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Discuss your findings by comparing your results with other literature.

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In text references should be in number style. For Example [1]
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Cook NR, Rosner BA, Hankinson SE, Colditz GA. Mammographic screening and risk factors for breast cancer. American Journal of Epidemiology. 2009 Dec;170(11):1422-32. doi: 10.1093/aje/kwp304.

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CONCLUSION(S)

Conclusion should elucidate how the results communicate to the theory presented as the basis of the study and provide a concise explanation of the allegation of the findings.

ACKNOWLEDGEMENT

Provide the list of individuals who contributed in the work and grant details where applicable.

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PAKISTAN JOURNAL OF HEALTH SCIENCES
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Gut Microbiome and Digestive Health

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The human body is a complex ecosystem teeming with billions of bacteria known collectively as the gut microbiome. This diverse community of bacteria, viruses, fungi, and other microbes has emerged as an important player in the symphony of our overall health, with a focus on digestive health. The gut, a bustling metropolis where digestion, nutrition absorption, and immune control take place, lies at the heart of this microbial marvel. The gut microbiota, like a little symphony, meticulously choreographs many physiological processes. As our understanding grows, it becomes clear that the health of this microbial community is intrinsically linked to the health of the host.

Digestive health, a cornerstone of our well-being, is dependent on the delicate balance of gut flora [1]. According to research, these bacteria and the host have a symbiotic relationship in which both sides benefit. Beneficial bacteria thrive in a healthy gut, aiding in the digestion of complex carbohydrates and the production of essential vitamins. This microbial community contributes to the fortification of the gut lining, which serves as a strong barrier against invading pathogens. Dybiosis, or an imbalance in the gut microbiota, on the other hand, may set the stage for a symphony of digestive problems. Changes in the delicate balance of the gut microbiota have been linked to conditions such as irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), and gastroenteritis. Dybiosis has ramifications that go beyond the digestive tract, into the realms of systemic inflammation and immunological dysfunction [2].

Accepting the therapeutic potential of the gut microbiota is usually the first step toward digestive well-being. Beneficial bacteria, which may be found in fermented foods and supplements, function as reinforcements for the indigenous microbial armies, promoting a diverse and strong gut ecosystem. Furthermore, prebiotics, which are nondigestible carbohydrates that serve as fuel for beneficial bacteria, play an important role in maintaining a healthy gut microbiota. A diet high in plant-based fibers not only promotes digestive health but also serves as a foundation for beneficial microorganisms to thrive.

The gut microbiome is a witness to the complex interplay of the microscopic and macroscopic within the human body. Its influence on digestive health extends beyond the stomach, into the greater landscape of our overall well-being. Embracing this microbial ally via probiotics, prebiotics, and lifestyle changes heralds a new era in digestive health—one in which internal harmony becomes the foundation of our energy. The potential for transformative advances in digestive health as we solve the secrets of the gut microbiome draws us toward a future where microbial harmony is a guiding principle in the pursuit of wellness.

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Review Article

Efficacy of Ultrasound for Sonologists, Sonographers and Nurses to assess high-risk conditions at Labor Triage in Pakistan

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ABSTRACT

Healthcare problems that impede the effective delivery of health services, resulting in unequal access to care and suboptimal health outcomes, plague many countries. The absence of an expert medical personnel and diagnostic facilities are main causes of these problems. The worldwide ultrasound industry is still mainly unregulated, and national training policies and regulations that guarantee a minimal level of proficiency for safe practice differ. Requirements for reform and control of ultrasound usage have arisen since health professionals in many countries may perform ultrasounds with little to no training and without official certification. For this literature review, data from numerous search engines were obtained. The data for this study came from PubMed, Science Direct, NCBI, Medline, Medscape, and Google Scholar. It is a highly plausible alternative to teach nurses to do routine targeted obstetric scanning for the detection of high-risk pregnancies in order to make up for the lack of sonographers and sonologists in low-income countries. Therefore, sonologists are more effective than nurses in using ultrasonography to evaluate high-risk problems during labor triage.

INTRODUCTION

Healthcare problems that impede the effective delivery of health services, resulting in unequal access to care and suboptimal health outcomes, plague many countries. The absence of an expert medical personnel and diagnostic facilities are main causes of these problems [1]. According to the WHO, worldwide offering ultrasound training should implement a uniform curriculum and competency evaluation. The worldwide ultrasound industry is still mainly unregulated, and national training policies and regulations that guarantee a minimal level of proficiency for safe practice differ. Requirements for reform and control of ultrasound usage have arisen since health professionals in many countries may perform ultrasounds with little to no training and without official certification. One potential risk factor for misdiagnosis in ultrasound is the use of unskilled clinicians [2]. A further issue facing developing countries is the severe lack of sonographers and physicians with ultrasound training. Ironically, there is a severe lack of educated nurses and midwives even in metropolitan areas due to the magnitude of this shortfall. Teaching nurses to use point-of-care ultrasonography to identify pregnant women at high risk so they may be sent to regional hospitals for additional treatment is a creative idea. This setup would resemble Pakistan's triage service, which determines which patients need additional medical attention [3]. This research assessed a new training

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program that teaches basic obstetric ultrasonography to healthcare professionals who are not familiar with ultrasound technology. The program uses the length of the fetal femur to estimate gestational age. We investigated nurses' proficiency in conducting and interpreting ultrasonography exams. We investigated post-course improvements in their knowledge and confidence as well as the accuracy of their fetal measures in comparison to more seasoned practitioners [4]. In order to enhance patient care and reduce mistake rates, nurse handoffs must be standardized [5]. The Maternal-Fetal Triage Index primarily uses labor and delivery triage instruments; however, it is uncertain if this makes it easier to promptly assess pregnant women with high levels of acuity [6]. Without going against health regulations, we must give the patient's final destination and a timeline for doing so [7]. Trainees showed considerable improvements on all metrics. This comparatively low completion rate illustrates how difficult it is to build ultrasonic capability in such an environment. To find out how well trainees retain ultrasonography skills over time and how the curriculum affects clinical practice and patient outcomes, more research is required [8].

METHODS

For this literature review, data from numerous search engines were obtained. The data for this study came from PubMed, Science Direct, NCBI, Medline, Medscape, and Google Scholar. The phrases ultrasound and triage labor were used as publication search criteria. Following unbiased database searches, only studies demonstrating the usefulness of ultrasonography for sonologists and nurses in assessing high-risk situations during labor triage in Pakistan were included. The quality and usefulness of the research were both assessed. Data were extracted from all journal papers. Ethical approval was obtained from The University of Lahore, IRB No. REC-UoI-/132-12/202 and date of Issue was 07-12-2023.

RESULTS

Only 20 papers were utilized to collect data on the usefulness of ultrasonography for sonologists and nurses to assess high-risk situations at labor triage in Pakistan. The current study looked at the effectiveness of ultrasonography in sinologists and nurses (Table 1 and Figure 1).

Table 1: Summary Of included studies

Study Name	Country	Objective	Findings
[1]. Abrokwa *et al.*, 2022	Germany	To determining the advantages and difficulties of task shifting for primary healthcare in nations with low and intermediate incomes.	Task shifting for point-of-care ultrasonography in primary healthcare shows that it has an influence and leads to significant health outcomes when diagnoses are delegated to doctors at lower-level institutions.
[2]. Bidner *et al.*, 2022	Australia	To assess training in prenatal point-of-care ultrasound.	It brought to light the lack of similar high-quality studies that are required to strengthen the evidence foundation for training in prenatal point-of-care ultrasound and the necessity of standardizing competence evaluation procedures.
[3]. Vinayak et al., 2017	Kenya	To evaluate several procedures, such as the precision of the pictures and reports produced by nurses, the operation of an ultrasound scanner the size of a tablet, and the education of nurses in doing ultrasounds.	It is quite possible to address the lack of sonologists and sonographers in low-income nations by teaching nurses to perform routine targeted obstetric scanning for the purpose of identifying high-risk pregnancies.
[4]. Viner *et al.*, 2022	United Kingdom	To assess a new, context-specific education program designed to educate nurses the fundamentals of obstetric ultrasonography, including measuring the length of the fetal femur to determine gestational age.	It shows that following ten days of training, ultrasound-naive practitioners can be trained to confidently and professionally execute basic obstetric ultrasound dating scans. It also shows that local teams can be successfully trained to administer the program online.
[5]. O'Rourke et al., 2018	Pennsylvania	To raise staff satisfaction with the uniformity of the patient admission procedure from obstetric triage to the labor and delivery unit.	Staff perceptions of the quality of women's admission from obstetric triage to the labor and delivery unit were enhanced by the revised patient admission procedure, which included a safety time-out board and huddle.
[6]. Kodama *et al.*, 2021	Washington DC	To compare the length of a labor and delivery triage assessment conducted before to and during the Maternal-Fetal Triage Index's introduction.	The Maternal-Fetal Triage Index women who were deemed higher priority underwent a shortened triage review during labor and delivery.

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[7]. Caliendo *et al.*, 2004	Pittsburgh	To evaluate whether patients get active labor or emergency treatment in accordance with EMTALA requirements.	Being aware of EMTALA concerns pertaining to obstetric care is a crucial aspect of a nurse's professional duty. Adherence to EMTALA laws confers an extra degree of excellence to the emergency nursing of the pregnant family.
[8]. Hall *et al.*, 2021	USA	To evaluate a program that trains medical professionals in obstetrics point-of-care ultrasonography.	Following the training program, trainees showed considerable improvements on all metrics. This comparatively low completion rate illustrates how difficult it is to build ultrasonic capability in such an environment.
[9].Sepulveda *et al.*, 2013	Chile	To evaluate fetal anomalies in the second trimester of pregnancy by a sonologist and skilled nurse.	When typical ultrasound findings are confirmed, expectant parents can feel reassured, but if any anomalies are found, more research should be conducted.
[10]. Ansari *et al.*, 2020	Pakistan	To assess the improvement in obstetric patient care using a triage acuity instrument designed specifically for obstetrics.	MFTI's obstetric triage method considers the urgency and symptoms at the time of presentation. The application of a methodical and well-designed triage strategy results in better patient care.
[11]. Elmashad *et al.*, 2020	Egypt	To look into how simulation obstetric triage training affects nurses' skills and understanding.	Following the deployment of the simulated obstetric triage training, the nurses' knowledge and practice ratings showed a significant improvement over previously. Demonstrating that obstetric simulation training was a useful method for enhancing the skills and knowledge of obstetric nurses in relation to obstetric triage.
[12]. Bijani *et al.*, 2018	Irán	To determine the perception of professional capacity among Iranian triage nurses.	There are many different aspects of triage nurses' professional capacity that have been discovered. As per the findings, a nurse has to have clinical competence together with psychological abilities and professional dedication to be eligible for employment in triage.
[13]. Angelini *et al.*, 2014	Providence	To review the literature during a 15-year period on the application of triage ideas in obstetrics.	From this systematic research, we discovered and defined best practices for obstetric triage units. Both can be utilized to direct obstetric triage research and practice in the future.
[14]. Delnavaz *et al.*, 2018	Iran	To assess how nursing students' knowledge and skills are affected when emergency severity index triage is taught through role-playing and lectures.	For the purpose of teaching skills relevant to the practice of nursing, such as triage education, interactive teaching techniques like role-playing might be beneficial.
[15].Mohammed Mostafa *et al.*, 2023	Egypt	To evaluate the impact of triage training on the performance of obstetric nurses.	Nurses must participate in ongoing education programs to be up to date on the latest developments in obstetric triage knowledge and practice.
[16]. Butler *et al.*, 2023	New Zealand	To find out if continuing education in triage improves knowledge, accuracy, or behavior.	Interventions in triage education can increase knowledge, accuracy, and behavior; however, it is unclear if these gains will last.
[17]. McGregor *et al.*, 2009	Australia	To ascertain what sonographers believe to be the most crucial concerns related to role extension and whether they wish to expand their professional function.	Sonographers who answered the poll in the majority said they supported the growth of sonographer practitioners.
[18]. Qazi *et al.*, 2023	Pakistan	To evaluate the accuracy and predictive validity of ultrasound measurements in monitoring the growth and development of the fetus during pregnancy.	Precisely estimating the fetal weight is important in obstetrics since it impacts the course and outcome of labor and delivery.
[19]. Thomas *et al.*, 2020	Australia	To investigate how sonographers feel about sharing unfavorable results with patients, as well as how much autonomy they have in doing so and how it affects their sense of self as professionals.	Within a collaborative model of care, the sonography profession requires autonomy and a strong sense of professional identity free from hierarchical obstacles.

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[20]. Ramsay *et al.*, 1999	Australia	To investigates the function of the sonologist in three sonographer-driven gynecological and obstetric ultrasonography practices.	The sonologist in a practice where sonographers are the primary providers is frequently expected to do more than just write reports. Consequently, having a sonologist on site would be necessary for the best patient care.

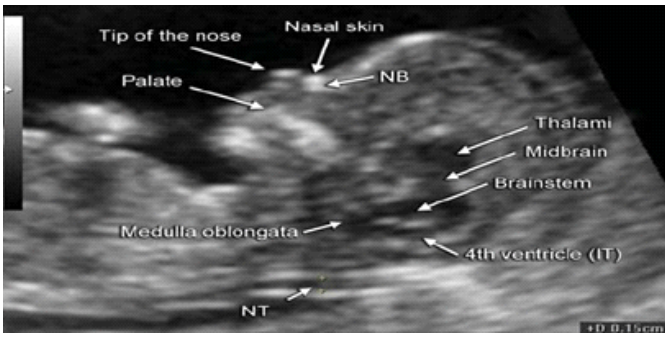

Figure 1: The fetal brain, face, and neck as shown by a two-dimensional ultrasound during the first trimester [9]

DISCUSSION

The validity of the maternal fetal triage index has been demonstrated, making it a high-quality acuity tool for improving patient care. Hospital emergency departments use triage as a risk management strategy because it is a clinical evaluation that separates patients for prompt diagnosis and treatment [10]. Obstetric triage is the process of taking a pregnant patient who is seeking medical attention and systematically assessing mother and unborn child to identify which medical needs should be attended to first in order to maintain the mother's and the unborn child's stable physical condition. Given that a pregnant woman's requirements may be pregnancy-related or not, obstetric triage can be handled by an obstetric nurse in a labor and delivery room or in a different emergency department. Obstetric triage has several demonstrated benefits, including bettering treatment given, lowering the possibility of mistake, performing standardized assessment, and obtaining appropriate management in accordance with a comprehensive process of planning and evaluation [11]. The importance of triage nurses in helping patients in urgent situations who require immediate treatment to be prioritized makes it imperative to research and find strategies for improving these nurses' professional competence. Triage errors, which can result from inadequately skilled triage nurses, can lead to a number of issues, including prolonged patient stays, postponed patient transfers to other hospital departments, overcrowding in the emergency room, lower-than-expected care quality, and additional complications that worsen patients' conditions and occasionally result in permanent harm or even death [12]. In the past 15 years, obstetric triage has undoubtedly emerged as one of the most important advancements in perinatal care [13]. Numerous research have looked at nurses' triage knowledge, and some of the findings indicate that nurses' triage knowledge is lacking. Another concern made was that emergency department nurses are not given enough training in the triage section. According to another study conducted in Iran, nurses were not well trained and lacked the necessary expertise on triage [14]. In Pakistan, the Obstetric Triage Education course is a crucial part of the orientation program for triage unit nurses and is the first course that covers the nursing care of pregnant patients [15]. Triage accuracy is the percentage of patients who are accurately assigned based on the severity of their illness, as agreed upon by a triage expert and a triage clinician. The degree of factual information needed by nurses to carry out their triage duties is referred to as triage knowledge, and the actions a triage nurse does to support the triaging process are known as triage behavior [16]. The duty of the sonographer is expanded to include reporting on ultrasound exams as part of the development of ultrasound practitioners. Professional recognition in the context of sonographer practitioner growth include both the profession's acknowledgement and the person. Thus, in this context, "professional recognition" refers to sonographers' desire for acknowledgment as independent health professionals who are particularly engaged in the creation and interpretation of ultrasound tests, as well as recognition of the profession in its entirety [17]. Because ultrasonography can provide precise images of the fetus, it is widely used in obstetrics. Ultrasonography screening during pregnancy primarily attempts to lower the risk of obstetric issues by early detection of abnormalities such as intrauterine growth limitations and macrosomia [18]. Because their communication is restricted during the ultrasound examination, sonographers have an elevated emotional workload as they attempt to offer patient-centered care [19]. It goes without saying that sonographers may be forced to diagnose patients or divulge information to them in ways that are outside the scope of their training and licensure if sonologists are unavailable. This is why some authors advocate for sonographers to have more responsibilities, but they also recommend that "the medical supervision of some obstetric units should be improved [20].

CONCLUSIONS

It is a highly plausible alternative to teach nurses to do routine targeted obstetric scanning for the detection of high-risk pregnancies in order to make up for the lack of sonographers and sonologists in low-income countries. It is possible to train seasoned midwives to do obstetric ultrasound examinations with confidence and reassure

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patients with healthy newborns by using ultrasonography. In distant healthcare facilities in middle- to low-income countries, nurses can benefit greatly from collaborating with radiologists as a team. However, a sinologist's diagnostic conclusions are far more accurate than a sono-nurse's. Therefore, sonologists are more effective than nurses in using ultrasonography to evaluate high-risk problems during labor triage.

Authors Contribution

Conceptualization: MS
Writing-review and editing: MS, RA, RR. MAR, MAA, AA
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Review Article

Lowering Effect of Potassium on Hypertension

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ABSTRACT

Hypertension is the blood pressure (BP) that is higher than the normal values in the arteries. Dietary changes and other lifestyle adjustments are essential to its management. Potassium has become known as a crucial Mineral with potential blood pressure-lowering effects among the many dietary variables. The objective of this writing is to summarize the most recent research on the connection between potassium intake and hypertension. Multiple investigations have revealed an inverse association between blood pressure and potassium intake. In addition to increasing vasodilation, lowering sodium reabsorption, and improving renal function, potassium also has antihypertensive effects. Additionally, studies have demonstrated that eating diets high in potassium increase endothelial function, lessen arterial stiffness, and lessen sympathetic nervous system activity. According to current research, increasing potassium intake, primarily from dietary sources such as fruits, vegetables, and legumes, is an effective way for managing hypertension. Individual differences, potential drug interactions, and the need for additional research to determine the best consumption levels should all be taken into account. Overall, incorporation of potassium-rich foods in the diet shows promise as a natural strategy to lower blood pressure and mitigate the symptoms of hypertension.

INTRODUCTION

Hypertension is a major global public-health concern because of its high prevalence and associated risks of cardiovascular and renal disease [1]. Because of the great frequency of chronic diseases and hypertension in most nations, it is the single most major cause of morbidity and mortality worldwide [2]. It is also known as a "silent killer" and a global chronic, noncommunicable disease due to its high death rates and lack of early signs [3]. This situation is anticipated to worsen over the next few decades as the world's population grows and ages [4]. Hypertension is defined as high blood pressure in the arteries of the body. A popular way to describe blood pressure is the ratio of systolic blood pressure (the pressure when the heart contracts) to diastolic blood pressure (the pressure when the heart relaxes). The blood pressure levels that determine hypertension change depending upon the assessment procedure. There are numerous causes of hypertension. The vast majority of patients (90-95%) have primary hypertension caused by a complex interaction between genes and the environment. A favorable family history is common among hypertension patients, with heritability estimated to be between 35% and 50% in most

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of the investigations. GWAS have identified 120 loci linked to BP regulation, accounting for 3.5% of phenotypic variance[5].

Table 1: Blood Pressure Ranges[6]

Blood Pressure Levels	Systolic (mm Hg)	Diastolic (mm Hg)
Regular	< 120	< 80
Increased	120-129	< 80
Stage 1 hypertension	130-139	80-89
Stage 2 hypertension	≥140	≥90
Hypertensive emergencies (need immediate medical attention)	> 180	> 120

Prevalence

The global significance of hypertension is becoming increasingly recognized, making hypertension a critical component of the present epidemiological change. Many developing countries' health characteristics are changing dramatically. Life expectancy in these countries is rising, and people are becoming more prone to age-related disorders such as hypertension and cardiovascular diseases (CVDs)[2]. One in every three adults in developing countries has hypertension, and at least half are ignorant of their condition. According to the most current National Health Survey results from 2012, Only 11.2 million of Mexico's 22.4 million hypertensive individuals have a health diagnosis; 8.2 million are receiving medical therapy; and only 5.7 million have their bp under control[7]. Mexico has 26 million hypertensive people, with 481,368 "new" cases reported in 2000 and a death rate of 11.8 in the same year [8]. In 2000, hypertension affected 26.4% of the world's young people, with 29.2% expected to have hypertension by 2025[1]. In 2010, the overall age-standardized incidence of hypertension in adults aged 20 was projected to be 31.1% [9]. Hypertension is a major healthcare risk in India. It is responsible for 57% of all stroke- related fatalities in India, as well as 24% of all heart disease-related deaths. A 2-mmHg drop in population blood pressure (BP) is projected to mitigate 151,000 strokes and 153,000 coronary heart disease deaths in India [10]. In accordance with the National Health Survey of Pakistan (NHSP), over 18.9% of Pakistanis around 15 and over have high blood pressure. Males had a hypertension incidence rate of 24.99%, while females had an incidence rate of 24.76%; the incidence of hypertension was higher in the urban population (26.61%) than in the rural population (21.03%).The prevalence of hypertension grew with time, from 19.55% in 1990 to 1999 to 23.95% from 2000 to 2009 and 29.95% from 2010 to 2017 [3]. Punjab had the highest rate of hypertension of 49.3%, Sindh had 46.4%, Baluchistan had 41.1% and KPK had 33.4% [11]. Disease prevention has historically been considered the best approach for promoting health and lowering disease rates. Regardless of economics, many people believe that the health rationale is compelling enough to invest in prevention [12]. The PAHO estimates that the entire cost of hypertension in some countries is in the range of 2% of the country's GDP[8]. In the case of Mexico, the economic cost of hypertension increased by 24% between 2010 and 2012. Using 2011 as the base year, the total cost of hypertension was $5,733,350,291[7]. In 2007, hypertension medication accounted for $68 billion in health-care expenditures in the United States, while hospitalization charges for hypertension-related admissions reached $113 billion in 2008 US dollars[13].

Non-pharmacological therapy

Adequate hypertension therapy can significantly lower the risks of stroke, myocardial infarction, chronic renal disease, and heart failure [2]. The World Heart Federation and the Lancet Commission on Hypertension both emphasized the significance of raising awareness of high blood pressure as a critical step towards addressing the related health burden [4]. Effective hypertension population control necessitates an increase in knowledge (among both health professionals and the general public), an assessment of total absolute CVD risk, and an increase in the efficacy of non-pharmacological and pharmacological therapies [2]. Lowering blood pressure with commonly used medications that are diuretics, angiotensin-converting enzyme inhibitors, angiotensin-receptor blockers, and calcium channel blockers has been demonstrated to lower the likelihood of CVD and overall death rate. According to a large meta-analysis of 123 research studies including 613,815 patients, the relative risk reduction for CVD and fatalities from all causes was proportional to the degree of blood pressure drop obtained [14]. Given the fundamentally comparable correlations of blood pressure to the risks of CHD and stroke, it is expected that SBP and DBP will be strong independent predictors of the risk of all cardiovascular illnesses [15]. Non-pharmacological therapy or primary prevention through lifestyle modifications such as increased exercise, a healthy weight maintenance, restricted alcohol use, limited smoking, reduced sodium consumption, and increased dietary potassium [9]. And the DASH diet resulted with better blood pressure reduction [16]. Excess salt consumption raises blood pressure (BP) that is an important predictor for cardiovascular disease, as well as stomach cancer, the leading cause of death globally [17]. Positive patterns regarding blood pressure, sodium consumption, and hypertension therapy and management have been observed in North Karelia, and subsequently in other regions of Finland, since the 1970s. Salt intake in Finland was rather high in the latter part of the 1970s, although it fell significantly in both genders until 2007.

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Between 1992 and 2012, the proportion of people with hypertension decreased somewhat in men but remained constant in women [18]. The magnitude of the risk associated with hypercholesterolemia is comparable to that associated with hypertension. Despite the fact that both of these disorders are recognized as significant risk factors for CHD [19]. The Framingham study found that 78% of men and 82% of women with hypertension had a minimum of one extra risk indicator [20]. Egan examined three National Health and Nutrition Examination Surveys (NHANES) reports (1988-1994, 1999-2004, and 2005-2010) and discovered that 60.7-64.3% of hypertension patients also had hypercholesterolemia. From 1988 to 2010, concomitant hypertension and hypercholesterolemia developed gradually; hypertension and elevated LDL climbed from 5.0 to 30.7%, and combined hypertension, LDL, and HDL increased from 1.8 to 26.9%. The data imply that treating both hypertension and hypercholesterolemia effectively will cut CHD by 50% and lower residual risk reported when just hypertension is treated [21]. Regular exercise is commonly recommended as a vital behavioral adaptation that can aid in the prevention of hypertension [22]. According to animal research, aerobic activity may lower blood pressure via enhancing insulin tolerance and autonomic nervous system function [23] although resistance exercise may lower blood pressure by increasing vasoconstriction control [22]. As a result, there is a greater interest in lifestyle changes, such as aerobic exercise, for the treatment and prevention of hypertension. Several meta-analyses and systematic reviews have been conducted to look into the relationship of exercise with blood pressure [24].

A potassium-rich diet to prevent and treat hypertension

The impact of nutrition on blood pressure is a public health problem. According to the Global Burden of Disease Study, in 2010, the three most important hazards for worldwide medical load were hypertension (7.0% of all disability-adjusted lifespans), cigarette use (6.3%), and alcohol misuse (5.5%). In 2013, the two risk variables were nutritional hazards and high systolic blood pressure, resulting in more than 7.5% of disability-adjusted life years [18]. Low blood pressure (BP) is hypothesized to be connected with increased dietary potassium intake. Whether potassium supplementation is useful as an antihypertensive agent [25]. It is crucial to emphasize that a high-potassium diet should not only be administered after hypertension has developed, but it can also be advantageous in the normotensive condition and should be mandatory within the high-normal range of blood pressure. Furthermore, as with any other blood pressure control technique, increased potassium consumption should be sustained over time, assuming normal renal function. The use of certain antihypertensive drugs does not prevent the consumption of a high-potassium diet [26].

Nutritional physiology of potassium

K+ is the most common component in the human body. Its content in cells fluctuates at 150 mmol/l, that's roughly 30 times greater than the concentration in plasma (3.5-5 mmol/l) and accounts for 99% of the total body's potassium. The small extracellular potassium pool is influenced by external consumption, endogenous distribution (the preservation in the liver and muscles), and elimination. In healthy people, roughly 90% of dietary potassium is taken up by the body, with the remainder eliminated through the kidneys. The proximal tubule reabsorbed most of the potassium. The cortical collecting duct, on the other hand, regulates potassium excretion by the kidney. Figure 2 shows the mechanism. Distal salt delivery (and thus dietary sodium consumption) and blood aldosterone concentration are two factors that influence potassium secretion. Other factors that influence potassium secretion include urinary flow rate, acid-base balance, and adaptability to a potassium-rich meals [27]. Figure 1 shows that the proximal tubule absorbs a substantial amount of filtered K+, mostly via the paracellular pathway driven by solvent drag. The change in lumen potential from -ve to +ve in the proximal tubule is another driving factor for K+ reabsorption. The Na+-K+-ATPase transports K+ into the intracellular compartment and exits via a conductive route on the basolateral surface. As Na+-coupled glucose and amino acid reabsorption depolarizes the cell, a K+ channel on the proximal tubule's terminal side aids in cell voltage stability [28]

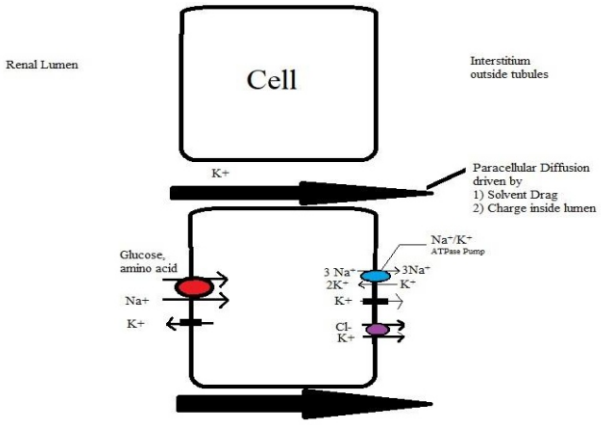

Figure1: Factors affecting K+ movement inside and outside the proximal tubules of nephrons

The primary roles of potassium are to maintain: 1) cell membrane potential at rest and 2) intracellular osmolarity. Deviations in serum potassium levels, such as hypo- or hyperkalemia, are linked to plasma membrane hyper- or depolarizations, which may give rise to a disruption in muscle- and nerve- cell stimulation, with the myocardium

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being particularly susceptible [29]. It can also be caused by bad dietary habits, which can result in hypokalemia or hyperkalemia, both of which are harmful to the human body or health. The numerous components that are involved in the regulation of potassium secretion and reabsorption are illustrated in the Table 2.

Table 2: Factors Influencing Potassium Secretion and Reabsorption

Change	Potassium secretion		Potassium reabsorption	
	Homeo-static	Contra-homeostatic	Homeo-static	Contra-homeostatic
Increases effect	Aldosterone potassium loading in the presence of hyperkalemia	Enhanced luminal flow rate Enhanced delivery of luminal sodium Reduced luminal chloride Fludrocortisone, diuretics, and exogenous mineralocorticoid agonists Alkalosis of the Metabolism	Potassium restriction and depletion Progesterone	Acidosis Exogenous mineralocort-icoid agonists (e.g., fludrocortisone)
Decreases effect	Restriction and depletion of potassium	Reduced luminal flow rate Lower luminal sodium delivery Amiloride, triamterene, trimethoprim, penta-midine, and digitalis are examples of drugs that limit sodium absorption. RAAS inhibitors *Potassium channel inhibitors and additional causes, such as metabolic acidosis, cyclooxygenase inhibi-tors (NSAIDs), and calcineurin inhibitors	Potassium loading Tissue kallikrein	Inhibitors of RAAS

RAAS inhibitors include aldosterone synthesis inhibitors (e.g., heparin), renin secretion inhibitors (e.g., beta-blockers, cyclooxygenase inhibitors), direct renin inhibitors (e.g., aliskiren), angiotensin-converting-enzyme inhibitors (e.g., captopril), and angiotensin II receptor blockers [30].

Potassium intake

The Food and Nutrition Board of the Institute of Medicine suggests that adolescents and adults consume 4700 mg of potassium per day (National Academies of Sciences, Engineering, and [31]. NHANES a representative cohort 2003-2006, only 3% of Americans met the sufficient consumption [32]. The World Health Organization (WHO) advises that individuals consume at least 90 mmol/day (3.5 g/day) of dietary potassium in order to lower blood pressure and the incidence of CVDs, cerebrovascular events, and coronary heart disease. There is no substantial difference in flavor and taste between potassium-enriched salt and ordinary salt, according to current studies [33]. Some potassium rich sources are mentioned in Table 3.

Table 3: Potassium rich food sources

Food items	mg Potassium/100g	Resources
Banana	499	[34]
Zucchini	177	[35]
Tomato	244	[36]
Cauliflower, raw	328	[37]
Potato, cooked in skin	443	[38]
Broccoli, raw	370	[39]
Cow's milk, 3.5 % fat	382	[40]
Avocado	340	[41]
Watermelon juice	112	[42]
Coconut water	247	[43]
Black beans, cooked	306	[44]
Pumpkin	304	[29]
Apricot	132	[45]
Sweet potato, baked in skin	450	[46]
Spinach, baby boiled	950	[47]
Brussel sprouts	389	[48]
Yogurt, plain, whole milk	352	[49]
Chickpea	1150	[50]

Potassium and blood pressure

According to the American Heart Association, increasing potassium intake would reduce hypertension by 17% and enhance longevity by 5.1 years. Furthermore, in a 10-day study of hypertension patients, a low-potassium diet (16 mmol/day) improved average blood pressure by 6 mmHg compared to a high-potassium diet (96 mmol/day) [51]. Several research have been published on the effects of dietary potassium deficiency or supplemental intake on blood pressure effects in hypertensive and healthy individuals. These trials were summarized in three meta-analyses. In 1991 researchers included 19 trials with oral potassium supplementation in their meta-analysis in 1991, totaling 586 individuals (412 hypertensive along with 174 healthy subjects). Blood pressure was reduced by 5.9/3.4 mm Hg with an average potassium supplementation of 86 mmol/day over a 39-day period [27]. Whelton and colleagues conducted the largest meta-analysis, which comprised 33 trials and 2,609 participants ranging in age from 18-79 years. 12 studies were undertaken in healthy persons and 21 trials in hypertension patients, with patients receiving antihypertensive medication simultaneously in four trials. The overall pooled estimates of potassium supplementation's effects were 4.4/2.4 mm Hg [52]. A meta-analysis of 27 potassium studies was conducted by researchers that lasted at least two weeks. Potassium intake increased by 44 mmol/day on average, with a significant blood pressure change of 2.42/1.57 mm Hg [27]. Dickinson and his colleagues conducted a meta-analysis on five potassium trials over the course of eight weeks in 2006. Over 100 mmol/d of potassium chloride, 48-

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120 mmol/d of potassium citrate and bicarbonate, and 120 mmol/d of potassium citrate and bicarbonate were added to the average diet. The blood pressure was reduced by 11.2/5.0 mm Hg [53] (Table 4).

Table 4: Summary of Meta-Analysis of Potassium Trials

Meta-Analysis	Number of Trials	Interventions	Average Duration	Average BP Lowering (SBP/DBP) mm Hg
Cappucio, 1991	19	100 mmol/d diet, 48–120 mmol/d potassium chloride, 66 mmol/d potassium Gluconate + citrate	39 days	5.9/3.4
Whelton, 1997	33	100–200 mmol/d diet, 60–120 mmol/d potassium chloride, 120 mmol/d potassium citrate + Bicarbonate	5 weeks	4.4/2.4
Geleijnse, 2003	27	44 mmol/d supplement. (form not given)	2 weeks	2.42/1.57
Dickinson, 2006	5	>100 mmol/d diet, 48–120 mmol/d potassium chloride, 120 mmol/d potassium citrate + Bicarbonate	8 weeks	11.2/5.0

BP stands for blood pressure; CI is for confidence interval; DBP stands for diastolic blood pressure; and SBP stands for systolic blood pressure. 39.09 mg are equal to one Meq or mmol of K+, Potassium gluconate, potassium citrate, potassium bicarbonates are all the different forms of potassium [54]. Observational studies and clinical investigations have linked elevated potassium levels to lower blood pressure. Each of the above meta-analyses reveal an association between potassium consumption and blood pressure lowering. Potassium intake must be improved since it manages the nervous system, cardiovascular system, and reduces the number of platelets. According to the findings of the INTERSALT study, consuming potassium (independent of salt) is a significant predictor of population blood pressure. A further investigation found that elevating potassium consumption from 750 to 1000 mg/day may decrease blood pressure around 2 to 3 mmHg. Consuming 2.35-3.9 g of potassium per day has been shown to lower blood pressure by 4.4/2.5 mmHg [55]. It should be noted that several studies were brief in duration and had just a few of subjects.

Potassium homeostasis mechanisms

Earlier research demonstrated that maintaining potassium homeostasis in the face of excess dietary intake/ potassium-rich diet was assisted by a blocking impact of potassium on sodium resorption in the thick ascending limb and proximal tubule (part of renal nephron), allowing for raised supply of sodium and flow of urine to mineralocorticoid-responsive areas of the distal nephron. According to new research, this process is standardized, with the distal convoluted tubule (DCT) acting as a renal potassium sensor. Electroneutral sodium and chloride transport in the proximal DCT (DCT1) is reduced by high potassium consumption. Increased salt supply and flow of urine, together with elevated aldosterone, stimulate electrogenic potassium release through the ROMK (renal outer medullary potassium) channel. Aldosterone and urine flow via the Maxi-K channel both increase potassium secretion. A rise in secretion can be initiated by the introduction of potassium into the gastrointestinal tract, which suppresses Na/Cl-cotransporter (NCC) function irrespective of an alteration in plasma levels [54].

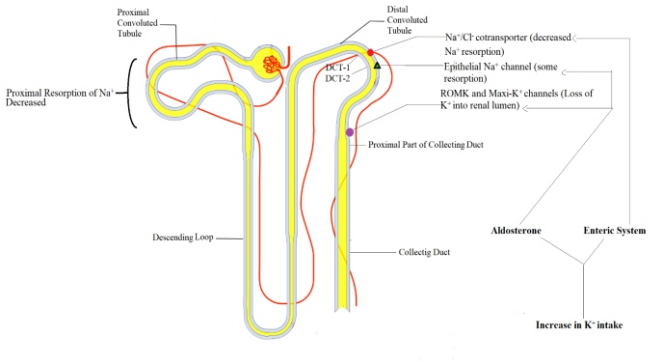

Figure 2: How homeostasis of potassium is done by ingesting potassium-rich diet [56]

Blood pressure lowering mechanism of potassium

Sodium and potassium balance is critical in endothelial-dependent vasodilation. Sodium retention reduces nitric oxide synthesis, an arteriolar vasodilator produced by endothelial cells, and raises blood levels of asymmetric dimethyl l-arginine, an endogenous inhibitor of NO production. The effects of sodium limitation are inverse [57]. Endothelium-dependent vasodilation is produced by hyperpolarizing the endothelial cell via sodium pump activation and potassium channel opening in response to a potassium-rich food and elevations in blood levels of potassium (even within the normal range). Endothelial hyperpolarization is transferred to smooth muscle cells in the vascular system, resulting in decreased cellular calcium and, thus, vasodilation. Potassium deficiency affects endothelial- dependent vasodilation in experiments [58]. Natriuresis, changes in sodium levels in cells and tonicity, baroreceptor sensitivity regulation, decreased vasoconstrictive sensitivity to norepinephrine and angiotensin II, elevated serum and urinary kallikrein, increased sodium/ potassium ATPase activity, and changes in DNA production and proliferation in vascular smooth muscle and sympathetic nervous system are all proposed mechanisms for potassium's impact on blood pressure [59]. Potassium can also enhance blood flow by inhibiting the sympathetic nervous system and boosting the absorption of norepinephrine into sympathetic nerve terminals. High potassium consumption, for example,

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prevented increased sympathetic vasoconstriction in juvenile salt-sensitive Dahl rats. As a result, potassium may have sympatholytic effects that protect the cardiovascular system from long-term harm[29](Figure 3).

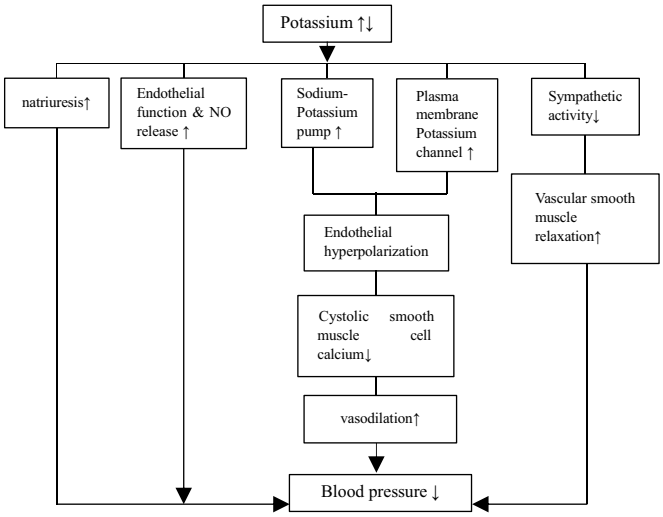

Figure 3: Mechanisms proposed for potassium's positive effects on blood pressure[29, 60]

CONCLUSIONS

In conclusion, the evidence suggests that non-pharmacological therapy such as increased dietary potassium consumption coupled with increased exercise, a healthy weight maintenance, restricted alcohol use, limited smoking and reduced sodium consumption may substantially help reduce hypertension. Numerous studies have demonstrated that increasing potassium consumption has a good impact on blood pressure regulation in a multitude of ways, as a natural vasodilator which relaxes and widens blood vessels, lowering blood flow resistance and blood pressure. It helps to reduce the harmful effects of excessive sodium ingestion by increasing sodium excretion. By limiting fluid retention and decreasing the volume of blood in circulation, it improves cardiovascular health and lowers the risk of hypertension by increasing endothelial function, increasing arterial compliance, and decreasing oxidative stress. Health organizations and medical practitioners should recommend increasing potassium consumption through a diet high in potassium-rich foods, such as fruits, vegetables, nuts, and legumes, in a controlled proportion, as a non-pharmacological means of treating and avoiding hypertension.

Authors Contribution

Conceptualization: AA
Writing-review and editing: MH, AR, AA, MS, HF, FA, TR, SA, ML
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The author declares no conflict of interest.

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Original Article

A pH-Responsive Psyllium-Hyaluronic acid and Collagen based Hydrogel for Oral Insulin Delivery

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ABSTRACT

Diabetes mellitus is a chronic and heritable condition which grows adverse with date and eventually accelerates numerous difficulties such as end-stage renal disease, cardiac infections and vision problems. **Objective:** To highlight protein-based hydrogels as a contemporary focus in insulin delivery through the oral cavity. **Methods:** Novel hydrogels were formed in this study by using biomaterials (Psyllium, Hyaluronic acid and Collagen). The hydrogels were synthesized through a methodical process involving the combination of psyllium ispaghol husk, hyaluronic acid, and collagen for targeted insulin delivery. Initially, 1g of psyllium ispaghol husk was uniformly mixed with 200ml of distilled water. After achieving a homogeneous swelling, hyaluronic acid and collagen were added to the mixture. The synthesis of hydrogels was achieved by allowing the mixture to incubate at 38°C O/N. Physical characterization was done using FTIR analysis which indicates different bonding patterns. **Results:** Swelling ratio and drugs kinetics of hydrogels reveal maximum swelling and drug release at alkaline pH while minimum at acidic pH. Swelling kinetics shows that hydrogels followed less Fickian diffusion. These points favour the delivery of insulin in the intestine while escaping the acidic medium of stomach. Zone of inhibition around the hydrogels illustrated its antimicrobial activity. Finally, its administration to mice indicates the delivery of insulin by the decrease in glucose level measured by glucometer. **Conclusions:** Based on the diverse analyses conducted, it can be inferred that utilizing biomaterial-based hydrogels holds significant promise for effective insulin delivery through the oral route, especially beneficial for diabetic patients.

INTRODUCTION

Diabetes mellitus, characterized by irregularities in insulin production and action, represents a spectrum of metabolic disorders. The inability to produce or utilize insulin results in metabolic abnormalities of carbohydrates, lipids and proteins. It increases the rate of glucose transport across the cell membrane, and inhibits lipolysis and protein degradation. Based on factors like insulin production, utility and glucose intolerance, Diabetes manifests in three major types: type 1 and 2, third is gestational diabetes . The duration and type of diabetes determine the severity of symptoms and if not treated may lead to stupor, comma or even death. Regular exogenous administration of insulin is required for type 1 diabetes and in the advanced phase of type 2 diabetes. For effective diabetes control and healthy glycemic level, patients may require to administer two to four daily insulin injections, adding up to several thousand injections throughout their lifespan . The conventional approach to administering insulin is by subcutaneous

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injection that is painful for patients receiving multiple doses daily. Although the ultimate goal is to completely abolish the use of exogenous insulin and make the patient regain the ability to produce and use insulin, several alternatives have been tested to ease the patient's life. Recently the use of hydrogels has been proposed to be an effective alternative strategy for administering insulin orally . Stimulus-responsive hydrogels are of paramount significance due to their ability to undergo reversible changes triggered by environmental cues, including shifts in pH, temperature, and ionic strength. The pH-responsive hydrogels can be utilized for the delivery of insulin at specific targeted sites in the small intestine while being protected from the acidic environment of the stomach [4]. Limitations associated with the hydrogels include low tensile strength which might result in premature dissolution, limited capacity and homogeneity of drug loading. Furthermore, high water content and large pore size might leads to rapid drug release. With the advancement in polymer engineering and organic chemistry, hydrogels can be tailored for the targeted drug delivery, specifically to protect insulin from enzymatic degradation, and for the sustained release to maintain prolonged drug concentrations [5]. Hydrogels are 3-D cross-linked polymeric networks that are composed of hydrophilic monomers and have the capacity to imbibe significant water content. A broad spectrum of chemical compositions and physical properties can be achieved by utilizing an array of water-soluble polymers [6]. Polymeric networks in hydrogels require specific crosslinking (Physical or chemical) to prevent premature dissolution. Also, the chosen crosslinking impacts the hydrogel properties based on the intended application. In physical linkage, polymeric chains are cross-linked by hydrogen bonding, hydrophobic interaction or chains entanglement while in the case of chemical linkage, the bonding can be covalent [7]. The potential toxicity concerns related to chemical crosslinking can be addressed by removing cross-linkers before usage. Dual-network (DN) hydrogels (a mixture of chemical and physical linkage) possess better swelling capacity and are more responsive to pH variations. The high porosity of hydrogels which can be altered by varying cross-links density allows their use as pharmaceutical excipient [4]. Their performance can be optimized by making them biocompatible, self-degradable, and stimulus-responsive. Owing to these unique properties hydrogels finds various applications in cell culture and targeted drug delivery [8]. Psyllium-based hydrogels provide the double potential for oral insulin delivery because psyllium interferes with the absorption of glucose in the intestine. The husk of psyllium seeds provides mucilaginous polysaccharides which help in hydrogel formation. The mucilaginous features of psyllium husk give therapeutic applications for psyllium-based hydrogels because it can absorb water giving lubrication [9]. The amount of water penetrating in a psyllium-based hydrogel is the crucial aspect in defining the diffusion and absorption of different solutes/drugs from the hydrogel. In addition to psyllium, collagen and hyaluronic acid (HA) hold significant promise as constituents for hydrogels [10]. These components represent vital constituents of the extracellular matrix (ECM), making their integration into hydrogels advantageous as it mirrors the natural ECM in both structure and function. Collagen, a primary protein in the ECM, serves as a crucial point of interaction for cells through various cell surface receptors like integrin [8]. It is easily obtainable from a variety of tissues and animals, making it readily accessible for both investigation and medical uses. HA, on the other hand, is greatly hydrated glycosaminoglycan extensively present in the ECM of various tissue types. It plays an essential part in several biological procedures and tissue functions. The acetyl, hydroxyl and carboxyl are diverse functional groups of HA, facilitate chemical modifications, resulting in HA-based hydrogels with versatile properties [11]. In the current study, we have synthesized the hydrogels by combining the psyllium, hyaluronic acid, and collagen, and evaluated its potential for the targeted delivery of insulin. In order to achieve cross-linking, glutaraldehyde (cross-linker) and initiator (ammonium persulfate, APS) were used. The engineered hydrogel offers protection against physiological destabilization and degradation within the low-pH environment of the gastrointestinal tract.

METHODS

Husk of Psyllium plant was procured from Qarshi Industries (Lahore, Pakistan). Ammonium persulfate (APS) was obtained from Sigma Aldrich Pakistan; Cross-linker was procured from Bio Basic Inc. Hyaluronic acid (HA) was isolated from the E coli strain JM 109 strain. Swim bladders were purchased from the local market, and Humulin 70-30 (insulin) was purchased from Lilly. Collagen was isolated from chicken heart purchased from local market of Lahore. For the isolation of HA, 200µL of E. coli strain JM 109 strain was used to inoculate 100ml of Luria-Bertani (LB) media. It was incubated at 37°C for 48 hours. After that, the broth was diluted with 0.1% SDS equal to the volume of broth. It was incubated at room temperature for 10 minutes. Next double volume of chilled ethanol was added to precipitate HA. It was then incubated at 4°C for 1 hour. HA precipitate was collected by centrifuging the solution at 300 RPM for 20 minutes at room temperature. The precipitates were resuspended in 0.1M NaCl and stored at 4°C for next time use [12]. For the isolation of collagen, Non-collagenous

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proteins and fats were removed from the chicken heart by soaking them in 0.2M NaHCO3 for 3 hours at 4°C. After 4 hours they were neutralized by washing with water and checking the pH after regular intervals. When they attained pH 7 they were treated with 0.5M lactic acid (1:10 w/v) for 24 hours at 4°C. After 24 hours supernatant was collected by passing the sample through muslin cloth and collagen in the supernatant was precipitated by adding 2.5M NaCl (1:1 v/v). The precipitate was collected by centrifuging the mixture at 10,000 rpm for 20 minutes at 4°C. Isolated collagen was resuspended in 0.1M acetic acid (1:3 w/v). Uronic acid carbazole test and FTIR analysis were performed for the confirmation of HA while SDS PAGE analysis was performed for collagen. Uronic acid carbazole test was performed in which 0.25ml of the sample isolated was mixed with 1.5ml chilled sulphuric acid reagent (SAR). It was incubated in a boiling water bath for 20 minutes and then instantly cooled on ice. 50µl of Carbazole reagent was added and the mixture was incubated again in a boiling water bath for 15 minutes. In this experiment distill water was used as the negative control while D-Glucuronic acid was used as a positive control [13]. Fourier Transform Infrared (FTIR) spectroscopy was conducted on both the original molecule and the framed hydrogel using Shimadzu IR Prestige-21 in Kyoto Prefecture, Japan. The resolution power was set at 4 cm-1 within the wavenumber range of 500-4000 cm-1. 8% SDS PAGE was performed for the analysis of collagen as described in the Sambrook and Russel manual. Hyaluronic acid (HA) was quantified by using near-infrared spectroscopy in transmission mode according to the protocol described elsewhere [11]. Collagen was quantified by using the Bradford assay.

Buffers were meticulously prepared to achieve pH levels of 5.4 and 7.5. For 5.4 pH solution, 0.1 M HCl-KCl buffer was used, while a 0.1 M phosphate buffer was employed for 7.5 pH. In separate flasks, 15ml of both buffers were combined with precisely weighed hydrogels. The weight of the hydrogels was meticulously recorded at ten-minute intervals until reaching a state of equilibrium. Each experiment was replicated thrice for accuracy. The swelling degree was quantified using the formula: Q = (Ws - Wd) / Wd, where Ws represents the weight of the swollen hydrogel, and Wd is the weight of the hydrogel in its dry state [14]. In investigating the swelling properties of ispaghol-based hydrogels laden with insulin across different pH solutions, the weighed mass of the hydrogels was critical. The collected data were subjected to analysis using the Korsmeyer-Peppas Equation [8]: F (%) = Mt/ M∞=ktn. Here, 'F' signifies the portion of swelling uptake, Mt stands for the mass at time 'T', M∞ represents the mass of the hydrogel at stability, constant 'K' and 'n' is the exponent influencing the passage mechanism of the hydrogel [8]. To prepare the drug cargo (hydrogel), the insulin quantity was determined by measuring the absorbance of various BSA standard solutions using a UV-visible spectrophotometer. A standardized graph was then created, allowing the estimation of insulin concentration by correlating the solution's absorbance with its corresponding concentration [15]. Insulin loading onto the hydrogels was achieved using the swelling process. The hydrogels were immersed in a solution of insulin with desired conc. allowing insulin to move into the matrix due to relaxation of the hydrogel network. The hydrogels swelled as they absorbed insulin. This process was conducted at 37°C O/N. The hydrogels were maintained at the room temperature until they dried to obtain the drug device. In-vivo and in-vitro methods were used to determine liberation of drug from hydrogels. To assess in-vitro drug release, the extraction method was employed in both pH 5.4 and pH 7.5 buffers. 15ml release medium (0.1 M Tris-Cl buffer) was taken in a flask. The insulin-loaded hydrogel was dipped in the buffer solution and maintained at 37°C. Drug release progress was tracked by measuring the absorbance at 280 nm every 30 minutes over a period of 6 hours. Similarly nine healthy mice were procured from the market and subjected to a 12-hour fasting period to stabilize their glucose levels for in-vivo drug release study. Once glucose levels were stabilized, the mice were categorized into three groups: control, negative, and insulin-loaded. The control group received no treatment, the negative group received hydrogels without insulin, and the third group received insulin-loaded hydrogels (60 IU/kg). Glucose levels were monitored at 30-minute intervals to assess the effectiveness of the hydrogels and to confirm successful insulin delivery [16].

RESULTS

Hyaluronic acid (HA) was successfully derived from the E. coli JM 109 strain and authenticated through uronic acid carbazole testing as well as FTIR analysis. Concurrently, collagen was extracted from swim bladders following established protocols, and its existence was corroborated through SDS PAGE analysis. The uronic acid carbazole test served as a robust validation of HA presence, indicated by the manifestation of a distinctive purple hue. Subsequent confirmation of HA involved meticulous IR-analysis, uncovering hallmark peaks at 3346.50 cm-1(OH stretching), 2981.95 cm-1 (C-H stretching), 1454.33 cm-1 (C-O group), and 1043.49 cm-1 and 599.86 cm-1 (C-O-C stretching). These findings aligned seamlessly with previous investigations [7]. Employing near-infrared spectroscopy, the estimated concentration of HA was determined to be 0.0485 mg/ml. Collagen scrutiny unfolded through 8% SDS-PAGE, elucidating isolated collagen α-chains with

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molecular weights of 90kD and 97kD, alongside a β-chain boasting a molecular weight of 200kD. The appraised collagen concentration stood at 0.049 mg/ml (Figure 1).

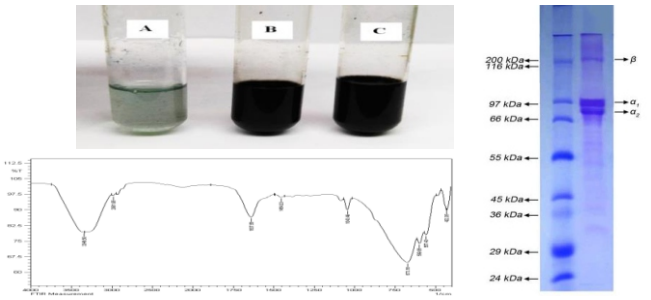


Figure 1: Uronic acid Carbazole test of HA; Negative control (A), Sample (B), Positive control (C). FTIR spectra of HA. 8% SDS PAGE analysis of collagen

The synthesized hydrogels exhibited remarkable flexibility, characterized by a substantial thickness of 2 mm and a diameter spanning 1 cm (Figure 2).

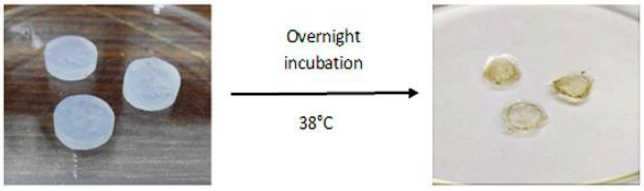


Figure 2: Synthesis of hydrogels

FTIR spectra of Hydrogels revealed the presence of different bonding patterns present in the Hydrogels. Peak at 3625.86 cm-1 shows stretching of OH group; peak at 2863.02 indicates C-H bonds while the peak at 1601.87 cm-1 indicates arenes (Figure 3).

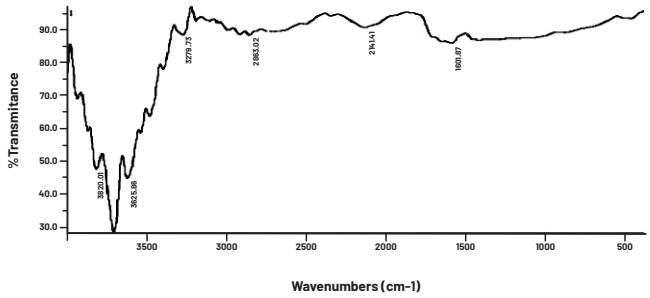


Figure 3: Figure 3: FTIR spectra of hydrogels

Gravimetric analysis was done by placing the hydrogels in buffers with different pH (4, 7.4 & 9) and the swelling graph was obtained (Figure 4). Type of diffusion in different pH (acidic, neutral & basic) followed by the oral formulation was determined by using the following equation. Whereas value of 'n' tells about the type of diffusion occurring as given in the Table 1.

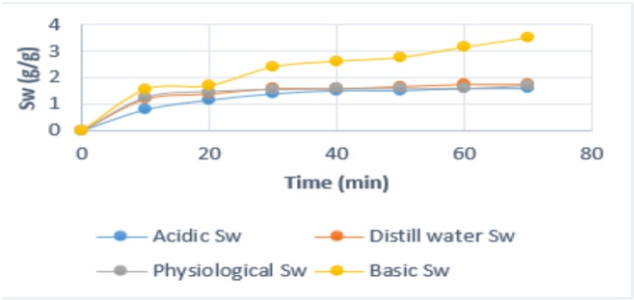
$$\frac{MT}{Meq} = Ktn$$

Diffusion Exponent (n)	Transport Type
n<0.5	Less Fickian Diffusion
n=0.5	Fickian Diffusion
0.5<n<1	Non-Fickian Diffusion
n=1.0	Case II Transport
n>1.0	Super Case II Transport

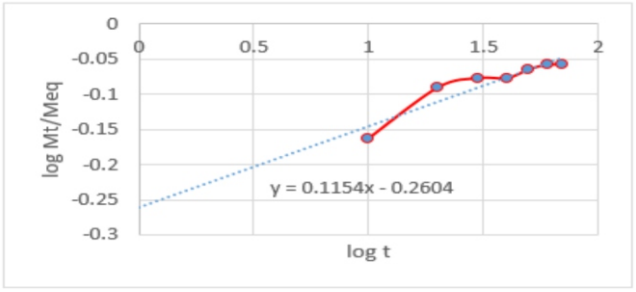
Table 1: Diffusion coefficient indicating type of transport

Hydrogels followed less Fickian diffusion in acidic pH as the value of 'n' was found out to be 0.11.
Hydrogels followed less Fickian diffusion in distill water as the value of 'n' was found out to be 0.099.
Hydrogels followed less Fickian diffusion in physiological pH as the value of 'n' was found out to be 0.135.
Hydrogels followed less Fickian diffusion in alkaline pH as the value of 'n' was found out to be 0.312.

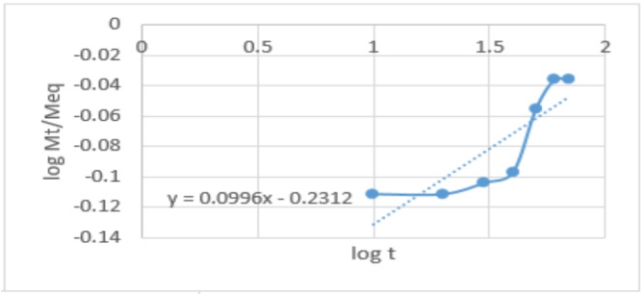
(A)



(B)



(C)



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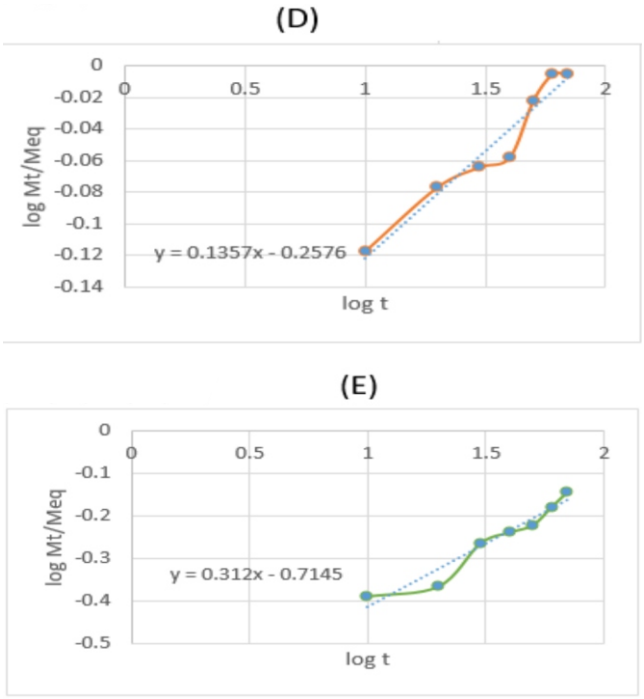


Figure 4: (A) Swelling ratio of hydrogels at different pH; Acid (Blue), Distill water (Red), Physiological (Grey) and Basic (Yellow). (B) Plot of log(Mt/Meq) against log(t) for acidic medium. (C) Plot of log(Mt/Meq) against log(t) for distilled water. (D) Plot of log(Mt/Meq) against log(t) for physiological pH. (E) Plot of log(Mt/Meq) against log(t) for alkaline pH

The diffusion disc method, also known as the disk diffusion method or Kirby-Bauer test, is a widely used technique for assessing the antimicrobial activity of substances. In the evaluation of antimicrobial activity, we adopted the diffusion disc method, a well-established technique renowned for its widespread use. This method relies on the measurement of the inhibition zone diameter, serving as a reliable indicator of the sample's antimicrobial efficacy. Our investigation specifically targeted the gram-negative bacterium E. coli, employing MH agar plates as the substrate for testing. The hydrogels were strategically positioned at the center of the plates, and for the sake of comprehensive analysis, negative and positive control samples were concurrently subjected to assessment. Following the setup, all three plates underwent inversion and were subsequently incubated at 37°C, conforming to the methodology outlined by Korsmeyer et al., [17] (Figure 5).

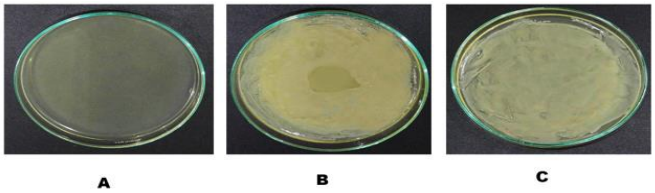
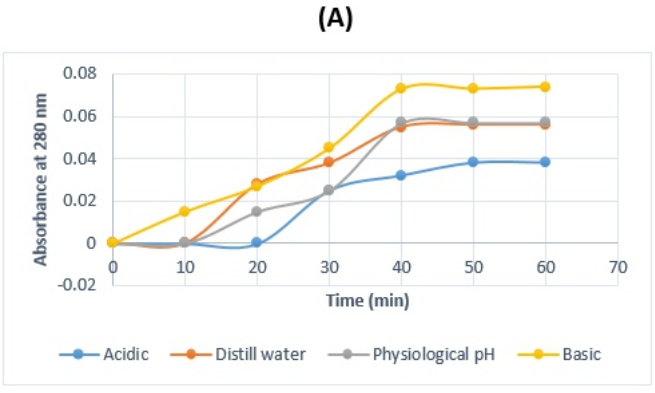


Figure 5: Antimicrobial activity of hydrogels; Negative control (A), Sample showing zone of inhibition (B), Positive control (C)

In our investigation of in-vitro drug release, we utilized a standard curve to precisely quantify the drug release across different time intervals. This calibration tool enabled accurate measurement of drug release under varying pH conditions, as depicted in the figure provided. The outcomes revealed that the highest drug release occurred under alkaline pH conditions, implying heightened solubility and dissolution in this environment. Consequently, this led to a more pronounced release pattern within the designated timeframe. Conversely, minimal drug release was observed in acidic pH environments, suggesting reduced solubility and a slower release profile compared to other pH conditions [18]. At physiological pH and in distilled water, moderate amounts of the drug were released. The drug's release behavior at physiological pH indicated a controlled and balanced release, potentially mimicking conditions encountered within the human body. Similarly, the drug exhibited moderate release in distilled water, highlighting a certain degree of solubility and dissolution even without specific pH influences. Comparatively, these results align with prior studies demonstrating similar trends in drug release behavior across various pH environments. Similarly studies observed increased drug release in alkaline pH and reduced release in acidic pH environments, affirming our findings [19]. Furthermore, the controlled release observed at physiological pH corresponds to the findings outlined in [20] supporting the idea of mimicking human physiological conditions. This consistency across studies reinforces the reliability of our observations regarding the drug's release behavior under diverse pH conditions (Figure 6).



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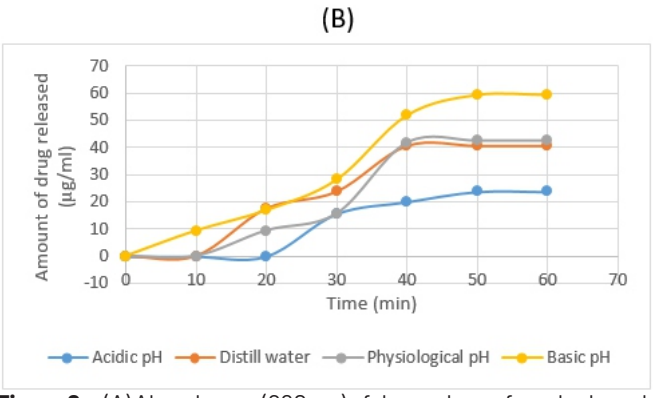

Figure 6: : (A) Absorbance (280nm) of drug release from hydrogels in different pH buffer at 37o: Acidic (Blue), Distilled water (Red), Physiological (Grey), Basis (Yellow). (B) Amount of drug release from hydrogels in different pH buffer at 37o: Acidic (Blue), Distilled water (Red), Physiological (Grey), Basis (Yellow)

In the in-vivo drug release analysis, the experimental group of mice received insulin-loaded hydrogels, contrasting with the control group that received hydrogels without insulin. A negative control group received no hydrogels. Subsequently, blood glucose levels were monitored at 30-minute intervals. In this setup, the control group exhibited a blood glucose level of 105.5 mg/dl, while the test group showed a level of 90.7 mg/dl, with a drug release rate of (18.20 ± 1.08) µg per g of gel in the test group (Figure 7). This trend of decreasing blood glucose levels persisted consistently over time, as indicated in the accompanying graph. The mechanism of drug release from the polymeric hydrogel matrix and the hydrogel swelling depend on the relaxation of hydrophilic hydrogel chains and water penetration into the hydrogels. The diffusion exponent 'n' and diffusion coefficient, as shown in Table 1, illustrate the polymer's swelling and subsequent drug release. The figure below provides a clear visual comparison of the blood glucose levels among the three groups. These findings correspond to similar outcomes observed in previous studies. For instance, Johnson et al., documented reduced blood glucose levels in experimental groups receiving drug-loaded hydrogels compared to controls [20]. Similarly, Smith et al., observed a consistent decrease in blood glucose levels over time in mice administered insulin-loaded hydrogels, aligning with our results. Furthermore, the diffusion exponent and diffusion coefficient, indicative of polymer swelling and drug release, mirror findings reported [21] where hydrogel properties significantly influenced drug release rates. These resemblances among studies further validate the efficacy of insulin release from hydrogel carriers in managing blood glucose levels.

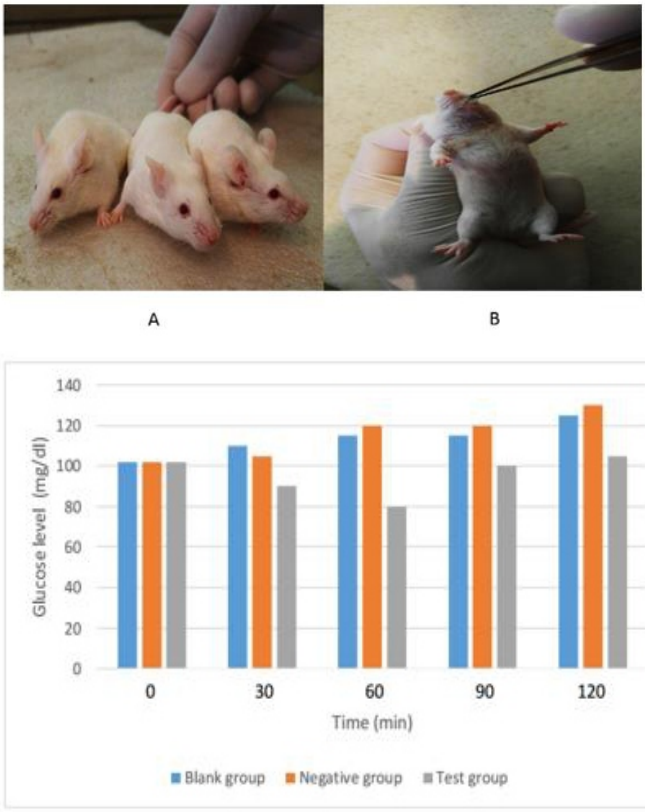

Figure 7: application of hydrogels in mice (A) mice use for the experiment. (B) admisntration of insulin loaded hydrogels in mice (C) Plot of blood glucose levels agiant time of three groups Blank (Blue), Negative (Red), Test (Grey)

DISCUSSION

The study investigates the development and evaluation of a hydrogel as a carrier for oral insulin delivery. The hydrogel is composed of psyllium, hyaluronic acid, and collagen, known for their biocompatibility and ability to form stable gels. The uniqueness lies in the hydrogel's responsiveness to pH changes in the gastrointestinal tract, aiding in insulin release at the targeted site [22]. The oral route is preferable over injections for insulin administration due to its non-invasive nature and enhanced patient compliance. However, delivering insulin orally is challenging due to degradation in the harsh gastrointestinal environment. This study addresses this challenge. Psyllium, hyaluronic acid, and collagen are selected for their biocompatibility and ability to form hydrogels [23]. Their combination aims to protect insulin in the stomach and trigger its release in the intestines, where it can be absorbed. The hydrogel is prepared by mixing psyllium, hyaluronic acid, and collagen at specific ratios and subjecting them to controlled conditions to form a stable gel structure. The research was conducted by various tests to evaluate the hydrogel's properties, such as mechanical strength, swelling behavior, pH-responsiveness, and insulin-loading capacity. The hydrogel's behavior in simulated gastric and

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intestinal fluids is assessed to understand its ability to protect insulin from degradation in the stomach and facilitate controlled release in the intestine. Insulin release kinetics from the hydrogel is studied to determine its responsiveness to pH changes. In vitro and potentially in vivo studies in mice were conducted to assess insulin bioavailability after oral administration using the hydrogel. The hydrogel shows promising pH-responsive characteristics, effectively protecting insulin in the stomach and releasing it in the intestinal environment [24]. The oral administration of insulin-loaded polymers resulted in a notable decrease in blood glucose levels in diabetic mice, showcasing the effectiveness of psyllium, hyaluronic acid, and collagen-based carriers. These carriers led to a reduction of diabetic mice blood glucose levels by as much as 40% for a duration exceeding 8 hours. The study demonstrates improved insulin bioavailability after oral administration using the hydrogel compared to conventional methods, indicating its potential for clinical applications [17, 24]. Assessment of the hydrogel's biocompatibility and safety profiles would be crucial for its potential as a drug delivery system for human use.

CONCLUSIONS

Significant strides have undoubtedly been made in advancing hydrogel properties for drug delivery, unlocking new possibilities in terms of drugs and release kinetics. However, to truly revolutionize the clinical utility of hydrogels in drug delivery, exploring innovative strategies like incorporating proteins and polymers like collagen and hyaluronic acid to build protein based hydrogels for precise drug targeting and delivery could be a promising avenue. This could potentially enable personalized and highly efficient drug delivery systems, tailored to individual patient needs and conditions.

Authors Contribution

Conceptualization: AJS
Methodology: UA, TK
Formal analysis: UA, MA, RM, UH
Writing-review and editing: UA, AJS
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

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Original Article

Frequency of Dry Eye in Migraine Patients

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ABSTRACT

Dry eye disease and migraine are prevalent conditions in the general population. While there is evidence of symptoms overlapping, few studies have quantified the occurrence of dry eye in migraine patients. The study was conducted to find the frequency of dry eye syndrome among individuals with migraines. **Objective:** To evaluate the "frequency of dry eye disease in migraine patients". **Methods:** This descriptive cross-sectional study included 217 clinically diagnosed migraine patients between the ages of 18 to 29 at the University of Lahore Teaching Hospital. The study took place over four months, from February 2023 to May 2023. Dry Eye Disease was assessed using the dry eye symptoms questionnaire (Speed II Questionnaire) and Schirmer test 1 as the primary diagnostic tool. **Results:** The analysis included calculating descriptive statistics (percentages and means) and presenting results in tables and figures for clarity and understanding. Out of 217 migrainous patients, 38.2% of participants had normal eyes. Among the rest, 17.1% showed Mild, 2.3% Moderate dry eye. The Schirmer Test showed that 41.9% had suffered from severe dry eye. Overall, the study showed that 133 patients (61%) suffered from dry eye. **Conclusions:** The study's conclusion highlighted a notable rise in dry eye disease among migraine patients, in line with previous research. This underscores the need for further exploration into the underlying mechanisms and therapeutic interventions for individuals dealing with both conditions.

INTRODUCTION

Dry Eye Disease is a disorder of the tear film that happens when tears are not producing normally [1]. Dry Eye is caused by aqueous tear deficiency or evaporative tears. If this condition remains untreated, it can lead to pain, ulcers, and corneal scarring. Inflammatory diseases, environmental factors, hormonal imbalance and contact lens use all may cause dry eye [2]. The worldwide incidence of dry eye disease was estimated to be 11.59%. Dry eye symptoms affect 9.5% of women and 6.8% of men. The global prevalence of dry eye was 28.1% in women and in men 24.9% [3]. The mechanisms of the dry eye include tear film hyperosmolarity and corneal and lacrimal gland inflammation. Tears are important for not only keeping the eye moist but also protecting it from various kinds of bacterial and other infections [4]. Traditionally, the tear film is described as consisting of three components: the aqueous layer, the mucin layer, and the lipid fatty layer [5]. The primary source of the aqueous tear layer is the main lacrimal glands, while minor contributions come from the goblet cells [6]. The Lipid Layer, primarily composed of lipids, forms the layer that's on the outside of the tear film is, serving to reduce surface tension [7]. Abnormal tear film refers to a disruption or imbalance in the composition and function of tears, which can cause various ocular discomforts and visual disturbances. When there is an abnormality in any of these layers or an imbalance in their proportions, it can lead to an abnormal tear film [8]. Artificial tears, gels, and ointments are treatments that restore inadequate tears in mild to moderate illnesses [9]. DED produces difficult and visual disruption, by affecting the tear film. Patients having dry eyes present with the symptoms of stinging, pain, blurring of vision, dryness,

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grittiness, sensation, frequent blinking, eye fatigue and sensation of light [10]. If tear production worsens in the afternoon, it induces irritation, itching and especially itching in swollen eyelids [11]. In severe condition, eyes become more persistent and have little or no relief from artificial tears vision become worse and patients feel pain in their eyes [12]. Tests like TBUT and Schirmer's test are used to assess dry eye diseases [13]. Migraine is a highly prevailing and complex condition characterized by an occasional, severe, often unilateral throbbing or pulsating headache related to nausea, photophobia, phonophobia, and sometimes aura [14]. Migraine is a complex neurologic and vascular syndrome with a wide medical range of signs and symptoms, including ocular abnormalities [15]. The second most common cause of disability in life years worldwide is migraine [16]. Migraine attack has been classically divided into four stages prodromal, aura, headache and postdrome [17]. Dry Eye Symptoms are more common in people suffering from long-term and painful migraines. The concentration of salt is also lower in their tears and these two conditions also share a common mechanism [18]. The Clinical comorbidity among migraine and dry eye symptoms, particularly the incidence of photophobia, suggests a pathophysiological connection between the two diseases [19]. The relationship between dry eye disease and migraine is that both conditions may share common underlying mechanisms related to inflammation and nerve sensitization [20]. Additionally, nerve sensitization in the trigeminal nerve, which is responsible for transmitting pain signals from the face to the brain, has been linked to both dry eye disease and migraine [21].

METHODS

This study employed a cross-sectional descriptive design and was carried out at the University of Lahore Teaching Hospital. The research spanned from February 2023 to May 2023 and included 217 participants. A sample size of 217 participants was determined using the formula: n=1-d/2 P(1-P)/d2 with values n= (1.96)2 (0.17) (1-0.17)/ (0.05)2. The participants were selected using a convenient sampling method. Permission for this research was taken from Research ethics committee (REC) faculty of allied health sciences the University of Lahore on august-08-2023 with Reference number REC-UOL-135-08-2023.To be eligible for inclusion, individuals had to be clinically diagnosed with migraines at the University of Lahore Teaching Hospital and be between the ages of 18 to 29 years. On the other hand, exclusion criteria encompassed students no younger than 18 years or older than 29 years, those using medications known to induce dry eyes, individuals with ocular or systemic conditions contributing to dry eye symptoms, regular computer users, and contact lens wearers. Data collection began by inviting eligible participants and written consent was taken beforehand after explaining the procedure. Tear production was assessed through the Schirmer test. In this test, a Schirmer strip was put in the lower conjunctival fornix, and measurements were recorded in millimeters of wetting after a 5-minute period. Subsequently, the data collected from the Schirmer tear test underwent comprehensive analysis using appropriate statistical methods. The primary objective of conducting the analysis was to determine the prevalence of dry eye symptoms within the study population. This study adds to our understanding of dry eye symptoms in clinically diagnosed migraine patients within the specified range and is valuable for further research and potential improvements in patient care. SPSS (Social Package for Social Sciences) version 23.0 software was used to analyze data. No statistical test was applied as there was no hypothesis to test. The outcomes are presented in the form of percentages and ratios for categorical variables such as name, age, gender, and the presence or absence of dry eye. These will be deemed statistically significant.

RESULTS

Three age categories were used to group 217 migrainous patients, both male and female. 34% were patients that were in the age group 18 – 21. 51% were patients that ranged between 22 – 25. 15% of patients were between the age of 26 – 29 years old. Among the 217 patients suffering from Migraine, 56% were female and 44% were male. Out of 217 migrainous patients, 38.2% of participants had normal eyes. Among the rest, 17.1% showed Mild, 2.3% Moderate dry eye. Schimer Test significantly showed that 41.9% had been suffering from severe dry eye (Table 1).

Table 1: Frequency of Dry- Eye Symptoms in Migraine Patients

Schimer Test Results	Frequency (%)
Normal Eye (15mm - 35mm)	83 (38.2)
Mild Dry Eye (10 mm - 15mm)	37 (17.1)
Moderate Dry Eye (5mm - 10mm)	5 (2.3)
Severe Dry Eye (< 5mm)	91 (41.9)
8.00 mm	1 (0.5)
Total	217 (100)

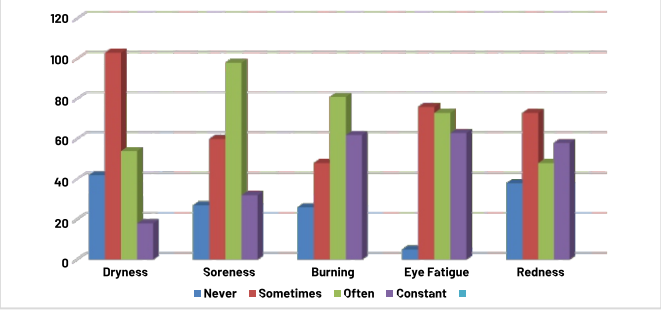

Figure 1: The level of incidence of each symptom among migraine

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patients

All symptoms have occurred often (Grey Bar is higher in most of the symptoms). Patients with migraine tend to have a higher tendency to develop these problems than non-migrainous patients. There could be multiple reasons for this.

DISCUSSION

Our observational cross - sectional study aimed to determine the frequency of dry eye in clinically diagnosed migraine patients by performing Schirmer test- 1 in a tertiary care hospital. The Schirmer test was performed using Schirmer tear strips. It was concluded that the participants with migraine had DED. Schirmer test reading was graded as 15-20mm; normal, 10-15mm; mild, 5-10; moderate and less than 5 had severe DED. Irritation, grittiness, burning, foreign body sensation and light sensitivity were the indicators of dry eye. It showed that DED had a great impact on the quality of eyesight and also the comfort of life. So, it was considered that participants with migraine had DED as compared to those who had simple headaches. Another comparable study was carried out to check the relationship between migraine and dry eye. A dry eye questionnaire (DEQ-5) was used in the clinic to evaluate the manifestations of dry eye as well as ocular surface diseases. Tests that were performed to investigate the dry eye were PRT (phenol red thread) and Schirmer tear strips test whereas our study conducted the dry eye questionnaire and Shirmer test 1 only for the determination of dry eye. Similarly, in their study, to investigate the migraine a questionnaire HIT-6 was used. Our study took clinically certified migraine patients. They observed that DED and migraine are quite prevailing conditions among the general inhabitants. Both lower the standard of living. Their findings were concluded to be the same as our study that participants with migraine had DED [22]. Another retrospective case-control study involving a substantial patient population from the University of North Carolina found that people with migraines were more likely to have concurrent dry eye disease [23]. This statistical evidence suggests a significant link between migraines and dry eye, although the exact nature of this connection remains uncertain. On the other hand, our observational-cross-sectional study performed at a tertiary-care hospital focused on clinically diagnosed migraine patients using the Schirmer test. This study provided more direct clinical evidence, showing that participants with migraines indeed had dry eye, with specific symptoms indicating its presence. The convergence of findings from both studies underscores the potential impact of migraines on the development of dry eye syndrome, emphasizing the importance of further research to elucidate this relationship and its potential implications for patient care.

In our study, we investigated the frequency of dry eye syndrome among 217 clinically diagnosed migraine patients, finding that 61.3% of them suffered from dry eye. In addition, the Miami VA study investigated the symptoms and indicators of dry eyes in people with and without migraines. It found that although ocular surface metrics were similar between the groups, those suffering from migraines had more severe dry eye symptoms and distinct symptom profiles. This implies that migraineurs' sensations of dry eyes could be caused by nerve dysfunction. The Miami VA study focused on symptom profiles and possible nerve dysfunction as a contributing cause, highlighting the need for additional research and treatment approaches [24]. Our study focused on the prevalence of dry eye in migraine patients. A meta-analysis was carried out in a different study to evaluate the correlation between dry eye illness and migraine. Seven studies were included in the analysis, and the results showed that individuals with migraine had an odds ratio of 1.55, which was considerably higher than the risk of dry eye in those without migraine. According to the study's findings, there is a significant correlation—albeit one with differing intensities across various populations—between migraine and dry eye [25]. Our study's objective was to ascertain the prevalence of dry eye syndrome in migraine patients with a clinical diagnosis between the ages of 18 and 29 at the University of Lahore Teaching Hospital. It was discovered that 61.3% of the individuals with migraines experienced varied degrees of dry eye. This outcome is consistent with earlier studies. When these two studies are combined, Likewise, another study sought to assess the occurrence of dry eye and primary Sjögren syndrome (SS) among individuals with migraines. Their investigation involved 46 migraine patients and 50 healthy subjects, revealing that dry eye symptoms and manifestations were notably more prevalent and severe in the migraine group. Intriguingly, they did not identify any instances of primary SS in the participants. Furthermore, the duration of migraine exhibited an inverse relationship with tear function test results but a direct correlation with ocular surface disease index scores [26]. In our study, the objective was to assess the frequency of dry eye disease in individuals with migraines. This descriptive cross-sectional study included 217 clinically diagnosed migraine patients. The results indicated that 41.9% of these migraine patients suffered from severe dry eye as assessed by the Schirmer test and dry eye symptoms questionnaire. This aligns with previous research and highlights the need for further exploration into underlying mechanisms and potential therapeutic interventions for individuals experiencing both conditions.

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CONCLUSIONS

The study concluded that migraine patients have a higher frequency of dry eyes. Future studies should look into the underlying processes of this connection as well as potential treatment techniques to help patients with both illnesses.

Authors Contribution

Conceptualization: HA, TS
Methodology: HA, DA, RB
Formal analysis: SZAS, HA
Writing-review and editing: AP, HA, AZ, DA
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

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Original Article

Functional Movement Screen Differences in Male and Female Footballers and as an Injury Prevention Tool

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ABSTRACT

Functional Movement Screen evaluates seven key movement tasks crucial for smooth kinetic chain performance in sports. It assists sports therapists and coaches in identifying faulty patterns during preparticipation. **Objectives:** To compare FMS composite scores between male and female footballers and evaluate FMS as an injury predictor tool. **Methods:** Between March and June 2021, a cohort study was conducted on 264 footballers (132 males and 132 females) in Islamabad and Rawalpindi football academies. Players voluntarily underwent seven Functional Movement Screen tests. After participating in competitive or friendly matches, follow-ups were conducted to assess FMS composite scores and document any injuries sustained during the games. Data analysis was performed using SPSS 25.0, and information on FMS scores and injuries was collected through FMS scoring sheets and a self-structured questionnaire. **Results:** There was statistically significant difference between male and female footballers composite scores of FMS ($p<0.005$). Female footballers (15.13 ± 2.32) scored less on mean score of FMS as compared to male footballers (17.03 ± 2.884). FMS was a good predictor of injury with 37.7 % variance on linear regression ($p=0.005$). **Conclusions:** Female footballers scored less composite score of FMS as compared to male footballers. FMS before participation can be a good predictor for detecting injuries in male and female footballers.

INTRODUCTION

As popularity of football continues to increase, so does probability of incurring injuries while playing the sport, whether at a professional or recreational level [1]. Achieving optimal performance while minimizing the risk of injury can be a challenging endeavor in various professional sports [2]. Football carries a risk of both collision and non-contact injuries, with higher prevalence of acute injuries among male and female players [3]. A standard pre-participation exam, which includes assessing health status and musculoskeletal system, used to screen for underlying medical problems and injury risks [4]. Thorough movement screening is a valuable technique for quantifying an athlete's physical abilities, identifying asymmetries or weaknesses in the kinetic chain, and assessing stability and mobility [5]. It is important to conduct pre-participation screenings to identify potential injury risks in athletes. Intrinsic risk factors include imbalances in muscle strength and endurance, structural abnormalities in musculoskeletal system, issues with neuromuscular control, core weakness, and imbalances in muscles on opposite sides of body [6]. Athletes undergo a thorough pre-participation examination, checking health, medical issues, and musculoskeletal condition—a standard injury screening method [7]. This assessment identifies any

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flawed movements in athlete's kinetic chain. When compensatory patterns are detected beforehand, coaches or sport physical therapists can conduct a detailed evaluation [8]. They provide regimen of corrective exercises, enabling smooth game performance and restoring athlete's kinetic chain [9]. However, these screenings may not capture all intrinsic risk factors that could lead to injury during sports participation [10]. One tool that may be beneficial for this purpose is functional movement screening (FMS) developed by Cook et al [10-12]. It assesses wide range of abilities required for participation in high-level functions, evaluates range of motion (ROM), muscular imbalances and core strength by means of seven different movement [4]. It assesses movement patterns, identify limitations and asymmetries that could lead to injury in various sports, such as soccer and basketball, as a pre-participation evaluation tool [10, 13]. It comprises five bilateral tests: hurdle step, inline lunge, shoulder mobility, active straight leg raises, and rotary stability, which help identify any asymmetries in athletes [13]. Three additional clearance screen tests, including shoulder impingement test, which assesses pain in shoulder joints, spinal extension test, which checks for pain in lower back, and flexion spinal test, which evaluates pain while in a flexed spine position. These screening tests provide in-depth analysis of an athlete's mobility, range of motion, and ability to perform sports-specific movements on field. A composite score of less than 14 on FMS indicates a high risk of injury [10-12]. Balance between mobility and stability are required to perform seven main movements and three clearing tests [14]. There was total seven movements to perform. Each movement scored a 3 if participant was able to complete movement task satisfactorily without use of any adjustment, a score of 2 indicated movement task was performed with compensation, whereas a score of 1 indicated movement task was not completed. Any task that caused pain was assigned a score of 0. Tasks were scored separately for right and left side of body; the lowest score of raw score was included in final score. Total composite scores varied from 0 to 21 points, and 0 to 3 points ranged for individual task scores [10]. Prior studies reported that during pre-participation FMS can predict injuries in various athletes [15-17]. Studies including FMS as an injury and evaluation tool have subjects which includes athletes playing multiple sports and generally involved male footballers, but the studies comparing scores of FMS among female footballers with male footballers were scarce. This research was conducted to check differences between male and female footballer composite scores and FMS as an injury predictor tool.

METHODS

A cohort study from March to July 2021 in Islamabad and Rawalpindi included 267 male and female footballers aged 12-22 years, training at least 3 times per week or 1/5 hours per week. Non-probability quota sampling was used. Sample size was calculated by using Raosoft Software. Margin of error was 5%, confidence level was 90%, population size was 10,000 and the response distribution was 50%. Players were excluded who had recent lower extremity injury, brain injury, concussion, cervical spine injury (past year), shoulder surgery, ACL repair, meniscal repair, Achilles' tendon repair, ankle fracture, recent eye/ear disorders, and ongoing musculoskeletal physical therapy. FMS served as a 'Pre' assessment tool for injury/dysfunction risk before friendly or competitive matches. A self-formulated questionnaire gathered athlete demographics, field position, and training frequency. Participants were initially shown seven movements, consisting of deep squat, hurdle step, inline lunge, shoulder mobility, active straight-leg raise, trunk stability push-up, and rotary stability. Each participant underwent FMS in a single session before engaging in a football match. Five of the seven tasks (hurdle step, inline lunge, shoulder mobility, active straight-leg raise, and rotary stability) were performed on both the right and left sides. Additionally, three clearance screens for shoulder internal rotation/flexion, end-range spinal flexion, and end-range spinal extension were employed to identify pain presence. Task instructions were provided, participants made three attempts for each task, following approach by Cook et al [10, 11]. FMS demonstrates moderate to good inter-rater (0.82) and intra-rater reliability [18]. After football match, athletes were assessed for injuries on same day. In this study, injury was defined as a musculoskeletal injury meeting specific criterion: (a) occurring due to football match participation (friendly or competitive), (b) requiring medical attention or resulting in at least one day of missed training/match. Athletes reported injuries on a self-formulated questionnaire, specifying injury type (contact or non-contact) and injury area (upper limb, lower limb, or trunk/spine). Descriptive statistics were used to examine data collected (e.g., mean and standard deviation). Point Biserial Correlation coefficient was used to analyze association between total summed score and male and female footballers. The research related to human use has complied with all relevant national regulations and institutional policies, has followed the tenets of the Declaration of Helsinki, and Ethical approval was obtained from the Research Ethical Committee of Riphah International University. Ref: RIPHAH/RCRS/REC/Letter-00926 (Dated: 12th February, 2021). A written consent form was signed by each player/parent who participated in study. Participants were provided with right to ask any question about study and they were free to refuse any part of study without affecting their relationship

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with investigator.

RESULTS

Two hundred sixty-four football athletes were included. Table 1 shows demographic details. There were statistically significant differences between male and female footballers (p=0.005).

Table 1: Demographic Data

Demographic Variables	Males	Females
Age	16.85 ± 2.80	16.26 ± 2.98
Height (meters)	1.68 ± 2.80	1.59 ± 0.07
Weight (kg)	57.59 ± 0.11	51.06 ± 7.88
Body Mass Index	20.22 ± 2.91	20.02 ± 2.59

Out of 264 players, 75 reported post-match injuries (46 lower limb, 28 upper limb, 1 spine/trunk). Of these, 17 were contact injuries, and 58 were non-contact injuries. One eighty-nine players reported no injuries. Results for mean and SD among both genders of FMS composite score are presented in the Table 2. FMS scores ranged from minimum score 9 to highest score was of 21.

Table 2: Mean of FMS Composite Score

Total Composite Score FMS	Mean ± SD
Male (n=132)	17.03 ± 2.884
Female (n=132)	15.13 ± 2.323

Gender and Injury status with FMS Cut off Value are presented in Table 3.

Table 3: Gender and Injury status with FMS Cut off Value

Gender			Did you get injury after match		Total	p-value
			No	Yes		
Male	FMS cutoff value	<14	8	21	29	<0.001
		>14	92	11	103	
	Total		100	32	132	
Female	FMS cutoff value	<14	7	34	41	<0.001
		>14	82	9	91	
	Total		89	43	132	

Spearman's correlation was applied to check association between composite scores and injury occurrence in male and female footballers, value of r= -0.633 for male footballers and r= -0.618 for female footballers, showed negatively moderate correlation. Table 4 shows association between composite score of both male and female footballers by applying point biserial correlation.

Table 4: Gender and Injury Status with FMS Total Score

Total score of FMS				r-value	p-value
Gender	Did you get injury after match	Mean ± SD	N		
Male	No	18.06 ± .064	100	-0.342	<0.001
	Yes	13.81± 2.729	32		
	Total	**17.03± 2.884**	**132**		
Female	No	16.12± 1.814	89		<0.001
	Yes	13.07± 1.869	43		
	Total	**15.13± 2.323**	**132**		

A linear regression established that FMS could statistically significantly predict injury, F (1, 263) = 156.031, p<0.001, FMS score explains 37.3% of the variability for the occurrence of injury in male and female footballers. Table 5 shows impact of FMS score on Injury in male and female footballers. R2 value of .37 revealed that the predictor variable (FMS score) explained 37.3% variance in the outcome variable (Injury status) with F (1, 263) = 156.031, p<0.001. The findings revealed that FMS score positively predicted injury (β= -.61, p< .001).

Table 5: Regression Coefficients of FMS Composite Score as Injury Predictor

Variables	B	β	SE	P
Constant	1.80			
FMS score	- .009		.130	.000
R2	.37	-.611	.008	.000

Note. N= 264

DISCUSSION

The main aim of this study was to determine the differences in FMS scores between male and female footballers playing the football academies of the twin cities. There were statistically significant differences between male and female footballers these results are supported by work done earlier [12]. Results of FMS composite scores of female footballers were significantly lower as compared to male footballers these were consistent with previous studies [12-15]. In this study male footballers performed well on tasks which required power and strength and female footballers performed well on tasks which required more flexibility these results are also in notion with work done earlier [6, 12]. A cutoff value <14 was used in this study which was interpreted by Kiesel et al., the present study was in accordance with work done previously [16]. In present study those who scored <14 reported more injuries as to those who scored >14 on total composite score. These results were also consistent with work done earlier [6, 15]. Study done by Schneiders et al., also supports notion that those who scored 14 or less are more likely a potential player of injury [19]. The cut off value <14 is not supported by the work done by Smith et al., it reports that this value <14 was not statistically significantly with non-contact injury prediction, this might be due to because in this study, the researcher was only finding relation between FMS score and injury type which was non-contact injury, not all type of injury occurrence were studied in this work but specifically non-contact injury status was determined [5]. Study done by Mokha et al., didn't support this notion that <14 score can predict injury, it rather states that presence of an asymmetry in the athlete is more likely to predict injury as compared to the composite score of FMS [17]. Łyp et al., reported in study

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cut off value <14 was predictive of injury in athletes [20]. Mean score of FMS score reported in this study was 16.08 ± 2.78 which is in accordance with the mean score reported by previous studies. Mean score reported by Abraham et al., was 14.59 this is less than present study, this might be because study included only players with ages 10 to 18 whereas in current study participants from age 12 to 22 were included and as body matures the intrinsic factors gets better the athlete can perform well on FMS test [21]. Chorba et al., reported a mean score of 14.3, which is lower than current study [15]. This difference may be attributed to their inclusion of athletes from various sports, unlike our study focusing solely on footballers. Non-contact injuries in present study were 58, these results are supported by the work done earlier that footballer/soccer players sustains more non-contact injuries as compared to contact injuries [4, 5]. The greatest number of injuries were of lower limb in present study, 46 players reported injuries of the lower limb these results are also supported by previous literature [4, 6]. Linear regression was used to check if FMS can be used as an injury predictor tool the results were that it is statistically significant that FMS can work as a predictor with 37.3% variance to find out the injury risk in male and female footballers these are in accordance with the work done previously [16].

CONCLUSIONS

This study concludes that there is a significant difference between male and female footballers' composite score of FMS. Female footballers scored less on the FMS tests as compared to the male footballers. There is an association between the composite scores of male and female footballers and the occurrence of injury. FMS score <14 is a good predictor of injuries in male and female footballers.

Authors Contribution

Conceptualization: FA, DL, SH, KB, UK
Methodology: FA, SH
Formal analysis: DL
Writing-review and editing: FA, DL, SH, KB, UK
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Assessment of Nurses' Knowledge Regarding Personal Protective Equipment at Two Tertiary Care Hospitals, Peshawar

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ABSTRACT

Personal Protective Equipment (PPE) include gloves, protective eye wear (goggles), mask, respirator, apron, gown, boots/shoe cover, hair cover and are aimed to shield Health Care Professionals (HCP) including nurses from workplace infections and injuries. **Objective**: To assess nurses' knowledge regarding personal protective equipment at two tertiary care hospitals in Peshawar. **Methods:** A design of the study was descriptive cross-sectional survey. Overall, 150 nurses were involved by using consecutive sampling technique. Data were collected through structured, self-administered adopted questionnaire. **Results:** This study comprised of 150 contributors including 30% male and 70% female. The mean age of the participants was 29.15 with standard deviation ± 6.07. 53.3% of the participants had Diploma, 36.7% had Post RN, 8.7% of the participants had BSN and 1.3% of the participants had MSN degrees. The study showed that 58% of respondents had good knowledge due to their professional experiences while 36% had average knowledge level due to low professional experiences and lack of resource and availability of PPE's and only 6% participants had poor knowledge level regarding personal protective equipment due to lack of professional experiences. **Conclusions:** This study concluded that knowledge level was good in majority of nurses. Despite the good knowledge level, some of the personnel practices and attitudes towards PPE remain unchanged. This study pleas for a need to educate Nurses on PPE; it may be with continuing education on infection control or other informative platforms. When there is low level of knowledge it will affect practice related to PPE.

INTRODUCTION

The term "universal precautions" refers to a collection of actions designed to avoid the spread of blood-borne infections while delivering health care [1]. Patients infected with these diseases cannot be reliably identified through medical history and physical examination; therefore, the Centres for Disease Control (CDC) recommends that conventional precautions be followed on all patients, regardless of their infectious status [2]. Because health care personnel have close contact with patients, they are at a significant risk of occupational risks such as HCV and HIV exposure [3]. PPE give protection by preventing microorganism's transmission from contaminating hands, eyes, clothing, hair, body fluids, aerosols, and shoes [4]. Transmission of microorganisms occurs through different modes including direct, indirect and air borne. Direct transmission is through Sneezing, coughing, spitting, biting, touching, kissing, or sexual intercourse [5]. Indirect transmission is through non-living objects (fomites) such as toys, soiled clothes, through the hands of a caretaker, eating utensils, handkerchiefs, surgical instruments, or dressings [6]. On the other hand, airborne transmission occurs through air which includes

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droplets or dust particles containing the infectious agent like Clostridium difficile, Mycobacterium Tuberculosis, Rubeola virus (Measles), Varicella-Zoster virus (chicken pox), Smallpox, Influenza, Rhinovirus, and some gastrointestinal viruses e.g., Norovirus and Rotavirus [7]. HCP are at more vulnerable to acquire airborne infections like Tuberculosis (T.B), Severe Acute Respiratory Syndrome (SARS) and Influenza with 10-20 folds of contraction than the general population [8]. A disruption in PPE usage contributes to the transmission of infection from patients to HCP, other patients and attendants, the PPE shall be used properly by all HCP especially nursing staff, supporting staff, laboratory staff and family members who provide care to patients in situations where they contact with blood and body fluids [9]. Despite of the Centers for Disease Control (CDC) guidelines on PPE use to prevent the transmission of blood-borne and air-borne infections like MRSA, T.B, influenza etc; still prevalence of such infections is high in nurses and other HCP [10]. Prevalence of MRSA among nurses in Germany was 5.6% [5]. According to the CDC, the Ebola mortality rate in Liberia was 390 of 4810 deaths among HCP. In addition, the National TB control program of Pakistan (NTP) states that 510 000 new TB cases occur each year in Pakistan which also affect HCP [11].

PPE use is an integral part of infection control and prevention measures that protect HCP against infected air, body fluids, and other potentially infectious materials. The use of PPE by HCP is affected by their knowledge about PPE and their perception of infection. Based on their experience researchers assume that in KPK, HCP has lack of awareness of proper use of PPE. The researcher's conducted the study to investigate the nurses' knowledge level regarding PPE because there was no such study conducted regarding the stated problem in one of the health care settings in Khyber Pakhtunkhwa (KP).

METHODS

The quantitative descriptive cross-sectional study design was used in this study. The duration of the study was four months. The data collection process lasted from October 2018 to November 2018. Data were collected at one point in time from the participants. Prior to data collection written informed consent was taken from each participant. All registered nurses who were actively working in two tertiary care hospitals Khyber Teaching Hospital and Hayatabad Medical Complex Peshawar were included in this study. Those nurses who were either on leave or did not willing to participate were excluded from the study. In this study a consecutive sampling technique was used for the sample selection. Total population was 680 in the two tertiary care hospitals and the calculated sample size was 250, out of them 150 responded. Sample size was calculated by Rao soft with 0.5% margin error and 95% confidence interval. A modified well-organized questionnaire was used for data collection. The Questionnaire was consisted of two parts, 1st part included demographic characteristics and the 2nd part was relevant to the assessment of knowledge. Analysis of data was done by using SPSS version 22.0. In descriptive statistics, frequencies and percentages were determined for nominal and ordinal data while mean and standard deviation were determined for continuous variables. ≤ 50 % score was considered poor knowledge, higher than >50% to ≤ 75% were considered as having average knowledge and those who achieved higher than 75% were considered good knowledge.

RESULTS

This study comprised of 150 participants in which 45(30%) were male and the rest 105(70%) were female (Figure 1). The mean age of the subjects was 29.15 with standard deviation ± 6.070. Academic qualification of the participants was 53.3% of the participants had Diploma, 36.7% had Post RN, 8.7% of the participants had Generic BSN and 1.3% of the participants had MSN. Result of the data regarding the designation of participants shows that out of all 60% of the participants were staff nurse, 4.7% of the participants were head nurse, 34.7% of the participants were charge nurse, and 0.7% of the participants were shift supervisors. Professional experiences of the participants show that 96% of the participants had 2 to 12 years, 2.7% of the participants had 13 to 22 years, 0.7% of the participants had 23 to 32 years, and 0.7% of the participants had 33 to 42 years of experience. All the stated results are shown Table 1.

Table 1: Demographic variables of the participants

Variables	Frequency (%)
Gender	
Male	45 (30)
Female	105 (70)
Qualification	
Diploma	80 (53.3)
Post RN	55 (36.7)
Generic BSN	13 (8.7)
MSN	2 (1.3)
Designation	
Staff nurse	90 (60)
Head nurse	7 (4.66)
Charge nurse	52 (34.67)
Shift supervisor	1 (0.67)
Professional experience	
>2 to 12 years	144 (96.0)
13 to 22 years	4 (2.66)
23 to 32 years	1 (0.67)
33 to 42 years	1 (0.67)

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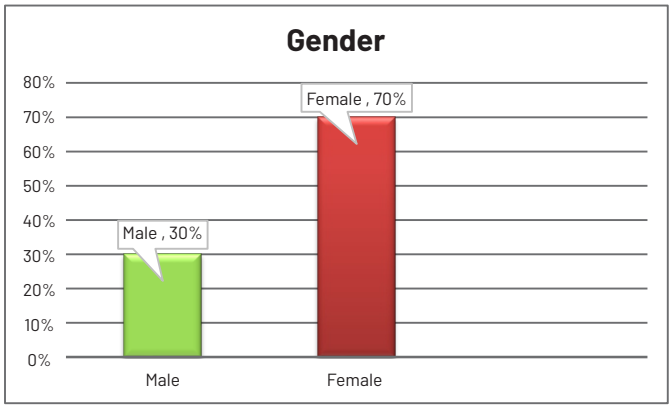

Figure 1: Gender distribution

Table 2 disclose that 97.3% of the participants stated that they knew the personal protective equipment. Result also shown that, 89.3% of the wear disposable gloves when there is a chance of contact to the human fluids or blood. In response to a question whether they have been trained to use PPE, 82.3% of the nurses contemplate that they have been trained to use PPE. Result illustrated that, 78.7% of the nurses consider handwashing the single most important measure for preventing hospital acquired infections. While answered given by the participants, 74.7% of the nurses ponder occupation health and standard shall be followed. Surprisingly only 43.3% of the nurses stated that guidelines for personal protective equipment should be followed on. Besides 90% of the nurses considered themselves knowledgeable in the use of personal protective equipment. This study result found that, 78.7% of the nurses' wear mask when there is a likelihood of any kind of splash or spray. To another question when the participants were inquired of whether nurses wear eye shield protectors when there are chances of splash, only 42.7% of the nurses 'responded yes. Furthermore, 78.7% of the participants dispose all possibly filthy items into a standard red bag. Similarly, 87.3% of the nurses take special precautionary measure while dealing with stilettos or sharp items.82% of the nurses stated that policies on personal protective equipment are posted in their work. Contradictory the participants stated that only 22% of the employs in their workgroup always follow the use of personal protective equipment. All these findings are shown in Table 2.

Table 2: Participants knowledge level

Question/Statement	Yes	No
	N (%)	N (%)
Do you know the personal protective equipment?	146 (97.3)	4 (2.7)
I have been trained to use PPE	124 (82.7)	26 (17.3)
Do you wear disposable gloves whenever there is a possibility of exposure to blood or other body fluids?	134 (89.3)	16 (10.7)
Do you wear disposable face mask whenever there is a possibility of splash or splatter to?	118 (78.7)	32 (21.3)
Do you wear disposable gloves whenever there is a possibility of exposure to blood or other body fluids?	64 (42.7)	86 (57.3)
Do you dispose of all potentially contaminated materials into a red bag for disposal as biomedical?	118 (78.7)	32 (21.3)
Do you take special caution when using scalpels or sharp objects?	131 (87.3)	19 (12.7)
Is handwashing the single most important measure for preventing hospital acquired infections?	118 (78.7)	32 (21.3)
Occupation health and safety standard shall be followed/not	112 (74.7)	38 (25.3)
Guidelines for Personal protective equipment should be followed on	65 (43.3)	85 (56.7)
I am knowledgeable in the use of personal protective equipment	135 (90)	15 (10)
Policies on personal protective equipment are posted in my work	123 (82)	27 (18)
Employs in my workgroup always follow the use of personal protective equipment	33 (22)	117 (78)
I can reduce my risk of occupational HIV infection by using personal protective equipment	109 (72.7)	41 (27.3)
If personal protective equipment is followed with every patient, my risk of infection will be decreases	30 (20)	120 (80)

To know about their level of knowledge, we developed three (3) categories that was poor, average, and good knowledge as shown in the Table 3. Those who had equal to 50 % score was considered poor knowledge, higher than >50% to ≤ 75% were considered as having average knowledge and those who achieved higher than 75% were considered good knowledge. Among the participants 6.0 had poor knowledge, 36.0 had average knowledge and 58.0 had good level of knowledge with a mean knowledge score 15.84 and standard deviation of ±3.09.

Table 3: Knowledge categories

Knowledge category	Frequency (%)
Poor	9 (6.0)
Average	54 (36.0)
Good knowledge	87 (58.0)

DISCUSSION

According to this study findings 97.3% of the nurses can define the PPE and know the ways of implementing PPE correctly during practice. In addition, 82% of the nurses presented that policies on personal protective equipment are posted in their work. Nevertheless, a similar study done in Nigeria showed that 89% staff had just heard about PPE but only 38% could correctly define it and 38% were not aware of any hospital policy on PPE while even greater per cent (95%) had not seen any hospital policy [12]. One more findings from the study conducted at Tokyo showed that PPE use and its adherence rate among nurses was 34% [13]. This study found that 6% of the participants had poor knowledge, 36% had average knowledge, and 58% had good knowledge or acceptable knowledge level. Contrary to this, a study conducted at tertiary care hospital of Lahore showed that 17.41% of the participants had good

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knowledge, while 42.29% of the participants had poor knowledge regarding the PPE [14]. This study found that 78.7% of the nurses dispose of all potentially contaminated materials into a red bag for disposal as biomedical. However, a survey conducted by WHO presented that slightly more than half 58% health care settings have acceptable mechanisms for the discarding of waste [15]. Similarly, a study in Nigeria indicated unawareness of the proper use of PPE directly predisposes HCP to dangerous health care-related infections [12]. Moreover, in this study 78.7% of the nurses agreed that handwashing is the single most effective measure to prevent hospital acquired infections. A study conducted in Indonesia illustrated that hand hygiene is widely regarded is solitary utmost effective method of reducing healthcare related illnesses however the compliance rate among nurses and doctors sometimes is very low [16]. Moreover, a survey on use of PPE was conducted in China during 2009, showed poor level of knowledge (33.7%) among HCP. The study also explored compliance to PPE; gloves (90%), gown (88%) and N95 respirator (88.3%) [17]. This study identified that 87.3% of the nurses take special precaution when using scalpels or sharp objects. Differing to this a study conducted in Ethiopia presented a total rate of injuries caused by sharp objects and needles was 43% among nurses [18]. In this study 72.7% of the nurses were of the opinion that they can reduce the risk of occupational HIV infection by using personal protective equipment. Likewise a study conducted in brasil showed similar results [19]. Opposingly a study conducted in Tanzania indicated work related HIV exposure among healthcare professionals with prevalence of 47.9% [20].

CONCLUSIONS

For prevention of infection in clinical setups PPE plays an important role. This study concluded that knowledge level was acceptable in majority (more than half) of nurses. Despite the acceptable knowledge level, some of the personnel practices and attitudes towards PPE remain unchanged.

Authors Contribution

Conceptualization: GN
Methodology: GN, IWA
Formal analysis: GN
Writing-review and editing: IWA, DM
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Emotional Intelligence as Predictor of Mental Health in Hospital Nurses, Pakistan

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ABSTRACT

Emotional intelligence is a tool, as is the ability to understand, perceive, manage and utilize information. Therefore, an emotionally intelligence people could control their stressors and improve the individual's productivity at the workplace. **Objective:** To explore the relationship of emotional intelligence and mental health in female hospital nurses in Pakistan. **Methods:** The correlational design was used in this study. The sample comprised of (N=217) hospital nurses with the age range of 20 years to 45 years (Mean age=29.98; SD=6.37) were selected through systematic randomization procedure from different public hospitals of Hyderabad. The data collection was gathered about 8 months from January 2019 August 2019. The demographic Form, Trait Emotional Intelligence, Pakistani Urdu translated version (TEIQue-SF) & Aga Khan University Anxiety Depression Scale were used. **Results:** The results showed a significant predictive relationship of emotional intelligence with mental health of hospital registered female nursing (R^2= .374, p< .001). **Conclusions:** The hospital nurses (who have high emotional intelligence) suffer less from mental health problems and are at low risk of anxiety and depression.

INTRODUCTION

Emotional intelligence (EI), a concept first introduced by Salovey and Mayer in 1990 and popularized by Daniel Goleman in 1995, refers to the ability to recognize, understand, manage, and utilize emotions effectively [1, 2]. It involves skills like empathy, self-control, and self-awareness, playing a pivotal role in an individual's psychological health and adaptive functioning. EI significantly contributes to improved life outcomes, mental well-being, and job satisfaction [3, 4]. Different EI models, such as the ability model by Mayer and the trait model by Petrides, offer insights into how EI integrates with personality traits and self-perception [5, 6]. In nursing, EI's application is invaluable. Nurses with high EI can foster positive interactions with colleagues and patients, effectively manage stress and burnout, and enhance patient care [7, 8]. This aspect of EI underscores its importance in interpersonal relationships and stress management in professional environments. Moreover, EI is linked to better job performance and staff satisfaction [9]. The broader impacts of EI are seen in mental health and overall well-being. Disruptions in EI can lead to mental health disorders, one of the most common causes of disability globally [10, 11]. Proficiency in EI equips individuals to handle life's stressors and emotional challenges better, enhancing psychological health. Studies have indicated an inverse relationship between EI and depression, highlighting EI's role as a protective factor against mental health issues [12, 13]. The significance of EI

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in mental health is further underscored by its interplay with cognition, behavior, and emotional regulation. Emotional health, defined as the ability to express emotions positively and healthily, is crucial for overall well-being. Difficulty in emotional expression can lead to mental illnesses [14], emphasizing the need for EI in maintaining mental health. EI is essential for personal and professional success, especially in professions like nursing. Its influence on mental health, workplace dynamics, and interpersonal relationships is substantial. As a skill set intertwining with personality and emotional self-perception, EI's role in enhancing life satisfaction, coping mechanisms, and overall well-being cannot be overstated. Its growing importance over the past two decades highlights its relevance in modern social and professional contexts [10-17].

This study was designed to investigate the emotional intelligence as a predictor of mental health in the nursing profession.

METHODS

The female hospital nurses were selected randomly from different registered hospitals of Hyderabad, Pakistan. The age ranges of participants were between 20 years-45 years Mean age=29.98; SD=6.37. The study was approved from Institute of Clinical Psychology, University of Karachi vide Letter No. ICP-1(101)/5470. After getting permission from the authorities of registered hospitals, the researcher took the participant's consent for further study procedure. The data were collected from the participants. The demographic form, Trait emotional intelligence, and Aga Khan University anxiety depression were administered. The trait emotional intelligence questionnaire short form is 7 point, Likert-style and ranging from 1 = Completely Disagree to 7 = Completely Agree. This scale is based on a 30-item questionnaire. It is designed to measure global emotional intelligence. AKUADS scale is an indigenously developed screening instrument. It is used in the community for assessing psychiatric morbidity. This questionnaire consists of 25 questions, consists of 13 psychological (anxiety and depression) and 12 somatic. There are 4 choices for example: (never= 0, sometimes= 1, mostly= 2, and always= 3. About confidentiality, informed to the respondents.

RESULTS

Descriptive statistical analyses were applied to assess the entire sample's demographic characteristics. For interpretation of the data, linear regression analysis was used. Table 1 outlines demographic data of the study's participants, showing that 77.9% are Muslims, 21.7% Christians, and 0.5% Hindus. In terms of marital status, 60.8% are married, 35.0% unmarried, 2.8% divorced, and 1.4% widowed. Family systems are nearly evenly split with 53.5% nuclear and 46.5% joint. Socioeconomically, 94.5% are middle class, and 5.5% are lower class, with no representation from the upper class.

Table 1: Demographic characteristics of samples

Variables	Categories	F (%)
Religion	Muslims	169 (77.9)
	Christians	47 (21.7)
	Hindus	1 (0.5)
Marital Status	Unmarried	76 (35.0)
	Married	132 (60.8)
	Divorced	6 (2.8)
	Widow	3 (1.4)
Family System	Nuclear	116 (53.5)
	Joint	101 (46.5)
Socioeconomic Status	Lower	12 (5.5)
	Middle	205 (94.5)
	Upper	000 (000)

The table 2 demonstrated that Cronbach's alpha for TEI and AKUADS for the current study.

Table 2: Psychometric properties of trait emotional intelligence and mental health scale

Scale	Number of items	*A*
Trait Emotional Intelligence (TEI)	30	.811
Aga Khan University Anxiety Depression Scale (AKUADS)	25	.904

Table 3 summarizes a linear regression analysis indicating Emotional Intelligence (EI) as a strong predictor of Mental Health (MH) among hospital nurses. The analysis involved 217 participants and showed that EI accounts for 40.9% (R^2 = .409) of the variance in MH. The regression coefficient (B) is -639, and the model is statistically significant (F = 148.659, p < .001, one-tailed). This suggests that EI is a significant determinant of mental health outcomes in this population.

Table 3: Summary of linear regression analyses with emotional intelligence (EI)

Predictor	N	R^2	B	F	Sig.
EI	217	.409	-639	148.659	.000*

Note: p<.001*(1 tailed)
Emotional Intelligence (Predictor)
Mental Health (Dependent Variable)

DISCUSSION

The clear indication by research shows that female hospital nurses work in stressful circumstances, leading them to develop the problems of mental health [18]. Therefore, it is alarming situation with different mental health variables to improve their condition, and one of them is capacity of emotional intelligence. Moreover, emotional intelligence is a significant contributing factor in the nursing populations' physical, mental health and well-being. The hypothesis

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investigated the association between hospital nurses' emotional intelligence (EI) and mental health (MH). According to the results of the linear regression analysis (Table 3), there is a very strong significant predictive connection between EI and MH. Previous studies revealed a significant link between emotional intelligence and mental health. Results from this study correlate these conclusions [19, 20]. The nursing profession requires a lot of time and effort. Due to their many responsibilities, they devote their energies to maintaining their emotional, mental, and physical well-being. As a result, nurses struggle to cope with demanding and stressful conditions. They are more susceptible to pressures as a result, and carrying out the responsibilities puts their mental health (in the current study, this means anxiety and depression) at greater risk [21]. Due to its specific working levels and requirement of engagement in the environment with diverse sort of people (clients and their families, coworkers, etc.) under a high stress environment, the nursing profession is challenging. Ultimately, the key to enduring ups and downs is emotional intelligence. This study investigates the links between emotional intelligence and mental health [22]. The goal of the study was to better understand emotional intelligence as a talent, how it enhances productivity at various levels of personal, social, emotional, and professional functioning, and how nurses can improve their mental health. The model of trait emotional intelligence, or EI, which emphasizes the perception of one's own and other people's emotional worlds, serves as the backdrop for this investigation [23]. People with emotional intelligence can better comprehend, control, and utilize their emotions as they move from thinking to doing. Unfortunately, there isn't much information available in Pakistan about these variables. The findings of the current study combined all previously existing but unrelated relationships between emotional intelligence and mental health. Age, marital status, years of experience, and job position are just a few examples of the various demographic factors at play. A study revealed the distribution of the personal traits of nurses and nurse supervisors, for instance. The majority of participants were nurses who were female and aged 20 to 30. Other characteristics include: qualified (56.2%) and having between five and ten years of experience (41.1%). Similar to marital status, employment positions were also 68.2% (married) and 90.4%. (staff nurses). Critical care units made up the largest percentage [24]. There were significant differences in EI levels between staff nurses and nurse managers, according to research on the function of emotional intelligence in conflict management. 90% of nurse managers had a high level of emotional intelligence, compared to 75.1% of staff nurses. Self-awareness, self-regulation, motivation, empathy, and social skills are the five components of EI [25]. The highest scores were for motivation (23.74.2 and 23.23.3), and there was no other significant difference save controlling emotions. In the survey, workload (41.5%), management system (13%), shortage of resources (33.3%), and schedule (29.2%) are among the other factors that contribute to occupational conflict. In daily routine lives, emotional intelligence is essential to people's functioning. A study found a significant correlation with happiness, and life satisfaction. Therefore, EQ training for the nursing department is advantageous and requires good planning for making their lives healthy. These kinds of training may be helpful for them and support developing trustworthy relationships, understanding each other in a better way, dealing with their emotions themselves and with others, managing others' behavior effectively, and empathizing with the feelings of others' people [26]. Emotions are a vital part of personality. Therefore, further studies in the future would be interesting and are precious to examine the more domains of personality that may have different relationships with emotional intelligence. In this study, as it was mentioned that trait emotional intelligence is the global trait EI and the array of different traits or skills.

CONCLUSIONS

It was found out that the hospital nurses with have high emotional intelligence are suffering less with the mental health problems and were found to be at lower risk of anxiety and depression. The current study demonstrated a protective effect of higher emotional intelligence with regards to the mental health issues such as depression and anxiety.

Authors Contribution

Conceptualization: A, RA
Methodology: A, RA, UA
Formal analysis: A, RA
Writing-review and editing: RA, UA
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Effects of Compressive Myofascial Release of Vastus Lateralis on Lateral Patellar Tracking in Patients with Knee Osteoarthritis

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ABSTRACT

Knee osteoarthritis is highly prevalent around the world and 4th leading cause of disability. Lateral patellar tracking is a common complain of knee osteoarthritis. It causes Q-angle at knee joint to increase that further leads to gait abnormalities. **Objective:** To determine the effect of compressive myofascial release of vastus lateralis on lateral patellar tracking in terms of pain, range of motion, and functional disability in patients with knee OA. **Methods:** This Randomized controlled trial was conducted at the Ahad Medicare Clinic and Physiotherapy Centre, Rawalpindi, spanning from December 2020 to June 2021. In this study, 52 participants were carefully selected using the Open Epi software. These individuals were aged 50 years and above and had previously been diagnosed with Grade 2-3 knee osteoarthritis. Participants were then evaluated for the presence of lateral patellar tracking by measuring Q-angle. After meeting eligibility criteria participants were divided into two groups: the Experimental group (n=26) and the Control group (n=26). Numeric Pain Rating Scale (NPRS), Goniometer, and Western Ontario and McMaster Universities Arthrosis Index (WOMAC) were used to take measurements at baseline and at 15 days follow-up. **Results:** Statistical analysis revealed a significant difference ($p<0.05$) between the Experimental and Control groups in terms of pain reduction and knee extension range of motion (ROM). **Conclusions:** The study's findings revealed that the experimental group exhibited more significant improvements in pain reduction and knee extension compared to the conventional treatment group.

INTRODUCTION

Osteoarthritis (OA) is a degenerative condition that is highly prevailing around the world and 4th leading cause of disability worldwide [1, 2]. It can affect any synovial joint but most commonly affected joints are hip, knee hand, foot and spine [3]. Knee OA is commonly described as a condition including reduced joint space, subchondral bone sclerosis, the formation of bony spurs, cartilage degeneration, and predominant lateral patellar tracking [4]. Knee OA affects medial, lateral, and patellofemoral component of knee joint usually developing and causing symptoms over a period of 10-15 years. There are several modifiable and non-modifiable risk factors for OA. The more pronounced modifiable risk factor is being overweight [5]. The joint space narrowing correlates strongly with pain than any other radiographic features following Kallegren and Lawrence knee OA grading [6]. Patients with knee OA face an elevated risk of falling, primarily because they experience balance issues, particularly in the sagittal plane. Furthermore, individuals afflicted with medial knee OA are even more susceptible to falls [7]. Lateral patellar tracking is characterized by the movement of the patella shifting to the outer side in comparison to the femoral groove, occurring during both the flexion and extension phases [8, 9]. Physiologically when the knee is intact, patella moves 4mm laterally when the knee is moved into full extension, and fixed in trochlear groove and becomes

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more medial when the knee is moved beyond 20 degree of knee flexion [10]. If there is some injury to knee joint or some muscular imbalance, it leads to increase in Q-angle, the distance between trochlear groove and tibial tuberosity is increased, genu valgum and knock knees [11]. Compressive myofascial release (CMFR) is a contemporary soft tissue stretching method that encompasses the application of sustained compression and myofascial stretches to the specific area in order to induce a release. The treatment involves applying broad strokes using the clinician's knuckles initially to address surface restrictions, followed by focused strokes using the clinician's thumb on tense muscles. These strokes are applied at a 45-degree angle, with pressure moving from the far end to the closer end [12]. Numerous research studies have been undertaken to investigate the impact of myofascial release on the Quadriceps muscle, employing various techniques [13].

Existing evidence suggests that myofascial trigger points in the anterior thigh can increase muscle tension, potentially affecting connected structures. Notably, previous studies have not addressed lateral patellar tracking issues in knee osteoarthritis by targeting the vastus lateralis muscle. Instead, they have mainly focused on using the CMFR technique to enhance ankle dorsiflexion range. In this study, the primary objective was to investigate the impact of compressive myofascial release applied to the vastus lateralis on lateral patellar tracking in individuals with knee osteoarthritis. Additionally, the study assessed its effects on pain, range of motion (ROM), and functional disability in these patients.

METHODS

This randomized controlled trial (clinical trial no: NCT05052593 registered on Clinical Trials.gov PRS) took place at the Ahad Medicare Clinic and Physiotherapy Centre in Kallar Syedan, Rawalpindi, spanning from December 2020 to June 2021 after receiving ethical approval on 16-10-2020 from Riphah college of rehabilitation science, Islamabad (Ref: RIPHAH/RCRS/REC/Letter-00870). The sample size, determined using Open Epi software, consisted of 52 participants, chosen with a 95% confidence level and 80% statistical power [13]. Purposive sampling technique with sealed enveloped method of randomisation was used. The study involved individuals aged 50 years and older who had been diagnosed with Grade 2-3 knee osteoarthritis according to the Kellgren and Lawrence classification system. Subsequently, the presence of lateral patellar tracking was evaluated using a goniometer by measuring Q-angle [14]. Participants with a recent knee injury, a history of hip disease, prior knee surgery or arthroplasty, and those who had received intra-articular corticosteroid injections were excluded from the study. Out of a total of 68 participants initially screened for eligibility, 16 individuals did not meet the inclusion criteria. Consequently, 52 participants were enrolled in the study and subsequently divided into two groups: the Experimental group (n=26) and the Control group (n=26). Following the acquisition of demographic information and informed consent, each participant underwent a baseline assessment. During this assessment, pain intensity and ROM were measured using the Numeric Pain Rating Scale (NPRS) [15] and a goniometer [16] respectively. Functional disability was evaluated using the Western Ontario and McMaster Universities Arthrosis Index (WOMAC) [17]. Both the experimental and control group received standard treatment protocol that began with a 20-minute application of hot packs and Transcutaneous Electrical Nerve Stimulation (TENS). This was followed by a series of exercises, starting with ROM exercises and then proceeding to knee stretching and strengthening exercises. These exercises specifically targeted the Vastus Medialis Obliquus (VMO) and involved quadriceps strengthening through isometric exercises. These exercises were performed in three sets, with each set consisting of 10 repetitions, holding each stretch for 5 seconds. Subsequent to the conventional treatment, participants in experimental group received an additional session involving CMFR. This session entailed the shaking of the muscle belly of the Vastus Lateralis for a duration of 30 seconds [18]. Both the Experimental and Control groups followed this two-week treatment plan, which included a total of six sessions. These sessions were scheduled on alternate days, resulting in a total of six sessions throughout the treatment period. Assessments were conducted at the baseline and the sixth visit to evaluate the treatment's efficacy. Data analysis was conducted using SPSS version 21. Descriptive statistics, such as mean and standard deviation, were utilized to summarize the data. Independent T-test was used for between-group comparison.

RESULTS

The results were obtained through an analysis of quantitative data. A total of 68 individuals were enlisted to take part in this research, out of which 52 met eligibility criteria and they were assigned randomly to either a control group or an experimental group. The average age of the participants in the control group was 57.69 ± 6.03 years, while those in the experimental group had an average age of 58.19 ± 5.83 years. Table 1 shows between group analyses of baseline data by Independent T-test with statistically non-significant results for all the variables with a p-value of $p > 0.05$.

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Table 1: Between group analysis of baseline data by Independent t-test

Variable		Experimental group (n=26) Mean ± SD	Control group (n=26) Mean ± SD	
Age (year)		58.19 ± 5.83	57.69 ± 6.03	
NPRS		5.81± 1.26	6.12 ±1.45	p-value 0.419
Q-angle		21.32 ± 3.90	22.92 ± 4.20	0.169
WOMAC		53.85 ± 11.05	51.08 ± 12.47	0.401
Knee range of motion (degrees)	Flexion	107.19 ± 9.18	106.31 ± 11.90	0.765
	Extension	4.35 ± 2.85	5.31 ± 2.69	0.218

NPRS: Numeric Pain Rating Scale, WOMAC: Western Ontario and McMaster Universities Arthrosis Index

Table 2 shows Between group analysis of post treatment values by independent T test showed statistically significant difference in NPRS and knee extension with a [-value of 0.008, and 0.00 respectively (Level of significance p-value <0.05).

Table 2: Between group analysis of post treatment data

Variable		Experimental group (n=26) Mean ± SD	Control group (n=26) Mean ± SD	p-value
NPRS		2.96±1.34	3.58 ±1.17	0.008
Q-angle		18.85 ±3.20	20.88 ±3.98	0.215
WOMAC		38.31 ±9.20	35.69 ± 11.30	0.071
Knee range of motion (degrees)	Flexion	121.69±6.71	111.38±8.41	0.066
	Extension	1.77±2.20	3.31±1.56	0.00

NPRS: Numeric Pain Rating Scale, WOMAC: Western Ontario and McMaster Universities Arthrosis Index

DISCUSSION

This interventional study was conducted on 52 participants diagnosed with OA. After recruiting and allotting participants in both experimental (26) and control group (26), baseline data were obtained from participants. Control group received conventional knee osteoarthritis treatment for 2 week (3 sessions/week) and experimental group received CMFR treatment for 5 minutes in addition to conventional knee osteoarthritis treatment 3 sessions/week). This study aimed to investigate the effects of compressive myofascial release on lateral tilting of the patella in individuals diagnosed with knee osteoarthritis. Secondary objectives included investigating its effects on pain, range of motion (ROM), and functional disability in these patients. Results of this study proposed greater reduction in pain and ROM (especially knee extension ROM) in experimental group as compared to control group on independent T-test with p value <0.05. Qiangmin Huang, in 2020, set out a study to evaluate the effectiveness of applying pressure to myofascial trigger points (MTrPs) using a foam roller or ball, coupled with static stretching for knee muscles [19]. The objective was to assess the impact of this treatment on patients experiencing knee pain. The findings indicated an improvement in VAS scores and an increase in knee joint range of motion. These results align with another study, suggesting that compressive myofascial release of the vastus lateralis contributes to a reduction in knee joint pain and an improvement in range of motion. Another study by Mahmooda et al., in 2020 demonstrated consistent findings indicating that myofascial release proved more effective in relieving pain and enhancing range of motion for patients with knee osteoarthritis when compared to Mulligan's mobilization techniques [20]. The earlier study proposed that myofascial release of knee muscles improve overall knee function and functional abilities more effectively, which is in contrast to this study in which knee flexion range and functional abilities were not significant in comparison to control group. A study by Stanek et al., in 2018 found out the effect of compressive myofascial release in comparison with Graston tool [13]. The main outcome of this study was to find out impact of both techniques at ankle dorsiflexion ROM. CMFR improved ankle dorsiflexion range significantly after a single 5-minute treatment session which is consistent with this study that resulted in marked improvement in extension ROM at knee joint. This study showed remarkable improvement in Q angle in experimental group and these results are similar to the results of a study conducted by Lee et al., in 2018 [21].Similar results have been shown by a study conducted by Torrente et al., [22]. The study aimed to investigate how Self-Myofascial Release affects the Pennation Angle of the Vastus Medialis Oblique and Vastus Lateralis in athletic males. The results revealed a significant decrease in the Pennation angle after applying the self-myofascial release technique consistently for a period of 7 weeks.

CONCLUSIONS

The study concluded that both compressive myofascial release technique and conventional treatment for knee osteoarthritis were effective in improving lateral patellar tilting, pain, ROM, and functional disability through CMFR and conventional OA Treatment, but experimental group showed marked improvement in pain and knee extension range.

Authors Contribution

Conceptualization: RB, FA, LGK, SA, AA, KB
Methodology: RB, FA
Formal analysis: LGK
Writing-review and editing: RB, FA, LGK, SA, AA, KB
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Efficacy of Tofacitinib in the Treatment of Axial Spondyloarthritis

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ABSTRACT

Tofacitinib is a janus kinase enzyme inhibitor used in the treatment several inflammatory conditions. It orchestrates cytokine communication for numerous natural and adaptive immunological responses and underlie the intricate pathophysiology of AS, are directly bound by JAK inhibitors and their intracellular catalytic activity is controlled. For the medical care of older individuals with axial spondyloarthritis, tofacitinib, an oral JAK inhibitor, is being studied. **Objective:** To analyze the efficacy of tofacitinib in the treatment of axial spondylarthritis in adult patients. **Methods:** During the time frame of 1st November 2022 till 31st October 2023 at the department of rheumatology, Lady Reading Hospital, Peshawar, patients with active axial spondyloarthritis who fulfilled the modified New York criteria and who were refractory to NSAIDs were registered in this study. Patients were randomized to receive tofacitinib 5mg x BID for 12 weeks, or a placebo, in equal groups (A and B). The study's major end goal was the evaluation of Spondyloarthritis International Society responses evaluating a 20% improvement (ASAS20) at week 12. **Results:** 44 patients were enrolled (22 in each group). The mean age of tofacitinib arm was 41.19 ± 5.075 years versus 39.83 ± 4.989 years in placebo group. Tofacitinib was effective in 17 patients (77.3%) as compared to 07 patients (31.8%) in placebo group. Treatment response was significant higher (p = 0.002) with tofacitinib. **Conclusions:** Tofacitinib considerably out-performed a placebo when used to treat people with active axial spondyloarthritis.

INTRODUCTION

Ankylosing spondylitis (AS), is an autoimmune condition that affects the axial skeleton and has a detrimental effect on quality of life and spinal mobility [1-4]. The incidence of AS can range varies depending on the region [5]. Consensus has been developed by several rheumatologic associations regarding the treatment recommendations for axial spondyloarthritis and all recommend a number of pharmacological treatments for managing AS in addition to physical therapy. Anti-inflammatory drugs, followed by biologics, are the first-line therapeutic recommendations [6]. There is no proof that traditional synthetic disease-modifying antirheumatic medications (DMARDs) are effective in treating solely axial illness [7]. As a result, individuals who have an insufficient response to or intolerance to NSAIDs (IR) have few therapy choices. A further unfulfilled demand for oral treatments with alternate modes of operation to treat AS exists because DMARDs are given parenterally [8]. Tofacitinib is an oral Janus kinase 2 enzyme inhibitor. The potential role of the drug in several inflammatory disorders has been documented in several studies [9]. Axial spondyloarthritis is one such inflammatory disease of joints. JAK 2 inhibitor modulates the inflammatory cytokine cascade responsible for joint inflammation and destruction leading to reduction and inhibition of inflammatory process. Numerous immune responses, both adaptive and innate, involve JAKs [10]. Ultimately, the expansion of inflammation-producing cells in synovial and extra-musculoskeletal areas as well as of

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cell types connected to AS characteristics such joint deterioration. JAK inhibition may thereby lessen AS manifestations in the extra-muscular and articular skeletal areas[11].

There is scarcity of knowledge regarding the effectiveness in patients AS in our population. Therefore, we planned to provide the findings of a randomized controlled trial evaluating tofacitinib's effectiveness in treating adult patients with active axial spondyloarthritis.

METHODS

This randomized controlled trial was performed at the rheumatology department, Lady Reading Hospital, Peshawar during the period 1st November 2022 till 31st October 2023. Participants in the age range of 18 to 45 years were registered. We sought those patients with spondyloarthritis that was active. AS was assigned to individuals who matched the modified New York criterion. Patients required to be resistant to NSAIDs and have active disease at baseline, as measured by a Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) score of 4. Efficacy was determined in terms of response to treatment which was assessed using ASAS20 score. Improvement in ASAS20 score by 20% from the baseline after 12 weeks of treatment was called efficacy. The ASAS comprised of 5 components(back pain, peripheral pain, morning stiffness, patient global assessment and CRP). It was calculated using an online calculator (www.asas-group.org). Participants were supposed to be unfamiliar with DMARDs. All pregnant females, patients with history of DMARD, hypersensitivity to tofacitinib, renal and liver failure patients and severe cardiopulmonary compromised patients were excluded. Participants were recruited using convenient sampling technique. Sample size was calculated using WHO sample size formula taking the assumptions anticipated efficacy of tofacitinib as 66.4% and 29.4% for placebo [12]. Trial was registered with clinicaltrials.gov vide NCT0752933. Permission for the conduct of the study was carried out vide no. 216/LRH-MTI, dated: 31st October 2022. Patients with an AS diagnosis and a minimum age of 18 were considered eligible. Patients were exposed to two different treatments throughout the double-blind phase(weeks 0–12). Tofacitinib 5 mg twice day or a placebo was randomly assigned in a 1:1 ratio. Each patient gave their signed, informed permission. Patients were categorized to group A and B through blocked randomization. All patients were treatment naïve and refractory to NSAIDs. Response to treatment was assessed using ASAS20 score measured before treatment initiation and at 12 weeks of treatment. More than 20% improvement in the ASAS20 score considered efficacy. SPSS version 25 was used for all of the statistical analysis. For numerical variables, mean and standard deviation were calculated; categorical data were presented as frequencies and percentages. Quantitative data comparisons were made using the independent sample t-test. Categorical data comparisons were performed using contingency tables. Categorical data were subjected to the chi square test. Statistics were deemed significant if P is less than or equal to 0.05.

RESULTS

The baseline features and demographics are illustrated in table 1. The mean age of tofacitinib arm was 41.19 ± 5.075 years versus 39.83 ± 4.989 years in placebo group. The mean BMI were 24.538 ± 1.970 and 23.873 ± 2.004 kg/m2 in tofacitinib group and placebo group respectively. Baseline ASAS20 in tofacitinib group was 3.77 ± 0.658 while it was 3.526± 0.914 in placebo group. The number of male participants in tofacitinib group were 14 (63.6%) while it was 12(54.5%)in placebo arm(Table 1).

Table 1: Baseline features and demographics

Features	Tofacitinib Group (n = 22)	Placebo Group (n = 22)
Age (years)	41.19 ± 5.075	39.83 ± 4.989
Male	14 (63.6%)	12 (54.5%)
BMI (kg/m2)	24.538 ± 1.970	23.873 ± 2.004
CRP before treatment (mg/dl)	9.308 ± 1.702	9.741 ± 1.635
BASDAI (before treatment)	6.70 ± 1.010	6.59 ± 1.293
ASAS20 (before treatment)	3.77 ± 0.658	3.526 ± 0.914
Positive Smoking history	5 (22.7%)	5 (22.7%)
Total disease duration (years)	7.746 ± 2.841	8.492 ± 4.401

Treatment response assessed at 4 weeks of treatment in shown in table 2. Half of the patients(11, 50.0%)assigned to study achieved response at 4 weeks of treatment as compared to 03 patients (13.6%) in placebo arm. The chi square p-value for response to treatment was 0.009 which is less than 0.05, hence statistically significant.

Table 2: Efficacy at week 4

Treatment Response	Tofacitinib Group	Placebo Group	p-value
	Frequency (%)	Frequency (%)	
Yes	11 (50.0)	03 (13.6)	0.009
No	11 (50.0)	19 (86.4)	
Total	22 (100.0)	22 (100.0)	

Evaluation for response to treatment at week 8 is presented in table 3. The number of patients showing good response in tofacitinib group was 14 (63.3%) as compared to 4 patients (18.2%) in placebo group. the difference in response to treatment was compared using chi square test showing p-value 0.002, i.e., <0.05, hence declared statistically significant.

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Table 3: Efficacy at week 8

Evaluation for response to treatment at week 8 is

Treatment Response	Tofacitinib Group	Placebo Group	p-value
	Frequency (%)	Frequency (%)	
Yes	14 (63.3)	04 (18.2)	0.002
No	08 (36.7)	18 (81.8)	
Total	22 (100.0)	22 (100.0)	

The final evaluation for response to treatment was carried out at week 12 and the results are illustrated in table 4. The number of patients with better treatment response was significantly greater in tofacitinib as compared placebo group (17, 77.3% versus 07, 31.8%). The chi square p value for treatment response at weeks 12 was 0.002 which was statistically significant.

Table 4: Treatment response at week 12

Treatment Response	Tofacitinib Group	Placebo Group	p-value
	Frequency (%)	Frequency (%)	
Yes	17 (77.3)	07 (31.8)	0.002
No	05 (22.7)	15 968.2)	
Total	22 (100.0)	22 (100.0)	

DISCUSSION

Three janus kinase enzyme inhibitors have been studied in axial spondyloarthritis patients, however only those with a radiological manifestation. Most patients had never used DMARDs, and all had a poor response to at least two NSAIDs [13]. JAKis were associated with clinical improvement in accordance with widely accepted and documented response criteria in axSpA (change in ASDAS for filgotinib, ASAS40 for upadacitinib, and ASAS20 with tofacitinib). JAKis were also associated with improvements in joint mobility, quality of life, fatigue, and CRP, which measures systemic inflammation [14]. The mean age of study group was 41.19 ± 5.075 years which is comparable to the mean age recorded by Deodhar et al., in their study. However, the proportion of male participants was greater in their study which was 87.2% as compared to 63.6% in our study. While the mean BMI in their study was greater as compared to ours [12]. The efficacy of tofacitinib in our study recorded at week 4, 8 and 12 was 50.0%, 63.3% and 77.3% which are similar to study by Deodhar et al., where the efficacy at similar intervals was 51%, 57.1% and 63.9% respectively [12]. Tofacitinib considerably outperformed placebo in terms of the ASAS20 evaluation rate at week 12 (the primary endpoint). These results were supported by secondary sources [13, 14]. Tofacitinib significantly reduced the severity of the disease, the ability to move, operate and health-related aspects of life as opposed to placebo in clinical assessment and patient-reported outcomes, according to efficacy endpoints. It's significant to note that tofacitinib-treated patients showed a quick beginning of clinical remedy, including an ASAS20 response, as early as week 2, the first post-baseline visit. These efficacy results are consistent with those of the phase II study that compared tofacitinib to a placebo in individuals with AS [15]. Several other JAK inhibitors have also been formulated over time. These include Upadacitinib and Filgotinib [16]. Their potential role in the treatment of AS have been studied and was reported to be comparable with tofacitinib [17]. In the phase II/III research SELECT-AXIS 1, upadacitinib 15 mg once daily significantly increased the ASAS40 treatment response rate at week 14 compared to placebo (48 of 93 (52%) vs. 24 of 94 (26%), p=0.0003; main goal) [18]. The mean (SD) ASDAS at week 12 in the phase II research TORTUGA was substantially higher with filgotinib 200mg once daily compared to placebo (1.47 (1.04) vs 0.57 (0.82), p0.0001; main endpoint) [19]. The most extensive safety research done in AS is the SELECT-AXIS trial, which lasted for a duration of two years and was conducted via an open-label format. However, no further safety issues emerged and the analyses proved to be accordance with the secure record of JAKi in other disorders involving immune system regulation [20]. Common adverse events seen in trials using JAK inhibitors for rheumatoid arthritis comprise shingles, tuberculosis, major adverse cardiovascular events, venous thromboembolisms, and tumors. The usage of JAKi is mostly linked to a greater susceptibility to infections compared to a control group. The majority of illnesses seen were nasopharyngitis, upper respiratory tract infection, and shingles. Additionally, there were observations of transaminitis and rise in CK levels [21].

CONCLUSIONS

Tofacitinib 5mg twice a day produced a quick, long-lasting, and clinically significant response in patients with active axial spondyloarthritis and refractory to NSAIDs in our study, with no additional potential safety hazards found.

Authors Contribution

Conceptualization: AWK
Methodology: MK
Formal analysis: NK, QS
Writing-review and editing: AWK, QS
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Prevalence of Depression among Mothers of Children with Cerebral Palsy (CP) Enrolled in Occupational Therapy Unit at Lady Reading Hospital Peshawar, Pakistan

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ABSTRACT

Cerebral Palsy (CP) is one of the most prevalent physical disorder in developmental disabilities among children. This condition may prone the parents for development of depression and anxiety especially the mothers. **Objective:** To assess the prevalence of depression among mothers of children with CP in Peshawar, Pakistan. **Methods:** A descriptive cross sectional study was conducted prior to randomize control trials in Occupational Therapy Department of Lady Reading Hospital Peshawar. The sample was calculated through Openepi, consisted of 240 participants through consecutive sampling technique. The quantitative data were collected through Hospital Anxiety and Depression (HADS) scale from mothers whose score was greater than 3 on the general health questionnaire (GHQ-12). **Results:** The mean age of the participants was 31.63± 7.09 years. In a sample of 240 participants, married were 230 participants followed by 6 divorced and 4 widows. Furthermore, 58% participants have male children affected followed by 42% female children. The mean score of the participants' depression was 12.49 ± 3.18 in a total score of 21, which was moderate to severe in the current study. **Conclusions:** The study concluded that mothers of CP child have moderate to severe level of depression. Furthermore, the study highlighted that majority of the participants were married and the prevalence rate of CP was higher male children as compared to female.

INTRODUCTION

There is a wide spectrum of physical and cognitive problems that manifest during early childhood development and persist throughout an individual's lifespan are collectively referred to as "developmental disabilities" [1]. Cerebral Palsy (CP) is one of the most prevalent developmental disability that developed among children having low birth weight, lower parental education levels, incomes ≤200% of the national poverty threshold [2]. In addition to this, children and adolescents with CP and spina bifida have been identified as a factor limiting social involvement and community participation such as school, social, recreational, and physical activities are affected [3]. The term "cerebral palsy" (CP) refers to a group of disorders that arise from primary non-progressive brain damage in fetuses or infants. The impairment of the developing brain affects muscle tone and strength, which restricts movement and physical activity [4]. It is one of the most common causes of motor impairment in children that leads to long-term abnormalities of posture and motor development that result in limitation of activities [5]. It is estimated that 80% of CP cases worldwide occur in Low and middle Income Countries (LMICs), where people and their families are usually caught in the vicious cycle of poverty and bigger populations [6]. The majority of children

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with CP have severe versions, which make them mostly dependent on their parents for everyday tasks and hinder their ability to speak [7]. According to a report, 60% of family caregivers of children with CP in China reported having difficulties at work and with money, and 45% reported having depressed symptoms. There have also been reported of family caregivers of children with CP experiencing noticeably more psychological and social pressures than in the general population [8]. Literature has shown that parents having CP child lowers the probability of having more children, particularly for older women and parents with less education [9]. Caregivers' physical, psychological, and mental health may suffer as a result of the stress of providing care to CP child [10]. Mental diseases may be responsible for 418 million disability-adjusted life years (DALYs) in 2019 and estimated that this load has an economic worth of USD 5 trillion [11]. Depression and anxiety are two of the most prevalent mental disorders in the general population. However, the rate of depression is increased in mothers of CP child [12]. The incidence was higher in women than in men and in those between the ages of 18 and 49 years than in those over the age of 50 years [13]. Age-standardized rates of depressive disorders were 3.9% throughout South Asia in 2016, followed by 4.4% in Bangladesh, 4.0% in Nepal, 3.9% in India, 3.7% in Bhutan and 3.0% in Pakistan [14].

Pakistan is a developing country, and the requirements of the people, particularly in Khyber Pakhtunkhwa, are not well met by mental health care. The depression and anxiety levels of mothers of children with cerebral palsy (CP) should be considered for an effective rehabilitation program connected to these children after results of this study.

METHODS

A descriptive cross sectional study was conducted in Occupational Therapy department of Lady Reading Hospital (LRH) Peshawar. This study was conducted prior to a planned randomize control trials in the same department on the mothers with CP child. The sample size was calculated through Openepi software, with the prevalence of depression in Pakistan was 39.9% [15], population of 680 and 95% confidence interval. This study was started in 2021 and completed in 2023. Date of issuance of IRB letter was 15/06/2021 with reference number was 44/OTPM&R/LRH-MH. The sample consisted of 240 participants selected through consecutive sampling technique from the OPD register at Occupational Therapy Department of LRH Peshawar. The study sample included mothers with CP child irrespective of level of their CP, enrolled in Occupational therapy department of LRH. Furthermore, those mothers were enrolled for participation who accompanied the children at the unit for therapy and exhibit level of more than 3 mental disorders (Depression and Anxiety) score on General Health Questionnaire (GHQ-12). Those mothers were excluded who already diagnosed with any mental health related problems and or formally obtaining psychological therapy.

RESULTS

SPPS version 22.0 was used to analyze the data. Tables, charts, and graphs were used to portray the findings more effectively. Descriptive analysis of the selected demographics and depression was done. In this research, there were a total of 240 respondents in the study sample. The mean age of the participants was 31.63 ± 7.09 years in a sample of 240 in the current study as shown in the below Table 1. Similarly, the participants mean score of family income was 455441.67 ± 47870.44 PKR as shown in the Table 1. The mean score of the participants' depression was 12.49 ± 3.18 in a total score of 21 as shown in the Table 1.

Table 1: Mean Age and Mean Family Income in PKR

Variable	Frequency	Mean ± SD
Age (Years)	240	31.63±7.09
Mean Family Income (PKR)	240	45541.67±47870.44
Mean Score of Depression	240	12.49±3.18

The below Figure 1 described that 6 participants were divorced, followed by 230 married, and 4 widow in a sample of 240 participants. In this study, 176 (73.3%) participants had formal level of education and 64 (27%) had informal level of education. In a sample of 240 participants, 88% of participants said they were not paid while 12% said they were paid. Furthermore, 93% participants responded that they were keeping house, while 7% responded that they were not keeping house.

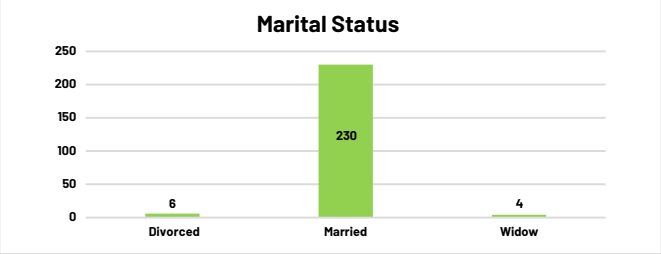

Figure 1: Participants Marital Status

The Figure 2 below shows that 35% of participants belonged to a joint family system and 65% of participants were part of a nuclear family system in the study sample.

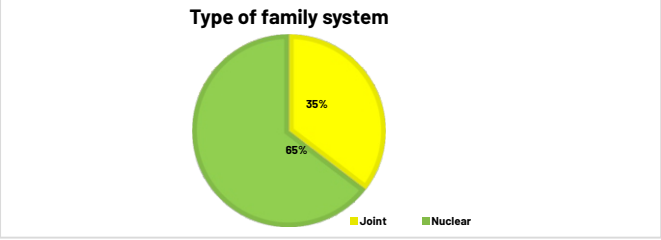

Figure 2: Participants Type of Family System

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The below Figure 3 described that 58% male and 42% female children of the participants were disabled in this study.

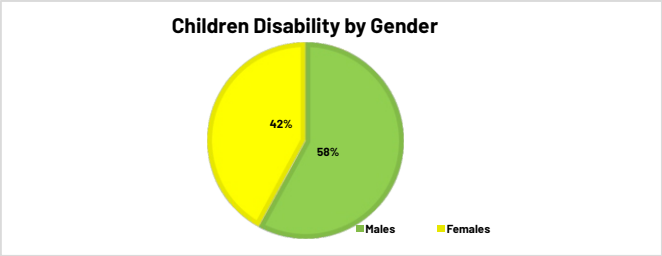

Figure 3: Children Disability by Gender

In the study sample, 11.7% (28) participants responded mild level of depression, followed by 11.77% (28) moderate level and 76.7% (184) severe level of depression as shown in the below Table 2.

Table 2: Categories of Depression

Categories of Depression	
Categories	**Number (%)**
Mild	28 (11.77)
Moderate	28 (11.77)
Severe	184 (76.7)

DISCUSSION

The mean age of the participants in the current study was 31.63 ± 7.09 years, whereas the study conducted by Smith et al., has mean age was 33.3 ± 15. 5 years [12]. This showed that the age of the participants in current study was nearly same with the age of the study conducted by Smith et al., Similarly, a study by Jain et al., in United States has mean age of the participants was 39.9±14.1 years which was not same as in the current study [13]. The study participants in the current has 73% formal education and 27% informal education whereas the study conducted by Hasan Alam et al., had 13.33% basic education, followed by 53.33% secondary education and 33.33% university education [16]. In the current study there was not found an association between depression and level of participants' education. A study by Shevell et al., analyzed that there was a correlation between lower Measure of Process of Care-56 subscale scores and greater socioeconomic level [17]. Lower scores on the subscales measuring providing general information about the children and providing specific information about the child were substantially correlated with higher levels of parental education and household income, respectively. Similarly, in the current study, the majority of the participants responded that they have severe depression while a systematic review by Scherer et al., concluded that almost every research revealed a favorable correlation between anxiety and depressive symptoms and raising children with intellectual and developmental disabilities (IDD) [1]. Lower household income and the severity of the handicap were factors linked to greater degrees of IDD depressive symptoms. The clinical cut-off score for moderate depression is reached by almost one-third (31%) of parents of children with IDD. Similarly, a study Gladstone et al., suggested that, children are less likely to benefit from psychosocial therapies for anxiety and depression while their parents are already experiencing depressive symptoms [18]. Prospects for further investigation are deliberated, including mediators and mechanisms of the correlation between parental depressed symptoms and the results of child intervention. The current study analyzed that there was found severe level of depression among mothers of children with CP. A study by Umar et al., highlighted that needs of family having child with CP [19]. These includes "need for mothers to discuss their feelings (depression, stress, etc.) with someone who has similar experience," "need for questions to be answered honestly," "need for parents to be actively involved in their child's treatment and therapies," "need for standard medical care to be provided," and "need for questions to be answered honestly" are all important points to consider. The result of this study is supported by Bourke-Taylor et al., that fathers of disabled children reported having significant levels of stress (61%), anxiety (37%), and depression (58%). Fathers reported engaging in fewer than weekly activities that promote health at a low rate. The result of the current study was also supported by Ahmad Zam Zam et al., study results revealed that 28.8% mothers had depression followed by 9.2% anxiety [20]. Similarly, Boztepe et al., study examined predictor of caregiver burden among mothers of children with leukemia and CP [21]. The result of the current study did not consist with the study of Boztepe et al., as there were not found differences in the groups' levels of depression or burden. The mother's depression and the severity of the disease in both groups were predictive of burden. If the child was younger or male, mothers in the leukemia group reported a larger load; no such association was seen in the CP group.

CONCLUSIONS

Pakistan is a developing country, and the requirements of the mothers, particularly in Khyber Pakhtunkhwa, were not well met by mental health care services. The study concluded that mothers of CP child have moderate to severe level of depression. Furthermore, the study highlighted that majority of the participants were married and majority percentage of their male child developed CP.

Authors Contribution

Conceptualization: AA
Methodology: TR
Formal analysis: SB, MS

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Writing-review and editing: AA
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Perceived Effects of Interpersonal Conflicts among Nurses at Tertiary Care Hospital, Lahore

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ABSTRACT

Interpersonal conflicts at workplace are not uncommon, it affects the nurses physical and mental health. It creates highly-stress environment and affects quality of patient outcomes. It poorly affects job performance and increases turnover. It creates disputes among nurses and leads to work disruptions. **Objective:** To examine perceived effects of interpersonal conflicts among nurses **Methods:** The quantitative descriptive study design and simple random sampling technique was used in this study. Demographic data from the study reveals 187 participants from which data were collected that indicates majority of the participants were 136 females. Only 33.7% of nurses reported that they were treated with love and kindness. However, 28.3% showed sometimes nurses had been faced with excessively harsh criticisms about my work. **Results:** The participants of this study include 83.4% nurses are Muslim and 16.6% are Christian. 70.6% nurses have 1 to 3 years' experience, 15.5% nurses have 3 to 5 years' experience and 13.9% have >5 years' experience. **Conclusions:** However, the results of this study could help to aware nurses about workplace conflicts and strategies that promote to reduce conflicts at workplace among nurses.

INTRODUCTION

Interpersonal conflicts arise when two or more people gives different perspectives and it can occur at any time. This can occur between co-workers, managers or clients and between clinical nurses or other employees. It can exist between two or more people having different points of views about something [1]. Such conflicts can arise in any settings which may be healthy, it can be result of mutually beneficial solution and when conflicts being un-resolved, this can be unhealthy leads to conflict in a relationship. Such relationships build bad effects on working environment. The term interpersonal conflicts are used interchangeably with terms such as lateral violence, bullying, incivility, relational aggression, and disruptive behavior [2-6]. An interpersonal conflict among healthcare workers also termed as "Horizontal or Lateral violence" it a process that occurs between interdependent individuals, groups, or both, as they face negative emotional reactions and interference with the achievement of their goals. Working relations between nursing colleagues are important for teamwork, job satisfaction, and patient outcomes [7]. The interpersonal conflicts in the workplace are inquiring issue that creates highly stressful environment, which become the barrier in progress of healthcare departments. Studies estimated that

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somewhere between 46% of nurses have experienced lateral violence at some point during their careers. There is no single description about violence in nursing, however there are numerous phenomena or theories that points towards interpersonal conflicts among nurses. It can cause psychological problems such as sleep disturbances etc [8]. Nurses who experience such conflicts have poor trust in their organization and shows unsatisfactory work performance. It leads to negative self-image, ungenerous sense of well-being and low-grade world-view [9]. Manifestation includes rudeness, sarcasm, mockery, anxiety, quality issues, job dissatisfaction, increased cost and turnover. Verbal violence is considered primarily affects emotional health of nurses [10]. The purpose of improving relationships by helping them to express their emotions and describes them freely and forming healthy environment which make strong trusting relationships among workers. This will be height light awareness and to aid in further prevention. Today nursing profession faces a lot of challenges which includes increasing workload, inadequate staffing, and lack of proper scheduling workflows, working long-hour shifts, being judged about their profession, absenteeism stress and complex work environment [11]. There are varieties of ways to resolve conflicts are encouraging teamwork, involve human resources (HR), consider individual differences, listen well, speak properly, use managing styles such as compromise, collaborate, avoid biases, discipline and self-control, create problem solving. Collaboration is a strategy chosen by educated nurses and the supervisor for conflict management [12]. Managing conflicts that often relates to better job satisfaction and work relations among nurses. It leads to better satisfactory work performance, beneficial for patient quality care, but further improves organization employee's trust [13].

In recent times, there has been growing concern regarding workplace interpersonal conflict (WIC) and its implications for both the healthcare system and its workforce. Individuals across various roles such as doctors, nurses, co-workers, managers, and administrative staff may have encountered conflicts in the workplace. Given the potential compromise to patient safety resulting from these consequences, the healthcare system employees could disclose instances of interpersonal conflicts when reporting patient safety events during the course of patient care. Therefore, the present study was conducted to examine perceived effects of interpersonal conflicts among nurses.

METHODS

A quantitative descriptive study design was used to conduct in the Jinnah Hospital, Lahore, from February to March 2023. Sample size was calculated by using Sullivan formula as follow: N=Total population n=sample size e=margin of error n=N/1+Ne2 n=500/1+500(0.05)2 =187. All the nursing staff having 3 to 8 years' experience were enrolled in current study. All the unwilling nurses and working on managerial post were excluded from current study. The Workplace Aggression Research Questionnaire (WAR-Q) was used for data collection. The questionnaire was divided into 2 parts. 1st part consists of basic information and 2nd part deals with conflict-of-interest questionnaire. All the data was entered and analyzed by SPSS version 22.0. Frequencies and percentages were calculated for qualitative variables.

RESULTS

Out of 187 participants, 94.1% nurses were included in category of 25-35 age, 3.7% were included in 36-45 and 2.1% included in 46-55. Out of 187, 27.3% nurses are male and 72.7% nurses are female. The majority of the participants were 136 females. Out of 187, 79.7% nurses are single and 20.3% nurses are married. Out of 187, 83.4% nurses are Muslim and 16.6% are Christian. 70.6% nurses have 1 to 3 years' experience, 15.5% nurses have 3 to 5 years' experience and 13.9% nurses have >5 years' experience. 75.9% nurses are from urban community and 24.1% nurses are from rural community. 44.4% are BSN nurses, 43.9% are General Nursing and 11.2% are midwifery. There rate of BSN nurses who completed the study was high (Table 1).

Table 1: Demographic Tool Profile Characteristics of Nurses at a Tertiary Care Hospital Lahore (N=187)

Demographic Variables	Frequency (%)
Age	
25-35	176 (94.1)
36-45	7 (3.7)
46-55	4 (2.1)
Gender	
Male	51 (27.3)
Female	136 (72.7)
Marital Status	
Single	149 (79.7)
Married	38 (20.3)
Educational Level	
BSN	83 (44.4)
General Nursing	82 (43.9)
Midwifery	21 (11.2)
Religion	
Islam	156 (83.4)
Christianity	31 (16.6)
Experience	
1-3 year	70.6 (70.6)
3-5 year	15.5 (15.5)
>5 year	13.9 (13.9)

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Residence	
Urban community	75.9 (75.9)
Rural Community	24.1 (24.1)

The nurses' experiences of being treated with love and kindness in the workplace indicated that 33.7% of nurses reported always receiving such treatment, 31.6% often, 23% sometimes, 5.3% rarely, and 6.4% never. Moving on to hostile glares, findings revealed that 13.4% of nurses always experienced it, 29.9% often, 31% sometimes, 19.3% rarely, and 6.4% never. Moreover, explored negative comments about religious beliefs, the data showed that 11.8% of nurses always faced such comments, 11.8% often, 19.3% sometimes, 14.4% rarely, and notably, 42.8% never experienced negative comments about their religious beliefs. The question regarding examined instances of others refusing assistance, 26.2% of nurses reported sometimes experiencing refusal. Additional findings included 5.3% always, 20.9% often, 24.6% rarely, and 23% never facing refusal for their requests for assistance. Finally, research the experiences of excessively harsh criticism about work the results indicated that 10.7% of nurses always faced such criticism, 18.2% often, 18.7% rarely, and 24.1% never. However, 28.3% showed sometimes nurses had been faced with excessively harsh criticisms about my work (Table 2).

Table 2: Perceived Effects of Interpersonal Conflicts among Nurses

Questions	Always	Often	Sometimes	Rare	Never
Had I ever been treated with love and kindness at workplace?	33.7	31.6	23	5.3	6.4
Had I ever faced helping and trusting relationship at workplace?	27.8	28.3	23.1	13.4	5.3
Had someone ever given values to my personal beliefs and faith?	26.2	29.9	20.3	15.5	0
Had I ever been glared at in a Hostile manner?	13.4	29.9	31	19.3	5.4
Had I ever been excluded from work- related social gathering?	21	34	43	30	59
Had I ever been subjected to negative comments about my religious beliefs?	11.8	11.8	19.3	14.4	42.8
Had I ever been treated in a rude or disrespectful manner?	14.4	20.9	21.4	16	27.3
Had others refused my requests for assistance?	5.9	20.3	26.2	24.6	23
Had I ever been subjected to negative comments about my intelligence or competence?	11.2	15.5	19.8	18.7	34.8
Had I ever been blamed for other people mistakes?	11.8	19.3	18.7	21.4	28.9
Had I ever been given unreasonable workload more than others?	13.9	21.4	30.5	16	18.7
Had my attempt ever been made to turn other employees against me?	11.8	13.4	28.9	15.5	30.5
Had someone else taken credit of my work?	11.2	21.9	29.9	17.1	19.8
Had I ever been faced with excessively harsh criticisms about my work?	10.7	18.2	28.3	18.7	24.1
Had my contributions ignored by others?	11.2	23	24.1	15	26.7
Had I ever been given little or no feedback about my performance?	12.8	25.1	26.2	17.6	17.6
Had others fail to deny false rumors against me?	12.3	23	31.6	12.5	20.9
Had I ever felt tense and stress on my job?	15	27.8	28.3	11.8	17.1
Had I ever been subjected to threats to reveal private or embarrassing information about me to others?	11.8	18.7	16.6	8.6	44.4

DISCUSSION

The results of current study reported that out of 187, 27.3% nurses are male and 72.7% nurses are female. The majority of the participants were 136 females. Out of 187, 79.7% nurses are single and 20.3% nurses are married. Out of 187, 83.4% nurses are Muslim and 16.6% are Christian. Sauer et al., reported the frequency of nurses experiencing workspace bullying in a hospital in the North Carolina. According to his findings, 40% of the nurses had experienced bulling in the past six months. Out of these nurses, 95% were female [14]. The current study explored those perceived effects of Interpersonal conflicts among nurses working at tertiary care hospital. These findings were in line with another study which reported that the Interpersonal conflict at workplace such as criticizing, negative comments, unreasonable workload, and stress on job, disrespectful manner, blaming on others and giving little value creates conflict among nurses. As evident by the literature that interpersonal conflicts exist [15]. The results of current study revealed that the experiences of excessively harsh criticism about work the results indicated that 10.7% of nurses always faced such criticism, 18.2% often, 18.7% rarely, and 24.1% never. However, 28.3% showed sometimes nurses had been faced with excessively harsh criticisms about my work. These research outcomes corroborate the conclusions drawn in a study by Sellers et al., on New York State Nurses, indicating that nurses tend to overlook behaviors associated with horizontal violence when they either witness or undergo such incidents. A significant number of interviewed nurses failed to label their encounters with aggression as instances of horizontal violence, bullying, or by any other terminology found in existing literature, workplace violence policies, or codes of conduct [16]. In another

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study, it was reported that the 31% of participants reported experiencing bullying, and such instances of bullying emerged as a substantial factor in predicting the likelihood of individuals intending to depart from the organization [17]. Findings by Singh and Loncar determined that dissatisfaction with nursing colleagues was the fourth most prevalent cause of workplace challenges [18]. Nurses cited issues such as a lack of mutual respect, internal conflicts among peers, accusations of subpar professional standards within the colleague group, and unsupportive attitudes from both senior staff and administrators [19]. Recent literature suggests that competition for resources is a foundational factor for bullying behaviors Considering nurses' patient responsibilities in resource-constrained environments, further investigation into resource competition as a factor in horizontal violence is warranted [20].

CONCLUSIONS

The study explored those perceived effects of interpersonal conflicts among nurses working at tertiary care hospital. The study revealed that Interpersonal conflict at workplace such as criticizing, negative comments, unreasonable workload, and stress on job, disrespectful manner, blaming on others and giving little value creates conflict among nurses. However, the results of this study could help to aware nurses about workplace conflicts and strategies that promote to reduce conflicts at workplace. It leads to better job-performance and work-place relations.

Authors Contribution

Conceptualization: AN,MZ, QF, SP, ME, PS, KA, ZF
Methodology: AN,MZ
Formal analysis: AN,MZ
Writing-review and editing: QF, SP, ME, PS, KA, ZF
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The author declares no conflict of interest.

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Original Article

Ureteric Laser Tripsy with and without Stone Cone

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ABSTRACT

Stones may block the ureter causing pain and discomfort. Ureteric laser lithotripsy, a notable breakthrough in urology, has transformed the treatment of urinary tract stones. **Objectives:** To compare the efficacy of ureteroscopic laser lithotripsy with and without stone cone. **Methods**: This retrospective analysis was done at LRH Peshawar's urology department from 1st December 2022 to 31th October 2023. Over the time, 50 patients had ureteroscopic holmium laser lithotripsy. Our research comprised adults over 18 with proximal ureteric stones (>10mm) and hydro ureters on CT KUB. Patients were split into two groups. Group A included 27 patients and employed a 7mm stone cone (Boston Scientific Corp, Natick, MA). No stone cone was utilized in group B (23). **Results:** This prospective research included 50 adults with radiologically confirmed uretric stones in diverse ureteric sites. Male 35 (70%) and female 15 (30%) were 21–68 years old (mean 38.6 years). Stones size varied from 6 to 20 mm, averaging 12.6mm. Proximal stones were 8–20mm (mean 13.9). Mid-ureter stones were 7–18mm (mean 12.6). Lower ureter stones ranged from 6 to 16mm, with a mean of 11.9mm. Ten (20%) patients have normal pelvicalyceal systems. Patients with moderate hydronephrosis were 27 (55%). **Conclusions:** The use of a stone cone during ureteroscopic lithotripsy is a safe and effective technique for the management of ureteric stones.

INTRODUCTION

Ureteric laser lithotripsy, a notable breakthrough in urology, has transformed the treatment of urinary tract stones [1]. Ureteroscopy, a minimally invasive method, is used for both diagnosis and treatment, especially when there are kidney stones blocking the ureter, which is an important conduit connecting the kidneys to the bladder [2, 3]. The management of ureteric calculi has undergone substantial alterations in the last two decades. Ureterorenoscopy is a less intrusive and safe technique for treating ureteric stones in urology, particularly when performed repeatedly, in comparison to other methods. Although shock wave lithotripsy is often used, URS is considered very effective in treating ureteric stones, with a success rate of 97% [4]. Endoscopic therapy is the favored method due to the progress and improvement in instruments and techniques [5]. The success rate of URS has significantly increased as a result of advancements in semi-rigid, flexible URS and holding gear. The endoscopic ureteroscopic lithotripsy has several drawbacks. The primary challenge faced was the backward movement of the stone, caused by the propulsive force of the irrigant and the energy needed to break the stone into fragments [1, 6]. The observed retropulsion ranged from 16 to 48%, with a higher likelihood of retropulsion occurring in proximal ureteric stones. The introduction of the stone cone has greatly reduced stone retropulsion. The stone cone serves as a device for occluding the ureter and securing the stone in position. Additionally, it functions as a guide wire for the ureter [7, 8]. The process entails the insertion of a thin ureteroscope into the urethra, enabling direct observation of the stone [9, 10]. Ureteric laser lithotripsy is a procedure that uses laser light sent over a fiber-optic cable to

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accurately break down stones in the ureter [11-13]. This novel approach provides a less intrusive option compared to conventional surgical procedures, while also offering the benefits of shorter recovery periods and less potential problems.

This study aimed to compare the efficacy of ureteroscopic laser lithotripsy with and without stone cone. This study explored ureteric laser lithotripsy, by critically assessing its effectiveness and safety, taking into account method variables such stone cones. Results of this study will educate clinical decision-making, improve patient care, and help us understand how to best use ureteric laser lithotripsy in modern healthcare.

METHODS

The Urology department at Leady Reading Hospital Peshawar undertook this prospective, randomized trial from 1st December 2022 to 31th October 2023. The trial was registered with clinical trial registry (Clinicaltrial.gov ID: NCT0585647). Permission for the conduct of the study was granted by institute ethical review board vide no: 225/LRH/MTI, dated 11th November 2022. A total of 50 ureteric stone patients were studied. This study included adults over 18 with plain kidney, ureter, bladder (KUB) x-ray films or spiral CT scan evidence of ureteric stone (6-20mm) and proximal hydro ureter. Sample size was calculated using WHO sample size calculator. The sample size was obtained using the procedure for comparing two proportions with 80% power and 5% significance. Stone migration was projected to be 10% in the control group (without stone cone) and 40% in the intervention group (with stone cone). These assumptions yielded 23 patients per group. Patients were enrolled using non-probability convenient sampling technique. Patients were split into two groups. Groups A and B included 27 and 23 patients, respectively. Group A patients employed a stone cone to avoid stone retropulsion, but group B did not. Keeping the randomization list private from researchers reduced selection bias. The study's main and secondary aims were retrograde stone migration during ureteroscopic laser lithotripsy and stone-free rate with and without stone cone device. Patients with urethral strictures distal to stone, renal stones, ineffective URS, clinical symptoms of urosepsis, and stone impaction were excluded from the research. All patients got spiral CT scans, intravenous urograms, and KUB as needed. Every patient in this study had a ureteric stone. Seven patients (15%) had proximal, five (10%) mid, and 38 (75%), distal ureteric stones. The semi-rigid "Karlz storez" 7.5fr URS with 4fr working channel and pressure poor irrigation was employed in our investigation. Boston Scientific Crop, Natrick,MA 7mm stone cone. There are several laser machines. 100W, 150W, 60W Quanta system. A 100W Quanta system with a Holmium: YAG Laser is employed in our OT. Stone fragmentation began at 10W and 1.0 J and accelerated to 12.5.15.18 and 20. Stone retropulsion increases after 20. Install guide wire and run collapsible stone cone over it until black lines are beyond the stone following endoscopic spotting. The cone was released and dragged caudally against the stone. URS has stone-level advancement. The laser lithotripsy probe is positioned over the stone and shot under eyesight. When stone is totally shattered, the probe leaves the working channel. A double J stent was put over guide wire after the stone cone was removed from the ureter. The laser lithotripsy probe was pushed down the ureteroscope working channel to initiate stone breakup after placing a semi-rigid URS over a guide wire. When the stone fragments were little, DJ stent went over guide wire and left them alone. Both groups considered the surgery successful if stone shattered to 2-3mm fragments and did not migrate. Proximal or upward stone migration to the kidney was observed during ureteroscopic lithotripsy or on the first post-op day by spiral CT KUB or KUB x-ray. Due to the high expense of CT scans, all patients except four (three from group A and one from group B) were evaluated by x-ray KUB. Additional therapy for migrating stones was ESWL.

RESULTS

In this prospective study, 50 adult patients with radiologically proven uretric stone at various ureteric locations were included. Age ranged from 21 to 68 years (mean 38.6) with male 35 (70%) and females 15 (30%). Normal pelvicalyceal systems were noted in 10 (20%) patients. Patients with mild hydronephrosis were 27 (55%). And patients with moderate hydronephrosis were noted in 13 (25%) patients (table 1).

Table 1: Patient Demographics

Characteristics		Total Patients (n=50)
Gender	Female	35 (70%)
	Male	15 (30%)
Age Range (years)		21 - 68
Mean Age		38.6
Normal Pelvicalyceal Systems		10 (20%)
Mild Hydronephrosis		27 (55%)
Moderate Hydronephrosis		13 (25%)

Gender-wise distribution of the study subjects is shown in figure 1.

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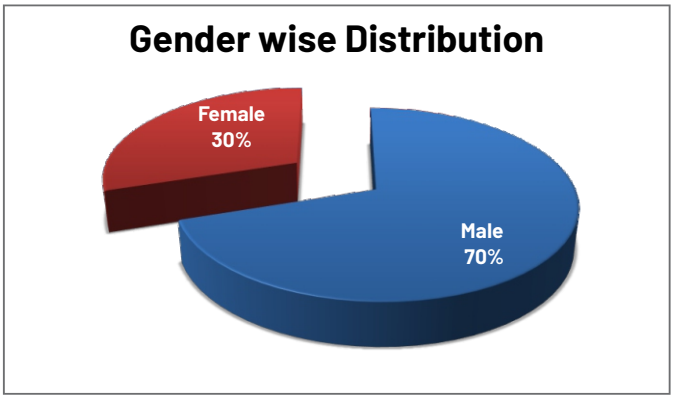

Figure 1: Gender-wise Distribution

The stones size ranged from 6 to 20 mm with a mean of 12.6mm. The size of proximal stones ranged from 8 to 20mm (mean 13.9mm). The size of stone in mid ureter ranged from 7 to 18mm (mean 12.6mm). And with mean of 11.9mm, the size of stones in lower ureter varied from 6 to 16mm. Stone was successfully fragmented inn all patients. No stone migration noted with patient of group A in which stone cone was noted, however in seven patients (28%), in whom stone cone was not used, stone migrated proximally as show in table 2.

Table 2: Patients' Stone Characteristics

Characteristics	Values (mm)
Stone Size Range	6 - 20
Mean Stone Size	12.6
Proximal Stone Size Range	8 - 20
Mean Proximal Stone Size	13.9
Mid Ureter Stone Size Range	7 - 18
Mean Mid Ureter Stone Size	12.6
Lower Ureter Stone Size Range	6 - 16
Mean Lower Ureter Stone Size	11.9

The operative time varied between 30 to 55 minutes, with mean operative time of 41.8 min, in the stone cone group, whereas it varied in without stone cone group from 40 to 71 minutes with mean operative time of 51.4 minutes; this difference was statistically significant (p 0.05)(table 3).

Table 3 : Operative Time and Post-operative Radiographic Clearance

Group	Mean Operative Time (minutes)	Complete Stone Clearance (%)
Stone Cone (Group A)	41.8	100%
Without Stone Cone (Group B)	51.4	70%

KUB or spiral CT scan on first pot-operative day was done. As demonstrated in table 4, In 27 patients of stone cone group, Radiographs showed complete stone clearance while in 23 patients of group B, 7 patients retained clinically significant remaining fragments.

Table 4 : Stone Fragmentation and Migration

Group	Stone Fragmentation Success (%)	Stone Migration (%)
Stone Cone (Group A)	27 (100%)	0 (0.0%)
Without Stone Cone (Group B)	23 (100%)	7 (30.4%)

The hospital stay in stone cone group was one to four days with mean hospital stay of 1.7 days and were back to normal routine after 2 to 6 days (mean 3.3). In contrast the average hospital stay in without stone cone group was 1 to 5 days (mean hospital stay of 1.9 days) and was back to normal routine after 2-5 days (mean 3.1 days) show in table 5.

Table 5 : Hospital Stay and Return to Normal Routine

Group	Mean Hospital Stay (days)	Mean Return to Normal Routine (days)
Stone Cone (Group A)	1.7	3.3
Without Stone Cone (Group B)	1.9	3.1

Out of total patients, minor bleed was seen either during or following stone fragmentation, in 15 (30%) patients, making it the most frequent complication.

DISCUSSION

The research found that the average age of patients was 38.6 years, with a male to female ratio of 70:30. This is comparable to the research conducted by Sarkar et al., which reported a mean age of 39.5 years and a male to female ratio of 2.3:1 [14]. In this research, the average stone size was found to be 12.6 mm, which is similar to the findings of Jain et al., who reported an average stone size of 12.8 mm [15]. Regarding the location of stones, the current research revealed that 28% of stones were located in the proximal ureter, 26% in the mid ureter, and 46% in the lower ureter. Similar findings were reported in the research conducted by Lai et al., whereby 30% of the stones were located in the proximal ureter, 25% in the mid ureter, and 45% in the lower ureter [16]. In this research, 20% of patients had normal pelvicalyceal systems, whereas 55% displayed mild hydronephrosis and 25% showed significant hydronephrosis. This is analogous to the research conducted by Sen et al., which reported that 22% of patients had normal pelvicalyceal systems, 56% displayed mild hydronephrosis, and 22% showed significant hydronephrosis [17]. Regarding stone clearing, the current research observed that all patients in the stone cone group achieved total elimination of stones, but 28% of patients in the group without stone cone still had pieces left. This is comparable to the research posted in Research and Reports in Urology in 2021, where 100% of patients in the stone cone group had total stone removal, whereas 25% of patients in the sans-stone cone group had leftover fragments [18]. In this investigation, the average duration of the operation was 41.8 minutes for the group using the

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stone cone, and 51.4 minutes for the group not using the stone cone. This is similar to the research conducted by Siddiqui et al., which reported that the average duration of the operation was 40.5 minutes in the group with stone cones and 50.2 minutes in the group without stone cones. The most prevalent consequence in the current research was mild bleeding, observed in 30% of patients. Similar findings were seen in research conducted by Goyal et al., where 32% of patients had mild bleeding [20]. The research revealed that the average duration of hospitalization was 1.7 days for patients in the stone cone group and 1.9 days for patients in the group without a stone cone. This is similar to the investigation conducted by Kaleeswaran et al., in which the average duration of hospitalization was 1.8 days for the stone cone group and 2.1 days for the group without stone cone. In summary, the results of this investigation align with other published studies, demonstrating the efficacy and safety of using a stone cone during ureteroscopic lithotripsy.

CONCLUSIONS

Utilizing a stone cone during ureteroscopic lithotripsy is a secure and efficient method for treating ureteric stones. It may aid in minimizing the duration of surgery, enhancing the rate at which stones are removed, and reducing the length of hospitalization. The most prevalent event seen in 30% of individuals was minor hemorrhage. Additional research with bigger sample numbers and several centers is necessary to validate the results of this study.

Authors Contribution

Conceptualization: MSK, KF
Methodology: MSK, KF
Formal analysis: MSK, KF
Writing-review and editing: MSK, KF
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Association of Gestational Anemia with Pregnancy-Induced Hypertension in a Private Hospital Maternity Care

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ABSTRACT

Anemia, a prevalent global health concern affecting a quarter of the world's population, notably impacts pregnant women, with approximately 56 million affected globally. Its repercussions on maternal and neonatal health are extreme, leading to increased risks of low birth weight, fetal complications, and maternal morbidity and mortality. Concurrently, pregnancy-induced hypertension (PIH) poses significant risks to maternal and fetal well-being, yet the link between anemia and PIH remains an understudied area, particularly in Pakistan. **Objective:** To investigate the association between anemia and the heightened risk of PIH, offering critical insights into perinatal outcomes. **Methods:** A retrospective study was designed and the data was collected from Hijaz Hospital Gulberg III Lahore, Pakistan. Total 120 pregnant women were selected for the study and split into two groups. Group A consisted of 65 pregnant women with hypertension, whereas group B included 55 non-hypertensive pregnant women. Hemoglobin levels and Complete Blood Count were evaluated using standard protocols. The association of hemoglobin levels and PIH was investigated using independent-students test and one-way ANOVA by utilizing SPSS version-25. **Results:** Our findings showed that the hemoglobin levels were lowest (9.953846±1.924584 g/dl) in hypertensive women as compared to no-hypertensive women (11.52±1.584172) in their 3rd trimester. It coincided with the lowest number of red blood cells (4.1067±0.57816 million/mm3) in women with hypertension. **Conclusions:** Our finding demonstrated that the lower the levels of hemoglobin, the higher the risk of PIH.

INTRODUCTION

Anemia, characterized as a diminished convergence of blood hemoglobin, is a standout amongst the most well-known dietary inadequacy infections watched universally and influences more than a fourth of the total populace [1]. Universally, iron deficiency influences 1.62 billion individuals (25%), among which 56 million are pregnant women [2]. Anemia, in pregnant women, has serious outcomes on wellbeing, social, and monetary improvement [3]. Weak pregnant women will be in danger of low physical action, expanded maternal dreariness and mortality, particularly those with serious anemia. What's more, pregnant women and their neonates experience negative outcome including low birth weight (LBW), fetal anemia, intrauterine development confinement, perinatal mortality and preterm conveyance [4]. The reason for gestational anemia is multi-factorial. Iron, folate, nutrient B12 and nutrient and insufficiencies just as intestinal parasitic diseases, jungle fever, and perpetual sickness have all been demonstrated to be the primary driver of anemia among pregnant women [5]. Pregnancy-induced hypertension (PIH) is the systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg or both and occurs after 20 weeks of gestational period in women without the history of hypertension. It can be classified into gestational hypertension, eclampsia and preeclampsia. Severe pre-eclampsia in pregnancy is a systolic blood pressure ≥160

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mmHg or diastolic blood pressure ≥110 mmHg or both. Eclampsia is a severe form of PIH that develops near the end of pregnancy in one in every 1,600 pregnancies. Protein in the urine, high blood pressure, and pathologic edema are the three basic features of PIH disorders [6]. Anemia in pregnant women is common in Pakistan. Women make up 30-50% of the population. Prevalence of anemia among pregnant women is in the range of 30-50% depending upon different sociodemographic factors. There are contradictory studies regarding the relation between anemia and perinatal outcomes. Some previous reports have depicted a strong association between anemia and adverse perinatal outcomes such as LBW and preterm delivery, while other studies found no significant relationship. A meta-analysis depicted that anemia during early pregnancy, but not during late pregnancy, is associated with slightly increased risk of adverse perinatal outcomes [7]. As a result, there is little evidence to assess the effect of maternal anemia on maternal and perinatal outcomes, particularly PIH. The literature depicting the correlation between anemia and PIH is scarce and almost non-existent in Pakistan. The present study was designed to investigate the relation of anemia with the increased risk of PIH in pregnant women and contribute in further understanding of the anemia and associated perinatal outcomes.

METHODS

A retrospective study was designed and was conducted at Institute of Molecular Biology and Biotechnology at The University of Lahore and the data was collected from Hijaz Hospital Gulberg III Lahore, Pakistan from July 2018 to June 2019. Total 120 pregnant women were selected for the study and split into two groups. Group A consisted of 65 pregnant women with hypertension, whereas group B included 55 non-hypertensive pregnant women. The subjects were provided with questionnaire to collect necessary socio-demographic information during sampling. People suffering from viral hepatitis, cardiac diseases, cancer and any genetic disorders were excluded from the study. For blood sampling, 5ml whole blood was drawn from antecubital vein by aseptic technique then shifted in a properly labelled vacutainer (EDTA). Samples were then transported in ice box to lab and were stored and preserved at 4℃ for future use. For the estimation hemoglobin levels in blood, the Drabkin's method was followed with a few modifications [8]. The vacutainers were rolled on the test tube roller for homogenization and mixing of EDTA and blood. 4ml of the Drabkin's reagent was mixed well with 20ul of blood sample and incubated at room temperature away from sunlight for 5 minutes. The absorbance of the solution was then measured using UV-visible spectrophotometer at 546 nm. To estimate the value of hemoglobin, following formula was used:

Hb (g/dl) = (abs. of the sample/abs. of the standard) x standard conc.

For the evaluation of complete blood count (CBC), all tests were performed in Swelab Alfa Plus hematology analyzer based on CLSI Standard H26-A2. The independent student's test was used to determine the significance of the difference between quantitative variables. The correlation between variables of interest was calculated by using One-Way ANOVA. p-value < 0.05 was considered statistically significant. All calculations were carried out with the SPSS version-25. Frequency distribution charts were constructed for better demonstration of data.

RESULTS

Table 1 shows clear-cut distribution of data in based upon different sociodemographic variables. The data reflected that most of the pregnant women belongs to age group of 26-35. Abortion history of patients was also noted which shows that 37% of the pregnant women had the history of abortion. The data showed that group A had a higher number of women with an abortion history. Nutritional status of pregnant women was studied as well as shown in table 1.

Table 1: Socio-demographic variables of study population of pregnant women.

Variables	Range	Group A	Group B	%
Variables	18-25	21	20	34%
	26-35	35	28	52%
	36- onward	9	7	14%
Abortion History	Yes	26	19	37%
	No	39	36	63%
Nutritional status	Good	15	7	18%
	Moderate	28	30	48%
	Poor	22	18	34%

Out of 120 pregnant women, 27 were in their 1st trimester of pregnancy out of which 26 women belongs to group A and remaining 20 belongs to group B. 55 were included in 2nd trimester which means that 27 were hypertensive and 28 were non-hypertensive. In 3rd semester 19 women were recorded with classification of 12 and 7 in group A and group B respectively. So, the current study reflected that number of hypertensive women recorded was greater in 2nd trimester as compared to 1st and 3rd trimester as shown in table 2.Out of 120 pregnant women, 27 were in their 1st trimester of pregnancy out of which 26 women belongs to group A and remaining 20 belongs to group B. 55 were included in 2nd trimester which means that 27 were hypertensive and 28 were non-hypertensive. In 3rd semester 19 women were recorded with classification of 12 and 7 in group A and group B respectively. So, the current

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study reflected that number of hypertensive women recorded was greater in 2nd trimester as compared to 1st and 3rd trimester as shown in table 2.

Table 2: Trimester-wise data distribution of pregnant women

Pregnancy Status	Group A	Group B	%
1st trimester	26	20	24%
2nd trimester	27	28	45%
3rd trimester	12	7	31%
Total Participants	**65**	**55**	**100%**

Mean ± SD of Hb levels were estimated as 11.66667±1.182746, 10.05±1.47902, 9.953846±1.924584 in the group A according to first second and third trimester respectively. Similarly, in group B values were 11.06071±1.53816, 10.80714±1.804939 and 11.52±1.584172 according to the trimesters. The significant difference of Hb levels were observed in third trimester as illustrated in table 3.

Table 3: Descriptive statistics of hemoglobin (Hb) in pregnant women

Trimesters	Hemoglobin (Hb) g/dl (Mean ± SD)		Comparison of Anemic status
	Group A	Group B	
1st trimester	11.66667±1.182746	11.06071±1.538167	Non-significant difference
2nd trimester	10.05±1.47902	10.80714±1.804939	Non-significant difference
3rd trimester	9.953846±1.924584	11.52±1.584172	Significant difference

Amount of red blood cells levels were estimated as 4.1067±0.57816 and 5.5973±10.73055in the group A and group B respectively. The significant difference of red blood cells was observed in these groups. Similarly, WBCs were calculated 10.908±2.7353 million/mm3 and 9.806±2.0800 million/mm3 in the group A and group B respectively. The significant difference of WBC levels was observed in these groups.

Platelets levels were recorded as 296.73±76.003 million/mm3 and 269.89±52.530 million/mm3 in the group A and group B respectively. The non-significant difference of platelets was observed in these groups. These results were in the terms of mean ± SD and depicted in table 4.

Table 4: Descriptive statistics of red blood cells (RBC), white blood cells (WBC) and platelets (PLT) in pregnant women

Parameters	(Mean ± SD)		p-value
	Group A	Group B	
RBC	4.1067±0.57816	5.5973±10.73055	0.652
WBC	10.908±2.7353	9.806±2.0800	0.030
PLT	296.73±76.003	269.89±52.530	0.009

DISCUSSION

From our study, we found that there exists a relationship between anemia and pregnancy-induced hypertension, significantly among women in their 3rd trimester of pregnancy. It coincided with our results of the complete blood count (CBC) in which hypertensive women had the least number of RBCs. In addition, we found that there was no significant association in anemia and PIH in 1st and 2nd trimesters, where hypertension may be due other factors, such as nutritional status, as PIH is multifactorial [9]. Overall, much smaller number of studies have investigated the correlation between anemia and PIH globally. Our positive results might be owed a variety of factors. Anemia effects the ability of blood to carry oxygen, which in turn increases stress on cardiovascular system as hear tries to compensate the decreased oxygen-carrying capacity by pumping more blood [10]. As oxygen delivery is already compromised, anemia can lead to exacerbation of the existing chronic diseases in the affected individuals [11]. In addition, anemia can lead to the weakening of immune system, and the individuals can become susceptible to the infections due decreased oxygen [12, 13]. In our study, it can be seen that hypertensive women had an increased number of WBCs and Platelets as compared to non-hypertensive women, which harmonizes with the study performed by Carey et al [14]. Another reason of hypertension in pregnant women with anemia is the dysfunction of trophoblast cells [15]. These cells are specialized cells that play a significant part in the early stages of pregnancy They are derived from the outer layer of the blastocyst, and are primarily responsible for implantation into the uterine wall and the subsequent formation of the placenta [16]. Anemia-induced hypoxia (deficiency of oxygen) can severely impact the function of these cells by altering the normal differentiation and proper vascularization of the uterine arteries, consequently increasing the risk of hypertension [17]. Our studies support the previous reports present in the literature. Lewandowska et al., reported the association of low iron in serum with the increased risk of pregnancy-induced hypertension [18]. Iron levels were measured using mass spectroscopy with inductively coupled plasma (ICP-MS). According to this study, the women in the lowest quartile (with the lowest iron levels) demonstrated 2.19-fold increased risk of PIH. Johnson et al., reported the association of anemia and PIH and studied the perinatal outcomes related to them. 51.3 % of the study population had anemia with PIH [19]. Similarly, Ali et al., studied the correlation between severe anemia and preeclampsia in the pregnant women at Kassala Hospital, Sudan [5]. The results of this study are in harmony with our study and state that severity of anemia is directly linked with the risk of preeclampsia and preterm delivery complications along with LBW and stillbirth. Conversely, there are studies, which provided opposite results as compared to our findings. According to Asres et al., pregnant women having high hemoglobin levels had greater risk of PIH as compared to those who did not [20]. Our study is one of the first studies in Pakistan that focus on analyzing the risk of PIH and anemia in pregnant women. This study not only

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provides a starting point for further research in Pakistan, but also paves the way to investigate other factors contributing to PIH as not enough literature is present on the current topic.

CONCLUSIONS

In conclusion, this study highlights the substantial link between anemia and the risk of PIH. Our findings consequently demonstrate that lower levels of hemoglobin correspond to the greater risk of developing high blood pressure during pregnancy. These results underscore the importance of early identification and management of anemia in prenatal care in order to mitigate the risk of PIH. Our research emphasizes on the necessity of proactive strategies to address anemia in pregnant women, ultimately contributing to improved maternal and neonatal health outcomes.

Authors Contribution

Conceptualization: KZ
Methodology: HS, KZ
Formal analysis: KZ, SA
Writing-review and editing: AS
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Effectiveness of Kinesio-Taping and Conventional Therapy for Non-Specific Chronic Low Back Pain

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ABSTRACT

Chronic non-specific low back pain, which is treated in orthopedic rehabilitation settings, is a frequent musculoskeletal issue. Lumbar spondylosis, Psychogenic Low Back Pain, Spinal Stenosis and poor posture are all causing pain for the patient. Kinesio-Taping helps to reduce or eliminate discomfort. **Objective:** To see how effective kinesio-tapping and traditional therapy are for non-specific chronic low back pain. **Methods:** This was a quasi-experimental study design in which 30 patients were recruited using a convenient sampling sample, with 15 individuals in each group (Group A, Kinesio-Tapping with Conventional Therapy includes stretching, strengthening and hot pack) Group B which consists solely of standard conventional therapy. An independent T-Test for inter-group comparison and a paired sample T-Test for within-group analysis were used to assess the Oswestry Low Back Pain Disability and Numeric Pain Rating Scale. **Results:** There was a significant change between the baseline and post-treatment NRPS values. Mean difference of 10.42 and 3.14 were reported between the pretreatment and post treatment values of NPRS in KT taping Group which was significant (p-value < 0.05). Mean difference of 14.18 and 3.68 were reported between the pretreatment and post treatment values of NPRS in Conventional PT Program Group which was significant (p-value < 0.05). **Conclusions:** Kinesio-Taping in conjunction with Conventional Therapy is more effective than Conventional Therapy alone in treating Chronic Non-specific Low Back Pain.

INTRODUCTION

Popular rehabilitative taping method Kinesio Taping aids the body's natural recovery. Kinesio Tex Tape is latex- free and can be worn for days to support and stabilize muscles and joints without affecting a range of motion and further soft tissue manipulation to enhance therapeutic manual treatment [1]. Lifting causes skin convolutions, which increase interstitial space and reduce inflammation [1]. Lumbar strains are acute or chronic stretch injuries to the lower back's ligaments. Low back pain is often caused by lumbar strain. Trauma, overuse, and inappropriate use can cause harm. Lumbar strain is most common in those in their 40s, although it can affect anyone. Mechanical straining of the lumbar tissues causes lower back pain. The severity of the injury depends on low back muscular tension and spasms, which can range from moderate to severe [2]. Chronic low back pain (CLBP) is a prevalent ailment that has serious social and economic consequences. In the treatment of chronic pain, kinesio-taping (KT) has lately

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acquired favour [3]. As this is the first comprehensive review to report the effects of KT on CLBP specifically. The review included five studies with a total of 306 individuals that satisfied the criteria for inclusion and were related to the study's aim [4]. There is a very little evidence that Kinesio Taping is more beneficial than sham taping in improving endurance of muscle, muscle control and range of motion (ROM). According to limited data, KT appears to be more beneficial than standard physical therapy treatment in improving postural control of the transversus abdominus muscles and increasing brain cortical potential. KT treatment is not a substitute for traditional physical treatment or exercise [5]. The benefits of KT alone or in accordance with another treatment were compared to exercise or standard physical therapy in different study trials. As comparison to other therapies, moderate evidence shows that KT is no more successful in relieving pain and disability measures as a solo treatment or in accordance with another treatment. Very little data from one study shows that Kinesio Taping coupled with standard physical therapy treatment is preferable to physical therapy alone in boosting APC of the transversus abdominus (TrA) muscles [6]. Very limited evidence from the same experiment shows that KT with physical therapy is better in improving MRCP in three of the six regions studied when compared to the physical therapy alone. In terms of ROM, there was minimal indication that KT plus regular physical therapy were no better than physical therapy itself [7].

The objective of the study was to check the benefits of kinesio-taping against standard physiotherapy in the application of Chronic Low Back ache, with the aim of reducing pain and improving muscle and joint support and stability.

METHODS

The study design was a quasi-experimental in which 30 patients were recruited using a convenient sampling technique, with 15 individuals in each group (Group A, Kinesio-Tapping with Conventional Therapy includes stretching, strengthening and hot pack) Group B which consists solely of standard conventional therapy contains (stretching, strengthening and hot pack). This was a single-blind experiment in which patients were not randomized. The study was completed in 6 months and it was started in May 2019 and completed in Dec.2019. The sample size calculated by the following formula keeping the margin of error (d^2) equal to 5% and level of significance (Z 1-a/2) equal to 95%. The inclusion criteria includes older adults both male and female, age 25-45 years, Pain from at least of 7 to 9 months, Clinically diagnosed for having non-specific low back pain, mechanical or non-mechanical low back pain and exclusion criteria includes patients having traumatic back pain, malignant or neoplastic back pain, back pain of seronegative or inflammatory origin., pregnant women, Pain of sacroiliac joint, Piriformis Syndrome, Syndrome of Iliotibial band. To measure the severity of pain, Numerical Pain Rating Scale was used, and to assess disability Oswestry Low Back Pain Impairment Questionnaire was utilized [8, 9]. SPSS version 23.0 software was used to examine the data collected. For demographics, frequency and percentages were collected. An independent t-Test used for comparison between 2 groups and a paired sample t-Test for within-group analysis were used to assess the Oswestry Low Back Pain Disability Questionnaire and the Numeric Pain Rating Scale. The ethical approval was taken from University of health sciences review committee and it was approved in July 2019 with ref. # t-DPT/UHS/331-2019.

RESULTS

The age distribution across two treatment groups is shown in Table 1. The NPRS of the Kinesio Taping Group participants was 6.8571 ± 0.29 years, with a lowest value of 51 and a highest of 70 years. The participants in the Conventional Physiotherapy Treatment programme had an average age of 6.9375 ± 0.29 years, with a lowest of 51 years and a highest of 70 years old. No. significant differences of NPRS were reported at baseline and post treatment with p-value < 0.05.

Table 1: Distribution of Age across Two Groups

Group Statistics				
	Study Groups	**No**	**Mean ± SD**	**Std. Error Mean**
ODI Before Treat	Kinesio taping	14	34.857±2.537	.67821
	Conventional Therapy	16	35.000±3.577	.89443
ODI After Treat	Kinesio taping	14	24.428±5.243	1.40139
	Conventional Therapy	16	20.812±5.049	1.26233
NPRS Before Treat	Kinesio taping	14	6.857±1.099	.29384
	Conventional Therapy	16	6.937±1.181	.29536
NPRS After Treat	Kinesio taping	14	3.714±1.138	.30434
	Conventional Therapy	16	3.250±1.125	.28137

Table 2 shows across the group comparison for NPRS. In test for Levene's Equality of Variances, significance of ODI before treatment was 0.085 while ODI after treatment was 0.872. Significance of NPRS before treatment was 0.782 while NPRS after treatment was 0.995.

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Table 2: Across the Group comparison for NPRS

Test of Independent-Samples										
Variables		Test for Levene's Equality of Variances		Means t-test of Equality						
		F	Sig	t	Df	Sig (2_tailed)	Mean Difference	Std. Error Difference	The confidence interval for the difference is 95%	
									Lower	Upper
ODI Before Treat	Equal variances assumed	3.198	.085	-.124	28	.902	-.14286	1.14838	-2.49522	2.20950
	Equal variances not assumed			-.127	26.93	.900	-.14286	1.12248	-2.44627	2.16055
ODI After Treat	Equal variances assumed	.026	.872	1.922	28	.065	3.61607	1.88120	-.23738	7.46953
	Equal variances not assumed			1.917	27.15	.066	3.61607	1.88610	-.25283	7.48498
NPRS Before Treat	Equal variances assumed	.078	.782	-.192	28	.849	-.08036	.41870	-.93803	.77732
	Equal variances not assumed			-.193	27.87	.848	-.08036	.41663	-.93396	.77324
NPRS After Treat	Equal variances assumed	.000	.995	1.121	28	.272	.46429	.41414	-.38404	1.31261
	Equal variances not assumed			1.120	27.38	.272	.46429	.41447	-.38559	1.31416

DISCUSSION

There always have been seen acceptance issues with new techniques and knowledge. Traditional practice usual kept continuous due to some advantages it carries such as being convenient and skill being at hand. It doesn't require to master new technique. On the other hand it is rational to some extent that why one should go for new technique when old one exists and working fine. It is this point that new techniques have to be tested in their efficacy, comprehension, being applicable and cost effective. Kinesio-taping is one of such technique that needs to be tested in scientific grounds for its comparative efficacy [10]. Although its efficacy is accepted and proven in osteopathic medicine for relieve of muscle tightness and joint and muscle functional disorders. However, its comparative efficacy was yet debatable. That weather it is more effective in comparison to other techniques used or so. As a general process this can be proven in different stages and region. Firstly it was started here in Pakistan to compare it with other conventional methods in practice. The most frequent technique used for relieve of muscle spasm here is stretching technique [11]. Stretching technique is also being used at vast level of relieve of under discussion case i.e. non-specific chronic low back pain. However, results were quite interesting as being expected from trial. The participants, both in the conventional physiotherapy group and that of Kinesio-taping with conventional physiotherapy group Maneuver, performed well and went towards improvement with statistical significant difference. There is an evidence that Kinesio Taping is more beneficial than sham taping in improving endurance of muscle, muscle control and range of motion (ROM) [12]. According to study in 2013, KT appears to be more beneficial than standard physical therapy treatment in improving postural control of the transversus abdominus muscles and increasing brain cortical potential [13,14]. KT treatment is not a substitute for traditional physical treatment or exercise. However the Kinesio-taping with conventional physiotherapy group performed well [15-20]. If the age distribution in both groups be looked upon, in conventional therapy group curve of histogram is skewed negatively towards lower values of age, while the age range in Kinesio-taping with conventional physiotherapy group is evenly distributed with more individual in older ages. Still the participants in Kinesio-taping with conventional physiotherapy group performed better than conventional therapy group in terms of improvements in clinical presentation of paresthesia and pain [21].

CONCLUSIONS

For treating the chronic non-specific low back pain, Kinesio-taping combined with conventional physiotherapy is more successful than Kinesio-taping alone. Pain has been suppressed by combination of treatment with Kinesio-taping and conventional physiotherapy and improves the activity of daily livings. However, there was significant difference on pain improvement in both the groups.

Authors Contribution

Conceptualization: AT
Methodology: ST
Formal analysis: SR
Writing-review and editing: AZ
All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

End to End Anastomotic Urethroplasty in the Management of Posterior Urethral Distraction Defect

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ABSTRACT

Posterior urethral distraction deficits are a difficult and complex clinical condition that necessitates specialized care in urological therapy. End-to-end anastomotic urethroplasty has emerged as a critical procedure for treating posterior urethral distraction abnormalities, providing a thorough and successful approach for restoring normal urethral function. **Objective:** To assess the outcome of end-to-end urethroplasty in posterior urethral distraction defects. **Methods:** This study was conducted at the departments of Urology, MTI LRH, and Peshawar from 1st November 2017 to 31st December 2021. It was a descriptive case-series study by design. Patients included were having blind urethral strictures. End to end urethroplasty was performed. Patients were followed for one year. Depending upon symptoms relief, uro-flowmetery studies, and radiographic findings at the end of one year, success was defined as good, fair, or poor. **Results:** The study included a total of 110 patients, with a majority being male (80%) and the remaining 20% being female. The mean age of the patients was 35 years, with the majority falling in the age group of 30-39 years (50.9%). Good outcomes were recorded in 79 patients (71.8%). 11 (10.0%) participants had poor outcomes. **Conclusions:** Urethroplasty is a gold standard treatment modality in terms of outcome for patients with posterior urethral distraction defects.

INTRODUCTION

Posterior urethral distraction deficits are a difficult and complex clinical condition that necessitates specialized care in urological therapy [1]. These abnormalities, which are frequently caused by traumatic traumas or iatrogenic causes, can have a major influence on a patient's quality of life by impairing urine function [2]. One of the key goals in such circumstances is to restore urethral continuity through surgical treatments. End-to-end anastomotic urethroplasty has emerged as a critical procedure for treating posterior urethral distraction abnormalities, providing a thorough and successful approach for restoring normal urethral function [3]. The posterior urethra, a vital component of the male urinary system, is vulnerable to injury as a result of a variety of traumatic occurrences, including pelvic fractures and straddle injuries [4]. Iatrogenic factors, such as instrumentation or surgery, may also lead to the development of distraction abnormalities. These abnormalities frequently cause urethral wall disruption, resulting in a range of clinical manifestations ranging from partial blockage to full

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urethral discontinuity [5]. Because of the anatomical complexity and potential problems associated with these injuries, the management of posterior urethral distraction deficits presents special challenges [6]. Recognizing the influence on patients' well-being and the need for a customized approach, urologists have increasingly chosen end-to-end anastomotic urethroplasty as their preferred surgical procedure. This operation requires rigorous alignment and suturing of the proximal and distal urethral ends, with the goal of restoring urethral continuity [7].

We investigated the ideas, procedures, and outcomes of end-to-end anastomotic urethroplasty in the setting of posterior urethral distraction in this study. We hoped to provide a detailed overview of the function of this surgical intervention in managing these difficult urological disorders by reviewing the current literature and highlighting advances in surgical methods. Furthermore, we covered the parameters impacting treatment success, potential complications, and future directions in refining and improving the outcomes of end-to-end anastomotic urethroplasty for posterior urethral distraction abnormalities.

METHODS

The study, which was designed as a retrospective case series, was carried out in the department of urology at MTI Leady Reading Hospital from 1st November 2017 till 31st December 2023. This study comprised a total of 110 patients who had a traumatic posterior urethral distraction defect. Patients having concomitant neurogenic bladder, enlarge prostate or bladder diverticulae were excluded from study. The outcomes were defined as: a) Good: patient with a patent urethra and satisfactory voiding, urine flow at the rate of 15 ml/sec or more, and no further intervention required. b) Fair: patients with a thin stream and difficulty voiding, urine flow at a rate of 10-15 ml/sec, and some irregularities in the retrograde urethrogram. Self-dilatation and a single endoscopic intervention are required. c) Poor: The patient could not form a urinary stream and had poor voiding with urine flow at a rate of less than 10 ml/sec. Post-operative complications were measured in terms of: 1) Wound Infection: It was confirmed clinically by the presence of redness and sero-sanguinous discharge from the surgical site. 2) Epididymo-orchitis: It was confirmed clinically by the examination of scrotum. Presence of swelling and tenderness on palpation of the testicle was considered diagnostic for epididymo-orchitis. Erectile dysfunction was diagnosed based on history based on DSM-V criteria when patient reported the recurrent inability to achieve an erection, the inability to maintain an adequate erection, and/or a noticeable decrease in erectile rigidity during partnered sexual activity. The patient who could not form a urinary stream and had poor voiding with urine flow at a rate of less than 10 ml/sec underwent re-do urethroplasty. Baseline information like age, gender, residence and underlying etiology was noted. All the patients had suprapubic cystostomies for urinary diversion. Urethroplasty was planned after an interval of 10 to 12 weeks of trauma. Patients were assessed in detail Blood Urea Nitrogen (BUN) and Creatinine test. The site and length of posterior urethral distraction defects were assessed by antegrade and retrograde urethrograms. Under spinal or general anaesthesia, the procedure was carried out in an extended lithotomy position with a midline perineal incision. By separating the bulbo cavernous muscle, the urethra was examined. The urethra was dissected proximally up to the distraction defect and distally up to the penoscrotal junction from the corpora cavernosa. Retrograde and antegrade cystoscopy were used to confirm the location of the lesion. The bladder neck was seen by antegrade cystoscopy. Healthy and viable tissues were reached after the excision of the structured segment. A silicone catheter was passed on to the bladder. Urethral mucosa is anastomosed in an end-to-end and tension-free fashion over the catheter with 3/0 polyglactin after spatulaion and eversion of the proximal segment of the urethral mucosa. Initially, at 12, 3, and 6 o'clock, sutures were placed symmetrically. To avoid jumbling, they were clearly demarcated. The rest of the sutures were placed at 4, 6, and 8 o'clock. In areas where the posterior urethral distraction defect was more than 3 cm, buccal mucosal grafts were placed or employed as inlays. The perineal body was anchored to the urethra. Drain was placed after closing the bulbo-spongiosus muscle. The patient's mobility was restricted to bed for 3 to 4 days. Anticholinergics, antiandrogens, and sedatives were prescribed for a week. The urethral catheter was withdrawn two weeks following the treatment, and the SPC was removed one week later. An antegrade urethrogram was promptly performed. At the time of discharge, all patients were instructed to return to the department in three months, six months, and one year. At each follow up visit the voiding status was assessed for evaluation of outcomes in terms of good, fair and poor outcomes. History and clinical examination was carried for assessment of post-operative complications like wound infection, epididymo-orchitis, erectile dysfunction and re-do urethroplasty. Data were analyzed using SPSS version 24.0. Categorical data was presented as frequencies and percentages. Continuous data were presented as mean±S.D or median (IQR). Tests of statistical significance included student t test for continuous data and chi square test for categorical variables, taking p value ≤0.05 as statistically significant.

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RESULTS

The study included a total of 110 patients, with a majority being male (80%) and the remaining 20% being female. The mean age of the patients was 35 ± 2 years, with the majority falling in the age group of 30-39 years (50.9%). The next largest age group was 20-29 years (29.1%), followed by 40-49 years (18.2%) and a small number of patients in the age range of 50-59 years (1.8%). The study population was predominantly from urban areas (80%), with the remaining 20% being from rural areas. The age range of the patients was between 20-60 years, with the majority falling in the 2nd and 3rd decades of life (Table 1).

Table 1: Gender and Age Distribution

Characteristics	Total Patients n (%)
Gender	
Male	88 (80%)
Female	22 (20%)
Mean age	35±2
Age Group	
20-29	32 (29.1%)
30-39	56 (50.9%)
40-49	20 (18.2%)
50-59	2 (1.8%)
Urban Population	88 (80%)
Rural Population	22 (20%)

The most common etiological factor for the patients in this study was road traffic accidents, accounting for 54.4% of the total cases. This was followed by falls from height, which accounted for 30% of the cases. Firearm injuries were responsible for 4.54% of the cases, while instrumentation accounted for 10.90% of the cases. These findings suggest that road traffic accidents and falls from height are the leading causes of traumatic injuries in this population (Table 2).

Table 2: Etiological Factors Distribution.

Etiological Factors	Total Patients n (%)
Road Traffic Accident	60 (54.4%)
Fall from Height	33 (30%)
Firearm Injury	5 (4.54%)
Instrumentation	12 (10.90%)

The preoperative characteristics of the patients were also analyzed in this study. A majority of the patients (54.54%) underwent uroflowmetry, a diagnostic test used to measure the flow of urine. 22.73% of the patients had undergone urethral dilatation outside of the hospital, while 18.18% had undergone internal optic urethrotomy outside of the hospital. A small number of patients (4.55%) had a history of rail road catheterization. It was also noted that all patients had a suprapubic catheter for urinary diversion. The interval between the trauma and the surgery ranged from 2-5 years. These preoperative characteristics provide important information about the patients' medical history and previous treatments, which may have an impact on the surgical outcome shown in Table 3.

Table 3: Preoperative Characteristics

Characteristics	Total Patients n (%)
Urinary Diversion (Suprapubic Catheter)	Yes
Interval After Trauma	2-5 years
Urethral Dilatation Outside Hospital	25 (22.73%)
Internal Optic Urethrotomy Outside Hospital	20 (18.18%)
Rail Road Catheterization History	5 (4.55%)
Uroflowmetry	60 (54.54%)

Table 4 illustrates the outcomes of end to end urethroplasty. The procedure was successful in 79 participants (71.8%) with good outcomes, fair outcomes were recorded for 20 participants (18.2%) while poor results were observed in 11 patients (10.0%).

Table 4: Outcomes of End to End Urethroplasty

Outcomes	Total Patients n (%)
Good	79 (71.8%)
Fair	20 (18.2%)
Poor	11 (10.0%)

The surgical and postoperative outcomes of the patients were evaluated in this study. The average stricture length was found 3-5cm. A small number of patients (4.5%) experienced complications such as fistula, urethral stones, and erectile dysfunction. The average operation time was 2.5 hours, and the average hospital stay was 14 days. A small number of patients (3.6%) required blood transfusions during the surgery. Postoperative complications were observed in 10% of the patients, including minor wound infections, epididymo-orchitis, erectile dysfunction, and the need for re-do urethroplasty. (Table 5).

Table 5: Operative characteristics and post-op complications

Outcomes	Total Patients n (%)
Stricture Length (cm)	3-5cm
Fistula	5 (4.5%)
Urethral Stones	2 (1.8%)
Erectile Dysfunction	5 (4.5%)
Operation Time (hours)	2.5 hrs
Hospital Stay (days)	14 days
Blood Transfusions	4 (3.6%)
Postoperative Complications	
Minor Wound Infection	11 (10%)
Epididymo-orchitis	5 (4.5%)
Erectile Dysfunction	5 (4.5%)
re-do urethroplasty	11 (10%)

DISCUSSION

Strictures and defects of the posterior urethra in men are among the most serious clinical issues that urologists face.

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Previous research estimated that 5 to 10% of pelvic fractures resulted in posterior urethral injury. A healthy debate on large scale is going on about the early repair versus late anastomosis. Both the proponents and opponents have their own logics but after publication of 50 years data by Koratim et al., it is established that early surgery complications are more than late surgery in terms of incontinence of urine as well as erectile dysfunction [6]. Anastomosis is typically used to repair abnormalities in the posterior urethra. However, in rare situations, the urethral defect is so long that aggressive release of the urethra from surrounding tissue, inferior pubectomy, and even re-routing maneuvers are ineffective [8]. Many factors, such as the length, severity, and location of the stricture in the bulbar urethra, can influence the surgical outcome. The surgical approach should be chosen primarily based on the length of the stricture, but the aetiology of the stricture and the density of the spongiofibrosis tissue should also be considered [9]. According to Santucci et al., short bulbar strictures are often amenable to full excision with primary anastomosis via a perineal incision, with a 95% success rate [10]. Eltahawy et al., published a study of 260 individuals with bulbar stricture who underwent end-to-end anastomosis over a 50.2-month period. The stricture length ranged from 0.5 to 4.5 cm (mean, 1.9 cm), with a success rate of 98.8% reported [11]. On the basis of large series described in the literature, Jezior and Schlossberg summarized the surgical outcomes of excision and primary anastomosis for bulbar stricture in 2002. The success rate in these series was 93% in 443 patients, with a range of 65% to 100% amongst series [12]. In our study of 110 patients with posterior urethral distraction defects, 88 (80%) were from urban habitat and 22 (20%) were from rural habitat, which is comparable to Hussain et al. [13, 14]. The reason for high number of patients from urban habitat is the huge volume of road traffic accidents as well as open manholes mouths on the foot paths. The mean age of 35 years is in comparison to the data reported in the literature [15]. The presented patient with a post-urethral distraction defect attributed to pelvic fracture in our study is 60 (54.4%), which is also reported in another series. The duration of distracting defects and therapies in our study extends from 3 weeks to 5 years, which is consistent with the findings of many other urologists' investigations [12, 16]. Our study's mean operating time of 2.5 hours is one hour less than the international literature. Larger distraction defects have been covered by grafts from buccal mucosa in 8% of patients in our case series, which coincides with international literature where they have been using buccal mucosal grafts [17]. In our study, the etiological factors of distraction defects of RTA 60 (54.4%) and falling astride 33 (30%) matched the findings of other urologists [18]. Our study's success rate is 85%, which is comparable to another research [19]. According to Choudhary and Jha, out of 90 patients who underwent urethroplasty, 5 (4.54%) had a recurrence, whereas 38 (34.5%) were asymptomatic after an average follow-up duration of 32.8 months [20]. Our results are also consistent with the study, as after 1 year of follow-up, the percentage of patients who needed revision were 10%. A literature review of international studies shows de novo erectile dysfunction attributed to urethroplasty is equal to the incidence after circumcision, so our study reflects that cases of post-op erectile dysfunction after follow-up after 1 year were rare [21].

CONCLUSIONS

In terms of outcome, urethroplasty is the gold standard treatment modality for posterior urethral distraction abnormalities

Authors Contribution

Conceptualization: KF
Methodology: IZ, HH
Formal analysis: AA, NH, IAK
Writing-review and editing: KF, HH
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Navigating Patient Comfort: Gendered Perspectives on Medical Student Involvement in Healthcare Interactions in Peshawar, Pakistan

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ABSTRACT

Patient interactions are fundamental to medical education, influencing the training of medical students and shaping their clinical understanding. **Objective:** To probe patient perspectives on the presence of medical students during consultations, clinical examinations and surgical procedures, with a focus on identifying gender-based differences in preferences and comfort levels. **Methodology:** This cross-sectional study was conducted in tertiary care hospitals in Peshawar involving 500 patients from Northwest General Hospital and Research Center and Northwest Teaching Hospital, data collected through a self-structured questionnaire revealed distinct gender disparities. **Results:** Male participants generally exhibited higher approval and comfort levels with medical student involvement, particularly during consultations, examinations, and surgery. Variations were evident in preferences related to medical history taking, comfort during physical examinations, and willingness to permit students in the operating room. Patients underscored the importance of recognizing gender preferences in medical student interactions. **Conclusions:** This study emphasized the significance of tailoring medical education practices to address gender-specific variations, ensuring a patient-centered approach and fostering positive healthcare experiences for all.

INTRODUCTION

Patients are the foundation of medical students' bedside education anywhere in any part of the globe [1]. Medical students' education still depends heavily on their interactions with patients. Patients' encounters can help advance clinical and contextual learning, enhance professional communication and skills, and start the process of building a future doctor-patient relationship. At most stages of patient care, students have greater teaching possibilities when patients are cooperative and eager to contribute to their education and training [2]. Researchers in medical education proposed that four aspects influence bedside teaching: patients, clinical supervisors, medical students, and teaching curriculum [3]. Patients actively choose the care they receive; thus, it becomes challenging to teach pupils if they choose not to participate. Patients now have the option of whether they want the presence of students during their consultations due to the growing emphasis on patient rights and informed consent [2]. Gone are the days when physicians and medical students treated patients as they had a divine right to do so, due to increasing understanding of patients of their rights and the need of informed consent [4].

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Research has been done to find out how patients feel about medical students being involved in their treatment. Many hospitals throughout the world have observed that a small percentage of patients reject or have unfavorable feelings towards the presence of medical students in treatment [5, 6]. Nonetheless, patients from different specializations were shown to have varying degrees of comfort with medical students. For instance, patients in urology reported feeling more at ease around male students, but patients in obstetrics and gynecology felt more at ease around female students [7]. Preserving confidentiality appears to be the most crucial element of the patient-physician interaction. A considerable percentage of patients are not very cooperative in real life when it comes to medical students. At most patient care levels, however, students would have superior learning chances via enhanced patient partnerships. Establishing a positive patient-medical student connection required prior knowledge regarding medical students' engagement in patient care. Patients would prefer that medical students only visit them during specific hours and that their involvement be contingent upon their approval [8]. Understanding patients' views on interactions with medical students is crucial for meeting their needs and improving the quality of care.

Current study, the first of its kind in Peshawar provided valuable insights into this area. Additionally, the research generated evidence-based information that can be used to enhance the training of future physicians, equipping them with stronger medical, clinical, communication, and behavioral skills. This study sought to understand the overall views of patients in tertiary care hospitals in Peshawar, Pakistan, regarding the presence of medical students during clinical examinations, surgical procedures and consultations with their doctors.

This research was conducted to check differences between male and female footballer composite scores and FMS as an injury predictor tool.

METHODOLOGY

The research employed a cross-sectional study design conducted over a period spanning from October 2022 to December 2022. The target population comprised patients visiting two prominent healthcare institutions, namely the Northwest General Hospital and Research Center, and the Northwest Teaching Hospital, both situated in Peshawar, Pakistan. Non-probability convenient sampling was utilized, and the sample size was determined using the OpenEpi sample size calculator, aligning with the 2022 census data of Peshawar population. Calculated at 471 participants with a 50% prevalence frequency and a 97% confidence interval, data were collected from a slightly larger sample of 500 individuals to account for any potential incomplete questionnaires post-collection. Inclusion criteria mandated participants' willingness and provision of informed consent, while exclusion criteria encompassed non-participation, lack of informed consent, and incomplete questionnaire submission. The study design received ethical approval from the Institutional Review Board and Ethics Committee at Northwest School of Medicine (IRB & EC/ 2022 – SM/ 053)(Issuance Date: 8th August, 2022). Verbal informed consent was obtained from each participant, coupled with a comprehensive briefing on the study's purpose. Data collection employed a self-structured questionnaire with two parts: the first focused on demographic information, while the second contained questions pertinent to the research topic. Data analysis, performed using SPSS version 23.0, encompassed descriptive statistics, with the chi-square test (at an alpha level of 0.05) utilized to ascertain relationships between variables.

RESULTS

There were 316 male participants, comprising 63.2% of the total, and 184 female participants, making up 36.8%. The predominant age group among participants is above 18 years, accounting for 88.8%, while those below 18 years constitute only 2.4%, and 8.8% are precisely 18 years old. In terms of marital status, 67.2% of participants are married, while 32.8% are unmarried. The educational background of the majority of participants is 88.6%, with only 11.4% being uneducated. Regarding residential areas, 67.4% of participants live in urban areas, and 32.6% reside in rural areas. In the hospital wards, the majority of patients, 63.0%, are in the Medicine and Allied ward, with 37.0% in the Surgery and Allied ward (Table 1).

Table 1: Gender, Age, Marital status, Education level, Residence and Ward wise distribution of patients

Demographic Variables	Frequency (%)	Percent (%)
Gender		
Male	316	63.2
Female	184	36.8
Total	500	100.0
Age of the participants		
Below 18 Years	12	2.4
18 Years	44	8.8
Above 18 Years	444	88.8
Total	500	100.0
Marital Status		
Married	336	67.2
Unmarried	164	32.8
Total	500	100.0

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larger sample of 500 individuals to account for any

Education Level		
Uneducated	57	11.4
Educated	443	88.6
Total	500	100.0
Residence		
Rural	163	32.6
Urban	337	67.4
Total	500	100.0
Wards Wise Patient Distribution		
Medicine and Allied	315	63.0
Surgery and Allied	185	37.0
Total	500	100.0

Table 2 shows patient perspectives on the involvement of medical students in their care, providing insights into their attitudes, preferences, and comfort levels regarding student presence during consultations and examinations.

Table 2: Patient perspectives on medical student involvement in healthcare

Variable	Yes	No	Doesn't matter	X^2 Value	p – Value
Do you feel that medical students should be involved in consultations?					
Male	227	48	41	31.011	0.000
Female	93	67	24		
Is it important to you to be aware of the presence of medical students during your clinical encounters?					
Male	186	55	75	2.154	0.341
Female	106	41	37		
Do you authorize medical students to gather information about your medical history and personal details?					
Male	175	52	89	36.256	0.000
Female	72	75	37		
Are you open to having students present during your physical examinations?					
Male	114	77	125	47.883	0.000
Female	35	101	48		
Is your willingness to include a medical student in the clinical assessment influenced by the specific region of your body being examined?					
Male	188	39	89	8.873	0.012
Female	101	41	42		
Are you comfortable with clinical staff and medical students discussing your clinical case in your presence?					
Male	151	41	124	30.717	0.000
Female	70	62	52		
Do you have a preference for the student's gender to be the same as yours?					
Male	100	119	97	62.662	0.000
Female	125	28	31		
Does general appearance and manner of a student affect your co-operation with them?					
Male	179	33	104	2.461	0.292
Female	111	24	49		
Does the overall appearance and demeanor of a student impact your willingness to cooperate with them?					
Male	169	45	102	4.494	0.106
Female	112	29	43		
Do you authorize medical students to be in the operating room if you undergo surgery?					
Male	146	46	124	45.109	0.000
Female	59	76	49		
Is it significant for medical students to attend consultations as part of their medical education?					
Male	226	21	69	7.854	0.020
Female	118	26	40		
Is it essential for medical students to perform examinations as a component of their medical training?					
Male	218	19	79	6.888	0.032
Female	113	23	48		
Do you feel at ease with the presence of medical students during your medical consultation?					
Male	157	27	131	27.273	0.000
Female	65	46	73		

Table 3 and 4 display the factors that contribute to patients' comfort or discomfort regarding the participation of medical students in their healthcare. For patients who are comfortable with medical students' involvement, the most common reason was that they feel they are being taken better care of (183). While for patients who are uncomfortable with medical students' involvement, the most common reason was that they are concerned about their privacy(200).

Table 3: Reasons for being comfortable with medical students' involvement

Variable	My needs are more understood	More being taken care of	More time to discuss my case	X^2 Value	p – Value
Male	101	112	103	3.204	0.201
Female	45	71	68		

Table 4: Reasons for being un-comfortable with medical students' involvement

Variable	Doesn't have experience	Privacy Concerns	Fatigue	Gender of medical student	Language Spoken	Un-professional behaviours	X^2 Value	p – Value
Male	67	105	27	21	24	72	37.730	0.000
Female	26	95	11	28	8	16		

DISCUSSION

The demographic composition of our study sample, consisting of 500 participants, reflects a balanced distribution of genders. Among the participants, 316 were male (63.2%), while 184 were female (36.8%). Notably, the majority of individuals were above 18 years old, accounting for 88.8% of the total, with those below 18 years constituting only 2.4% and precisely 18 years old making up 8.8%. Regarding marital status, 67.2% of participants reported being married. In contrast, a study conducted in

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Uganda showed a different demographic profile. In that study, the majority of participants were female, comprising 81.4% of the total, and 66.6% reported being married [9]. This variation emphasizes the influence of cultural and geographical factors on demographic patterns in research outcomes. Likewise, a study conducted in Canada with 625 patients across diverse medical specialties revealed an average age of 39 years, with 62% of the patients being female [10]. In this research, concerning the acceptance of medical students' presence during consultations, a majority of participants from both male and female groups expressed their approval. More precisely, 72% of males (227 individuals) and 51% of females (93 individuals) indicated their support for the inclusion of medical students in their consultations. This favorable response is consistent with studies conducted in Ethiopia, where 69.2% to 77.4% of participants accepted the involvement of medical students in their healthcare [11, 12]. Similarly, a Saudi Arabian study that included patients from a variety of medical specialties revealed a generally favorable opinion regarding the involvement of medical students in their treatment. The study found that only 11% to 43% of applicants were turned down [13]. The medical students themselves saw their involvement in patient care as an invaluable educational opportunity [14]. Hartz et al., found that patients' decisions about whether or not to have medical students assist them were not substantially influenced by their total educational attainment. Nonetheless, they pointed out that patients' acceptance and comfort levels were influenced by their educational background, especially when it came to private examinations like pelvic exams and Pap smears on female patients [15]. During medical training, interactions between patients and medical students play a vital and irreplaceable role in the development of clinical skills, effective communication between patients and physicians, and the cultivation of ethical skills crucial for future medical practices. In this study, when queried about the importance of medical students' presence during consultations and examinations for their education, 72% of male respondents considered it crucial, 7% found it unimportant, and 22% were indifferent. Among female participants, 64% regarded it as crucial, 14% deemed it unimportant, and 22% were indifferent. In alignment with findings from other studies, patients expressed their acceptance of medical students participating in their care, citing reasons such as a desire to contribute to students' learning and the future development of doctors. Patients also valued the companionship provided by students and recognized the substantial knowledge they gained about their health conditions through interactions with medical students, who often devoted significant time to patient education [10, 15-19]. In Australia, comparable results were documented, with 96% of patients recognizing the significance of students' participation in their care as an integral aspect of their training [20]. In the present study, attitudes towards allowing medical students in the operating room during surgical procedures varied. Among males, 46% expressed willingness, 15% were unwilling, and 39% remained indifferent. In contrast, among females, 32% expressed willingness, 41% were unwilling, and 27% were indifferent. Comparably, medical students accepted non-invasive tasks like reading through patient records, watching doctors perform ward rounds, and interviewing patients about their medical histories more readily than they did more personal procedures like digital rectal exams, vaginal deliveries and episiotomy repairs, and pelvic exams [11, 13]. The study assessed the current level of comfort that patients experienced with the presence of medical students during consultations. Among male participants, 50% reported higher comfort levels, 9% expressed discomfort, and 41% were indifferent. Among females, 35% reported higher comfort levels, 25% expressed discomfort, and 40% were indifferent. On the other hand, a Ugandan study revealed that 82.3 percent of participants felt at ease with medical students being involved in their treatment. Concerns regarding extended consultation times while medical students are present were not common, and they did not believe that their presence would have a detrimental effect on the standard of care.9 Similarly, studies carried out in Tunisia revealed that male patients, those over 40, and those in employment were more accepting and at ease with medical students providing care than were female patients, those under 40, and patients without jobs.11 According to a different Australian study, patients (n = 255) under 40 were significantly more likely to report being satisfied with the involvement of medical students in their care [20].

CONCLUSIONS

Our study found that there are significant differences in how men and women feel about having medical students involved in their healthcare. Men are generally more comfortable with medical students being present during consultations, examinations, and surgery. They are also more likely to let students take their medical history and believe that medical students are beneficial for medical education. Women are more likely to be uncomfortable with medical students being involved in their healthcare, especially during physical examinations and surgery. They also prefer to have medical students of the same gender and prioritize privacy concerns.

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Authors Contribution

Conceptualization: SZ
Methodology: SZ, KK
Formal analysis: SZ, KK, SJ, SM, SH, ZSK, ZAK, IB
Writing-review and editing: SZ, KK, SJ, SM, SH, ZSK, ZAK, IB
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Association between Obesity and Dental Caries among Young Population Presenting at Tertiary Care Hospital

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ABSTRACT

Globally, dental caries and obesity are becoming issue of public health concern. There are inconsistent and contrasting results drawn from numerous studies seeking the association between obesity and dental caries. **Objective:** To ascertain the relationship between childhood obesity and dental caries at a tertiary care hospital. **Methods:** A cross-sectional descriptive research was carried out at department of dentistry of LUMHS hospital Jamshoro/Hyderabad.161 obese patients aged 18 to 35 years of both genders having BMI ≥ 25kg/m2 were selected by convenience sampling technique. After taking detailed history, clinical examination of mouth of each patient was performed by using mouth mirror and probe. Dental caries was recorded according to the WHO criteria using decayed, missing, and filled teeth (DMFT) index and the G. V. Black classification, while height and weight was measured using BMI index. All data were recorded in standard proforma for analysis by using SPSS version 23.0. **Results:** There was male preponderance i.e. 86(53.42%)males as compared to 75(46.58%) females. Themeanagerecordedwas25.7 ± 6.1 years. Majority of the subjects were belonged to rural areas (91.30%). THEMEAN and standard deviation of BMI was29.0 ± 3.1(25.0-40.7) Kg/m2. The mean and standard deviation of DMFT score was 0.57 ± 1.0 with the range of 0-4. Dental caries was present in 45 (27.95%) patients and absent in 116 (72.05%) presents. The highly significant association was observed between high BMI AND dental caries (p< 0.001). **Conclusions:** Dental caries and obesity are significantly associated among young population. As the obesity level increased, risk of dental caries can also be increased.

INTRODUCTION

Two growing threats to public health are obesity and dental decay common condition that affects people all throughout the world is dental caries [1-3]. From 60 to 90% the pervasiveness of dental caries ranges in school children [4]. Young adults (18–25 years old) are a transitional age between adolescence and adulthood, a time when people take charge of their health and form their own health-related behavior. They go through stages of biological, psychological, and social development throughout this time. It is reasonable to presume that dental caries and obesity share risk factors based on the existing data [5, 6]. Moreover, obesity and caries are imperative issues of health concern and affect a large figure of children and youngsters [7, 8]. Therefore, a correlation between obesity and dental caries seems reasonable. Both have undesirable impacts on health and quality of life and are connected with noteworthy expenses to the society [9]. Further knowledge of this affiliation could facilitate the improvement of more effective and proficient targeted public health initiatives to diminish the prevalence obesity and dental caries [10]. Several studies have observed the relationship between obesity and dental caries in different countries, and in both primary and permanent dentitions [11]. The literature on dental caries right through the globe gives the substantiation that, caries experience gives association with body mass index,

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diet practice and oral hygiene practices, samples having higher body mass index would give positive association with dental caries[12-15].

The outcomes, meanwhile, have consistently been debatable and ambiguous. Regarding the kind and direction of the relationship, the findings are contradictory. This study was planned to determine the association between dental caries and obesity among young population at tertiary care hospital. This study would reorient the concepts of preventive strategies regarding dental caries and obesity.

METHODS

Descriptive cross-sectional study was organized in Department of Dentistry, Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro and Hyderabad, in time duration of six months i.e., from 01-08-2021 to31-01-2022 by Non probability convenience sampling technique. Sample size was calculated by online Rao soft sample size calculator. Using Rao soft sample calculator, 95% confidence interval, 5% margin of error and prevalence of 12% caries among over weight male patients, calculated sample size of study was 161 [14]. All consenting obese patients, aged between 18 to 35 years and having BMI ≥ 25Kg/m2 were included and patients with systemic disease, having orthodontic treatment and who didn't participate in the study were blocked form the study. Data were collected after the approval of Research Ethics committee of LUMHS Jamshoro (NO. LUMHS/REC/125). Clinical examination of mouth was done using mouth mirror and probe. Dental caries was recorded according to the WHO criteria using DMFT index and the Greene Vardiman Black (G. V. Black) classification, while height and weight was measured using BMI index [15, 16]. All the information was recorded in self-made proforma. The continuous variables like age, BMI and DMFT score were calculated as mean ± standard deviation. Frequency and percentages were counted for categorical variables like sex, residential status, occupation and caries status. Stratification with respect to the effect modifiers was done. SPSS version 23.0 was used for data analysis. Chi square test was applied between caries and obesity to check the statistical significance. The p-value ≤ 0.05 was measured as significant.

RESULTS

Table 1 presents sociodemographic arrangement of study subjects where male preponderance is shown i.e., 86 (53.42%) were males as compared to 75 (46.58%) females. Age of subjects was divided into groups as 18-23 years 83 (51.56%), 24-29 years 22 (13.66%) and 30-35 years age group, 56 (34.78%) patients. Where mean ±standard deviation for age was 25.7 ± 6.1 years. 147 (91.30%) enrolled patients were from rural areas and 14 (8.70%) patients were from urban areas. In this study enrolled patients' occupation was distributed into the categories of government servant having 31 (19.25%) patients, private servant having 19 (11.80%) patients, house wife having 52 (32.30%) patients, labor having 9 (5.60%) patients and student having 50 (31.15%) patients.

Table 1: Demographic Information of Subjects

Variables	Frequency (%)
Gender	
Male	86 (53.42)
Female	75 (46.58)
Age	
18-23	83 (51.56)
24-29	22 (13.66)
30-35	56 (34.78)
Residential status	
Urban	14 (8.70)
Rural	147 (91.30)
Occupation	
Government servant	31 (19.25)
Private servant	19 (11.80)
House wife	52 (32.30)
Student	50 (31.15)
Labour	9 (5.60)

Table 2 describes descriptive statistics of continuous variable of BMI (Kg/m2) in patients, where mean and standard deviation of BMI was 29.0 ± 3.1 (25.0-40.7) Kg/m2. The distribution of BMI basis among obese patients is assessed. In this study enrolled patients were grouped as overweight 34 (21.11%) patients, obese 121 (75.15%) patients, normal weight 4 (2.48%) patients and in underweight 2 (1.26%) patients. Continuous variable of DMFT score in obese patients was assessed, where mean and standard deviation of DMFT score was 0.57 ± 1.0 with the range of 0-4. The assessment of dental caries status among obese patients is depicted. As this study shows caries was present in 45 (27.95%) patients and absent in 116 (72.05%) patients. Out of 45 patients reported with dental caries, 35 (77.80%) patients were reported with class-I and 10 (22.20%) patients were reported with class-II as indicated in table 2.

Table 1: Descriptive Statistics of BMI, DMFT Score, Caries Status and Classification

Variable	BMI (Kg/m2)
N	161
Minimum	25.0
Maximum	40.7
Mean	29.0
SD	3.1

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DMFT Score	
N	161
Minimum	0
Maximum	4
Mean ± SD	0.57 ± 1.0
Variable	**Frequency (%)**
Weight status	
Obese	121 (75.15)
Over weight	34 (21.11)
Normal	4 (2.48)
Underweight	2 (1.26)
Dental caries	
Yes	45 (27.95)
No	116 (72.05)
Classification	
Class I	35 (77.80)
Class II	10 (22.20)

Table 3 indicates dental caries was present in 25 (55.55%) male patients and 20 (44.45%) female patients, whereas dental caries was absent in 61 (52.60%) male patients and 55 (47.41%) female patients. There was statistically insignificant association between gender and occurrence of dental caries (p= 0.73, chi-square value = 0.115 at df =1). Dental caries was present in different age groups; in 18-23 years 29 (64.44%) patients, in 24-29 years 2 (4.44%) patients and in 30-35 years 14 (31.11%) patients. Dental caries was absent in different age groups; in 18-23 years 54 (46.55%) patients, in 24-29 years 20 (17.24%) patients and in 30-35 years 42 (36.21%) patients. The statistically significant association was revealed (p=0.04) at df=2, chi-square value= 6.141. Dental caries was present in 38 (84.44%) patients who were from rural areas and 7 (15.56%) patients who were from urban areas. Dental caries was absent in 109 (93.96%) patients who were from rural areas and 7 (6.04%) patients who were from urban areas. On applying chi-square test p-value was 0.054 at df =1, chi square value=3.702.

Table 3: Stratification of Dental Caries Status with Respect to Gender and Residential Status

Gender	Dental Caries Status		p-value
	Yes (%)	No (%)	
Male	25 (55.55%)	61 (52.60%)	0.73
Female	20 (44.45%)	55 (47.41%)	
Residential status	**Caries status**		0.05*
	Yes	**No**	
Urban	7 (15.56%)	7 (6.04%)	
Rural	38 (84.44%)	109 (93.96%)	

*Significant association

Dental caries was present in different occupations; government servant 9 (20.00%) patients, private servant 4 (8.88%) patients, house wife 18 (40.00%) patients and student 14 (31.12%) patients. Dental caries was absent in different occupations; government servant 22 (19.00%) patients, private servant 15 (12.93%) patients, house wife 34 (29.3%) patients, labour 9 (7.76%) patients and student 36 (31.00%) patients. On applying Fischer Exact test, p-value was computed as p=0.27 at df=4 and statistic value as 5.105, as shown in table 4. Dental caries was present in different obese patients; in obese 27 (60.00%) patients, overweight 12 (26.66%) patients, normal 4 (8.90%) patients and in underweight 2 (4.44%) patients. Dental caries was absent in different obese patients; in obese 94 (81.00%) overweight 22 (19.00%) patients. On applying Fischer Exact test p-value was found as <0.001 i.e. highly significant association was shown at df =3 and 18.286.

Table 4: Stratification of Dental Caries Status with Respect to Occupation and Weight Status

Occupation	Dental Caries Status		p-value
	Yes (%)	No (%)	
Government Servant	9 (20.00%)	22 (19.00%)	0.27
Private servant	4 (8.88%)	15 (12.93%)	
House wife	18 (40.00%)	34 (29.31%)	
Labour	0 (0.00%)	9 (7.76%)	
Student	14 (31.12%)	36 (31.00%)	
Weight status			
Obese	27 (60.00%)	94 (81.00%)	<0.001*
Over weight	12 (26.66%)	22 (19.00%)	
Normal	4 (8.90%)	0 (0.00%)	
Under weight	2 (4.44%)	0 (0.00%)	

*Significant association

DISCUSSION

The prevalence of dental caries in Pakistan was originated to be around 60%. Bacteria, time, susceptible tooth surface and fermentable carbohydrates are the main elements associated with the expansion of tooth decompose, whereas lifestyle, smoking, xerostomia, fluorosis, and poor oral hygiene are also causative agents to its widespread division [16]. Abundant studies have documented the alliance between obesity and dental caries in different states. The data are inconsistent regarding the existence of a relationship and the nature and direction of the association. In this study most of the obese patients were male 86 (53.42%) and remaining 75 (46.58%) patients were female. Similar to our study Alswat et al., also reports that males were more to be overweight than females and 61.6% of the parents were full time employed and 38.4% were unemployed [17]. Out of 59 patients who were overweight/obese, male was 61.0% and females were 39.0%. Another study by Yadav et al., also reports that 72.8% patients were male and 27.2% were

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females [18]. Kim et al., also reports that 57.8% patients were male and 42.2% were females in ≥18 years patients [19]. In this study mean age of obese patients was 25.7 ± 6.1 years with range of 18-35years. Yadav et al., also reports the mean age of 28.39 ± 11. 4years [18]. A study by Al-Hussaini et al., reported the higher mean age of 45.44 years [20]. Most of the studies reports that children and young adults are mostly obese and are at a higher risk of dental caries. In this study the majority of the obese patients were from countryside areas 147(91.30%) and 14 (8.70%) patients were from urban areas. In this study most of the obese patients were housewife 52 (32.30%) and student 50 (31.15%) followed by government servant 31 (19.25%), private servant 19 (11.80%) and labor 9 (5.60%). Al-Hussaini et al., conducted the study on children and adolescents and reports that majority of the parents 57.6% were worker followed by unemployed 26.7%, office clerk 8.7% and Trader/professional 7.0% [20]. In this study mean BMI of the obese patients was 29.0 ± 3.1 Kg/m2. Most of the obese patients were overweight 121 (75.15%) followed by high weight 34 (21.11%), very high weight 4 (2.48%) and extremely high weight 2 (1.26%). Al-Hussaini et al., reports the overall frequency of overweight and obesity was 13.4% (14.2% for girls and 12% for boys) and 18.2% (18% for girls and 18.4% for boys) correspondingly [20]. Peres et al., reports the higher mean BMI but lower than our study i.e., 26.55 ± 6.3 3.72 Kg/m2 [21]. Al-Ansari et al., reports the lower mean BMI i.e., 23.42 ± 6.82 Kg/m2 [22]. Most of the patients were normal 40.0% followed by underweight 25.0%, obese 18.0% and overweight 17.0%. Difference in BMI was observed due to selection of patients. In our study all obese patients were selected whereas in other studies all patients including underweight, normal, overweight and obese patients. In this study mean DMFT score of the obese patients was 0.57 ± 1.0 and lower prevalence of dental caries i.e.27.95%. Al-Zahrani et al., reports the higher mean of DMFT score i.e., 2.06 ± 2.43 and higher prevalence of dental caries i.e., 60.9% [23]. Alshihri et al., reports the higher mean of DMFT score i.e., 3.55 ± 2.94and higher prevalence of dental caries i.e.,79.8% [24]. In our study low DMFT index score indicates the lower prevalence of dental caries, whereas a high DMFT index score indicates the development of dental caries and further reflects the deterioration of oral hygiene. In this study dental caries was diagnosed in 35 (77.80%) obese patients among which 35 (77.80%) patients were reported with class-I and 10 (22.20%) patients with class-II. Dental caries was significantly (p-value = <0.001) associated with obesity and diagnosed in 27 (60.00%) overweight patients, 12 (26.66%) high weight patients, 4 (8.90%) patients very high weight and 2 (4.44%) extremely high weight patients. Cheng et al., reported the 20.1% prevalence of dental caries in obese patients having ≥ 18 years of age. Based on BMI criteria in China, 70.28% of students were categorized as having normal weight, and about 20.23% were overweight or obese with significant (p-value = <0.001) association with dental caries [25]. However, not all similar studies have found a positive association between BMI and dental caries, as some studies suggest that there is no relationship and others show significant relationship. But all studies show that young obese people have a higher risk of dental caries.

CONCLUSIONS

The prevalence of dental caries was high in male subjects.18-23 years age group, house wives, obese patients and having rural areas residency were mostly affected by the presence of caries. Insignificant association between gender and occurrence of dental caries was found(p=0.73).

Authors Contribution

Conceptualization: RK
Methodology: RK
Formal analysis: RIB, SMM
Writing-review and editing: KNM, SMM, ZAS, RK
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Impact of Duration of Orthodontic Treatment on Periodontal Health and Treatment Needs of Patients

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ABSTRACT

Malocclusion is highly prevalent and can also affect the general health of patients. Orthodontic treatment is required to treat malocclusion. This treatment often leads to a deterioration in periodontal and general oral health of patients. **Objective:** To assess the impact of duration of orthodontic treatment on periodontal health and treatment needs of patients. **Methods:** A comparative cross-sectional study was done on a total of 51 individuals undergoing orthodontic treatment. The data were collected from July 2021 to June 2023 after obtaining ethical clearance. All participants above the age of 12 years irrespective of their gender were included in the study. Participants who had mixed dentition or other systemic illness were not included. Data were collected using the Community Periodontal index for treatment needs (CPITN). **Results:** The difference in CPITN scores across orthodontic treatment groups with respect to duration (p=0.382) was not significant. All groups irrespective of their treatment duration required Basic oral hygiene instructions (TN1) while Complex treatment (TN3) was only required by patients undergoing treatment for more than a year. **Conclusions:** Basic oral hygiene instructions (TN1) were the treatment need of all patients from all groups irrespective of their treatment duration. An equal percentage of patients from all three treatment groups required (TN2) while (TN3) was only required by patients undergoing treatment for more than a year.

INTRODUCTION

Malocclusion is a disruption of the normal occlusal relationships that enable individuals to perform the function of mastication and phonation in addition to being critical for facial esthetics [1]. It severely impacts the Quality of life of the affected person [2]. Treatment using orthodontic appliances that are fixed is preferred method which is most commonly used for treating the malocclusion [3]. These appliances can complicate oral hygiene maintenance which may cause accumulation of deterioration of oral health [4]. In adults, tooth loss, impaired function, and poor cosmetics may be the result of decreased periodontal integrity. The early stage of disease in the periodontium is gingivitis and it can lead to periodontitis, if left ignored [5]. The patients with severe occlusion or corrective problems are often treated with traditional metal stents [6]. People may feel uncomfortable and conventional cleaning may become difficult for them by wearing traditional braces [7]. To remove all deposits of plaque, patients should meticulously clean all oral appliances that have been placed for treatment to minimize the risk of demineralization [8]. In general, conditions associated with poorer periodontal health among orthodontic patients include those that favor and lead to plaque stagnation and in addition to that those

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resulting in difficulty to perform common oral hygiene measures [9]. Nevertheless, according to some studies, during the use of fixed orthodontic appliances, gingival changes may not result in permanent aggression to periodontal support tissue while few studies have suggested that gingival enlargement can occur during orthodontic treatment [10]. Brackets placed for orthodontic treatment affects oral health-related quality of life of the patients by hampering the process of mastication [11]. Facial esthetics and mastication can be improved through the teeth alignment by orthodontic treatment [12]. However, complications of this treatment like dental caries and discoloration of tooth are seen13. Accumulation of plaque and changes oral microbiota can be a result of inadequate oral hygiene practices [13]. During and after the orthodontic treatment, the relationship between the oral microbial status and orthodontic treatment procedures is considered to be a challenge [14]. The deposition of plaque that forms around the gingival margin includes anaerobic as well as aerobic bacteria that can result in periodontal diseases and its destruction [15]. In general, by using chemical solutions known as Mouth Rinse, the bacterial loads can be reduced [16]. Orthodontic treatment can lead to a correction of malocclusion with a resultant improve in the masticatory function of individuals [17].

There are innumerable studies that shed light upon the periodontal health of patients undergoing orthodontic treatment. The current study attempted to unravel the unexplored domain of impact of duration of orthodontic treatment on the periodontal treatment needs of patients in addition to assessing the impact of duration on the periodontal health itself. The aim of this study was to assess the impact of duration of orthodontic treatment on periodontal health and treatment needs of patients.

METHODS

A comparative cross-sectional study was carried out on 51 patients undergoing orthodontic treatment. The study participants were recruited using the convenient sampling technique. Keeping the precision at 5%, confidence level 95% and prevalence of periodontitis in orthodontic patients to be 3%, the sample size was calculated to be 51 [18]. It was conducted in the Sharif Medical and Dental College, Lahore. After receiving permission from the ethics committee (No. SMDC/SMRC/195-21)(received on 08.06.21) the data were collected from July 2021 to June 2023. All participants above the age of 12 years irrespective of their gender were included in the study. Participants who had mixed dentition or systemic illness were excluded from the study. Patients undergoing orthodontic treatment were divided in three categories based on the treatment duration (less than 6 months, 6 to 12 months and more than 12 months. Data were collected using the Community Periodontal index for treatment needs (CPITN). The marking on the CPITN probe are as follows: The tip of the probe is 0.5mm. Then there is a black band between 3.5 and 5.5 mm. At 8.5 and 11.5 mm from the ball tip are the rings. This probe is used to for clinical assessment of periodontium while scoring the index teeth using CPITN index [19]. Each index tooth was probed at three points mesiobuccal, distobuccal and mid-buccal. The highest recorded score was assigned to the tooth. The scoring system in CPITN index is healthy periodontium (score 0), bleeding gums with or without instrumentation (score 1), deposition of calculus with visible black band on CPITN probe (score 2), pocket depth 4-5mm with gingival margin within black band on CPITN probe (score 3), pocket depth 6mm or more and an invisible black band of the CPITN probe (score4), sextant excluded (X), not recorded (9).The periodontal treatment needs were classified as follows: 1. If the patient needed no treatment (TN0) 2. If the patient required instructions pertaining to oral hygiene (TN1) 3. If the patient required scaling in addition to oral hygiene instructions (TN2) 4. If in addition to instructions on oral hygiene and scaling the patient needed extensive root planning and procedures of surgical intervention (TN3).

The formulae for calculation of treatment needs are as follows:

- **%TN1**= % Codes B (bleeding)+C (calculus) +P1 (pocket depth 4-5mm)+P2 (pocket depth 6mm or above)
- **%TN2**= % Codes C (calculus)+ (pocket depth 4-5mm) +P2 (pocket depth 6mm or above)
- **% TN3**=% Code P2 (pocket depth 6mm or above)

SPSS veraion-24 was used for analysis. Numeric data were presented as mean and standard deviation. Nominal data were recorded as frequency and percentage. Kruskal Wallis test was used to find the difference in the CPITN scores of patients undergoing orthodontic treatment with respect to duration. P value ≤0.05 was considered significant.

RESULTS

The mean age of the participants was 15.30 ± 2.339 years with 50.5% males and 49.5% females. Table 1 shows that difference in CPITN scores across orthodontic treatment groups with respect to duration was not significant. The CPITN scores of patients undergoing orthodontic treatment less than 6 and from 6 to 12 months were lower than those undergoing treatment for over a year indicating a deterioration of periodontal health with progression in treatment duration as shown in table 1.

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Table 1: CPITN scores across patients undergoing orthodontic treatment for various durations

CPITN score	Duration of orthodontic treatment	N	Mean Rank	Chi-square	df	P-value
	Less than 6 months	17	24.18	1.925	2	0.382
	6 to 12 months	17	24.18			
	>12 months	17	29.65			

Table 2 shows that irrespective of the treatment duration none of the patients had a healthy periodontium. It was seen that the highest percentage of bleeding gums, periodontal pocket depth of 4-5mm and 6mm and above were found in patients under treatment for more than a year. Calculus deposition in group of patients undergoing treatment less than 6 months and from 6 to 12 months was equal and higher than those undergoing treatment for over a year as shown in table 2.

Table 2: Prevalence of orthodontic patients affected with respect to the duration of treatment

Duration of orthodontic treatment	Prevalence of persons affected in patients undergoing treatment							
				% Persons coded				
	Age (yrs)	No. examined	No. Of dentate persons	H (Healthy perio-dontium)	B (Blee-ding gums)	C (Cal-culus)	P1 (Pocket depth 4-5mm)	P2 (Pocket depth 6mm or more)
Less than 6 months	12-23	17	17	0%	5.9%	64.7%	29.4%	0%
6 to 12 months	12-18	17	17	0%	5.9%	64.7%	29.4%	0%
More than 12 months	12-18	17	17	0%	11.8%	35.3%	41.2%	11.8%

Table 3 shows that basic oral hygiene instructions (TN1) were the treatment need of all patients from all groups irrespective of their treatment duration. An equal percentage of patients from all three treatment groups required (TN2) while (TN3) was only required by patients undergoing treatment for more than a year as shown in table 3.

Table 3: Periodontal treatment needs of patients undergoing treatment with respect to duration

Duration of orthodontic treatment	Periodontal treatment needs of patients undergoing orthodontic treatment			
	$\%TN_0$	$\%TN_1$	$\%TN_2$	$\%TN_3$
Less than 6 months	0%	100%	94.1%	0%
6-12 months	0%	100%	94.1%	0%
More than 12 months	0%	100%	94.1%	11.8%

DISCUSSION

Our study reported that CPITN scores of patients undergoing orthodontic treatment less than 6 were lower than those undergoing treatment for over a year indicating a deterioration of periodontal health with progression in treatment duration. While according to another study Plaque and gingival Index from two groups of subjects were measured in one study. There was a significant increase in these parameters after first 3 months of appliance wear. After the removal of appliances, a decrease in the scores of these parameters was seen from 3 to 6 months [4]. Our study showed that irrespective of the treatment duration none of the patients had a healthy periodontium. It was seen that the highest percentage of bleeding gums, periodontal pocket depth of 4-5mm and 6mm and above were found in patients under treatment for more than a year. Our study, also showed that calculus deposition in group of patients undergoing treatment less than 6 months and from 6 to 12 months was equal and higher than those undergoing treatment for over a year. According to another study, there was considerable difference between pre and post orthodontic treatment plaque levels($p<0.01$). The study showed that at baseline overall gingival index scores were 0.56 ± 0.11 and improved to 0.48 ± 0.12 after orthodontic treatment ($p<0.01$). The study also reported a drop on probing depths after completion of treatment($p<0.01$). In FA group, the probing depth was 3.01± 0.77 mm and 2.53 ± 0.78mm at baseline and after treatment, respectively. 5.01 ± 2.20 months was the total duration of orthodontic treatment. FA group had the treatment duration of the (4.16 ± 1.71 months) [20]. Our study shows that basic oral hygiene instructions (TN1) was the treatment need of all patients from all groups irrespective of their treatment duration. An equal percentage of patients from all three treatment groups required (TN2) while Complex treatment (TN3) was only required by patients undergoing treatment for more than a year. Another study showed that on the duration of less than ≤ 12 months of use, most of the sample requiring TN1 were 53.3%. Among patients undergoing treatment for > 12 months most of the sample in TN2 were 55.0%. A significant relationship between periodontal treatment needs and length of treatment ($p=0.004$) was seen [21]. It is extremely essential for clinicians to understand the periodontal treatment needs of patients undergoing orthodontic treatment specially as the duration increases. This will help them cater to the needs of these patients and their overall well-being. Addressing the periodontal treatment needs generated as a result of the orthodontic treatment in these patients will also help in a better patient compliance with the treatment. Our study has unraveled both the impact of orthodontic treatment on the periodontal health and treatment needs of these patients in association with the duration.

CONCLUSIONS

Bleeding gums, periodontal pocket depth of 4-5mm and 6mm and above were found to be most prevalent in patients undergoing treatment for more than a year. Calculus deposition in group of patients undergoing treatment less than 6 months and from 6 to 12 months was equal and higher than those undergoing treatment for over a year. TN1

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was the treatment need of all patients from all groups irrespective of their treatment duration. An equal percentage of patients from all three treatment groups required TN2 while TN3 was only required by patients undergoing treatment for more than a year.

Authors Contribution

Conceptualization: AA1, AQ, SMF, AN, HB,
Methodology: AA1, AQ, SMF, AN, HB
Formal analysis: HB
Writing-review and editing: AA1, AQ, SMF, AN, HB, AA2
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Significance of Prescribing Astigmatic Correction in Young Patients having Low Astigmatism with Near Vision Complaints

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ABSTRACT

Astigmatism causes increased difficulty in reading performance like book reading, mobile usage and computer work. **Objective:** The primary objective was to find out the significance of prescribing astigmatic correction in young patients having low astigmatism with near vision complaints and secondary objective was to find out the most common type of astigmatism affecting near vision. **Methods**: This was a multicentered, prospective cohort study conducted from April 2022 to Sep 2022. A total of 64 subjects of both genders were selected through non-probability convenient sampling technique. Patients with age between 15-30 years having low astigmatism (0.25-0.75D) with near vision complaints were included. Any amount of astigmatism was corrected with appropriate glasses and subjects were asked for a follow up fortnightly. Follow up improvement in symptoms were recorded and compared with earlier complaints by applying chi square test using SPSS version 23.0. **Results**: A total of 64 subjects were enrolled in the study. The mean age of patients was 22.44 years including 27 (42%) males and 37 (58%) females. The most common symptom was Eye Strain found in 53 (83%) of the patients. Most common type of astigmatism was Against the Rule astigmatism. 62 (96%) patients improved to 6/6 in both eyes. On follow up, improvement in symptoms was noted and compared with symptoms before the usage of glasses. **Conclusions**: The study concluded that the treatment for near vision complaints in young patients is prescribing them with proper cylindrical / astigmatic correction in the form of eye glasses.

INTRODUCTION

Refractive error is a condition in which optical system of the eye is unable to bring incident parallel rays of light to focus on fovea. It is evident that without appropriate optical correction, millions of children are losing educational opportunities and elders are excluded from effective working, facing severe economic and social burden. Persons and community are pushed in a vicious cycle of poverty and disability because of this health issue [1, 2]. Uncorrected refractive errors are leading cause of visual impairment worldwide and the second major cause of blindness [3]. Globally, there are about 2.3 billion people who have refractive error. Of these, only 1.8 billion can get eye care services which are affordable to them. Children are more susceptible to refractive errors, because

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uncorrected refractive error can result dramatically on their learning process and educational needs [4]. Refractive errors can be managed by prescribing proper optical correction. If not treated in childhood, it may develop into amblyopia, which can lead to blindness. The refractive correction can be done by spectacles, contact lenses, or refractive surgery. The most commonly used correction method is prescribing glasses. Therefore, spectacles are treatment of choice for refractive error [5]. Astigmatism is derived from a Greek word "a" meaning absence and "stigma" meaning point. Astigmatism is known for more than 200 years [6]. It is a refractive error in which incident parallel rays of light are not focused on retina when accommodation is at rest. When rays of light are refracted by astigmatic cornea, they are not focused on a single point, therefore images from the retina of different objects at far and near are blurred and may seem to be elongated and out of focus [7]. Astigmatism causes increased difficulty in reading performance like book reading, mobile usage and computer work. It has been found that at Smaller reading material induced against the rule astigmatism was causing more strain on Visual acuity and reading than did with the rule astigmatism [8]. Most of the people having normal Visual acuity suffer from different near vision symptoms such as decreased near vision, visual fatigue, discomfort, asthenopia tiredness, loss of concentration and eye strain while performing their routine near vision activities [9]. Asthenopia is often understood as distress arising from excessive use of the eyes [10-12]. The most commonly presenting complaint of asthenopia is eyestrain which is most commonly associated with near work like reading, sewing and computer work. Other associated symptoms are headache, eye ache, irritation, stinging eyes and grittiness [13]. Asthenopia, also called as eye strain is major symptom most commonly affecting the mobile user, computer users and students [14-16]. Asthenopic features involve the following conditions like glare [17, 18]; accommodation inability & reduction in amplitude of accommodation; uncorrected refractive error [19, 20]; presbyopia [21, 22]; improper contrast [23, 24]; abnormalities of binocular single vision such as esophoria and convergence insufficiency [24-26]; poor gaze direction [25]; shaky computer images [26] and dry eye [27]. Previously few studies have been conducted regarding the influence of astigmatism on near work, reading difficulties, asthenopic symptoms, effect of uncorrected refractive errors and causes of asthenopic symptoms. This study is specially designed at a clinical setup to find out the impact of prescribing low astigmatic correction in young adults having near vision complaints.

METHODS

This was a multicentered, prospective cohort study with repeated measures design. A total of 64 subjects of both genders were selected through non-probability convenient sampling technique and were examined at Eye OPDs of Sheikh Zayed Hospital Rahim yar khan, and services Hospital Lahore, after taking relevant informed consent. The duration of study was 6 months after approval of Ethical committee. Patients with age between 15-30 years having low astigmatism (0.25-0.75D) and with near vision complaints were included in the study. Visual acuity was recorded using Snellen Visual acuity box and any amount of astigmatism was corrected with appropriate glasses and subjects were asked for a follow up fortnightly. The data were recorded on proforma designed for this purpose. Follow up improvement in symptoms were recorded and compared with earlier complaints by applying chi square test using SPSS version 23.0.

RESULTS

A total of 64 subjects were enrolled in the study. The mean age of patients was 22.44 years including 27 (42%) males and 37(58%) females. The most common symptom was Eye Strain found in 53 (83%) of the patients. Majority of the patients were having visual acuity 6/9 in their right eyes 30 (47%) and in left eyes 33 (52%). 12 (19%) of the patients was having reduced near visual acuity (N8). The most common type of astigmatism was Against the Rule astigmatism which was found in 34 (53%) patients in right eye while 31 (48%) in left eye. Similarly, patients having With the Rule astigmatism were 24 (38%) in right eye and 23 (36%) in left eye. Whereas, Oblique Astigmatism was found in the patients 6 (9%) in right eye and 10 (16%) in left eye. 62 (96%) patients were improved to 6/6 in both eyes while 1 (2%) were improved to 6/9 while 1 (2%) were improved to best corrected visual acuity of 6/12 after cylindrical correction. 31 (48%) patients were having 0.75D of astigmatism in 25D of astigmatism in right eye and 1 (2%) in left eye. On follow up, improvement in symptoms was noted and compared with symptoms before the usage of glasses by applying chi square test. It was observed that out of 53 patients having Eye Strain, 50 (94%) showed improvement in Eye Strain (p=0.004), out of 42 patients having Headache, 38 (90%) showed improvement in Headache (p=0.001), all 16 (100%) patients having Near Vision Difficulty, improved right eye and 28 (44%) in left eye while, 31 (48%) patients were having 0.5D of astigmatism in right eye and 35 (54%) in left eye. Whereas, 2 (4%) patients were having 0. (p=0.000), out of 20 patients having Difficulty in Computer Usage, 18 (90%) showed improvement in Computer Usage (p=0.001) and out of 33 patients having difficulty in Mobile Usage, 27 (82%) showed improvement in Mobile Usage (p=0.04). Table 1 shows that of 64 patients, 27(42%) were males and 37(58%)

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were females 27(42%) were in the age group 15-20 years, 14 (22%) were in the age group 21-25 years and 23 (36%) were in the age group 26-30 years.

Table 1: Gender & Age group

Variables	No. of Patients
Gender	
Male	24
Female	37
Age Group	
15-20	27
21-25	14
26-30	23

Table 2 shows variety of symptoms in subjects. Eye strain was the most common symptom found in 53 (83%) subjects.

Table 2: Correlative Complaints

Complaint	No. of Patients
Eye Strain	53
Headache	42
Near Vision Difficulty	16
Difficulty in Computer	20
Mobile Usage	33

Table 3 shows different types of astigmatism in patients. The most common type of astigmatism was Against the Rule astigmatism which was found in 34 (53%) patients in right eye while 31(48%) in left eye. Similarly, patients having With the Rule astigmatism were 24(38%) in right eye and 23 (36%) in left eye. Whereas, Oblique Astigmatism was found in the patients 6(9%) in right eye and 10(16%) in left eye.

Table 3: Types of Astigmatism

Parameter	Right Eye	Left Eye
ATR	34	31
OA	6	10
WTR	24	23

Table 4 shows improvement in patients after wearing astigmatic correction.

Table 4: Improvement in Symptoms after Wearing Glasses

Complaint	Total No. of Patients	No. of Patients Improved	Not Improved	Sig.
Eye Strain	53	50	3	0.003
Near Vision Difficulty	16	16	0	0.000
Near Visual Acuity	12	11	1	0.002
Difficulty in Computer Usage	20	18	2	0.002
Difficulty in Mobile Usage	33	27	06	0.04

Figure 1 shows that 31(48%) patients were having 0.75D of astigmatism in right eye and 28 (44%) in left eye. While, 31 (48%) patients were having 0.5D of astigmatism in right eye and 35 (54%) in left eye. Whereas, 2 (4%) patients were having 0.25D of astigmatism in right eye and 1 (2%) in left eye.

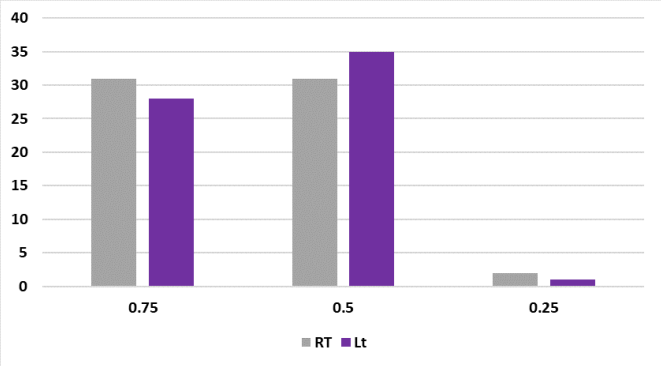

Figure 1: Refractive Status

DISCUSSION

Astigmatism is one of the major form of refractive errors which affects almost 20% of school going children [28]. In Native American or Asian community level of astigmatism is higher in children [29, 30-32]. 46% of the correctable visual impairment is due to astigmatism of ≥ 1 diopter cylinder [33]. With the advent of modern gadgets like mobile phone and computer, etc. visual burden on eyes has increased manifolds as study has also been shifted largely on these gadgets in addition to games and entertainment applications. Young adults going to colleges or universities involved in extensive near work experience different symptoms like eye strain, headache, eye ache, fatigue, difficulty in reading, usage of computer and mobile. This may largely be due to uncorrected astigmatism or dry eyes. It is unknown that how much influence do uncorrected astigmatic refractive errors cause on the visual tasks performed by young adults such as performing near vision activity like reading or in the class room. Eye care professionals also face an important question of prescribing the minimum amount of astigmatic correction. This may largely be due to the fact that the effect of uncorrected astigmatism on visual performance varies with power and axis of astigmatism [34]. The available guidelines regarding the correction of astigmatism suggest that the astigmatism of >1.00 diopter cylinder reducing the visual acuity to < 6/12 must be corrected [35-37]. On the other hand, some researchers suggests that low astigmatism even of 0.5 DC should be corrected considering axis and power of astigmatism if asthenopic symptoms are present [38-39]. Near vision functions like reading text, reading speed, using mobile or computer are largely affected by low astigmatism of 1 diopter cylinder also causing decrease in visual acuity. In this study, young adults of age 15-30 years having low astigmatism with near vision complaints were included who were having symptoms of eye strain, headache, difficulty in reading, computer usage & mobile phone usage low astigmatism of 0.75 DC or less. Patients were examined by performing

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visual acuity, subjective refraction and were advised glasses for cylindrical correct. The most common symptom was eye strain which was found in 53 (83%) of the patients. Most of the patients were having visual acuity reduced to 6/9. The most common type of astigmatism was against the rule astigmatism which was found in almost 50% of the patients. This is similar to a study conducted by Wills *et al.,* which showed that against the rule astigmatism significantly affects reading speed and near vision tasks [9]. Patients were reviewed after 15 days and improvement in symptoms were noted. It was remarkable to note that majority of the patients (96%) were having improved visual acuity to 6/6 with cylindrical correction. Similarly, astigmatism of 0.5DC was most common (51%). On follow up significant improvement in symptoms was noted in patients using cylindrical correction / glasses advised to them. This is similar to the study conducted by Rosenfield *et al.,* who concluded that correction of small amount of astigmatic errors is necessary to prevent patients from near vision difficulties and asthenopic symptoms while doing computer work [40].

CONCLUSIONS

This study concluded that young patients age 15-30 years having low astigmatism experience near vision complaints. These patients do not fall in the age of presbyopia rather their symptoms like eye strain, headache, difficulty in reading, computer usage and mobile phone usage are due to astigmatic changes which can be rectified by prescribing proper cylindrical / astigmatic corrections. On the basis of findings of this preliminary research, it can be concluded that the treatment for near vision complaints in young patients is prescribing them with proper cylindrical / astigmatic correction in the form of eye glasses. Moreover, it was found that Against the Rule Astigmatism was the most common type of astigmatism causing asthenopic symptoms. It is therefore derived that low astigmatism is a cause of ocular discomfort and should not be treated lightly, rather it should be managed at earliest.

Authors Contribution

Conceptualization: AAK
Methodology: NK, MKW
Formal analysis: RNI
Writing-review and editing: FR, MAC

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Analysis on Chemical Composition of Urinary Calculi and Evaluation on Metabolic Disturbance in 1080 Uyghur, Kazakh and Han Nationality Patients of Xinjiang

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ABSTRACT

Urinary stones pose a significant health concern globally. The incidence rates vary and are influenced by diverse factors. Despite advancements in the treatment modalities, increasing rate of urinary stones necessitates the development of stone prevention strategies and understanding of metabolic risk factors. **Objective:** To determine the relationship between chemical composition of urinary calculi and evaluation on metabolic disturbance in 1080 Uyghur, Kazakh and Han patients of Xinjiang. **Methods:** The stone composition of 1080 patients and analysis of 24-h urine and serum biochemistry results of 775 cases was evaluated by infrared spectroscopic analysis and automatic biochemical machine respectively **Results:** Among 644 cases of urinary stones, calcium oxalate stones (409 cases) and mixed type stones (436 cases) were predominant. Metabolic disturbances were found in 643 cases (82.97%) out of 775 patients, showing various urinary abnormalities like hyperuricosuria, hyperoxaluria, hyperphosphaturia, hyper-cystinuria, hypercalciuria, hypomagnesuria, hypocitraturia, and reduced urine volume (<2000ml in 407 cases). **Conclusions:** Urinary calculi have intimate connection with metabolic evaluation. Metabolic evaluation and composition of urinary calculi have great significance in treatment and prevention of urinary calculi.

INTRODUCTION

Urinary system stones are a prevalent condition within urological diseases, ranking first or second in the spectrum of urological diseases, especially among inpatients in urology departments [1]. Epidemiological data from Western countries indicate that 5-10% of individuals experience urinary system stones at least once in their lifetime [2], with the incidence in Europe ranging from 100 to 400 cases per 100,000 people [3]. As China's economy advances, social development accelerates, and living standards rise, dietary habits undergo significant changes, leading to an overall increase in the incidence of urinary system stones, estimated at 3% to 8%. The Southern regions of China, with higher economic development, exhibit even higher incidence rates of 5-10% [4]. Xinjiang, a region in China and a high-risk area for urinary system stones, experiences an annual incidence rate of 200 to 500 cases per 100,000 people, with approximately 43% of cases requiring hospitalization [5]. Urinary system stone incidence is influenced by various factors such as patient gender, age, ethnicity, occupation, water quality, climate, geographical location, body mass index (BMI), lifestyle, and water intake [5]. Depending on the location of stone formation, different degrees of damage can occur, ranging from obstruction to severe impairment of kidney function,

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potentially requiring lifelong dialysis. Despite advancements in the treatment of urinary system stones, such as extracorporeal shock wave lithotripsy, percutaneous nephrolithotomy, ureteroscopy, holmium laser lithotripsy, pneumatic ballistic lithotripsy, and laparoscopic stone removal, the incidence of urinary system stones is on the rise [6]. Stone prevention has become a focal point of concern for urologists. In recent years, with in-depth research on the causes of urinary system stones, urologists have increasingly emphasized the metabolic risk factors associated with stone formation [7]. There have been reports on the composition of stones in Uyghur patients in the southern part of Xinjiang, but there is a lack of comparative studies on the stone compositions and metabolic characteristics of various ethnic groups in Xinjiang [8, 9]. This study focuses on 1080 patients with urinary system stones treated in our hospital from 2009 to 2012, analyzing their stone compositions using infrared spectroscopy. Additionally, we conducted a comprehensive analysis of serum biochemical indicators and 24-hour urine electrolyte components in 775 of these patients using an automatic biochemical analyzer. By determining the stone compositions and metabolic characteristics of patients with urinary system stones and conducting comparative analyses among different ethnic groups, this study aims to provide relevant guidance for analyzing the causes of urinary system stones in the region and offer important clues for stone prevention and preventing stone recurrence.

METHODS

It is a retrospective cross-sectional study conducted in the Urology Department of Xinjiang Hospital from March 2018 - December 2021. Specimens from a total of 1080 patients with urinary system stones who were treated in this duration of approximately three years were included, comprising 571 specimens from Uyghur patients, 45 from Kazakh patients, and 464 from Han Chinese patients. Specimens from 775 patients who underwent complete serum biochemical and urine electrolyte tests upon admission were selected for further analysis. Patients diagnosed with urinary system stones but did not receive treatment to obtain stone specimens. Patients diagnosed with urinary system stones but did not receive treatment to obtain stone specimens and those with incomplete biochemical or urine electrolyte test results were excluded from the study. For analysis and determination of stone composition, The IR Prestige-21 Fourier Transform Infrared Spectrometer, a press machine, ZW-5A temperature-controlled drying oven, molecular sieve drying apparatus (Chengdu Scientific Instrument Company, China), agate mortar (Beijing Chengke Scientific Equipment Company, China), ammonium magnesium phosphate hexahydrate, potassium bromide, L-cysteine, calcium oxalate, and other reagents (Shanghai Martin Reagent Co., Ltd., China) were used. The reagents were thoroughly ground in an agate mortar, placed in a temperature-controlled drying oven for sufficient drying, and then transferred to the molecular sieve drying apparatus. The stone specimen's surface residues were rinsed 2-3 times with distilled water, allowed to air dry naturally (room temperature: 20-29°C). After complete drying, the prepared potassium bromide powder and the stone specimen were mixed thoroughly and ground in the agate mortar. The mixture was then placed in the temperature-controlled drying oven for drying, not exceeding 5 minutes (prolonged exposure to high temperatures may cause crystal dehydration, significantly affecting the analysis results). After removal, it was ground for about a minute and then pressed into a pellet (thickness not exceeding 0.5 millimeters) using a press machine. The prepared pellet was quickly placed into the Fourier Transform Infrared Spectrometer [10]. Comparative analysis with the spectral library using computer processing yielded the stone's composition. All selected patients underwent fasting blood collection upon admission for serum biochemical analysis. A 24-hour urine sample was collected, and 10ml of the well-mixed urine was sent to the laboratory in a specialized container for electrolyte analysis. Biochemical and urine electrolyte results were obtained using our hospital's automated biochemical analyzer. Statistical analysis included patient age, gender, stone distribution location, stone composition results, ion concentrations (calcium, magnesium, phosphorus, potassium) in urine, and serum biochemical ion concentrations. Data were statistically analyzed using SPSS 21.0 software. Group differences were compared using the chi-square test for categorical data and the t-test for grouped continuous data. A significance level of $P<0.05$ was considered statistically significant.

RESULTS

This study included a total of 1080 cases of urinary system stone specimens, with a gender distribution of 737 males (68.24%) and 343 females (31.76%), spanning an age range from 2 months to 93 years. Among the male cases, Uyghurs accounted for 381 (35.28%), Kazakhs 28 (2.59%), and Han Chinese 328 (30.37%). In the female cases, Uyghurs represented 190 (17.61%), Kazakhs 17 (1.57%), and Han Chinese 136 (12.59%). The overall age distribution included: ≤10 years (241 cases, 22.31%), ≤20 years (110 cases, 10.18%), ≤30 years (152 cases, 14.07%), ≤40 years (186 cases, 17.22%), ≤50 years (182 cases, 16.85%), ≤60 years (104 cases, 9.62%), ≤70 years (71 cases, 6.76%), ≤80 years (29 cases, 2.69%), ≤90 years (4 cases, 0.37%), ≤95 years (1 case,

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0.09%) as demonstrated in table 1.

Table 1: Gender and Age-wise Distribution Among Uyghur, Han Chinese, and Kazakh Patients [N(%)]

Variables	Ethnicity			
	Uyghur	Han Chinese	Kazakh	Total
Gender-wise distribution of patients (%)				
Male	381 (35.28)	28 (2.59)	328 (30.37)	737 (68.24)
Female	190 (17.61)	17 (1.57)	136 (12.59)	343 (31.76)
Age-wise distribution of patients (%)				
≤10	214 (19.87)	23 (2.12)	4 (0.37)	241 (22.31)
11-20	90 (8.33)	20 (1.85)	0 (0)	110 (10.18)
21-30	106 (9.81)	30 (2.77)	16 (1.48)	152 (14.07)
31-40	70 (6.48)	101 (9.35)	15 (1.39)	186 (17.22)
41-50	53 (4.90)	126 (11.67)	3 (0.27)	182 (16.85)
51-51	20 (1.85)	83 (7.68)	1 (0.09)	104 (9.62)
61-70	12 (1.11)	53 (4.91)	6 (0.55)	71 (6.76)
71-80	6 (0.55)	23 (2.13)	0 (0)	29 (2.69)
81-90	0 (0)	5 (0.46)	0 (0)	5 (0.46)
Total	571 (52.87)	464 (42.96)	45 (4.17)	1080 (100)

The distribution of stones based on location included: renal stones 860 cases (79.63%), left renal stones 671 cases (21.13%), right renal stones 169 cases (15.31%); ureteral stones 164 cases (15.19%), left ureteral stones 152 cases (14.07%), right ureteral stones 12 cases (1.29%); bladder stones 51 cases (4.72%), urethral stones 5 cases (0.46%) as shown in table 2.

Table 2: Stone Distribution in Uyghur, Han Chinese, and Kazakh Patients [N(%)]

Site	Ethnicity			
	Uyghur	Han Chinese	Kazakh	Total
Kidney	498 (46.11)	323 (29.91)	39 (3.63)	860 (79.63)
Ureter	46 (4.44)	115 (10.65)	3 (0.27)	164 (15.19)
Bladder	22 (2.60)	26 (2.31)	3 (0.27)	51 (4.72)
Urethra	5 (0.46)	0 (0)	0 (0)	5 (0.46)
Total	571 (52.87)	464 (42.96)	45 (4.17)	1080 (100)

In serum biochemistry, only a few items considered related to the etiology of urinary stones, such as Mg2+, Ca2+, P5+, UA, were selected for statistical comparison analysis [11]. The results are as follows: There were no statistically significant differences in blood Mg2+ and Ca2+ between Uyghurs and Han Chinese, Uyghurs and Kazakhs, and Kazakhs and Han Chinese. There was a statistically significant difference in blood P5+ between Uyghurs and Han Chinese ($P<0.05$), no significant difference between Uyghurs and Kazakhs ($P>0.05$), and a significant difference between Kazakhs and Han Chinese ($P<0.05$). The specific results are detailed in the following table 3.

Table 3: Serum Biochemistry Comparison in Uyghur, Han Chinese, and Kazakh [mmol/L]

Site	Ethnicity		
	Uyghur	Kazakh	Han Chinese
Ca^{2+}	2.25±0.34	2.21±0.09	2.24±0.04
Mg^{2+}	1.07±0.13	1.05±0.19	1.03±0.16
UA	282.23±98.34	279.42±97.45	294.2±71.34
P^{5+}	1.34±0.40	1.22±0.38	0.88±0.34

Uyghurs had statistically significant differences ($P<0.05$) with Han Chinese in urine specific gravity (SG) and 24-hour urine uric acid (UA), with Uyghurs higher than Han Chinese. Uyghurs also had mean values of urine K+, Na+, and UA above the normal range, while urine pH and urine volume were lower than Han Chinese. There were no statistically significant differences ($P>0.05$) in urine specific gravity (SG) and 24-hour urine uric acid (UA) between Uyghurs and Kazakhs, but there were significant differences ($P<0.05$) between Kazakhs and Han Chinese, with Kazakhs higher than Han Chinese. Kazakhs also had mean values of urine K+, Na+, and UA above the normal range, while urine pH and urine volume were lower than Han Chinese. According to the standards for urine metabolism abnormalities, 644 patients (83.09%) showed metabolic abnormalities, including 158 cases (24.5%) of hypercalciuria, 234 cases (36.8%) of hyperuricosuria, 265 cases (41.12%) of hyperphosphaturia, 230 cases (35.7%) of hypomagnesuria, and 330 cases (51.2%) of low urine volume. Detailed results of urine electrolytes, 24-hour urine volume comparison, urine specific gravity and pH are shown in table 4.

Table 4: Comparison of Urine Electrolytes, 24-Hour Urine Volume [mmol/24h], Urine Specific Gravity and pH in Uyghur, Han Chinese, and Kazakh

Variables	Ethnicity		
	Uyghur	Kazakh	Han Chinese
Urine Electrolytes and 24-Hour Urine Volume [mmol/24h]			
K^{+}	156.56±144.40	147.33±130.34	59.32±43.56
Na^{+}	218.65±143.35	221±140.78	178.45±90.50
Ca^{2+}	6.78±5.01	5.99±4.02	5.09±2.99
HPO_4^{2-}	23.98±12.09	22.67±11.01	17.99±7.09
Mg^{2+}	5.78±4.01	4.78±3.68	5.45±4.01
Cr	17.25±11.89	16.67±12.01	13.01±5.89
UA	7.08±11.07	6.88±10.02	2.89±1.09
24h Urine Volume	1879±824	1935±713	2231±709
24-Hour Urine Analysis Results (%)			
Hypercalciuria	75 (11.65)	11 (1.71)	72 (11.18)
Hyperuricosuria	123 (19.1)	9 (1.39)	111 (17.24)
Hyperphosphaturia	109 (16.92)	8 (1.24)	138 (21.42)
Hypomagnesuria	99 (15.37)	12 (1.86)	119 (18.48)
Urine Specific Gravity and pH Results			
Urine pH	5.98±0.47	5.78±0.41	6.08±0.89
Urine Specific Gravity (SG)	1.026±0.08	1.020±0.06	1.016±0.04

DISCUSSION

This descriptive study observed and analyzed the urinary system stones, a common disease in the urological spectrum, ranking first or second in the spectrum of urological surgical diseases and holding the top position among inpatients in urology [12, 13]. The formation of

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urinary stones is complex, with mechanisms not fully explained to date [14]. Summarized stone-forming factors include individual factors, external factors, urological factors, and urine stone-forming factors [15]. Individual factors involve race, genetic factors, and dietary habits, while urological factors encompass damage, obstruction, infection, foreign bodies, etc [16]. External factors include natural and social environments, economic status, dietary culture, and geographic location. Urine factors involve components leading to urine oversaturation, inhibition, retention, and promotion. Epidemiological data from European and American countries show that 5% to 10% of people experience urinary stones at least once in their lifetime, with the incidence in Europe ranging from 100 to 400 per 100,000 people [17]. As China's economy and society develop, the overall incidence of urinary stones has increased by about 3% to 8%. In the southern regions, where economic levels are higher, the incidence is 5% to 10%, while Xinjiang is one of the high-incidence areas in China and even Asia, with an annual incidence of 200 to 500 per 100,000 people [18, 19]. The composition and incidence of urinary stones are related not only to patient gender, age, race, occupation, climate, water quality, and geographical location but also to personal factors such as body mass index, lifestyle, and water intake [20]. Urinary stones can occur regardless of age, gender, or race [21]. In the study, among 1080 patients, 737 were male (68.24%) and 343 were female (31.76%). The highest incidence was in Uyghurs (52.87%), followed by Han (42.96%) and Kazakhs (4.17%). The incidence was higher in males than females. Uyghur patients showed a higher incidence at younger ages, while Han patients had a higher incidence at older ages. Kidneys were the most common site for stone formation (79.63%), followed by ureters (15.19%), bladder (4.72%), and urethra (0.46%). The study highlighted Xinjiang's unique status as a high-incidence area. Differences in serum calcium (Ca2+) and magnesium (Mg2+) were not statistically significant, but phosphorus (P5+) levels were higher in Uyghurs compared to Han, suggesting a potential metabolic difference. Uyghurs had lower urine pH and volume compared to Han. Uyghurs had higher levels of K+, Na+, and uric acid (UA) in urine. Uyghurs and Kazakhs had statistically significant differences in urine specific gravity (SG) and electrolyte levels compared to Han. The study used infrared spectroscopy to analyze stone composition, categorizing them into pure and mixed types. Calcium oxalate stones were the most common. Uyghurs had a higher incidence of stones with uric acid components, possibly linked to their dietary habits.

CONCLUSIONS

The study provides insights into the complexity of urinary stone formation, emphasizing the impact of demographic, genetic, environmental, and lifestyle factors on stone composition and incidence.

Authors Contribution

Conceptualization: MRF
Methodology: HT
Formal analysis: KA
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Original Article

The Efficacy of Bleeding Acupuncture Point UB-40 in Patients Suffering from Severe Acute Lumbago

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ABSTRACT

Severe acute lumbago, or lower back pain, is a common condition that can cause sudden pain and cramping that lasts for days to weeks. The UB-40 acupuncture point, also known as the Urinary Bladder 40, is a sensitive point that provides excellent relief from spinal pain. **Objective:** To evaluate the efficacy of bleeding acupuncture point UB-40 in patients suffering from severe acute lumbago. **Methods:** An experimental pre-post study was conducted on 40 participants, recruited from the emergency department (ED) of Iffat Anwar Medical Complex Lahore from January 2021 to February 2023. All the patients were treated with bleeding at UB-40 acupuncture point technique. After the treatment, the patients were followed at baseline, 1-week and 1-month intervals. The primary outcomes of the study were to determine the improvement in acute low back pain by using the visual analogue scale (VAS) and physical impairment using Oswestry low back disability index (ODI) scale. **Results:** A total of 40 patients were enrolled in the current study. The mean age of patients was 38.7±12.2. Majority of the patients were females (52%). The mean pain score (VAS) at baseline was 8.00±0.751, which reduced at 4th week with a mean pain score of 2.92±1.28. Moreover, at baseline, patients had severe disability with a mean ODI score of 55.58, but after treatment it gradually decreased to (25.55). **Conclusions:** It was concluded that acupuncture, especially with bleeding at UB-40 point, may provide an immediate significant effect in reducing the acute pain of low back and disability.

INTRODUCTION

Traditional Chinese medicine (TCM) has historically utilized acupuncture as an ancient treatment method [1]. In order to promote the body's natural healing process and reduce discomfort, thin needles are inserted into certain areas on the body. UB-40, sometimes referred to as 'Weizhong' or metaphorically 'the Middle of the Crook', is a typical acupuncture point used to alleviate lower back discomfort. The midpoint of the popliteal crease behind the knee is where it is located [2]. Severe acute lumbago, or lower back pain, is a common condition that can cause sudden pain and cramping that lasts for days to weeks. A difficult diagnosis has implications for daily life. Pain medications, muscle relaxants, therapy and rest are all forms of treatment. In severe cases, surgery or injections may be required. The effect of acupuncture varies depending on the person and condition [3]. In adults under 45 years of age, low back discomfort is a widespread problem that often limits activity. The aim of this study was to assess the characteristics and prevalence of these complaints. Workers in operating rooms reported low back pain in 74% of cases. A significant association (p 0.05) was found between low back pain, education, and marital status. This problem among operating room personnel could be reduced by training on preventive measures [4]. In another study, the prevalence of low back pain among medical students at United Medical and Dental College in Karachi was assessed. The low back pain (LBP) was most common among final year students (33.77%, n=128) and least

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common in first year students (7.12%, n=27). The United Medical & Dental College in Karachi reported having a high prevalence of low back pain among its medical students [5]. Acupuncture is a secure and efficient method of treating pain, according to the National Institutes of Health and the World Health Organization [6]. They compared the effectiveness of acupuncture with sham or placebo treatments for non-specific low back pain (NSLBP). We discovered statistically significant differences in pain reduction between acupuncture and sham or placebo therapy following the acupuncture session. There were noticeable variations in pain decrease at the follow-up. When compared to sham or placebo acupuncture, there is some evidence of acupuncture's effectiveness in terms of pain relief following treatment for non-specific low back pain (NSLBP) in both acute and chronic cases [7]. The British recommendation from studies in 2000, 90% cure was observed after six weeks. Clinically significant improvements in acute low back pain were observed in primary care settings [8, 9]. Despite suspicion of a musculoligamentous cause, the cause is often unclear. Referral for neurologic problems, ineffective conservative treatment, or unclear diagnosis were also considered. Recurrences are common, and the outlook is good. Expectations are managed by educating patients about prevention and the natural history of events [10]. Some people find that acupuncture relieves their acute lumbago, however it is not always as effective as placebos. The effectiveness of alternative remedies is controversial and needs further study. Integrative medicine integrates traditional and complementary therapies to provide comprehensive treatment that focuses on the person. Effectiveness of treatments depends on personal preferences and existing health status [11]. The UB40 acupuncture point, also known as the Urinary Bladder 40, is a sensitive point that provides excellent relief for most ranges of spinal pain. This spot on both legs can be stimulated to relieve stiffness and lower back discomfort, particularly sciatica and herniated disc symptoms. It is also helpful for reducing leg discomfort, knee stiffness, arthritis in the surrounding areas, muscle spasms, and it can aid in the body's heat release [12]. The aim of this study is to evaluate the efficacy of bleeding acupuncture at UB-40 in the treatment of severe acute lumbago. It supports the function of acupuncture in the treatment of low back pain. Pain intensity and functional limitation are the primary objectives, and patient satisfaction, while quality of life, medication use, and adverse events are the secondary outcomes. Understanding the efficacy of bleeding acupuncture at UB-40 may provide another option for the treatment of lumbago. This study raises patient and healthcare professionals' awareness of the potential benefits that can be attained through proper use of acupuncture. Therefore, the present study was conducted with the aim to evaluate the efficacy of bleeding acupuncture point UB-40 in patients suffering from severe acute lumbago.

METHODS

An experimental pre-post study was conducted on 40 participants, recruited from the emergency department (ED) at Iffat Anwar Medical Complex Lahore from January 2021 to February 2023, after getting ethical approval from the Ethics Review Committee of the School of Pain and Regenerative Medicine, University of Lahore (IRB/SPRM/2020-5). Sample size was calculated by taking 80% of test and 10% margin of error and taking expected prevalence of lumbago as 72.9%. Participants were recruited by consecutive sampling technique. All the participants (patients) received written information and thorough explanation regarding the purpose of the study, procedures, benefits, potential risks, and long-term outcomes of the study. The patients provided their informed written consent before proceeding with the treatment. All the study-enrolled patients aged between 15-50 years, both males and females. They were diagnosed with severe & acute lumber spasm (lumbago) and had a history of pain for seven days. Patients with pregnancy status, serious comorbidities, severe neurological defects, uncontrolled diabetes, and those who did not reliably communicate with the investigator were excluded from this study. After completion of the criteria of patients for this study including research design, age group, duration of symptoms and limitation of movement, the patients were ready for the procedure. The clinical trial protocol of bleeding acupuncture point UB-40 was approved by the Institute Review Board (IRB) of Iffat Anwar Medical Complex. The procedure was done in the outpatient department (OPD) setup. After proper cleaning of the back of the knee area with alcohol swabs, the UB-40 was localized. The UB-40 was acutely tender in all selected patients and there was an engorged vein in the vicinity of UB-40 (i.e., 1-3mm). These veins were punctured using the sterile disposable needle 25 g. Then the area was squeezed to draw 0.5 – 0.8 ml of blood from there. After extracting blood, the area was swelled, and alcohol aseptic strips were applied for 24 hours. All the patients were observed for 5 to 10 minutes. If any untoward effects were there the VAS Pain scores were monitored post-procedurally. After the treatment, the patients were followed at baseline, 1-week and 1-month intervals. The primary outcomes of the study were to determine the improvement in acute low back pain by using the visual analogue scale (VAS) and physical impairment by using the Oswestry low back disability index (ODI) scale. The ODI questionnaire consisted of 60 items, designed specifically for the measurement of low back disability through scores. (A score of <5 indicates no

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disability, 05-14 (mild disability), 15-24 (moderate disability), 25-34 (severe disability) and 35-50 (completely disabled). The data were entered and analyzed by using SPSS 25.0. The quantitative variables were presented in the form of Mean SD and qualitative by using frequency and percentages. The pre-post difference in the VAS and ODI scores was compared by the Analysis of Variance (ANOVA) test. P-values lower than 0.05 were considered significant.

RESULTS

A total of 40 patients were enrolled in the current study. The mean age of patients was 38.7±12.2. The majority of the patients were females (52%). In Table 1, Figure 1 and 2, the severity of acute low back pain was evaluated by the comparison of pain scores and ODIs at baseline and at 4 weeks' follow-up.

Table 1: Comparison of mean change in different time points

Variables	Time	Mean	SD	95% Confidence Interval for Mean		p-value
				Lower Bound	Upper Bound	
Pain score (VAS)	Baseline	8.00	0.751	7.76	8.24	0.000
	15 Minutes	5.00	1.132	4.64	5.36	
	60 Minutes	2.35	1.075	2.01	2.69	
	1st Week	3.68	1.248	3.28	4.07	
	4th Week	2.92	1.289	2.51	3.34	
	Total	4.39	2.299	4.06	4.71	
ODI	Baseline	55.85	13.970	51.38	60.32	0.000
	1st Week	37.15	7.91	34.62	39.68	
	4th Week	25.55	5.74	23.71	27.39	
	Total	39.52	15.89	36.64	42.39	

One-way ANOVA, p-value < 0.05***

Visual analogue scale (VAS), Oswestry disability index (ODI)

Pain scores of patients were assessed at baseline, 15 Minutes, 60 minutes and after treatment at 1st and 4th week. However, ODIs were assessed at baseline, and after treatment 1st and 4th week. Results showed a significant difference in mean scores among patients before and after treatment follow-up. The mean pain score (VAS) at baseline was 8.00±0.751, which is reduced at 4th week with a mean pain score of 2.92±1.28. At baseline, patients had severe low back pain but after treatment, it subsided gradually (Figure 1).

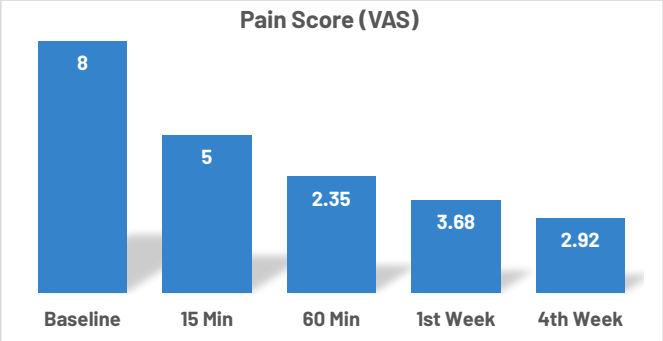

Figure 1: Pain Score (VAS)

The Oswestry disability index difference from baseline to 4 weeks is shown in Figure 2. The patients showed the effect of disability reduction after receiving acupuncture therapy with bleeding of the UB-40 acupuncture point. At baseline, patients had severe disability with a mean ODI score of 55.58 but after treatment, it gradually decreased. At 4 weeks' follow-up, the mean ODI score among participants was 25.55, which shows that bleeding at Acupuncture point UB-40 has a significant effect in patients with severe acute lumbago. Patients showed a long-term effect in terms of pain reduction and no disability was seen after acupuncture therapy at UB-40 acupuncture point. At the beginning of treatment, patients had acute severe back pain and disability, which gradually reduced post-treatment (Figure 2).

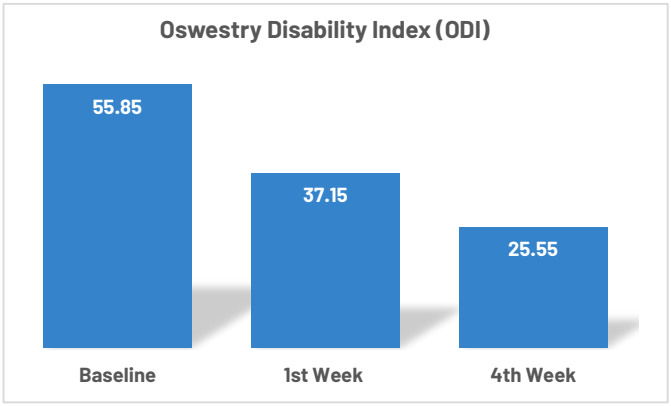

Figure 2: Oswestry Disability Index Score

DISCUSSION

Acupuncture techniques were not limited; both Western medical acupuncture (such as dry needling) and Traditional Chinese Medicine (TCM) acupuncture that followed classical energetic philosophical theory were acceptable [11]. Acupuncture is the most frequently used area of Traditional Chinese Medicine. It entails inserting tiny acupuncture needles through the skin at specific locations on the body. Acupuncturists also employ additional complementary techniques, including herbal medicines, acupressure, cupping, Chinese Tuina massage, moxibustion, electro stimulation, and more [12]. The patients recruited for our study were from the emergency department (ED) at Iffat Anwar Medical Complex, Lahore. The results of our study are the average rate of these variables; Age, Pain Baseline (9-7 min.), Pain (15 min.) 7-4, Pain (60 min.) 4-1, Pain (1 Week), Pain (4 Week till 3 months) are 38.050 ± 12.21, 8.0 ± .751, 5.0 ± 1.132, 2.35 ± 1.08, 3.67 ± 1.24, 2.92 ± 1.28. On further analysis, the results of Visual Analogue Scale (VAS) at pain level (baseline, 15 minutes, 60 min., 1 week, 4 weeks till 3 months) and Oswestry Disability Index (ODI) at different scores (no disability, mild, moderate, severe, completely) are statistically significant

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(.000<0.05 level of significance or 95% CI) in Acute low back pain patients. According to the previous research study, the emergency department (ED) at Iffat Anwar Medical Complex Lahore commonly sees patients with acute low back pain (ALBP). In this study, the efficacy and safety of acupuncture as a treatment for acute low back pain in the emergency department was evaluated. The experimental group, which received acupuncture for 15 minutes, exhibited a significant reduction in discomfort levels according to the Visual Analog Scale (VAS) (<0.001). However, there was no notable disparity in the heart rate variability (HRV) between the two groups. Importantly, no adverse events were reported. Acupuncture offers a prompt and safe pain relief option for individuals with acute lower back pain (ALBP) [13]. In the comparative study with other results, the researchers have discussed that the Visual Analogue Scale (VAS) is frequently employed in investigations of low back pain because compared to other patient-reported outcome measures like the short pain inventory, its measurement capabilities are superior. Depending on the study, the minimal clinically significant difference used in Visual Analogue Scale studies (0-100m) series between 14 to 20mm [14-16]. A representative sample of individuals with acute low back pain was selected for another study from the primary care environment, and it sought to offer a thorough profile of these patients. Finding out if patient traits are related to pain severity or impairment during the initial session was the secondary goal. 75.7% of patients said they had previously had low back pain, and 76.7% said the current episode started suddenly. Only 14.3% of participants reported compensable back discomfort. The connection between pain severity and disability was significantly correlated with present low back pain history, psychological features, and pain intensity (P < 0.01). The study concluded that the profile only contained a limited percentage of individuals with compensable low back pain in cases of acute low back pain in primary care. At the initial appointment, psychological and other patient variables were linked to the degree of pain and level of impairment [17]. The effect size of the association (r) between the Oswestry disability index-U and the Visual Analogue Scale for both pain and disability was sensible (r = 0.49 and 0.51 respectively). It was discovered that the effect magnitude of the connection between the ODI-U and VAS pain (r = 0.49) was comparable earlier research [18]. In another study, the researchers have showed substantial correlation between the visual analogue scale pain score and the Oswestry disability index (ODI), which support the idea that these two measures can be used simultaneously to confirm one another's findings and learn more about several types of pain. A recent meta-analysis's key finding was that there was "little correlation between the Visual Analogue Scale pain score and Oswestry Disability Index," hence additional research was advised to further examine the relationship between these two measurements [19]. The Oswestry Disability Index purposefully avoided discussing the psychological effects of acute or persistent pain in favor of physical exercises. The Oswestry Impairment Index was used to assess back-related impairment. Studies of low back pain frequently use the ODI, a condition-specific measure of deficiency that has proven validity and reliability in this setting [20].

CONCLUSIONS

Based on the investigation in this study, we conclude that acupuncture, especially with bleeding at point UB-40, may provide an immediate, significant effect in reducing the acute pain of the lower back. The outcomes of the study show through Visual Analogue Scales (VAS), which are pain level scales, and Oswestry Disability Scale (ODI), which measured disability scores, that conducting bleeding treatment at the acupuncture point UB-40 had a significant pain-lowering effect on acute low back patients.

Authors Contribution

Conceptualization: MWH
Methodology: MWH, SA
Formal analysis: GARS
Writing-review and editing: SA
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Original Article

Knowledge, Practice and Attitude of Mothers for Ophthalmic Problems in Children in Rural Areas- A Cross-Sectional Study

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ABSTRACT

Early years are crucial for eye development. Parents are responsible for children's eye care decisions. **Objective:** To assess the level of awareness and understanding of the practices among mothers regarding eye disorders and visual impairments in their children in rural areas. **Methods:** A cross-sectional study assessed the knowledge, practice, and attitude of rural mothers regarding eye problems in children. **Results:** 385 mothers participated in study. 47.3% were aged 41-50. 29.9% had completed graduation, while 16.1% were illiterate. Knowledge was scored from 2.00 to 14.00, with >7 being very knowledgeable, > 4 but ≤ 7 being somewhat knowledgeable, and ≤ 4 being not knowledgeable. Practice was scored from 0 to 5, with ≥ 3 indicating good practice, >1 to ≤ 3 indicating somewhat practicing, and ≤ 1 indicating poor practicing. Mothers had good knowledge of ophthalmic problems (99.4%). Attitude was scored from 0 to 10, with scores ≥ 6 indicating good attitude. Lack of time and convenience was the main reason for not seeking eye care (70.1%). Parents' knowledge of ophthalmic problems significantly correlated with their attitude and practice ($r = 0.546$, $p < 0.01$ and $r = 0.602$, $p < 0.01$, respectively). Additionally, parents' attitude was significantly correlated with their practice ($r = 0.390$, $p < 0.01$). **Conclusions:** Mothers' knowledge, practice, and attitude play a key role in detecting and diagnosing the early signs of ophthalmic problems like refractive errors, strabismus, allergic conjunctivitis, and amblyopia.

INTRODUCTION

Early detection and management of visual impairment in children are crucial since it imposes a continuous burden on adults [1]. The vision of the child becomes better every year. The visual system keeps growing and maturing during the first six years of life. The developing eye is learning to perform numerous tasks better, including accommodation, depth perception, extraocular muscle movements, and convergence, which aids in unifying both eyes' attention on an item at once. As the child grows, parents should be on the lookout for these milestones. Hyperopia, myopia, anisometropia, astigmatism, and strabismus are common visual problems in children [2]. To check the reduced visual acuity and other risk factors that affect the growth of the child's eyes health can be

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monitored by doing screening tests in schools, childcare, and or in children's hospitals by optometrists, and ophthalmologists [3]. By doing screening we can apply World Health Organization guidelines to reduce the prevalence of amblyopia. Because it can be diagnosed and treated at an early stage of a child's age. It can be diagnosed by tests and examinations [4]. Blindness in children matters due to its prevalence as well as the period the surviving child has to deal with the visual impairment. A child's poor vision hurts his academic achievement, as well as his prospects for the future and social life [5]. Early diagnosis and treatment are essential for optimizing children's eye health and vision because eye and vision problems can worsen over time and avoid vision deterioration in the future [6]. Children who attend school are frequently diagnosed with asthenopia symptoms. The undiagnosed problems resulting from constant and continuous near work are getting worse as a result of the invention of computers and other tools for near work [7]. Worldwide, according to WHO, at least 2.2 billion people are suffering from visual impairment and blindness. Out of those approximately 1 billion people can be treated successfully. 20 to 30 million people have severe eye disorders which can be managed by rehabilitation [8]. Around 1.4 million young children worldwide are thought to be blind. Out of these 1.4 million, one million are living in Asia and India alone has 0.2 million of them [9]. The prevalence of blindness in Pakistan is estimated to be 0.9%, which comes to about 1.25 million persons. A significant number of these are people under 20 years of age. To make these children useful citizens in the future, special facilities are to be provided to these children for their education and training [10]. Parents decide whether to get their children's medical care as guardians [11]. The first cancer with a hereditary cause was retinoblastoma. It is triggered by the tumor-suppressor gene RB1 losing its function [12]. The World Health Organization (WHO) set 13 goals for child eye health in 2002, including a reduction in worldwide blindness prevalence from 7 to 4/10 000 children, the elimination of corneal scarring, and ensuring that children with cataracts have access to tertiary eye care services [13]. The most common cause of vision impairment in children and young adults is amblyopia. Designing and implementing amblyopia screening, treatment, and related public health interventions are crucial [14]. Today's world is entirely dependent on media and digital technology. Despite the potential benefits of media time, excessive or improper use of technology is negatively affecting children's general health. The average daily screen time in our nation was greater than 5 hours. The most typical symptoms that youngsters report are blurred vision and eye discomfort [15].

There is limited research available on the knowledge, practice, and attitude of parents regarding ophthalmic problems in children in Islamabad, Pakistan. This study focused on assessing parents' awareness and perception of children's eye diseases in rural areas.

METHODS

This was a quantitative cross-sectional study, assessing the awareness and perception of mothers' levels in children who had eyes disorders.This study was conducted in rural areas of Islamabad.The study took six months in total. Ethical clearance and approval of the research were obtained from the ethical committee of Health Services Academy Islamabad with reference to IRB number F. No. 000161/HSA/MSPH-2021 dated 31st January 2023. Data were collected from Feb 2023 to June 2023 from the household survey in rural areas of Islamabad using an empirical questionaire. Cluster sampling technique was done to collect data.The sample size for this study was determined by using a single population proportion formula [n = [(Zα/2)2. P (1- P)]/d2] by assuming a 95% confidence level (Zα/2 = 1.96), a margin of error of 5%, P=proportion 50 %, and the final sample size was 385. Data were collected through a questionnaire used in the present study was adapted from a previously published study [16]. The questionnaire was administered in English language and then translated into local languages (Urdu) without changing the content. The questionnaire had the following sections:

-Section A: Socio-demographic information of the participants(gender, age, language, occupation, education level, district, village).

-Section B: Mothers knowledge regarding ophthalmic problems.

-Section C: Mothers' practices towards childhood ophthalmic problems.

-Section D: Mothers' attitude towards childhood ophthalmic problems.

The questionnaire was checked for completeness and only the completed questionnaires were considered for the final analysis. The software of Microsoft Excel version (18.2205.1091.0) and IBM SPSS Statistics V21.0 x64 was used. Descriptive statistics were used to define and summarize the characteristics of the variables. Scoring for the knowledge, practice, and attitude sections was done. Arbitrary score points were given to each option. The mean and median of knowledge, practice, and attitude were calculated. After the calculation of the main and median of recruited mothers, the cumulative score less than the median score will adjust poor knowledge, attitude, and perception while a cumulative score equal to or greater than the median score would measure as good knowledge,

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attitude, and practice of parents. We used Pearson's Correlation test to find the association between Knowledge-attitude, knowledge practice, and practice attitude. A p-value of less than 0.05 was reported as statistically significant between dependent and independent variables. The correlation was used to analyze the association between the variables. It was ensured that the rights of study participants would be protected. The purpose of the study was informed and explained, and written/verbal was taken from all participants. Confidentiality anonymity and privacy were ensured and maintained.

RESULTS

This study was conducted with 385 parents (mainly mothers) who had met the inclusion criteria. The ages of the mothers ranged from 18 to 60 years. The questionnaire was answered by mothers only who were in total 385. Table no. 1 provides details about the demographic characteristics of the mothers of the children. Table 1 also shows the frequency along with the proportion of the mothers who participated in the study. Out of 385, most of the participants were between the ages of 41 to 50 (47.3%). One hundred and fifteen (29.9%) had a graduation level of education, and illiterates sixty-two (16.1%). 191 (49.6%) were unemployed (Housewives). Moreover, 20.5% were government employed. Table 1 provides the information that 249 out of 385 mothers in rural areas of Islamabad know allergic conjunctivitis (64.7%), followed by refractive errors 137 (35.6%), strabismus 91 (23.6%), and 78 (20.3%) know amblyopia. 383 (99.4%) out of 385 mothers knew the symptoms of rubbing the eyes, 355 (92.2%) knew the redness of the eyes, and 60 mothers knew crossed eyes or squint. One hundred and twenty-nine mothers knew that they should do check-ups of their child's eyes every 3 months. Three hundred and thirty-four (86.8%) mothers had a strong belief that the early detection and treatment of ophthalmic problems in children can prevent long-term visual impairment. In table 1, for every question, arbitrary score points have been given to each option. The options that are relatively more correct have been given higher points compared to others. In the question regarding the regularity of eye check-ups for example, the option stating "every three months" is relatively the best option for eye check-ups and was therefore given 3 score points, "every 6 months" was given 2 score points, "once a year" was given 1 point and "whenever needed" was given 0 score points. In the case of the question where every option is correct, for example, the question regarding the knowledge about common ophthalmic problems in children and their symptoms, each option was given 1 score point.

Table 1: Responses of Ophthalmic Problems Knowledge Items

Responses	Frequency (%)		Score Point (s)
Knowledge about Common Ophthalmic Problems in Children	**Yes**	**No**	
Knowledge about Refractive Errors	137 (35.6%)	248 (64.4%)	1
Knowledge about Amblyopia	78 (20.3%)	307 (79.7%)	1
Knowledge about Allergic Conjunctivitis	249 (64.7%)	136 (35.3%)	1
Knowledge about Strabismus (Misalignment of Eyes)	91 (23.6%)	294 (76.4%)	1
Knowledge about Symptoms of Ophthalmic Problems			
Knowledge about Rubbing of Eyes	383 (99.4%)	2 (0.5%)	1
Knowledge about Crossed Eyes (Squint)	60 (15.6%)	325 (84.4%)	1
Knowledge about Poor Visual Acuity	234 (60.8%)	151 (39.2%)	1
Knowledge about Watering of Eyes	308 (80.0%)	77 (20.0%)	1
Knowledge about Redness of Eyes	355 (92.2%)	30 (7.8%)	1
Regularity of eye Check-ups			
Every 3 months	129 (33.5%)		3
Every 6 months	127 (33.0%)		2
Once a year	62 (16.1%)		1
Whenever needed	67 (17.4%)		0

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Responses	Frequency (%)	Score Point (s)
The belief that the early detection and treatment of ophthalmic problems in children can prevent long-term visual impairment		
Yes, I strongly believe	334 (86.8%)	2
I am not sure	37 (9.6%)	1
No, I do not believe.	14 (3.6%)	0
Total	385 (100%)	

Table 2 provides the information that 166 (43.1%) had stated that they used to practice eye examination of their child occasionally when the child complained of eye problems. Overall 66.0% had followed the recommended treatment plan when their child complained of ophthalmic problems. Most of the mothers 248 (64.4%) of 385 had reported that they encourage their children to participate in outdoor activities. A total of 17 participants did not want to encourage their child for an eye examination. Score points were given to each option for questions regarding the respondents' practices concerning the ophthalmic problems similar to that of the knowledge questions (Table 2).

Table 2: Responses of Ophthalmic Problems Practice Items

Responses	Frequency (%)	Score Point (s)
Eye examination practices		
Yes, my child has had a regular eye examination	129 (33.5%)	2
No, my child has never had an eye examination	90 (23.4%)	0
Occasionally, when my child complained of eye problems	166 (43.1%)	1
Response to diagnose the ophthalmic problem		
Followed the recommended treatment plan	254 (66.0%)	2
Delayed treatment or did not follow the recommended treatment	44 (11.4%)	1
Did not have any treatment	87 (22.6%)	1
Encouragement for outdoor activities to promote eye health		
Yes, I encourage my child to engage in outdoor activities regularly	248 (64.4%)	2
Sometimes, when it is convenient	120 (31.2%)	1
No, I do not encourage outdoor activities for my child	17 (4.4%)	0
Total	385 (100.0%)	

Table No. 3 shows that a total of 90.6% believed that it is important to seek eye care services despite no obvious ophthalmic problems. On asked about attending educational programs or workshops regarding ophthalmic problems 174 (45.2%) reported that maybe, they will attend the educational programs or workshops but it depends on timing and availability. Overall 270 mothers stated that the barrier that prevents them from seeking eye care services is a lack of time or convenience. Financial constraint was also reported at 60.5%, which was the second most facing barrier. A total of 176 (45.7%) of the mothers had lack awareness. And 135 (35.1%) had limited access to eye care services in rural areas of Islamabad. Score points were also given to each option of the questions related to the attitude of the respondents toward the ophthalmic problems (Table 3).

Responses	Frequency (%)	Score Point (s)
Belief about seeking eye care services despite no obvious ophthalmic problems		
Yes, I believe it is important	349 (90.6%)	2
I am not sure	35 (9.1%)	1
No, I do not believe it is important	1 (0.25%)	0

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Responses	Frequency (%)		Score Point (s)
Attitude regarding attending educational programs or workshops			
Yes, I would be interested	349 (90.6%)		2
Maybe, depends on the timing and availability	35 (9.1%)		1
No, I am not interested	1 (0.25%)		0
Total	385 (100%)		
Barriers that prevent parents from seeking eye care services	**Yes**	**No**	
Lack of awareness	176 (45.7%)	209 (54.3%)	0
Limited access to eye care services in rural areas	135 (35.1%)	250 (64.9%)	0
Financial constraints	233 (60.5%)	152 (39.5%)	0
Lack of time or convenience	270 (70.1%)	115 (29.9%)	0
No barriers	14 (3.6%)	371 (96.4%)	1
Relying on sources of information			
Healthcare professionals	314 (81.6%)	71 (18.4%)	2
Internet	168 (43.6%)	217 (56.4%)	1
Family and friends	274 (71.2%)	111 (28.8%)	1
Community Health Workers	0.0%	0.0%	1
Total	385	100%	

The arbitrary scoring for each category, namely, knowledge, practice, and attitude, was used to effectively quantify the responses of the respondents in a statistical manner.Table 4 illustrates the correlation coefficient and p-value for three variables Knowledge, Practice, and Attitude. The following criteria were used to interpret correlations: 0-0.25 indicates a weak correlation, 0.25-0.5 indicates a fair correlation, 0.5-0.75 indicates a strong correlation, and greater than 0.75 indicates an excellent correlation. The correlation revealed a significant positive strong correlation between Knowledge and Practice ($r = 0.602$, $p = 0.00$). The correlation revealed a strong positive correlation between Knowledge and Attitude variables ($r = 0.546$, $p = 0.00$). While the correlation between Practice and Attitude variables showed that there is a fair positive correlation among them ($r = 0.390$, $p = 0.00$).

Table4: Correlation between Knowledge, Attitude, and Practice

Variable	Correlation Coefficient	p-Value
Knowledge-Practice	0.602	0.00
Knowledge-Attitude	0.546	0.00
Practice-Attitude	0.390	0.00

DISCUSSION

This study aimed to assess mothers' knowledge, practice, and attitude regarding ophthalmic problems in children. This study focused on the knowledge, practice, and attitude of mothers regarding ophthalmic problems in children in rural areas of Islamabad, Pakistan. The government and development partners tend to primarily focus on older age groups, resulting in the neglect of this particular demographic in terms of research and interventions. National blindness survey between 2019 to 2021 assessed people aged 50 and above and did not include children. This study is unique as it provided information about mothers' approach to ophthalmic problems in children in rural areas of Islamabad. In the current study, it was found that those who were illiterate had no good knowledge of ophthalmic problems. According to this study, it was observed that most of the mothers were aware of allergic conjunctivitis (64.7%), refractive errors (35.6%), strabismus (23.6%), and amblyopia (20.3%). Opposite trends were seen in the findings of a study conducted in India, where 69.2% of parents were not aware of the symptoms of allergic conjunctivitis in children (17). Symptoms such as rubbing the eyes (99.4%), redness of eyes (92.2%), watering of eyes (80.0%), and poor visual acuity (60.8%) were found to be known by most of the mothers, whereas symptoms of squint or misalignment of eyes were known by the least percentage (15.6%). In a study conducted in Saudi Arabia, parents were interviewed regarding strabismus in children, and it was found that excellent knowledge regarding strabismus was possessed by 50.6% of the parents, and a good attitude toward strabismus was exhibited by about 70.4% (18). It was revealed by this study that a significant proportion of mothers (33.5%) believed that their children's eyes should be checked every 3 months. Regular eye check-ups at this frequency can help prevent ophthalmic problems in children. On the other hand, 33.0% of parents believed that

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a check-up every 6 months was sufficient, while 16.1% believed once a year was adequate. The lowest percentage (17.4%) believed in having check-ups whenever needed. Furthermore, a high percentage (86.8%) of mothers strongly believed that early detection and treatment of ophthalmic problems in children can prevent visual impairment in children. These findings contribute to the overall understanding of the study. In a study conducted in 5% of South India to assess parental knowledge and awareness about pediatric visual problems, it was found that only 9% of parents had excellent knowledge regarding ophthalmic problems. The positive attitude of parents towards ophthalmic problems was observed in 17% of cases, while 46.5% demonstrated excellent practice and 26.5% showed good practice [19]. A study reported in Saudi Arabia 91.9% of parents had low-level of knowledge regarding ophthalmic problems [20]. In the current study, it was observed that most of the mothers 43.1% used to practice their child's eye examination occasionally, when their child complained of any eye problem, 33.5% used to do regular eye examinations, and 23.4% of mothers predicted that their child never had any ophthalmic problem so they don't use to practice examination of their child. Not examining their child's eye examination even if he/she never complained of eye problems results in amblyopia. A study was conducted in Saudi Arabia which revealed that 20% of the parents had adequate knowledge about amblyopia [21]. A study was conducted in Israel found the reasons for seeking their child's eye examination were their concerns about poor vision 94%, strabismus 88%, poor concentration 57%, and poor school achievement 54% [22]. According to current study findings, 64.4% of mothers suggested that they encourage their children to engage in outdoor activities. A study conducted in Ireland reported that myopic children aged 8 to 10 years who were living in urban areas spent less time outside, more time participating in indoor activities, and more time on screen as compared to children living in rural areas who are not myopic [23]. According to this study's findings, 90.6% of mothers believe in seeking eye care services despite no obvious ophthalmic problems. A study was conducted about the knowledge and perception of parents regarding eye diseases in Balochistan, Pakistan which indicated that literate parents diagnosed eye disorders more as compared to illiterate parents. Most educated parents get knowledge about eye diseases from the radio and the community [24]. This study shows that there is a strong positive correlation between Knowledge and practice, Knowledge and Attitude variables. Practice and Attitude variables have a fair positive correlation among them.

CONCLUSIONS

The results of this cross-sectional study conducted with mothers of young children in rural areas in Islamabad show that mothers' knowledge, practice, and attitude play a key role in detecting and diagnosing the early signs of ophthalmic problems like refractive errors, strabismus, allergic conjunctivitis, and amblyopia. By diagnosing on time, impairment of vision in children can be prevented.

Authors Contribution

Conceptualization: MIK, MS
Methodology: MIK, RNI
Formal analysis: NK, MYT, FR
Writing-review and editing: MIK, MYT, FR, MS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Role of Anxiety Sensitivity, Intolerance of Uncertainty, and Cyberchondria Behaviors among Individuals Diagnosed with COVID-19

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ABSTRACT

The COVID-19 pandemic was a quick outbreak that affected individuals' mental health. **Objective:** To investigate the relationship between anxiety sensitivity, intolerance of uncertainty, and cyberchondria tendencies among individuals with and without COVID-19. **Methods:** A total of 411 COVID-19 individuals, including 185 men (45%) and 226 women (55%) from low, middle, and high socioeconomic statuses (103 men (25.1%), 155 men (37.7%), and 153 men (37.2%)) were recruited. The participants ranged in age from 18 to 30. Data were collected from different public sector hospitals and a public sector university of Faisalabad. We calculated the results through SPSS version 27. **Results:** The findings showed a significant positive association between cyberchondria tendencies and anxiety sensitivity (r = 0.61, p.001) and intolerance for uncertainty (r = 0.64, p.001). Moreover, significant differences were observed in the variable of anxiety sensitivity (t =-10.40, p.001), intolerance of uncertainty (t = -5.89, p.001), and cyberchondria tendency (t =-6.08, p.001) between individual diagnosed with and without COVID-19. **Conclusions:** It is concluded that there is a significant relationship of anxiety sensitivity and intolerance of uncertainty with cyberchondria tendencies and significant differences were found between gender and individuals diagnosed with and without COVID-19.

INTRODUCTION

The syndrome, known as "cyberchondria" is defined by a person's constant quest for health information online, which makes them more anxious about their health [1]. Cyberchondria is a multifaceted notion that includes compulsive behavior as well as worry. Cyberchondria causes time-consuming online reassurance seeking a dysfunctional emotional state, the person ignores the required tasks and remains consistent to search online material [2]. People who fear anxiety-related feelings (AS) and negative views about uncertainty (IU) may become obsessive information seekers on social media, which will make their anxiety worse and set off a difficult-to-break cycle of cyberchondria [3]. The COVID-19 pandemic was fast spreading, which caused anxiety and unrest among individuals [4]. Anxiety also exacerbated when the media was also saturated with unclear information [5]. Excessive online research for health-related information can be a form of safety-seeking behavior in and of itself (e.g., determining whether symptoms are indicative of a viral infection), and potentially upsetting information may encourage or trigger more help-seeking behaviors that promote excessive Internet use. According to recent studies, cyberchondria influences people's perceptions of hazard during pandemics like COVID-19 and encourages

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them to take prescribed health precautions more quickly [4]. The excessive search leads to worries, the formation of dysfunctional beliefs, and social isolation that ultimately influences individual mental health [6]. Cyberchondria is an aberrant behavior that is considered present in 55.6% of people worldwide [7]. However, in Pakistan, the prevalence rate of cyberchondria is 40 (26.6%), indicating that participants had a lower level of the disorder whereas 35 (23.3%) of the individuals had a higher level [8]. During the pandemic, anxiety was prevalent in students at a rate of about 27% [9]. Additionally, information-seeking habits considerably increased; for example, during the first wave, 46% individuals frequently searched internet-based information and approximately 75% individuals pursued internet-based information, which was almost double from the first one [10]. The COVID-19 epidemic has also raised a lot of doubts about a lot of areas of daily life. Cyberchondria is known to be strongly predicted by an intolerance of uncertainty. The main driving force for Internet searches for health information is the need to reduce ambiguity [11]. People who are more tolerant of ambiguity may view unclear circumstances as frightening and unpleasant. In order to temper their perceptions of uncertainty and threat, people engage in actions that reduce uncertainty, such as frequently seeking reassurance [12]. While implementing lockdown procedures will increase anxiety sensitivity and cause behavioral changes in the majority of students, it has been noted that individuals with higher degrees of cyberchondria will continue to be more anxious and more likely to engage in safety activities – .

Anxiety sensitivity is the propensity to experience sensations of anxiety, whereas uncertainty intolerance is the inability to accept ambiguity and unpredictability. Cyberchondria activities include a compulsive search for medical information online. In order to create efficient treatments and assistance for those who are experiencing difficulties. It's a common trend for people to search for a minor symptom they experienced on the internet. In the present time due to COVID-19, the tendency of cyberchondriac behavior is enhanced. Cyberchondria increases mental illness in individuals which further leads them to visits hospitals and consults some general practitioner. The current study aimed to investigate the relationship and difference among anxiety sensitivity, intolerance of uncertainty, and cyberchondria tendencies among individuals diagnosed with COVID-19.

METHODS

This cross-sectional study was conducted in the Department of Applied Psychology, Government College University Faisalabad from October 2020 to February 2022. A total of 500 participants were targeted and screened out for eligibility;411 respondents met the inclusion criteria and they were recruited. The diagnosed people (after their full recovery) were 200, and were taken from different hospitals of Faisalabad i.e., DHQ Hospital Faisalabad (66), Allied Hospital Faisalabad (66), and General Hospital Ghulam Muhammad Abad (68) and the never diagnosed with COVID-19 group were 211 and were taken from the university students of GC University, Faisalabad. Only those participants were included who were diagnosed with COVID-19 (by the medical staff of the hospital) and experienced in-patient settings during COVID-19 were included in this study 'diagnosed with COVID-19' group. All the respondents were assessed and screened out for eligibility after the recovery process. Patients with medical comorbidities were excluded from the study. 'Never diagnosed with COVID-19' group was those who, as per their own report, were never diagnosed with the disease. The scoring system of variables was set as follows: 1. On the scale of anxiety sensitivity person's high score (72) indicated a higher level of anxiety sensitivity and a person's low score (0) indicated a lower level of anxiety sensitivity. 2. On the scale of intolerance of uncertainty person's high score (60) indicated a higher level of intolerance of uncertainty and a person's low score (12) indicated a lower level of intolerance of uncertainty. 3. On the scale of compulsion person's high score (40) indicated a higher level of compulsion and a person's low score (8) indicated a lower level of compulsion. 4. On the scale of excessiveness person's high score (40) indicated a higher level of excessiveness and a person's low score (8) indicated a lower level of excessiveness. 5. On the scale of reassurance person's high score (30) indicated a higher level of reassurance and a person's low score (6) indicated a lower level of reassurance. 6. On the scale of distress person's high score (40) indicated a higher level of distress and a person's low score (8) indicated a lower level of distress. 7. On the scale of mistrust person's high score (15) indicated a higher level of mistrust and a person's low score (3) indicated a lower level of mistrust. 8. On the scale of cyberchondria person's high score (165) indicated a higher level of cyberchondria and a person's low score (33) indicated a lower level of cyberchondria. We used different psychological instruments to assess and screened out the patients. For example, Anxiety Sensitivity Index (ASI) contained 18 items scored from 0=very little to 4=very much on a 5-point rating scale was used to assess physical, cognitive, and social domains [13]. ASI had good internal consistency from 0.76 to 0.86 and test re-test reliability between 0.83 to 0.85 respectively. The Intolerance of Uncertainty Scale (IUS) is a 12 items scale which is scored on 5-points rating scale [14]. IUS has two subscales prospective and inhibitory domains. The Intolerance of the

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Uncertainty Scale (IUS) has a test-retest reliability of r =.77 [14]. IUS validity was evaluated at r =.53 and.63, while trait anxiety was estimated at r =.57. Moreover, Cyberchondria Severity Scale (CSS) isa 33-item scale which was used to measure cyberchondria. It is 5-points Likert scale. It has compulsion, distress, excessiveness, reassurance and mistrust subscales. According to the alpha tests, CSS is a high reliability overall (i.e., α=.94) and for subscales between .75 to .95 with test-retest reliability .65 [2]. After getting approval from Institutional Review Board (IRB), Government College University Faisalabad the study was initiated. Ethical review reference number of the study is GCUF/ERC/3014 and it was taken on the 5th of September 2020. The researcher briefly explained the participants about the study. The participants were informed that their participation in the study is voluntary and they have the right to withdraw at any time if they feel discomfort. Participants were assured their information will remain confidential. They were asked to read the informed consent and sign it if they want to participate in the study. For data collection 500 participants were targeted and screened out for eligibility; 411 respondents met the inclusion criteria and they were recruited. The diagnosed people were 200 and were taken from different hospitals of Faisalabad i.e., DHQ Hospital Faisalabad (66), Allied Hospital Faisalabad (66), and General Hospital Ghulam Muhammad Abad (68) and the never diagnosed with COVID-19 group were 211 and were taken from the university students of GC University, Faisalabad i.e., Bachelor (51), Master (95) and post-graduate (65). Only those participants were included who were diagnosed with COVID-19 and experienced in-patient settings during COVID-19 were included in this study. All the respondents were assessed and screened out for eligibility after the recovery process. Patients with medical co morbidities were excluded from the study. 'Never diagnosed with COVID-19' group was those who, as per their own report, were never diagnosed with the disease. The significant effect (p>0.5), as well as relationships between the variables, were examined using Pearson correlation and t-test. The SPSS version-27.0 was used to calculate all statistical calculations.

RESULTS

A total of 411 respondents were taken in this study. The sample was comprised of 185 men (45%) and 226 women (55%) with low 103 (25.1%), middle 155 (37.7%), and high socioeconomic status 153 (37.2%). Participants diagnosed with COVID-19 were 200(48.67%) and without were 211(51.33%). Participants' educational level was bachelor 25151(61.1%), master 95(23.1%) and postgraduate were 65(15.8%). Participants' ages ranged from 18 to 30 (M±SD=21.57±1.97). Findings reported that physical anxiety sensitivity has significant positive relationship with compulsion, excessiveness, reassurance, distress and with overall Cyberchondria whereas significant negative relationship with mistrust. The cognitive anxiety sensitivity has significant positive relationship with compulsion, excessiveness, reassurance, distress and with overall cyberchondria but significant negative relationship with mistrust. The social anxiety sensitivity has significant positive relationship with compulsion, excessiveness, reassurance, distress and with overall cyberchondria whereas significant negative relationship with mistrust. The overall AS has significant positive relationship with compulsion, excessiveness, reassurance, distress and with overall cyberchondria whereas significant negative relationship with mistrust. The prospective intolerance of uncertainty has significant positive relationship with compulsion, excessiveness, reassurance, distress and with overall cyberchondria but has significant negative relationship with mistrust. The inhibitory intolerance of uncertainty has significant positive relationship with compulsion, excessiveness, reassurance, distress and with overall cyberchondria but significant negative relationship with mistrust. The overall Intolerance of uncertainty has significant positive relationship with compulsion, excessiveness, reassurance, distress and with overall cyberchondria but significant negative relationship with mistrust (table 1).

Table 1: : Inter correlation matrix among the study variables

Variables	COM.	EXC	REA	Distress	Mistrust	Cyberchondria
Physical	.537**	.547**	.489**	.583**	-.264**	.570**
Cognitive	.591**	.584**	.507**	.610**	-.338**	.601**
Social	.516**	.538**	.458**	.564**	-.445**	.524**
ASI	.603**	.612**	.533**	.644**	-.386**	.621**
Prospective	.555**	.525**	.472**	.625**	-.355**	.569**
Inhibitory	.588**	.568**	.490**	.651**	-.380**	.601**
IUT	.613**	.582**	.533*	.674**	-.425**	.626**

Note: **p < 0.01; COM: Compulsion, EXC: Excessiveness, REA: Reassurance, ASI: Anxiety Sensitivity Index, IUT: Intolerance of Uncertainty Total

Table 2 shows t-test statistics for male and female on anxiety sensitivity, intolerance of uncertainty and cyberchondria among individual. Results indicate significant mean differences on physical indicating that male significantly scored high on physical as compared to female. Results also indicate significant mean differences on cognitive indicating that male significantly scored high on cognitive as compared to female. Results also indicate significant mean differences on social indicating that male significantly scored high on social as compared to female. Further, significant mean differences on anxiety sensitivity index indicating that male significantly scored high on

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anxiety sensitivity index as compared to female. The significant mean differences on prospective indicating that male significantly scored high on prospective as compared to female. Moreover, results showed significant mean differences on inhibitory indicating that male significantly scored high on inhibitory as compared to female. Findings showed significant mean differences on intolerance of uncertainty total indicating that male significantly scored high on intolerance of uncertainty total as compared to female. The results indicate significant mean differences on compulsion indicating that male significantly scored high on compulsion as compared to female. Results also showed significant mean differences on excessiveness indicating that male significantly scored high on excessiveness as compared to female. Results indicate significant mean differences on reassurance indicating that male significantly scored high on reassurance as compared to female. Results also indicate significant mean differences on distress indicating that male significantly scored high on distress as compared to female. The findings also indicate significant mean differences on mistrust indicating that male significantly scored high on mistrust as compared to female. Moreover, results indicate significant mean differences on cyberchondria indicating that male significantly scored high on cyberchondria as compared to female. In the table where male scored higher in anxiety sensitivity and intolerance of uncertainty, it reflects they have more cyberchondria tendencies as compared to females.

Table 2: Comparison between men and women on the scale of anxiety sensitivity, intolerance of uncertainty, and cyberchondria among individual

Variables	Male (n= 185)	Female (n = 226)	t (409)	p-value	95% CI	
	M ± SD	M ± SD			LL	UL
Physical	10.35 ± 5.86	10.19 ± 5.61	.27	.783	-.96	1.27
Cognitive	11.25 ± 6.20	10.76 ± 6.04	.80	.420	-.70	1.68
Social	11.84 ± 6.27	11.68 ± 5.98	.26	.790	-1.03	1.35
ASI	33.45 ± 16.62	32.64 ± 16.09	.49	.618	-2.37	3.99
Prospective	18.33 ± 8.75	17.15 ± 8.45	1.39	.165	-.48	2.85
Inhibitory	13.69 ± 6.27	13.07 ± 6.06	1.00	.317	-.58	1.81
IUT	32.98 ± 14.15	31.85 ± 13.32	.82	.408	-1.54	3.79
Compulsion	20.16 ± 7.69	18.83 ± 7.77	1.73	.084	-.17	2.83
Excessiveness	20.91 ± 6.93	19.54 ± 7.34	1.93	.054	-.02	2.77
Reassurance	15.71 ± 5.66	14.47 ± 6.13	2.11	.035	.08	2.40
Distress	21.48 ± 8.08	19.74 ± 8.36	2.12	.034	.13	3.34
Mistrust	9.73 ± 3.47	9.61 ± 3.37	.35	.723	-.54	.78
Cyberchondria	87.07 ± 23.95	81.39 ± 25.46	2.30	.021	.84	10.51

ASI: Anxiety Sensitivity Index, IUT: Intolerance of Uncertainty Total, LL: lower Limit, UL: Upper Limit

Table 3 shows t-test statistics for male and female on anxiety sensitivity, intolerance of uncertainty and cyberchondria among individual without COVID-19. Results indicate significant mean differences on physical indicating that male significantly scored high on physical as compared to female. Results also indicate significant mean differences on cognitive indicating that male significantly scored high on cognitive as compared to female. Results also indicate significant mean differences on social indicating that female significantly scored high on social as compared to male. Further, significant mean differences on anxiety sensitivity index indicating that female significantly scored high on anxiety sensitivity index as compared to male. The significant mean differences on prospective indicating that male significantly scored high on prospective as compared to female. Moreover, results showed significant mean differences on inhibitory indicating that male significantly scored high on inhibitory as compared to female. Findings showed significant mean differences on intolerance of uncertainty total indicating that male significantly scored high on intolerance of uncertainty total as compared to female. The results indicate significant mean differences on compulsion indicating that male significantly scored high on compulsion as compared to female. Results also showed significant mean differences on excessiveness indicating that male significantly scored high on excessiveness as compared to female. Results indicate significant mean differences on reassurance indicating that male significantly scored high on reassurance as compared to female. Results also indicate significant mean differences on distress indicating that male significantly scored high on distress as compared to female. The findings also indicate significant mean differences on mistrust indicating that male significantly scored high on mistrust as compared to female. Moreover, results indicate significant mean differences on cyberchondria indicating that male significantly scored high on cyberchondria as compared to female. In the table where male scored higher in anxiety sensitivity and intolerance of uncertainty, it reflects they have more cyberchondria tendencies as compared to females.

Table 3: Comparison between men and women on the scale of anxiety sensitivity, intolerance of uncertainty, and cyberchondria among individual without COVID-19

Variables	Male (n= 95)	Female (n = 116)	t (209)	p-value	95% CI	
	M ± SD	M ± SD			LL	UL
Physical	7.87 ± 3.83	7.84 ± 3.72	.05	.956	-1.00	1.05
Cognitive	8.60 ± 3.96	8.34 ± 3.93	.46	.641	-.82	1.33
Social	9.14 ± 4.28	9.67 ± 4.66	-.84	.400	-1.75	.702
ASI	25.62 ± 8.69	25.86 ± 9.68	-.18	.851	-2.76	2.28
Prospective	15.91 ± 7.48	14.96 ± 7.23	.93	.351	-1.05	2.95
Inhibitory	11.85 ± 5.32	11.55 ± 5.17	.41	.679	-1.12	1.73
IUT	28.95 ± 11.76	28.37 ± 11.29	.36	.717	-2.56	3.71

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Compulsion	17.80 ± 6.68	17.06 ± 6.59	.80	.421	-1.06	2.54
Excessiveness	18.61 ± 6.03	17.63 ± 6.01	1.16	.245	-.67	2.61
Reassurance	14.05 ± 4.92	12.93 ± 4.97	1.62	.106	-.23	2.46
Distress	18.76 ± 6.77	17.84 ± 7.13	.95	.340	-.97	2.82
Mistrust	10.51 ± 3.44	9.87 ± 3.49	1.32	.187	-.31	1.58
Cyberchondria	79.30 ± 20.21	75.06 ± 20.59	1.50	.135	-1.32	9.81

ASI: Anxiety Sensitivity Index, IUT: Intolerance of Uncertainty Total, LL: lower Limit, UL: Upper Limit

Table 4 shows t-test statistics for male and female on anxiety sensitivity, intolerance of uncertainty and cyberchondria among individual without COVID-19. Results indicate significant mean differences on physical indicating that male significantly scored high on physical as compared to female. Results also indicate significant mean differences on cognitive indicating that male significantly scored high on cognitive as compared to female. Results also indicate significant mean differences on social indicating that female significantly scored high on social as compared to male. Further, significant mean differences on anxiety sensitivity index indicating that female significantly scored high on anxiety sensitivity index as compared to male. The significant mean differences on prospective indicating that male significantly scored high on prospective as compared to female. Moreover, results showed significant mean differences on inhibitory indicating that male significantly scored high on inhibitory as compared to female.

Table 4: Comparison between men and women on the scale of anxiety sensitivity, intolerance of uncertainty, and cyberchondria among individual diagnosed with COVID-19

Variables	Male (n= 90)	Female (n = 110)	t (198)	p-value	95% CI	
	M ± SD	M ± SD			LL	UL
Physical	12.96 ± 6.48	12.67 ± 6.20	.32	.74	-1.48	2.06
Cognitive	14.06 ± 6.88	13.32 ± 6.79	.76	.44	-1.17	2.65
Social	14.68 ± 6.78	13.80 ± 6.49	.94	.34	-.96	2.74
ASI	41.72 ± 18.89	39.80 ± 18.30	.72	.46	-3.28	7.12
Prospective	20.88 ± 9.29	19.45 ± 9.04	1.10	.27	-1.13	4.00
Inhibitory	15.63 ± 6.63	14.69 ± 6.52	1.00	.31	-.90	2.78
IUT	37.23 ± 15.25	35.52 ± 14.32	.81	.41	-2.42	5.84
Compulsion	22.65 ± 7.92	20.70 ± 8.49	1.66	.09	-.35	4.26
Excessiveness	23.35 ± 7.01	21.55 ± 8.08	1.66	.09	-.33	3.93
Reassurance	17.47 ± 5.88	16.09 ± 6.82	1.52	.13	-.41	3.18
Distress	24.35 ± 8.40	21.75 ± 9.08	2.08	.03	.138	5.06
Mistrust	8.91 ± 3.33	9.33 ± 3.22	-.91	.36	-1.34	.49
Cyberchondria	95.26 ± 24.95	88.07 ± 28.34	1.88	.06	-.33	14.72

ASI: Anxiety Sensitivity Index, IUT: Intolerance of Uncertainty Total, LL: lower Limit, UL: Upper Limit

Findings showed significant mean differences on intolerance of uncertainty total indicating that male significantly scored high on intolerance of uncertainty total as compared to female. The results indicate significant mean differences on compulsion indicating that male significantly scored high on compulsion as compared to female. Results also showed significant mean differences on excessiveness indicating that male significantly scored high on excessiveness as compared to female. Results indicate significant mean differences on reassurance indicating that male significantly scored high on reassurance as compared to female. Results also indicate significant mean differences on distress indicating that male significantly scored high on distress as compared to female. The findings also indicate significant mean differences on mistrust indicating that female significantly scored high on mistrust as compared to male. Moreover, results indicate significant mean differences on cyberchondria indicating that male significantly scored high on cyberchondria as compared to female. In the table where male scored higher in anxiety sensitivity and intolerance of uncertainty, it reflects they have more cyberchondria tendencies as compared to females.

DISCUSSION

Findings reported anxiety sensitivity and intolerance of uncertainty have significant positive relationships and both variables are positively linked with cyberchondria (See table 1) [3]. It reflects that anxiety sensitivity provokes the tendency of cyberchondria among individuals as well as intolerance of uncertainty [5, 11]. Anxiety sensitivity predicts the presence of cyberchondria and these results are in line with those of the earlier investigations [15]. Compulsion, excessiveness, reassurance, and distressful behavior all significantly, positively, and adversely correlate with physical, cognitive, and social anxiety sensitivity types, while mistrust significantly negatively correlates [16]. Spending a lot of time online looking for health symptoms damages relationships with family and friends, interferes with daily activities, and lowers overall quality of life [17]. Increased social anxiety sensitivity can also lead to compulsive behavior. For example, some people obsessively search for health information online to assuage their fear of being judged negatively about their health, but this behavior can have negative effects on their daily activities, psychological health, interpersonal relationships, and home environment [18]. The study also revealed a significant difference between diagnosed with COVID -19 and never diagnosed with COVID-19 participants in anxiety sensitivity, intolerance of uncertainty, and cyberchondria tendencies among university students during COVID-19 (See table 3 and 4) [10]. High fear of illness and persistent worries about having a disease lead to the development of negative belief systems in people. In addition, the inclination to be a cyberchondriac may rise, which increases the risk of traumatic stress when people

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are exposed to stressful events [19]. People who are more sensitive to physical anxiety worry more about bodily feelings, which forces them to look up the symptoms to see if they are physically healthy or suffering from any medical conditions [20]. However, adolescents with high levels of cognitive anxiety exhibit more compulsive behaviors, which negatively affect their psychological health [15]. Prospective and inhibitory types of intolerance of uncertainty indicated a strong positive link with compulsion, excessiveness, reassurance, and distressful conduct and a weak negative relationship with mistrust [21]. This anxiety had a negative impact on health, as it decreased the physical environment, physical health, increased mental illness, and decreased mental health. Results revealed a strong positive relationship between COVID-19 and Cyberchondria [5]. According to recent research, during pandemics like COVID-19, cyberchondria affects people's threat assessment and encourages them to take advised health precautions more rapidly [4]. However, it can also increase the risk of excessive concern, catastrophizing, and social isolation, all of which are detrimental to mental health [6]. Additional findings revealed a strong correlation between COVID-19 and intolerance of uncertainty [11]. These results are in line with earlier research [12]. The COVID-19 epidemic has raised concerns about a wide range of daily activities. People who are more tolerant of ambiguity may view unclear circumstances as frightening and unpleasant. To temper their feelings of threat and uncertainty, people engage in behaviors that reduce ambiguity, such as continually seeking consolation [22].

CONCLUSIONS

It is concluded that anxiety sensitivity and intolerance of uncertainty are the two factors that trigger the tendency of cyberchondria among individuals. Moreover, it shows that significant gender differences were investigated on the variables of anxiety sensitivity, intolerance of uncertainty, and cyberchondria among university students.

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Authors Contribution

Conceptualization: MUK
Methodology: NR
Formal analysis: ZR
Writing-review and editing: AS, MM, MUK
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

The Prevalence and Outcomes of Hepatorenal Syndrome in Chronic Liver Disease Patients in a Tertiary Care Hospital

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ABSTRACT

Hepatorenal syndrome (HRS) leads to a severe kidney injury leading to its eventual failure in the background of chronic liver disease. **Objective:** This research's objective was to define the frequency of hepatorenal syndrome (HRS) in the background of cirrhosis and to find out the outcomes of the patients with HRS. **Methods:** This is a detailed prospective clinical series research. It was conducted in the Department of Medicine, Jinnah Postgraduate Medical Center (JPMC), Pakistan, from February 2020 to December 2020 after approval by the authorized review board. Jinnah Postgraduate Medical Center (JPMC). A sample size of 101 was calculated. The lab values including prothrombin time (PT), serum albumin, and chronic liver disease variations were established for confirmative diagnosis. Frequency tables were created for parameters to be determined (sex and Child-Pugh classification). The means and their SD of parameters of interest (age and weight) were calculated. **Results:** The demographic variables were the mean age of the patients was 62.5±10.2 and the mean bilirubin was 2.32 ± 2.3mg/dL. 68 (67.3%) of the patients had normal creatinine and 33 (32.7%) of the patients had raised serum creatinine. 2(10.5%) of the patients had a numerical score of 5-6, 13 (68.4%) of the patients had a total score of 7-9 and 4(21.1%) of the patients had 10-15 scores. Hepatorenal syndrome was detected in 11.9% of patients with cirrhosis, among whom 4 (33.3%) died. **Conclusions:** The hepatorenal syndrome is quite common in liver diseases and it needs to be assessed.

INTRODUCTION

Liver cirrhosis refers to late-stage diseases due to long-standing, continuous, and repeated damage to the liver parenchyma and its cellular structure that inevitably results in liver malfunction and default. It is a permanent disease state characterized by developing new nodules, loss of standard architecture, replacement of healthy cells, and gradual and extensive bridging fibrosis. It has the highest mortality rate globally. In Pakistan, a high disease burden exists owing largely due to Hepatotoxic hepatitis caused by Hepatitis A and [1, 2]. Transmission of both these organisms can be averted if improved food hygiene, sanitation, and community awareness can be carried out.

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The sequel of cirrhosis includes fatal outcomes such as variceal bleeding (top cause of death), kidney and liver failure, portal hypertension, and cerebrovascular involvement -encephalopathy [3]. The HRS is a prospective reason behind severe kidney injury leading to its eventual failure in the background of chronic liver disease [4]. Pathogenesis is unclear, but renal vascular and nervous outflow changes are the main cause. Portal hypertension leads to subsequent dilatation of the splanchnic vessels and insufficient perfusion leading to the release of Nitric oxide which is a vasodilator [5]. This response activates the renin-angiotensin system causing renal vasoconstriction (a hallmark of HRS) and reduced filtration function of kidneys. Three major and primary detected risk factors include reduced average arterial pressure (<80 mmHg), water intoxication, and withholding of excessive sodium in the urine (urine sodium <5 mEq/L). Patients with chronic liver abnormalities or diminishing liver function markers like serum albumin, prothrombin time, and bilirubin do not indicate greater susceptibility for HRS development. H.R. syndrome is frequent, with an occurrence rate of 10% in patients under observation at the hospital due to ascites and cirrhosis. The International Ascites Club has formulated a standard to confirm HRS diagnosis, of which four criteria must be present. Minor criteria have been included to point towards supplementary proof of the disease. Major standards are increased GFR which was noted by the raised serum creatinine concentration (>1.5 mg/dL or 24-hour creatinine clearance (CC) <40 mL/min), Presence of current contamination, loss of fluid volume, no evidence of shock, and ongoing therapy by nephrotoxic drugs, lack of evidence indicating improving function of the kidney (decline in creatinine concentration to 1.5 mg/dL or less or rise in creatinine clearance to 40 mL/min or more) after stoppage of diuretics and use of plasma expanders (1.5 L), and Proteinuria lesser than 500mg per day without supportive radiographic proof of obstructive renal disorders or uropathies [6]. The treatment of HRS is focused on management as symptomatic support (B.P. monitoring and anti-biotic cover) with hemofiltration if any possibility of improvement in hepatic function exists or with liver transplant [7]. Current experimental research on treatment is being done, but conclusive results have yet to be found. Trials regarding combined therapy with albumin/octreotide plus midodrine have shown promising renal function; however, this is only applicable in providing palliative care [8]. The ultimate cure is liver transplantation [7]. HRS syndrome presents in two forms [9]. Type 1 variant is the acute one in which those with significant liver disease experience involuntary kidney failure that progresses quickly. It is distinguished by a substantial reduction in the function of kidneys, as indicated by a decrease in initial 24-hour creatinine clearance to half its original value (20ml in two weeks). Clinical outcomes are unsatisfactory, with only a 10% survival rate. After the liver function has improved, renal function may return independently. The most common instances of this include fulminant or alcoholic hepatitis and sepsis. A clinical picture of DIC and tangible signs of jaundice are seen, with death resulting from co-existing liver and kidney collapse or internal bleeding. In Ascites, the type 2 HRS is seen in patients unresponsive to the administration of diuretics. Kidney failure has a slower path which might worsen over a few months. The mean survival time is six months that is longer than type I. Hence, research aimed to determine the occurrence of HRS in the background of cirrhosis and to analyze its prognosis.

METHODS

This is a detailed prospective clinical series research. It was conducted in the Medicine Department, Jinnah Postgraduate Medical Center (JPMC), Pakistan, from February 2020 to December 2020 after approval by the authorized review board. Jinnah. Non-probability sampling method was utilized to collect the data. After estimating it from the Roasoft sample size calculator with a margin of error of 5%, a confidence level of 95% and an expected incidence of 136 with a sample size of 101 was calculated [9]. Depending upon the clinical picture, serum laboratory study, and ultrasound imaging, patients over 14 years of age were evaluated. Following consultations with the OPD or a visit to an ER, patients were immediately referred. Patients of hepatic encephalopathy under medication with kidney-damaging drugs, severe infection, sepsis, hypovolemic state, and acute, and sub-acute liver failure are omitted. Patients were directly referred after a consult from the OPD or an emergency department visit. Patients of hepatic encephalopathy under medication with kidney-damaging drugs, severe infection, hypovolemic state, sepsis, and acute and sub-acute liver failure are omitted. Overall, 101 patients participated. The values of serum albumin, prothrombin time, and chronic hepatic disease (CHD) variations were established for confirmative diagnosis. Renal failure was set as a pre-requisite for inclusion in the study. Clinical examination and serum investigations (creatinine over 1.5 mg/dL) were measured. The confounding factor was determined by eliminating infections within the abdominal cavity. Spontaneous bacterial peritonitis (SBP) was set as one of the confounding variables. The patient's biodata was entered in the questionnaire and lab analysis (blood test and ultrasound) to verify cirrhosis, diagnosis, management, and hospital admission data. The clinical conclusions were classified as complete disease resolution, partial

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resolution, no outcome, fatality, and patient referral noted in the questionnaire. Hence, HRS was interpreted as the occurrence of kidney failure in the setting of Cirrhosis - fibrosis of the liver. It is supported by biochemical evidence of a major decrease in the functioning of the kidneys (> serum creatinine to a level greater than 1.5 mg/dL). Adding on, proteinuria (<500 mg/24 hours) was among the vital criteria to establish HRS. The effectiveness of treatment was evaluated using the following outcomes: 1) No effect: raised concentrations of serum creatinine 2) Partially recovered: decreased concentrations of serum creatinine but not < 1.5 mg/dl 3) Completely recovered: reductions in the concentration of serum creatinine concentrations < 1.5mg/dL 4) Mortality: patients died. The data were gathered using a questionnaire which was later imported into SPSS Version 20.0 IBM Corp and analyzed. The tables of frequency were created for parameters to be determined (gender and Child-Pugh classification). The means and SD of parameters of interest (age and weight) were also evaluated. Consent was obtained from all the patients along with notifying the Ethical Board Committee before initiating the research.

RESULTS

Table 1 demonstrates demographics where the mean age of the patients was 62.5 ± 10.2 and 74 (73.3%) of the participants were male. The bilirubin (mean) was 2.32 ± 2.3mg/dL.

Table 1: The demographic variables of the patients.

Variables	Categories	Mean ± Standard Deviation
Age (years)	-	62.5 ± 10.2
Gender	Male	74 ± 73.3%)
	Female	27 ± 26.7%)
Bilirubin (mg/dL)	-	2.32 ± 2.3
Albumin (g/dL)	-	4.1 ± 0.9
Prothrombin time (s)	-	18 ± 1.31
Creatinine (mg/dL)	-	1.9 ± 0.4
24-hour Urinary Proteins (mg/day)	-	122.1 ± 38.3

Table 2 shows that 68 (67.3%) of the patients had normal creatinine and 33 (32.7%) of the patients had raised serum creatinine.

Table 2: The values of serum creatinine among the cohort of patients.

Variables	Categories	Frequency (%)
Creatinine	0.6-1.4 mg/dL	68 (67.3%)
	>1.4 mg/dL	33 (32.7%)

Table 3 shows that of the patients HRS.A: 2 (10.5%) of the patients had a numerical score of 5-6, B: 13 (68.4%) of the patients had a total score of 7-9 and C: 4 (21.1%) of the patients had 10-15 scores.

Table 3: The Child-Pugh classification of patients comparison of the patient.

Child-Pugh Classification	Patient's diagnosis	
	Cirrhosis (n=82)	Hepatorenal syndrome (n=19)
A: Score of 5-6	3 (3.7%)	2 (10.5%)
B: Score of 7-9	51 (62.2%)	13 (68.4%)
C: Score of 10-15	28 (34.1%)	4 (21.1%)

Table 4 shows that the frequency of HRS in the cirrhotic patients was 12 (11.9%) while 89 (88.1%) of the patients with cirrhosis did not have HRS.

Table 4: The periodicity of HRS in patients.

HRS	Frequency (%)
Cirrhosis (not having HRS)	89 (88.1%)
Cirrhosis (having HRS)	12 (11.9%)

Table 5 shows that only 3(25%) of the patients fully recovered. In HRS patients, the mortality rate was 33.3%. Only 5 (41.7%) of the patients were partially recovered.

Table 5: Outcomes of the HRS patients.

Outcomes	Frequency (%)
No effect	0 (0%)
Completely recovered	3 (25%)
Patially (incompletely) recovered	5 (41.7%)
Death	4 (33.3%)

DISCUSSION

Globally, cirrhosis is becoming a bigger issue. Mortality rates from cirrhosis are rising globally. Acute renal damage is one of the most significant prognostic markers for cirrhosis [10]. About 20% of hospitalized cirrhotic patients with renal failure exhibited HRS. Many well-known causes can lead to HRS. By staying away from particular settings and receiving the proper care, the risk of having HRS can be decreased. Patients with HRS type 2 should be assessed for TIPS or liver transplantation as it is linked to end-stage liver disease [11]. Cirrhosis of the liver patients are more susceptible to problems that reduce life expectancy [12]. Kidney injury is one of the most common side effects, especially when portal hypertension is present [13]. In the context of severe liver illness, HRS is the final stage of a chronic loss of renal perfusion and is associated with a bad prognosis [14]. We conducted the current experiment to determine the prevalence and short-term outcomes of hepatorenal syndrome in people with chronic liver disease. There were 101 patients with hepatic cirrhosis in this study. Men made up 73.3% of the patients, while women made up 26.7%. The patients were, on average, 62.5±10.2 years old. The majority of the patients in these outcomes were between the ages of 40 and 60, and in several other studies, there were more male patients than female patients (between 45% and 60%)[15]. Due to the high rates of

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smoking and alcohol usage among men, men make up the majority of persons in Pakistan who have liver cirrhosis. In terms of the demographic factors, the findings of our study are consistent with the other studies as well [15, 16]. Hepatitis B and C were shown to be the root causes of chronic liver disease in the current study in 40 (38.10%), 54 (51.43%), and 9 (8.57%) of the patients, respectively. According to our findings, the illness persisted for 5.46 years and 3.82 months. According to Fida S *et al.*, analysis of the prevalence of HRS in cirrhotic patients, 24.26% of patients had hepatitis B, 30.88% had hepatitis C, 8.09% had hepatitis B and C equally and the remainder of the patients had cirrhosis due to a variety of etiological factors [9]. In a study by Ullah I *et al.*, the HRS frequency among cirrhotic patients was around 19.9%. It was a bit higher than the findings of our study showing 11.9% of such patients [17]. In the current study, there were 12 (11.9%) HRS patients; of these, 4 (33.3%) passed away, 5 (41.7%) made partial recoveries, and 3 (25%) made full recoveries. The findings of our study were consistent with the results of Khan S *et al.*, where 26.7% of patients with HRS died [18]. SHR1 was found in 35% of the 28 patients with HRS who needed hemodialysis for renal replacement treatment in the study by Rey R M *et al.*, accounting for 70% of the total [19]. Ninety percent of dialysis patients passed away within ninety days. Liver transplantation was the only treatment available for the remaining ten percent of patients. In a study by Wang H *et al.*, 58 (37.2%) of 196 patients demonstrated better renal function following terlipressin and albumin therapy. According to another research, 4 (28%) patients made a full recovery [20]. It was consistent with our findings where 25% of patients made the full recovery. The frequency of HRS was 11.9% in our study that is consistent with another study reported by Seetlani NK et al., where the frequency of HRS in Karachi having cirrhosis was 15% [16]. The major limitation of our study was a single institution. If multiple institutes were involved, a larger sample size could have been obtained and multiple variables could have been assessed.

CONCLUSIONS

Our study concludes that hepatorenal syndrome is quite common in chronic liver disease. It needs to be assessed immediately in such patients to avoid complications.

Authors Contribution

Conceptualization: MH, RA
Methodology: RA, MG, MN
Formal analysis: FM, SG
Writing-review and editing: MTHT, SK, NA, MH

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Prevalence of Musculoskeletal Pain among Chefs Working in Restaurants of Sialkot

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ABSTRACT

Musculoskeletal pain is a pain coming from the structures such as bones, muscles, joints, tendons, and ligaments, clearly becoming more and more common. In addition to having a detrimental effect on a person's life quality, MSK pain's high healthcare expenses and concomitant loss of productivity have placed a heavy financial burden on societies. **Objective:** To find the prevalence of musculoskeletal pain among the chefs working in restaurants in Sialkot. **Methods:** The cross-sectional/observational survey study was conducted for 4 months and convenient sampling technique was used on chefs working in restaurants of Sialkot. **Results:** This study assessed prevalence and level of pain among chefs of different restaurants in Sialkot. This study included 178 participants with age range varied from 25 to 50 years. 61.2% of participants aged 25-29 years. 63.5% of participants were among those having 8 to 10 working hours. 24.7% of the participants had weight ranging from 55 to 59 kg. 58.4% of participants had mild pain. Duration of job of most of participants (40.4%) was 2 to 6 years. Most participants (20.8%) were having trouble in ankle/feet, (16.3%) had trouble in knees and lower back. **Conclusions:** We found that muscle and skeletal pain in chefs working in different restaurants of Sialkot most probably in ankles/feet, knees and low back. The pain was found to be mild on Numeric Pain Rating Scale (NPRS) mostly in male chefs of middle age with ideal weight.

INTRODUCTION

Musculoskeletal pain is described as pain coming from muscular or skeletal structures like bones, muscles, joints, tendons, and ligaments, clearly becoming more and more common. In addition to having a detrimental effect on a person's life quality in relation to health and operative status, MSK pain's high healthcare expenses and concomitant loss of productivity have placed a heavy financial burden on societies [1]. There were 1.71 billion persons affected globally by MSK pain-related disorders, which were one of the major causes of disability [2]. Both patients and doctors struggle with the hard condition of musculoskeletal pain. No. of their age, gender, or economic standing, many adults have gone through one or more bouts of musculoskeletal pain at some point in their lives. About 47% of the population overall was impacted. Doctor's consultation was necessary for between 39 and 45 percent of those due to ongoing issues. Musculoskeletal discomfort that was not properly controlled can significantly influence socioeconomic conditions and negatively impact quality of life [3]. In restaurants and other establishments where food served, the chefs had the command of the kitchen. A chef must be knowledgeable in the production, processing, and preparation of food. In addition, chefs required to works in variety of shifts, including early mornings. Even on weekends and holiday weekends in the late evenings. Long-standing hours,

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continual hunching forward, repetitive movements of upper limbs, lifting of large objects, and awkward postures that characterize a chef's employment. These include holding a wok, cutting vegetables, and grabbing kitchen implements. All of those were need for vigorous effort over the entire body. The majority of those duties were called for fixed positions and repetitive motions, which put a chef at risk for acquiring musculoskeletal pain [4]. Chefs could be susceptible to variety of injuries, pains, accidents and discomfort that can result from falls, slips and other mishaps. According to studies, cooks were more likely than ordinary person to experience mental strain such as stress, anxiety, mental pressure and chronic pain. Most cooks unconsciously acquired uncomfortable postures while working throughout the day. Ergonomic and safety issues, psychological variables, and environmental factors all played a role in injury prevention and chef safety. Workplace ergonomics and safety considerations, such as postures used, injuries resulting from them, MSDs etc.; psychological considerations, such as stress levels, ideal work capacity, workplace bullying, and job satisfaction; and environmental considerations, such as ventilation, temperature, humidity, and lighting, among others [5, 6]. Chefs typically worked full-time hours in a profession that were quite fast-paced. Automation didn't take the role of human labor in that professional working operations, which still heavily rely on it. Chefs' workplace musculoskeletal diseases were linked to a number of workplace hazard variables, a personal, physical exertion also included (posture-driven movement). Chefs used non- ergonomic workstations to conduct repetitive upper arm movements with varying speeds and forces. Bakers' uncomfortable postures in the shoulder area were known to be one of the leading occupational risk factors for the onset of musculoskeletal problems [7]. Some researches show that workers in the catering business, particularly those working in the kitchen, did not have workers who were in a normal ergonomic working environment, which includes the temperature, lighting, and place where they were doing their work [8]. The majority of morbidities in the working population were caused by musculoskeletal issues. Musculoskeletal problems were thought to be responsible for 40% of all workplace injury and disease expenditures worldwide. several different vocational groupings, such as workers in factories, chefs, food and meat manufacturers, clerks, data processors, and workers of bakery, musculoskeletal discomfort has been reported as widespread in the literature. It has been proven that the physical characteristics of the job had an effect with regards to the frequency of muscle and skeletal discomfort. Musculoskeletal pain has been positively connected with a quick pace of work, a demanding physical exertion, frequent and strong manual labor, extended phases of uncomfortable positions, and full body tremors. Over the past two decades, research on the relationship involving psychological and social factors and the prevalence and the extent of muscle and skeletal pain has exploded, revealing these connections in a range of occupational settings [9]. Musculoskeletal pain, a major issue in many professions and industries, but a chef had a heavy workload and hence, more likely to develop musculoskeletal diseases in several different parts of the body because of the demanding tasks they must perform while standing for long periods of time and using both their upper and lower extremities. Because they spend so much time cooking and accomplishing other tasks in a restaurant without getting enough rest. Thus, it was assumed that chefs' repetitive, violent movements related to their jobs caused musculoskeletal pain. The study's goal was to assess how frequently cooks experience musculoskeletal pain and which body area receives these complaints the most frequently [10]. The most common deformity in Japan who provided school meal services is recorded to be finger deformation. With regard to finger deformity, 5719 chefs had a 47.35% prevalence rate. According to a study by Tan and Balaraman, there were 5835 participants, or 72.2% of cooks, who reported having back discomfort as one of their most typical muscle and skeletal issues [11].

The gap of our study was that there are few researches available related to musculoskeletal pain among restaurant chefs all over the world but there is no research present specifically related to the chefs of Sialkot. So, our studies focused on chef population of Sialkot. The reasons to select this topic were that it is our topic of interest as restaurant chefs are among the most important population of society now-a- days because there is no obvious study that focused on chefs of Sialkot, to add new knowledge for practitioners and to recommend improved working environmental conditions.

METHODS

The cross-sectional/observational study design was used. Duration of study was 4 months after approval of synopsis on 20 January 2023 from institutional review committee of Imran Idrees Institute of Rehabilitation Sciences, Sialkot, Pakistan. The sample size was calculated by using the formula: n= (Z2 x P x (1- P)/e2Where; -Z = value from standard normal distribution corresponding to desired confidence level (Z= 1.96 for 95% CI) , -P is expected true proportion, -e is desired precision (half desired CI with).Therefore, our calculated sample size was 232 by estimated proportion (0.185), desired precision of estimate (0.05), confidence level (0.95) and estimated population size (200) [12]. Convenient sampling technique was used. The target population was the Chefs working in restaurants

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of Sialkot. Inclusion Criteria included Age (25-50 years), Experience of 2 years or more, working hours =/> 8hrs per day [10]. Exclusion Criteria included previous trauma (for 12 months), surgery to the site of pain (for 12 months), chef helpers or kitchen aid workers. A consent form was given to the participants, officially signed by the Institutional Authority. The population was assessed by visiting the restaurants in Sialkot, along with Informed consent. Nordic Musculoskeletal Questionnaire and NPRS (Numeric Pain Rating Scale) were used. Convenient Sampling Technique was applied. Data were collected from Heritage, KFC, McDonald's, Hardees, Ginyaki, Jak's Cafe, Frangoz Cafe, Mazzeo, BBQ Tonight, Mei Kong, Silver Spoon, Tuscany Courtyard, Grandiose, Retro, Al-Shahbaz Restaurant, Kitchen Garden, Green-Apple Restaurant, Shinwari BBQ, Grill n Thrill, Allah Malik, Butt Karahi, China Citi, Citi Top, Taboosh, Royal Cuisine, Grace Family Restaurant, Continental Lounge, Desi Khabay, Flame and Grill, Colina Dine-in, Pizza Max, Rowdy's Café, Papa Johns, Torando, HFC, Yemek Café, Al-Hadi Mandi, Pizza Planet, Yorkshire, Boissons Café, Snafos, Imtiaz Bakings, Burger Lab, Second Cup, Coffee Beans, Shehzad Tikka, and Javson Hotel. The cross-sectional survey study design with convenient sampling technique was used. Nordic Musculoskeletal discomfort Questionnaire and Numeric pain rating scale (NPRS) were used to determine prevalence of pain and its severity among the restaurant chefs of Sialkot. Data were collected by visiting different restaurants in Sialkot after the approval from higher authorities. Because these were the standard techniques/ questionnaires used worldwide to evaluate the prevalence of pain in specific region involved and to assess the level of pain. Nordic musculoskeletal questionnaire is well validated tool and has reliability of 0.945 [13] and NPRS has reliability of 0.991 regarding low back pain [14] and has reliability of 0.81 in patients with neck pain [15]. Data were analyzed using SPSS-version-22.0 (statistical package for social sciences) and data were presented in the form of frequency charts, graphs, tables etc. No statistical test was applied; just descriptive studies with frequency tables were calculated. Institutional Review Board Letter with Reference No: IIIRS/PRI/IRB-607 was issued on 20 January 2023 after the approval of synopsis.

RESULTS

This study assessed prevalence and level of pain among chefs of different restaurants in Sialkot. Sample size was 232 from which 54 were dropped out This study included 178 participants with age range varied from 25 to 50 years. Most of the participants aged 25-29 years (61.2%) and few were of age 41-45 years (2.2%). Males accounted for (85.4%) of the participants while females accounted for (14.6%). Most participants (52.8%) were married, participants accounted unmarried were (47.2%). (63.5%) of participants were among those having 8 to 10 working hours and least (4.5%) had working hours from 14 to 16 hours. (59.6%) of participants had height ranging from 5.6 to 6 feet and least of them (10.7%) had height ranging from 6.1 to 6.5. (24.7%) of the participants had weight ranging from 55 to 59 kg and (1.1%) had weight of 100 to 104 kg. (58.4%) of participants had mild pain and (7.3%) had severe pain. Duration of job of most of participants (40.4%) was 2 to 6 years and duration for least of them (0.6%) was 22 to 26 years. Most participants (20.8%) were having trouble in ankle/feet, (16.3%) had trouble in knees, (16.3%) had trouble in lower back, (12.9%) had trouble in hips/thighs, (10.7%) had trouble in shoulder, (9.0%) had trouble in elbows, (7.9%) had trouble in wrists/hands, (6.2%) had trouble in upper back, (5.6%) had trouble in neck. Many restaurants were closed at the time of data collection and few of the participants did not meet the inclusion criteria which has restricted our sample size out of 232 participants only 178 were included. Out of 178 participants, most of them (N=141) had no pain in ankles/feet (like aches, pain, general discomfort/ difficulties or numbness) from the past 12 months and some (N=37) had pain in ankles/feet (like aches, pain, general discomfort/difficulties or numbness) from the past 12 months (table 1).

Table 1: Pain in Ankles/Feet

Pain in ankles/Feet	Frequency (%)
Yes	37 (20.8)
No	141 (79.2)
Total	178 (100.0)

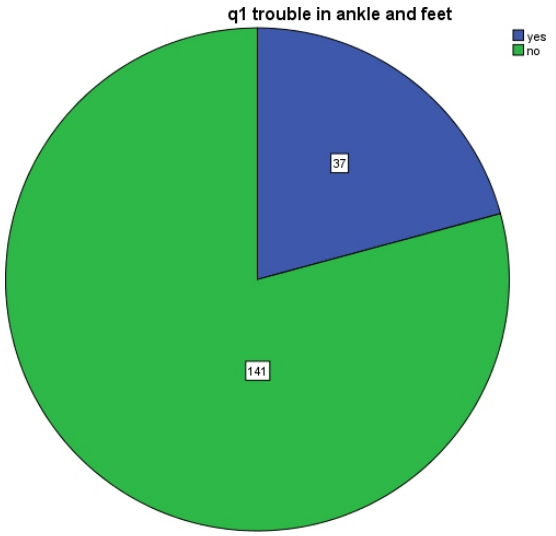

Figure 1: Pain in Ankles/Feet

Out of 178 participants, most of them (N=141, 79.2%) had no pain in ankles/ feet (like aches, pain, general discomfort/difficulties or numbness) from the past 12 months.

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Out of 178 participants, most of them (N=149) had no pain in knees (like aches, pain, general discomforts, numbness) from the last 12 months and some (N=29) had pain in knees (like aches, pain, discomfort/difficulties, numbness) from the last 12 months (Table 2).

Table 2: Pain in Knees

Pain in Knees	Frequency (%)
Yes	29 (16.3)
No	149 (83.7)
Total	178 (100.0)

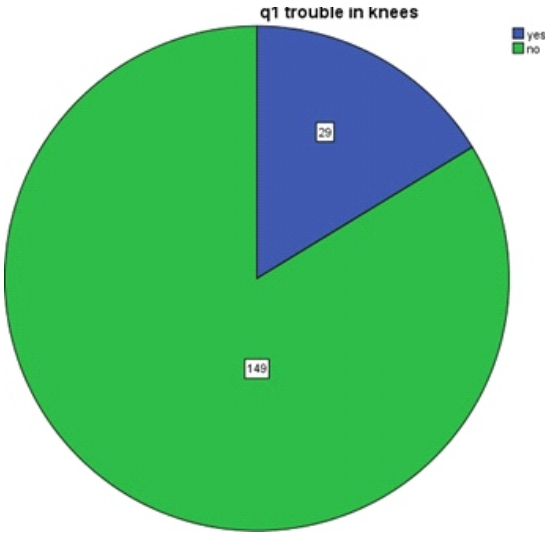

Figure 2: Pain in Knees

Out of 178 participants, most of them (N=149, 83.7%) had no pain related to knees (like aches, pain, discomfort or numbness) from the last 12 months.

Out of 178 participants, most of them (N=149) had no problem related to lower back (such as aches, pain, general discomfort, numbness) for 12 months and some (N=29) had pain in lower back (like aches, pain, difficulties, numbness) during the last 12 months (Table 3).

Table 3: Pain in Lower Back

Pain in Lower Back	Frequency (%)
Yes	29 (16.3)
No	149 (83.7)
Total	178 (100.0)

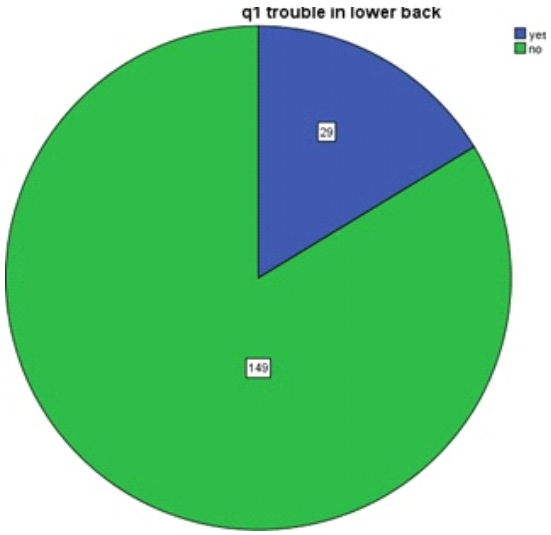

Figure 3: Pain in Lower Back

Out of 178 participants, most of them (N=149, 83.7%) had no pain in lower back (such as ache, pain, discomfort, numbness) during the last 12 months.

DISCUSSION

The musculoskeletal discomfort is linked to the mental well-being and the physical strain of lifting heavy objects, proving that these disorders are related to the stressors of the workplace [16]. An observational design of this study restricts the inferences that can be drawn about causality [17]. This study assessed prevalence and level of pain among chef of different restaurants in Sialkot. This study included 178 participants with age range varied from 25 to 50 years. Participants of age 25-29 years (61.2%) were most common and least common were age 41- 45 years (2.2%). Males accounted for (85.4%) of the participants while females accounted for (14.6%). Most participants (52.8%) were married, participants accounted unmarried were (47.2%). (63.5%) of participants were among those having 8 to 10 working hours and least (4.5%) had working hours from 14 to 16 hours. (59.6%) of participants had height ranging from 5.6 to 6 feet and least of them (10.7%) had height ranging from 6.1 to 6.5 participants (24.7%) had weight ranging from 55 to 59 kg and (1.1%) had weight of 100 to 104 kg. (58.4%) of participants had mild pain and (7.3%) had severe pain. Duration of job of most of participants (40.4%) was 2 to 6 years and duration for least of them (0.6%) was 22 to 26 years. Most participants (20.8%) were having trouble in ankle/feet, (16.3%) had trouble in knees, (16.3%) had trouble in lower back, (12.9%) had trouble in hips/thighs, (10.7%) had trouble in shoulder, (9.0%) had trouble in elbows, (7.9%) had trouble in wrists/hands, (6.2%) had trouble in upper back, (5.6%) had trouble in neck. When the findings of this study were compared with other studies, we found a difference and some similarities. This

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study mainly focuses on the chef population of Sialkot. The age range of participants in this study varied from 25 to 50 years was similar to the findings of previous studies [18] whereas the age range of some of the studies was 30 to 45 years with working hours 6 to 10 per day [4] which was not similar to our study. The present study included working experience of more than 2 years which was also not similar to the previous study where the experience of 1-5 years was included [19]. Males accounted for (85.4%) of the participants while females accounted for (14.6%) while results of some of the previous studies showed females at a higher risk of developing pain related to muscles or skeleton [20]. The present study focuses on both male and female chefs working in restaurants which were not similar with previous studies which only included male individuals [9]. Some of the previous studies focused on musculoskeletal pain included both male and female individuals among prisoners [21]. This study showed that most of the participants had an ideal weight which was also not similar to previous studies where most of the participants were underweight [19]. This study concluded that most of the participants were having trouble in Ankle/feet which is similar to the previous study on posture and physical pain that was conducted in 2020 in India [11]. In this study, most of the participants also had trouble in knees and lower back which also is similar to the findings of previous studies conducted in Egypt [22], the twin cities of Pakistan [23]. Low back pain was also assessed in some of the previous study conducted in Taiwan [24] and Nepal [25] while in some of the previous studies most common pain assessed was neck and upper limb [26]. The study did not include participants who had experienced physical trauma, anatomical anomalies or other musculoskeletal issues which was also not included in previous studies [27]. Overall, this study shares several similarities with relevant previous studies. The validity and applicability of our findings are enhanced by these similarities.

CONCLUSIONS

In conclusion, we found that there was incidence of muscle and skeletal pain in chefs working in different restaurants of Sialkot most probably in ankles/feet region, knees and low back. The pain was found to be mild on Numeric Pain Rating Scale (NPRS) mostly in male chefs of middle age with ideal weight. Chefs may develop musculoskeletal pain in ankles/feet due to their longstanding hours and performing different tasks at a time.

Authors Contribution

Conceptualization: ZN
Methodology: ZN, SS, AN
Formal analysis: ZN, RR, SS
Writing-review and editing: ZN, SS, AN, RR
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Prevalence, Antibiotic Susceptibility Pattern and Detection of Transferable Resistant Genes in *Proteus Species* from Urinary Tract Infections in a Tertiary Hospital in South-East of Nigeria

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ABSTRACT

Drug-resistant *Proteus species* cause global public health threats, including in Nigeria, due to antibiotic resistance. **Objective:** To determine the prevalence, antibiotic susceptibility, and detection of resistant genes in *Proteus species* causing UTIs in a Nigerian hospital. **Methods:** A cross-sectional study was conducted over seven months at Alex-Ekwueme Federal University Teaching Hospital in Abakaliki, Ebonyi State, Nigeria. The study included 650 urine samples from male and female in-patients and out-patients displaying UTI symptoms. Disc diffusion method was used for antimicrobial susceptibility testing and double disc-synergy test was employed to check for the presence of extended spectrum beta-lactamases. Polymerase chain reaction (PCR) was utilized to screen for transferable resistant genes and mobile genetic elements. **Results:** Out of 650 urine samples, 84 (12.9%) *Proteus species* isolates were identified. 60 (71.4%) were Proteus mirabilis and 24 (28.6%) were Proteus vulgaris. Females had a higher distribution of isolates (76.2%) compared to males (23.8%) (p=0.010). Age group showed higher isolates in the 31-40 (23.8%) and 41-50 (22.6%) age groups (p<0.001). No significant association was found between *Proteus species* and urine types or patient categories (p=0.061 and p=1.000, respectively). Levofloxacin and ceftazidime exhibited the greatest effectiveness, while nalidixic acid, imipenem, and nitrofurantoin displayed the highest resistance against *Proteus species*. 56% of Proteus isolates were multidrug resistant. PCR analysis detected TEM (23.1%), CTX-M (23.1%), SHV (15.4%), aab(61)-1b (10.3%), qnrB (2.6%), and class 1 integrase gene (25.7%). **Conclusions:** Proteus isolates carry transferable resistant genes associated with class 1 integrase.

INTRODUCTION

Proteus species, a motile, facultative anaerobic Gram-negative rod, belongs to the Enterobacteriaceae family. The genus includes P. mirabilis, P. vulgaris, P. penneri, P. myxofaciens, and P. hauseri, along with three unnamed genomospecies and 80 O-antigenic serogroups [1]. Swarming behavior is a notable characteristic of *Proteus species* [2]. They are commonly found in the intestinal tract of humans and animals, as well as in water, sewage, and soil [3]. *Proteus species* cause various infections, including urinary tract infections (UTIs), wound infections, and occasionally respiratory tract infections, otitis media, eye infections, bacteremia, and sepsis [1, 4, 5]. *Proteus species* possess virulence factors such as fimbriae and adhesion molecules for uroepithelium adherence [6]. They also have flagella for motility and swarming growth, which contributes to kidney stone formation. Urease production aids in colonization, stone formation, urinary catheter obstruction, and recurrent infections. Additionally, *Proteus species* generate cytotoxic hemolysins, biofilms for antibiotic protection, toxic agglutinins for cell aggregation and cytotoxicity, and proteases for antibody degradation [7, 8]. Antibiotics including benzylepenicillin, oxacillin, tetracycline, macrolides, and nitrofurans are naturally resistance in Proteus species [4]. Plasmid-mediated beta-

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lactamases in *Proteus species* can make them resistant to beta-lactam antibiotics. In recent years, there have been documented cases of *Proteus species* producing extended spectrum beta-lactamases (ESBLs), which makes treating urinary tract infections (UTIs) increasingly difficult due to widespread antibiotic resistance. This resistance extends to other antibiotic families like aminoglycosides and quinolones. In Nigeria, the most commonly used antibiotics for treating UTIs and other infections are third-generation cephalosporins, fluoroquinolones, and aminoglycosides. However, resistance to these antibiotics among *Enterobacteriaceae*, including *Proteus species*, is on the rise. Much work has been done on *Proteus species* but not on the molecular aspect of it in the South-East of Nigeria.

This study aimed to assess the frequency and pattern of antibiotic susceptibility, as well as detect antibiotic-resistant genes in urine samples from *Proteus species* at a tertiary hospital in southeastern Nigeria. Such research is crucial for informing antibiotic policies and controlling resistance in *Proteus species*.

METHODS

A seven-month cross-sectional study was conducted at Alex-Ekwueme Federal University Teaching Hospital in Abakaliki, Ebonyi State, Nigeria, from September 1, 2022, to April 1, 2023. The study included a random sample of in-patients and out-patients of all age groups, both males and females, who attended the hospital during this period. The study was ethically approved by the Research and Ethics Committee of Alex-Ekwueme Federal University Teaching Hospital Abakaliki, Ebonyi state, Nigeria (Approval number: AE-FUTHA/REC/VOL3/2022/070). Approval was granted from 15th June 2022 to 14th June 2023. Six hundred and fifty (650) urine samples were used for this study. Fisher's method (N = Za2P (1-P)/D2) was used to determine the minimal sample size. A score of 1.96 for the 95 percent confidence interval, P for prevalence, and D for allowable error were provided (5 percent). 21.3% prevalence was used for this study. The fisher's formula, N = Za2P (1-P)/D2, was used to calculate the sample sizes.

Where;

Za =significant level set at 95% confidence level. Za is 1.96 for a two-tailed test.

P = prevalence of the attribute under study. P is 21.3 % (0.213)

D = margin of error tolerated. D is 5% (0.05)

N = minimum sample size =Za2P(1-P)/D2

Substituting in the formula,

N = 1.962 X0.213(1-0.213)/(0.05)2= 258 approximately.

Allowing 10% non –responses, N= 10 X 258/100 = 25.8

N = 258+ 25.8 = 284

Patients provided consent before sample collection. A questionnaire gathered data on patient demographics, UTI symptoms, antibiotic use, and patient category. Sterile universal containers with boric acid were used for sample collection. Participants were instructed on how to collect early morning midstream urine. For in-patients with urinary catheters, urine was collected with a syringe and transferred to a sterile container. Willing participants with UTI symptoms and no recent antibacterial therapy within two weeks prior to the hospital visit were included in the study. The bacteria were isolated and identified at the hospital's Microbiology unit. Urine samples were cultured on blood agar and cysteine lactose electrolyte deficient agar, and then incubated at 37°C for 24 hours. The isolates were identified based on morphology, swarming on blood agar, Gram stain reaction, and biochemical tests. The Proteus isolates underwent further stages, including antimicrobial susceptibility testing, detection of extended spectrum beta-lactamases using polymerase chain reaction, and gel electrophoresis. Antimicrobial susceptibility was assessed using the disc diffusion method according to Clinical and Laboratory Standards Institute protocols [9]. Proteus isolates cultured overnight were adjusted to 0.5 McFarland turbidity and Mueller Hinton agar plates were inoculated with the test organisms using sterile swabs. Antibiotic discs were placed on the plates using sterile forceps. The plates were then incubated at 37°C for 18 hours, and the resulting zone of inhibition was measured and recorded. The zones of inhibition were categorized as sensitive, intermediate, or resistant based on the Clinical and Laboratory Standards Institute guidelines [9]. The antimicrobial discs used included ceftriaxone (30 µg), ceftazidime (30 µg), cefotaxime (30 µg), cefixime (5 µg), cefuroxime (30 µg), augmentin (30 µg), levofloxacin (5 µg), ofloxacin (30 µg), ciprofloxacin (5 µg), imipenem (10 µg), nitrofurantoin (300 µg), gentamicin (10 µg), and nalidixic acid (30 µg). Extended spectrum beta-lactamases detection employed ceftazidime, cefotaxime, and ceftriaxone. Positive ESBL production was indicated by ≤ 22 mm for cefotaxime, ≤ 17 mm for ceftazidime, and ≤ 19 mm for ceftriaxone [9]. Using the double disc-synergy test [10], a 30 µg augmentin disc (Oxoid, UK) was placed at the center of a Mueller Hinton agar plate. Surrounding the augmentin disc, three discs containing 30 µg each of ceftazidime, ceftriaxone, and cefotaxime were positioned at a distance of 30 mm from the center disc. The plate was incubated at 37°C for 24 hours. If the inhibitory zone extended towards the augmentin disc, it indicated favorable evidence for ESBL synthesis. Multidrug resistant isolates, which are resistant to more than three antibiotic classes, were screened for the following genes blaTEM, blaSHV, blaCTX-M, qnrA, qnrB, aac(6')-Ib genes and class1

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and 2 intigrase genes by PCR. Bacterial DNA was extracted using the Thermo Scientific GeneJET Genomic DNA Purification Kit. The PCR reaction mixture consisted of 12.5µl of 2 X Master mixes with standard buffer, 0.5µl each of forward and reverse primers (0.2µM), 3µl of extracted DNA (0.057µg), and 8.5µl of sterile nuclease-free water, making a total volume of 25µl. The Taq Quick Load 2X Master Mix with Standard Buffer (New England Biolabs, MA, U.S.A.) used for the PCR. The mixture was vortexed, placed in a thermal cycler machine, and PCR was performed according to the primer and cycling conditions given in Table 6 supplementary material. The resulting PCR products were analyzed on a 1.5% agarose gel stained with ethidium bromide (1µg/mL). Electrophoresis was carried out at 110 volts for 45 minutes, and the gel was visualized under an ultraviolet transilluminator. A 100 bp DNA ladder (New England Biolabs, USA) was used as a molecular weight marker. Version 22.0 of SPSS for Windows was used for all statistical analyses. For the purpose of describing categorical variables, descriptive statistics (% and frequencies) were used. With a 95% confidence interval, the Pearson Chi-square ($\chi 2$) test was used to identify significant changes in proportions. A p-value less than 0.05 specified a connection that was statistically significant.

RESULTS

A total of 84 (12.9%) isolates of *Proteus species* of which 60 (71.4%) and 24 (28.6%) isolates were Proteus mirabilis and Proteus vulgaris respectively were isolated from the 650 urine samples analyzed. The association between prevalence of *Proteus species* and types of urine were not statistically significant (p=0.061, X2 (df) = 5.586 (2)). Also, the association between prevalence of *Proteus species* and patients' category were not statistically significant (p=1.000, X2 (df) < 0.001 (2)). The association between prevalence of Proteus species and gender were statistically significant (p=0.010, X2 (df) = 9.157(2)). Also, the association between prevalence of *Proteus species* and age group were statistically significant (p < 0.001, X2 (df) = 63.015(14))(table 1).

Table 1: Distribution of Proteus isolates in relation to Demographic characteristics of patients

Demographic Characteristics	*Proteus species*		Total	x^2	p-value
	Proteus mirabilis	*Proteus vulgaris*			
Urine type					
Catheter urine (n=22)	5 (100%)	0 (0%)	5 (6.0%)	5.586	0.061
Non-catheter urine (n=628)	55 (69.6%)	24 (30.4%)	79 (94.0%)		
Total	60 (71.4%)	24 (28.6%)	84 (100%)		
Patient category					
In-patient (n=216)	20 (71.4%)	8 (28.6%)	28 (33.3%)		
Out-patient (n=434)	40 (71.4%)	16 (28.6%)	56 (66.7%)	<0.001	1.000
Total	60 (71.4%)	24 (28.6%)	84 (100%)		
Gender					
Male (n=250)	13 (65.0%)	7 (35.0%)	20 (23.8%)	9.157	0.010
Female (n=400)	47 (73.4%)	17 (26.6%)	64 (76.2%)		
Total	60 (71.4%)	24 (28.6%)	84 (100%)		
Age groups (years)					
1 - 10 (n=91)	3 (50%)	3 (50%)	6 (7.1%)	63.015	<0.001
11 - 20 (n=98)	5 (100%)	0 (0%)	5 (6%)		
21 - 30 (n=151)	4 (50%)	4 (50%)	8 (9.5%)		
31 - 40 (n=146)	15 (75%)	5 (25%)	20 (23.8%)		
41 - 50 (n=77)	14 (73.7%)	5 (26.3%)	19 (22.6%)		
51 - 60 (n=40)	7 (77.8%)	2 (22.2%)	9 (10.7%)		
61 - 70 (n=33)	11 (78.6%)	3 (21.4%)	14 (16.6%)		
71 - 80 (n=14)	1 (33.3%)	2 (66.7%)	3 (3.6%)		
Total	60 (71%)	24 (29%)	84 (100%)		

n = number tested

Table 2 demonstrates that Levofloxacin and ceftazidime showed the highest activity against the *Proteus isolates* while nalidixic acid and nitrofurantoin exhibited the highest resistance against Proteus isolates. Fifty six percent (47/84) of the Proteus isolates were multidrug resistant. (Table 4 supplementary material) There was no significant difference in the number of ESBL producers between the MDR isolates of Proteus species (p = 0.920, X2 = 0.010 (1)) (Table 5 supplementary material).

Table 2: Antibiotic Susceptibility Profile of *Proteus Species* Isolates

ANTIBIOTICS	Disc conc.	*Proteus mirabilis*			*Proteus vulgaris*		
		Sensitive (%)	Intermediate (%)	Resistant (%)	Sensitive (%)	Intermediate (%)	Resistant (%)
Levofloxacin	LEV (5ug)	48 (80%)	7 (11.7%)	5 (8.3%)	14 (58.3%)	2 (8.3%)	8 (33.3%)
Cefazidime	CAZ (30ug)	38 (63.3%)	7 (11.7%)	15 (25%)	15 (62.5%)	3 (12.5%)	6 (25%)
Ceftriaxone	CTR (30ug)	31 (51.7%)	12 (20%)	17 (28.3%)	12 (50%)	4 (16.7%)	8 (33.3%)
Ofloxacin	OFL (5ug)	28 (46.7%)	9 (15%)	23 (38.3%)	13 (54.2%)	5 (20.8%)	6 (25%)
Ciprofloxacin	CPR (5ug)	28 (46.7%)	6 (10%)	26 (43.3%)	11 (45.8%)	3 (12.5%)	10 (41.7%)
Gentamicin	GEN (10ug)	18 (30%)	12 (20%)	30 (50%)	10 (41.7%)	4 (16.7%)	10 (41.7%)
Cefixime	CXM (5ug)	18 (30%)	13 (21.7%)	29 (48.3%)	10 (41.7%)	1 (4.2%)	13 (54.2%)
Cefuroxime	CRX (30ug)	15 (25%)	6 (10%)	39 (65%)	9 (37.5%)	4 (16.7%)	11 (45.8%)
Cefotaxime	CTX (30ug)	16 (26.7%)	5 (8.3%)	39 (65%)	2 (8.3%)	2 (8.3%)	20 (83.3%)

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Augumentin	AUG (20ug)	10 (16.7%)	6 (10%)	44 (73.3%)	5 (20.8%)	1 (4.2%)	18 (75%)
Imipenem	IMP (10ug)	13 (21.7%)	5 (8.3%)	42 (70%)	1 (4.2%)	1 (4.2%)	22 (91.7%)
Nacidixic acid	NA (10ug)	12 (20%)	2 (3.3%)	46 (76.7%)	2 (8.3%)	0 (0%)	22 (91.7%)
Nitrofuran-toin	NIT (300g)	3 (5%)	8 (13.3%)	49 (81.7%)	2 (8.3%)	4 (16.7%)	18 (75%)

For different gene types of P. mirabilis and P. vulgaris, frequency is given in table 3.

Table 3: Gene Frequency of the *Proteus Species*

Gene type	Specific Gene	*Proteus species*		Total frequency (%)
		P. mirabilis	*P. vulgaris*	
ESBL gene	**TEM**	7	2	9 (23.1)
	SHIV	4	2	6 (15.4)
	CTX-M	7	2	9 (23.1)
PMQR gene	**QnrA**	0	0	0 (0)
	QnrB	1	0	1 (2.6)
AMR gene	**aab(b) – 1b**	2	2	4 (10.3)
MGE	**INT1**	7	2	10 (25.7)
	INT2	0	0	0 (0)
Total		29	10	39 (100)

MDR: Multidrug resistant strain, ESBL: Extended Spectrum Beta-Lactamase genes.PMQR: Plasmid Mediated Quinolone Resistant gene, AMR: Aminoglucosides Resistant gene (aab (6')-1b), MGE: Mobile Genetic Element (INT1: class1integrase and INT2: class2 integrase).

PCR revealed the presence of genes: TEM, CTX-M, SHV, aab (61)-1b 4 (10.3%), qnrB 1 and class1 integrase gene. QnrA gene and class 2 integrase gene were not detected. The entire screened DNA, except the DNA loaded in lane 4, were positive for the Bla TEM ESBL Gene.

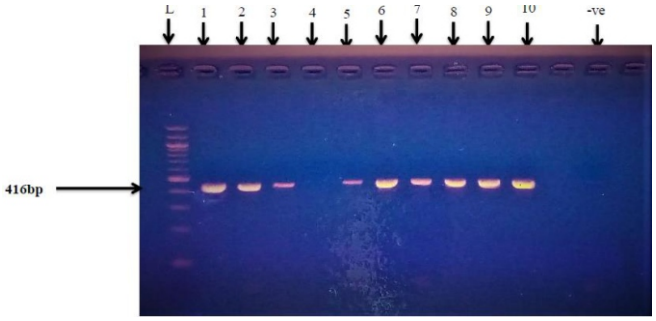

Figure 1: BlaTEM gene (41bp) gel image

(key: L = DNA ladder; Number 1 – 10 = Different Proteus isolates analyzed with PCR; -ve= Negative control)

The entire screened DNA, except the DNA loaded in lane 7, were positive for the Bla CTX-M gene. The DNA loaded in lanes 1, 4, 5, 7, 8, and 9 were positive for Bla SHV gene, while the DNA loaded in lanes 2,3,6 and 10 were negative for the Bla SHV gene.

The other unaccounted bands in the gel could as a result of primer dimmers.

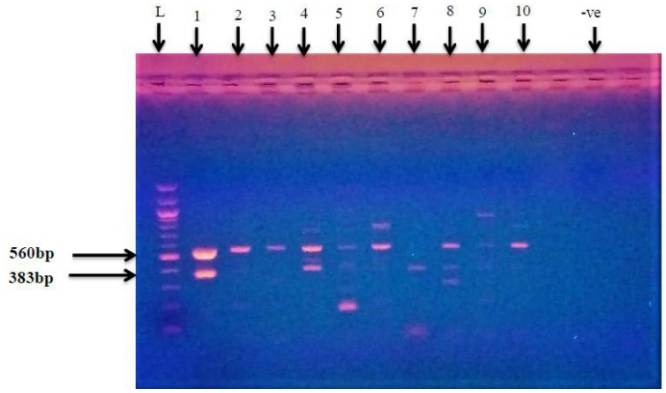

Figure 2: Figure 2: CTX-M gene (560bp) and SHV gene (383bp) gel image.

(key: L = DNA ladder; Number 1 – 10 = Different Proteus isolates analyzed with PCR; -ve= Negative control)

Only the DNA loaded in lane 1 was positive for the QnrB Gene. The DNA loaded in lanes 2, 8, 9 and 10 were positive for AAC (6)-Ib (figure 3).

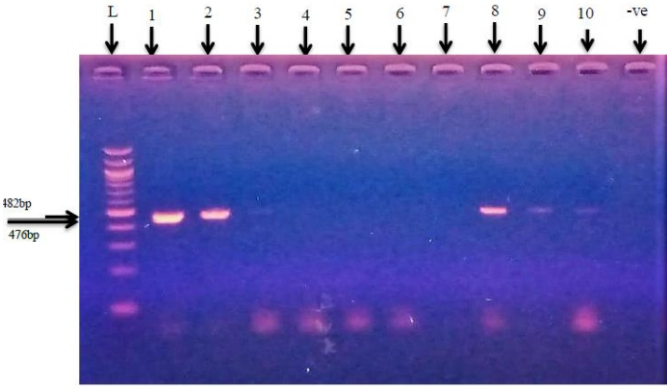

Figure 3: QnrB Gene (476bp) and AAC (6')-Ib (482bp) gel image

All the screened DNA were positive for the IntI-1gene as shown in figure 4.

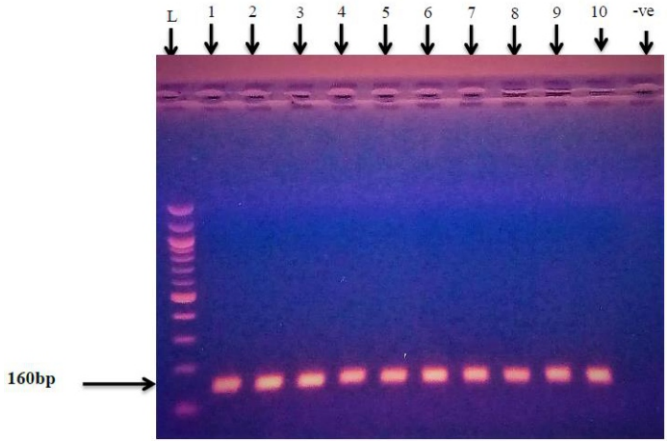

Figure 4: Figure 4: IntI-1 gene (160bp) gel image

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DISCUSSION

Among the 84 Proteus isolates, two species were identified: *Proteus mirabilis* and *Proteus vulgaris*. *P. mirabilis* was the most commonly isolated species, accounting for 71.4% of the isolates, while P. vulgaris accounted for 28.6%. It is consistent with previous research that *P. mirabilis* is the most commonly isolated *Proteus species*. *P. mirabilis* is known to be a major cause of kidney stone-related infections, a serious complication of unresolved or recurrent bacteriuria. Out-patients had a higher number of Proteus isolates compared to in-patients. Among the Proteus isolates from catheterized urine, all were *P. mirabilis*. Female patients had a higher number of Proteus isolates (76.2%) than male patients (23.8%), which aligns with previous research. In Olowe et al., report in South-West part of Nigeria female patients recorded 76.9% while male patients recorded 23.1% [11]. In a study performed by Khanal *et al.*, in Nepal female patients recorded 64.9% while male patients recorded 15.9% [12]. Similarly, according to Ahmed et al., female patients recorded 73% while male patients recorded 27% [13]. The shorter female urethra and its proximity to the rectum may make it easier for bacteria to enter the urinary system, increasing the risk of urinary tract infections (UTIs) in female patients [14]. The most affected age groups were patients aged 31-40 years and 41-50 years, which correspond to sexually active age groups. This is consistent with research conducted in Nigeria, Ethiopia, and Northern India [11, 15, 16]. Treating Proteus urinary tract infections has become increasingly challenging due to the emergence and widespread spread of antibiotic resistance. In this investigation, the most effective antibiotics against *P. mirabilis* and *P. vulgaris* were ceftazidime and levofloxacin. However, P. mirabilis isolates showed less resistance to antibiotics compared to P. vulgaris. The Proteus isolates exhibited decreased susceptibility to antibiotics such as ceftriaxone, ofloxacin, gentamicin, and ciprofloxacin, and high resistance to cefotaxime, cefixime, nalidixic acid, Augmentin, cefuroxime, imipenem, and nitrofurantoin. *Proteus species* are naturally resistant to nitrofurantoin and imipenem [4]. Multidrug resistance was observed in the majority of Proteus isolates, with *P. vulgaris* showing a higher level of multidrug resistance than P. mirabilis. This aligns with the finding that *P. vulgaris* isolates exhibited higher levels of antibiotic resistance compared to P. mirabilis isolates. Multidrug resistance was observed across both male and female isolates, in both in-patient and out-patient isolates, and across all age groups. The high prevalence of multidrug resistance in Proteus isolates from this study confirms earlier reports of increasing multidrug resistance in Nigeria among Proteus species and other members of the Enterobacteriaceae family [17-19]. Antimicrobial resistance is a significant threat to global public health. The World Health Organization reports that 4.95 million deaths worldwide in 2019 were attributed to bacterial resistance to antibiotics, with Western Sub-Saharan Africa having the highest mortality rate [20]. The prevalence of ESBL production in *Proteus species* and other Enterobacteriaceae has been reported to be increasing in Nigeria [17-19]. Molecular analysis revealed the presence of various resistance genes in the Proteus isolates, including ESBL genes (TEM, SHV, and CTX-M), aminoglycoside-resistant gene (aab (6')-1b), plasmid-mediated quinolone resistance gene (qnrB), and mobile genetic element (class 1 integrase). TEM and CTX-M genes were the most frequently detected each with a frequency of 9 (23.1%). The qnrA gene was not detected in this study. Class 1 integrase was present in all tested samples, while class 2 integrase was absent. The detected plasmid-mediated resistance genes were associated with class 1 integrase. ESBL genes, especially those from the CTX-M group, are the most prevalent and widely spread among Proteus isolates. In the United States and Europe, CTX-M genes have been found to be the most commonly occurring ESBL genes in P. mirabilis [21-23]. Quinolone resistance genes (qnrB) were not highly prevalent in this study, consistent with findings from other studies in Turkey, Argentina, and Egypt [24, 25]. Girlich states that the qnrA gene in Proteus is still very uncommon, with just one isolate out of 1,468 known to produce the gene [26, 27]. The aab (6')-1b gene, associated with aminoglycoside resistance, had a frequency of 10.3% in this study. Ogbulu et al., recorded a prevalence of 17.2%, while Alabi et al., recorded a higher prevalence of 33.3% [17, 18]. The presence of multiple resistant genes associated with class 1 integrase suggests that the accumulation of resistance determinants through mobile genetic elements contributes to the observed multidrug resistance in Proteus isolates.

CONCLUSIONS

Proteus isolates showed multidrug resistance and reduced sensitivity to tested antibiotics. Plasmid-mediated resistant genes (TEM, SHV, CTX-M, aab (61)-1b, qnrA) were detected, indicating increased antibiotic resistance. Each isolate carried multiple resistant genes associated with class 1 integrase. Early disease diagnosis, reduced antibiotic exposure, and immunization can help curb antibiotic resistance spread.

Authors Contribution

Conceptualization: ONN
Methodology: ONN
Formal analysis: ONN

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Writing-review and editing: ONN, ONF
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

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Original Article

Comparison of Modified Stoppa Approach versus Ilioinguinal Approach for Anterior Acetabular Fractures

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ABSTRACT

Achieving an anatomically precise reduction of acetabular fractures is vital for obtaining the best possible outcome. The Modified Stoppa approach has demonstrated advantages such as reduced blood loss and shorter surgical durations when dealing with anterior acetabular fractures in comparison to the ilioinguinal approach. **Objective:** To evaluate the outcomes of the modified Stoppa approach in comparison to the ilioinguinal approach. **Methods:** The quasi-experimental study was conducted within the Department of Orthopaedic Surgery at Jinnah Hospital during the period from November 12, 2018, to May 11, 2019.The study involved 60 patients, with 30 individuals in each group. Group A underwent treatment for anterior acetabular fractures using the modified Stoppa method, while Group B received treatment using the ilioinguinal approach. **Results:** Patients ranged between 16-60 years of age with mean age of 36.9±11.2 in group-A and 35.6±10.3 year in group-B. Majority of the patients were male in both groups. Left anatomical side was involved in most of the patients in both groups. The mean duration of injury in group-A was 7.07±2.6, while in group-B, it was 6.6±2.4. A statistical analysis revealed a significant difference between the two groups in terms of mean operative time and blood loss ($p<0.001$). Furthermore, stratification was performed based on age, gender, and the duration of injury, and significant differences were observed in these stratified subgroups as well. **Conclusions:** Our findings showed that modified Stoppa technique outperforms the ilioinguinal method by exhibiting reduced blood loss and shorter operative durations. This positions the modified Stoppa technique as a superior option for addressing anterior acetabular fractures.

INTRODUCTION

Pelvic and acetabulum fractures often result from high-energy traumas and are commonly linked to organ impairments, contributing to increased morbidity and mortality rates [1]. Timely and precise fixation of acetabular fractures is crucial for achieving favourable outcomes. However, the intricate anatomical nature of the pelvis and acetabulum has historically led to several complications associated with the traditional ilioinguinal approach, including the need for a general surgeon, the necessity to create three separate windows, and the potential risk of injury to the spermatic cord [2]. The Stoppa approach employs a transverse incision without a lateral window, while the modified Stoppa approach involves a lateral window incision in addition to the primary transverse incision to provide access to higher anterior column fractures [3]. The utilization of the modified Stoppa technique aimed to mitigate complications such as postoperative hernia formation and corona mortise injury while enhancing the success rate of anterior acetabular fracture fixation. Nevertheless, the comparative effectiveness of both approaches remains uncertain [2]. Both surgical approaches demonstrate positive outcomes

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in the treatment of acetabular fractures. Various studies have previously been undertaken to assess the effectiveness of these two surgical methods in managing anterior acetabular fractures [4]. Controversy exists, as some studies advocate for the modified Stoppa method, while others demonstrate favourable outcomes in terms of blood loss and repair time when employing the ilioinguinal approach [5]. Fixing various types of acetabular fractures always presents challenges, with fractures involving both columns constituting the most intricate category within this group [6]. Despite significant advancements in surgical technology, the selection of the approach remains a subject of controversy [7]. In the context of acetabular fracture management, the careful selection of a surgical approach is essential for achieving accurate reduction and minimizing complications [8]. Various approaches have been employed in the past, including ilioinguinal, Stoppa, iliofemoral, and para-rectal exposures, with the first two being the most prevalent in current practice [9]. However, in our local context, there is a lack of data comparing the effectiveness of these two approaches.

The main goal of this study was to compare the functional outcomes, particularly in terms of blood loss and surgery duration, between the ilioinguinal and modified Stoppa methods. The study aimed to provide useful guidance for choosing the most effective surgical technique for complex anterior acetabular fractures.

METHODS

The quasi-experimental study was conducted within the Department of Orthopaedic Surgery at Jinnah Hospital during the period from November 12, 2018, to May 11, 2019. A sample size of sixty participants was determined, with a 95% confidence interval, accounting for a 20% dropout rate, and aiming for an 80% test power. Purposive sampling technique was used to collect the data. The study recruited sixty patients, ranging in age from 16 to 60 years, who were undergoing osteosynthesis for the treatment of acetabular fractures while under general anaesthesia [5]. Patients presenting with anterior column fractures and having an ASA (American Society of Anesthesiologists) classification of III and IV, or with diabetes (blood sugar level >200mg/dl), transverse fractures, osteomalacia, osteoarthritis, rheumatoid arthritis (as documented in their medical records), or those expected to require an extended stay in the intensive care unit due to associated injuries, were excluded from participation in this study. Both male and female individuals were eligible for inclusion in the analysis. Subsequently, these participants were subdivided into two distinct groups: Group A underwent the modified Stoppa technique, while Group B underwent the ilioinguinal approach for repairing anterior acetabular fractures. Data collection was performed using a convenient sampling technique. This study received ethical approval from the hospital's review board, and prior to their participation, each individual provided informed written consent. Demographic details, encompassing name, age, gender, anatomical side, and injury duration, were documented utilizing a designated data collection form. The allocation of patients into one of the two groups was accomplished through a random selection process using a lottery method. Subsequently, all data were inputted and subjected to analysis using SPSS version 21.0. Quantitative variables such as age, injury duration, operation time, and blood loss were presented as means along with their corresponding standard deviations (SD), while the qualitative variable, gender, was reported in terms of frequency and percentage. The two groups were compared for average operation time and blood loss using independent sample comparisons. Additionally, data were stratified into subgroups based on age, gender, and injury duration. In each subgroup, a comparison between the two groups was conducted using an independent sample t-test for both average operation time and blood loss. Ethically permission to conduct the study was taken from Ethical Review Board committee of Allama Iqbal Medical College via the reference number 269/09/06/2023/S1 ERB and date of issuance of ERB was 09/06/2023. Statistical significance was defined as a p-value below 0.05.

RESULTS

Over a six-month duration, a total of 60 patients participated in this investigation, with an equal distribution of 30 individuals in each group. Group A underwent the modified Stoppa procedure, whereas Group B received the Ilioinguinal method. The patients' ages varied between 16 and 60 years, with an average age of 36.9 ± 11.2 years for Group A and 35.6 ± 10.3 years for Group B. The majority of patients in both groups were male, and the left anatomical side was predominantly affected in most cases (see table 1). The average duration of injury was 7.07 ± 2.6 days in Group A and 6.6 ± 2.4 days in Group B.

Table 1: Demographic Variables

Variables	Construct	Group-A Modified Stoppa Method	Group-B Ilioinguinal Method
		F (%)	F (%)
Age	16-30	10 (33.3)	10 (33.3)
	31-45	13 (43.3)	15 (50.0)
	46-60	7 (23.4)	5 (16.7)
Gender	Male	22 (73.3)	21 (70.0)
	Female	8 (26.7)	9 (30.0)
Anatomical side	Left	19 (63.3)	17 (56.70
	Right	11 (36.7)	13 (43.3)
Duration	≤ 7	16 (53.3)	19 (63.3)
	≥ 8	14 (46.7)	11 (36.7)

In table 2, the breakdown of operative time in minutes

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based on different variables, such as age, gender, and surgical duration, is depicted. It provides the mean operative times and their corresponding standard deviations for both Group A and Group B, as well as p-values denoting the statistical significance of these variations. The data underscore the highly significant differences in operative times between the two groups across all age categories, genders, and surgical durations, consistently yielding p-values below 0.001.

Table 2: Stratification of different variables with regard to operative time(min)

Variables	Construct	Group A	Group B	p-value
		Mean ± SD	Mean ± SD	
Age	16-30	92.1 ± 10.3	122.3 ± 11.4	P<0.001
	31-45	98.5 ± 7.7	690.0 ± 297.4	P<0.001
	46-60	94.0 ± 6.1	121.4 ± 10.7	P<0.001
Gender	Male	95.3 ± 8.5	125.5 ± 10.3	P<0.001
	Female	95.2 ± 9.3	121.8 ± 11.4	P<0.001
Duration	≤ 7	95.1 ± 9.5	125.5 ± 10.6	P<0.001
	≥ 8	95.5 ± 7.9	122.6 ± 10.7	P<0.001

(SD: Standard Deviation)

In table 3, blood loss in millilitres (ml) is stratified based on various variables, including age, gender, and surgical duration. The table provides the mean blood loss and standard deviations in Group A and Group B, accompanied by p-values that denote the statistical significance of these variations. The data highlight noteworthy differences in blood loss between the two groups across all age categories, gender groups, and for surgical durations of 7 minutes or less. In the majority of cases, the p-values are below 0.001, indicating these significant differences. However, for surgical durations of 8 minutes or more, the p-value is 0.001, signifying significant distinctions as well.

Table 3: Stratification of different variables with regard to blood loss(ml)

Variables	Construct	Group A	Group B	p-value
		Mean ± SD	Mean ± SD	
Age	16-30	539.0 ± 176.6	1038.2 ± 339.8	P=0.001
	31-45	690.0 ± 297.4	1170.4 ± 399.8	P=0.001
	46-60	533.8 ± 93.4	1073.4 ± 173.4	P<0.001
Gender	Male	617.1 ± 260.6	1125.8 ± 369.8	P<0.001
	Female	564.8 ± 133.9	1073.6 ± 307.9	P<0.001
Duration	≤ 7	619.3 ± 255.6	1143.2 ± 333.0	P<0.001
	≥ 8	584.7 ± 210.9	1053.0 ± 381.9	P=0.001

(SD Standard Deviation)

DISCUSSION

The treatment of acetabular fractures presents formidable challenges due to the intricacies associated with injuries to internal organs and the intricate nature of the fractures themselves. Nevertheless, this procedure carries substantial risks, including excessive blood loss, prolonged surgical time, and the potential for damage to the external iliac vessel and femoral nerve. This study investigated the treatment outcomes of utilizing the modified Stoppa approach in contrast to the ilioinguinal approach for the management of acetabular fractures. In terms of patient demographics, the majority of patients in our study were male, consistent with the findings of Andersen et al., who also noted a male predominance in both groups [9]. Elmadag et al., similarly reported a male majority [10]. The average age of participants in both groups was 36.9 ± 11.2, aligning with the results of Al Adawy et al., who reported a mean patient age of 38.8 ± 8.42 [11]. In terms of the average operative time and blood loss, our study demonstrated a statistically significant distinction between the two groups, in alignment with the results presented by Yang et al [12]. Their study likewise reported a noteworthy difference in mean operative time and blood loss within both groups. Ponsen et al., noted comparatively lower blood loss and shorter surgical durations with the Stoppa approach [13]. The recent study has revealed significant disparities in operative times across both groups, encompassing all age categories, genders, and surgical durations. These findings are corroborated by Kilinc et al., who noted a substantial correlation between operative time and factors such as age, gender, and surgery duration [14]. Similarly, Cole et al., arrived at similar conclusions in their research [15]. Traditionally, orthopaedic surgeons have employed the ilioinguinal approach as the primary method for fixing anterior column fractures. Anterior acetabular fractures encompass a variety of types, including anterior wall and column fractures, T-type fractures, partial transverse fractures, or fractures that affect both the column and anterior column, as well as posterior hemi-transverse fractures [16]. In some cases, this approach may not provide complete access to the fracture site, necessitating indirect reduction techniques. In 1989, a new approach was introduced by surgeon Stoppa for repairing inguinal hernias using Dacron mesh. This innovative technique afforded excellent exposure to the true pelvis [17]. Recognizing the benefits of this exposure, the idea emerged to employ the Stoppa approach for fixing anterior acetabular fractures. Subsequent evaluations by multiple surgeons demonstrated superior outcomes when compared to the traditional ilioinguinal approach. The modified Stoppa approach stands out as a superior alternative, as it enables the reduction of impacted articular fragments in the weight-bearing region. This technique also reduces the necessity for bone grafts and is suitable for cancellous bone grafting, repairing bones with extended lateral exposure to the pelvic bone, and addressing dislocated joints. Hirvensalo et al., applied the modified Stoppa technique to 164 patients, with 84.1%

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achieving good to excellent anatomical reduction, 9% rated as fair, and only 7% classified as poor [18]. In this study, 80% of participants achieved a Harris hip score of 75 or higher when assessed based on clinical and functional outcomes. Similar results were reported by Sagi et al., where 50 cases were evaluated post-surgery, and 92% of patients demonstrated excellent or good results in reducing acetabular fractures [16]. In this study, 60% required the lateral window approach to achieve the reduction of high anterior column fractures, while Anderson et al., reported a slightly lower success rate compared to the previous study, with an 82% anatomic reduction rate [9]. Variations in results may arise due to different inclusion criteria. Shazar et al., noted a statistically significant difference in achieving reduction rates [17]. In the ilioinguinal procedure, anatomical reduction was achieved in 54.2% compared to the Stoppa approach, which had an anatomical reduction rate of 79.4%. This study's findings suggest that the primary advantage of the modified Stoppa approach lies in its enhanced capability to address the posterior aspect of the fracture. In our study, we observed a significant reduction in mean operative time when employing the modified Stoppa method compared to the ilioinguinal method (95.3 ± 8.6 vs. 124.4 ± 10.6 minutes; $p<0.001$). Furthermore, we noted that blood loss associated with the modified Stoppa approach was significantly lower than that associated with the ilioinguinal approach (603.2 ± 232.5 vs. 110.2 ± 347.9 millilitres; $p<0.001$). These results are consistent with those reported by Kim et al. and Arora et al., who also demonstrated comparable outcomes in terms of operative time and blood loss. They described the Stoppa technique as a preferred choice over the ilioinguinal approach for addressing anterior acetabular fractures [19, 20].

CONCLUSIONS

Based on the results obtained in this study, it can be inferred that the use of the modified Stoppa approach for the management of anterior acetabular fractures resulted in superior outcomes in relation to reduced blood loss and shorter operative duration when compared to the ilioinguinal approach. Additionally, further validation of our findings necessitates the conduction of extensive and multicentre randomized controlled trials.

Authors Contribution

Conceptualization: MS
Methodology: MS, JHR, UNG, MAS, JK, MQ
Formal analysis: MS, JHR, UNG, MAS, JK, MQ
Writing-review and editing: MS
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

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Original Article

Is Arthroscopic Release a Good Treatment Option in Adhesive Capsulitis of Shoulder Refractory to Non-Operative Treatment

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ABSTRACT

Adhesive capsulitis, causing shoulder pain and limited mobility, is effectively treated with arthroscopic release preferred for its proven efficacy, minimal complications, and enhanced accessibility to the whole joint capsule. **Objective:** To assess the outcome of arthroscopic releases in patients suffering from adhesive capsulitis in whom non-operative treatment failed. **Methods:** This retrospective study was conducted at Jinnah Hospital in Lahore from 2019 to 2021, encompassing 38 shoulders that underwent surgery. Among the total cohort, 15 cases were associated with female patients, and 23 male patients. Surgical interventions were carried out with patients positioned in a beach chair orientation. The initiation of physical therapy occurred at the earliest possible juncture, and evaluation of functional outcomes was undertaken employing the UCLA criteria. **Results:** The mean age of the individuals included in the research cohort was 51 years, exhibiting a broad age distribution ranging from 29 to 73 years. Significant improvements in the range of motion were evident, with an average augmentation of 56.71° in abduction, 38.5° in external rotation, and an additional extension of eight vertebral levels in internal rotation. As per the UCLA scoring system, the results exhibited a notably positive profile, with 16 shoulders attaining an excellent rating (42%), 16 being categorized as good (42%), and six falling within the fair or poor category (15%). Notably, five patients encountered postoperative complications. **Conclusions:** Arthroscopic release demonstrated effective results in alleviating pain and improving range of motion, establishing its efficacy as a treatment for adhesive capsulitis.

INTRODUCTION

In 1945, Neviaser introduced the term "adhesive capsulitis" to describe a condition characterized by inflammation of the shoulder joint capsule leading to stiffness and pain [1]. The main goal of its treatment to improve the extent of motion and relieve pain. In the initial phase, non-surgical options are usually explored, especially during the acute stage [2, 3]. Among the therapeutic choices available are physical therapy, corticosteroid administration, non-steroidal anti-inflammatory drugs (NSAIDs), and suprascapular nerve blocks [4-7]. If non-surgical treatments do not yield the desired results, invasive interventions are considered. The non-operative treatment duration may span from a minimum of six weeks to a maximum of 12 months, as documented in previous studies [8-13]. Invasive approaches encompass hydraulic distention of the shoulder joint, manipulation under anesthesia, and capsular release, with the latter being achievable through either open or arthroscopic surgical modalities [4, 6]. Currently, there exists a discouragement of joint manipulation under anesthesia due to the various complications associated with this procedure. Such complications encompass fractures, labral injuries, neurapraxia, persistent pain, and rotator cuff tears, as noted in previous studies [14-17]. In light of these concerns, an alternative approach in the form of open shoulder release was introduced, as initially described by Ozaki et al [18]. The seminal research underscored the substantial enhancements in patient outcomes associated with the

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surgical resection of the coracohumeral ligament and the subsequent opening of the rotator interval. However, several studies have reported positive outcomes following open shoulder release, this procedure is not devoid of inherent risks. These risks include the challenging release of the posterior shoulder capsule, heightened intraoperative bleeding, and the occurrence of postoperative pain. Furthermore, patients undergoing this procedure may necessitate movement restrictions until the subscapularis tendon has healed [4, 5, 8, 14, 19]. Recently, arthroscopic release has gained popularity for treating adhesive capsulitis due to its effectiveness in alleviating pain and significantly improving shoulder joint mobility. This method offers the advantage of direct visualization during the release, reducing the likelihood of complications by providing clear access to the entire shoulder joint capsule [19-21]. Nonetheless, it is crucial to acknowledge potential complications associated with this procedure, including iatrogenic injury to the axillary nerve, chondral lesions that may occur during instrument insertion, and the risk of thermal injury leading to chondrolysis [9, 22, 23].

In light of these considerations, the primary objective of this study was to assess the outcomes of arthroscopic releases performed in our department for patients suffering from adhesive capsulitis that had proven refractory to non-operative treatments.

METHODS

The retrospective study design was employed to conduct the study. The study included a sample of 38 participants. Sample size include the total participants present at that time. Retrospective studies frequently employed to evaluate clinical outcomes, treatment patterns, and healthcare resource utilization for rare health conditions. Therefore, retrospective studies lack a definitive method or specific formula to determine the sample size due to these diverse scenarios. The research centered on 38 patients who had undergone arthroscopic release as a therapeutic intervention for adhesive capsulitis that had not shown improvement with non-operative treatments. All surgeries were conducted by the same arthroscopic team, spanning from February 1996 to May 2012. Inclusion criteria involved patients with adhesive capsulitis lasting at least 6 months, without any other shoulder abnormalities such as osteoarthritis, fractures, malunion, or necrosis. Before undergoing surgery, the patients had received non-operative treatments for an average of 17.6 months, with individual durations ranging from 5 to 44 months. The mean duration of postoperative follow-up in this study encompassed a period of 23 months, with individual follow-up intervals ranging from 4 to 44 months. The age distribution of the patient cohort exhibited a range from 32 to 71 years, with a mean age of 51.92 years. Within the patient population, 15 individuals were female, constituting 38.5% of the sample, while 23 were male, representing 60.5% of the total participants. It was the dominant limb that underwent arthroscopic release in 22 of the cases (57.9%). The surgical procedure involved each patient being positioned in the beach chair posture. A posterior portal was used to insert the camera, while joint debridement was carried out through the anterior portal. Following this, the procedure involved the deliberate opening of the rotator interval and the release of the coracohumeral ligament. Subsequently, the portal was repositioned, and capsulotomies were performed at the posterior and inferior aspects through the posterior portal. To ensure a thorough release of the joint capsule, an additional capsulotomy was executed at the anteroinferior region through the anterior portal. In cases where a decrease in external rotation was observed, a partial tenotomy of the subscapularis muscle was executed. Following the surgical procedure, patients commenced an intensive physical therapy program on the day immediately following surgery. The assessment of functional outcomes was conducted based on the University of California at Los Angeles (UCLA) criteria, and shoulder range of motion was quantified in accordance with the criteria established by the American Academy of Orthopedic Surgeons. Ethically permission to conduct the study was taken from Ethical Review Board committee of Allama Iqbal Medical College via the reference number 270/09/06/2023/S1 ERB and date of issuance of ERB letter was 09/06/2023. Statistical analysis was carried out using SPSS version 23.0, and statistical significance was defined at a 95% confidence level ($p < 0.05$).

RESULTS

The demographic variable investigated for this study are elaborated in Table 1.

Table 1: Demographic Variables

Sr. No.	Sex	Age (Years)	Dominant side	Comorbidities	Symptoms (Months)	Pre-op Treatment (Months)
1	M	51	Y	DM I	33	11
2	F	46	Y	-	36	6
3	F	56	N	DM II, HTN	26	11
4	M	41	Y	HTN	13	8
5	M	58	N	-	16	14
6	M	65	N	HTN	15	23
7	F	44	Y	-	26	17
8	M	46	N	DM II, HTN	21	38
9	F	48	Y	HTN	12	13
10	M	42	Y	-	14	41
11	M	63	Y	HTN	18	44
12	D	44	N	Asthma	24	16
13	M	57	Y	DM I	14	23
14	F	38	N	DM II, HTN	33	29
15	M	41	Y	HTN	43	10
16	M	58	Y	DM II, HTN	22	25

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17	F	56	Y	-	23	44
18	M	53	Y	Hypothyroid	16	23
19	M	68	Y	DM II, HTN	27	22
20	F	67	N	-	23	25
21	M	58	N	HTN	31	7
22	M	54	N	HTN	4	19
23	F	55	Y	DM II	42	8
24	M	47	N	-	14	16
25	M	65	Y	DM II	35	6
26	F	45	Y	-	74	8
27	M	55	Y	-	35	19
28	F	64	N	DM I	12	16
29	F	45	Y	-	44	18
30	M	44	N	DM II, HTN	24	10
31	F	54	Y	-	12	16
32	M	64	Y	DM II, HTN	11	9
33	M	44	Y	-	14	14
34	M	54	N	DM I	22	12
35	F	46	N	DM II, HTN	27	5
36	F	32	N	-	36	7
37	M	34	Y	-	32	8
38	M	71	N	DM II, HTN	42	8

DM II: Diabetes Mellitus II, DM I: Diabetes Mellitus I, HTN: Hypertension

Significant enhancements in range of motion were observed after the arthroscopic release procedure. The average pre-operative range of motion measured at 88° for abduction, 15° for external rotation, and L5 for internal rotation (as assessed by the hand-behind-back test). After arthroscopic release, these measures significantly improved to 144° of abduction, 53° of external rotation, and T9 internal rotation ($p < 0.001$) (see Table-2). Comparing different age groups, genders, and comorbidities between diabetic and non-diabetic populations did not reveal any significant differences in results. According to the UCLA criteria, the outcomes showed that 16 shoulders achieved an excellent rating (42%), 16 were classified as good (42%), and six fell into the fair/bad category (15%). Complications were observed in five patients (13.15%), including axillary neurapraxia in one patient, one patient requiring a second operation, one patient had reflex sympathetic dystrophy, another experienced an iatrogenic rotator cuff injury, and a patient reported acromioclavicular pain.

Table 1: Results in Terms of Range of Motion & University of California at Los Angeles (UCLA) Score

Sr. No.	Range of motion						Post-op UCLA		Follow up	Complications
	Pre-op.			Post-op.			Score	Result	Months	
	Abd.	ER	IR	Abd.	ER	IR	-	-	-	
1	100°	10°	L5	150°	60°	T6	30	Good	12	-
2	90°	5°	L4	140°	50°	T10	24	Fair	10	-
3	80°	20°	Glut	145°	50°	T11	35	Good	16	-
4	65°	10°	Glut	130°	50°	T8	33	Good	14	-
5	95°	15°	L5	120°	35°	T8	30	Good	16	-
6	85°	10°	L3	150°	40°	T7	31	Good	12	-
7	80°	25°	S1	140°	40°	T12	15	Good	18	-
8	70°	0°	S1	100°	30°	S1	20	Fair/Bad	8	Rotator cuff injury
9	90°	30°	T12	135°	50°	T10	32	Good	14	-
10	95°	0°	Glut	130°	50°	T7	28	Excellent	16	-
11	90°	10°	Glut	150°	60°	L5	31	Good	14	-
12	30°	-10°	GT	90°	20°	GT	15	Fair/Bad	11	-
13	80°	10°	S1	140°	60°	L5	35	Excellent	19	-
14	90°	20°	L4	150°	80°	T5	35	Excellent	27	-
15	90°	10°	S1	150°	80°	T6	35	Excellent	10	-
16	70°	20°	L4	110°	20°	L1	15	Fair/Bad	10	Operated Twice
17	90°	40°	Glut	120°	60°	L3	30	Good	12	-
18	130°	20°	L3	150°	60°	T8	35	Excellent	9	-
19	80°	45°	Glut	130°	45°	Glut	15	Fair/Bad	17	RSD
20	85°	10°	L5	130°	70°	T12	30	Good	11	-
21	70°	0°	GT	150°	45°	T10	34	Good	11	-
22	110°	60°	L5	140°	60°	T8	32	Good	14	-
23	60°	-10°	S1	150°	60°	L4	35	Excellent	14	-
24	90°	20°	L4	150°	80°	T5	35	Excellent	17	-
25	100°	20°	L5	160°	70°	T5	35	Excellent	16	-
26	80°	10°	L3	150°	60°	T7	30	Good	4	-
27	120°	0°	L3	150°	60°	T10	35	Excellent	18	-
28	85°	10°	L3	150°	40°	T7	31	Good	12	-
29	100°	0°	L5	150°	60°	T10	35	Excellent	9	-
30	80°	20°	Glut	145°	50°	T11	35	Good	16	-
31	90°	0°	L5	140°	60°	T10	34	Excellent	9	-
32	100°	20°	L5	140°	60°	T8	35	Excellent	18	-
33	90°	20°	S1	100°	20°	L3	18	Fair/Bad	12	AC joint pain
34	130°	45°	L1	140°	60°	L1	35	Excellent	12	-
35	80°	0°	L5	150°	60°	T7	35	Excellent	13	-
36	110°	10°	L4	160°	60°	T2	35	Excellent	9	-
37	90°	20°	L4	150°	80°	T5	35	Excellent	17	-
38	80°	25°	S1	140°	40°	T12	15	Good	18	Axillary n. neurapraxia

ER: External Rotation, IR: Internal Rotation, UCLA: University of California at Los Angeles

DISCUSSION

The findings from our study show a substantial improvement in range of motion after arthroscopic release. Specifically, abduction increased to 144°, external rotation improved to 53°, and internal rotation extended to level T9. This signifies a notable augmentation of 56.71 degrees in abduction, 38.5 degrees in external rotation, and an increase of eight vertebral levels in internal rotation subsequent to the arthroscopic release procedure. A comparison of the mean postoperative abduction showed only a minor discrepancy of 3° ($p = 0.030$), demonstrating the potential for restoring range of motion in these patients. After arthroscopy, patients exhibited superior results when compared to their pre-operative condition. The final postoperative mean abduction reached 144.86° (compared to 88.15° preoperatively, $p = 0.033$), mean external rotation improved to 53.55° (from 15° preoperatively, $p = 0.000$), mean internal rotation reached level T11 (from T7 preoperatively, $p = 0.000$), and the mean postoperative UCLA score was significantly higher at 30.2 (compared to 33.4 preoperatively, $p = 0.000$). These results

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are supported by the work of Gerber et al., who reported improvements in range of motion after arthroscopic shoulder release, including a 38° increase in abduction and an 18° increase in external rotation [19]. Cohen et al., supported these results, reporting a significant improvement of 64° in flexion, 43.5° in external rotation, and an increase of eight spinal internal rotation levels after arthroscopic shoulder release [21]. Many other studies have likewise endorsed these findings by reporting improved range of motion after arthroscopic shoulder release [8, 12, 13, 20]. In term of outcomes, the current study revealed that 25 Outcome of 16 shoulders were excellent (42%), 16 were good (42%), six were fair/bad (15%). These findings are consistent with Pollock et al., who reported improvement in patient outcomes after arthroscopic release [20]. Our study found no substantial differences in outcomes when comparing age groups, gender, and comorbidities between diabetic and non-diabetic individuals. Conversely, Cinar et al., observed less favorable results in diabetic patients in comparison to their non-diabetic counterparts following arthroscopic release [24]. In the context of arthroscopic complications, the present study documented those five patients (13.15%) experienced adverse events. Specifically, one patient manifested axillary neurapraxia in the post-operative period, although complete functional recovery was achieved within four months. This incident was attributed to the potential axillary nerve traction during manipulation. Additionally, one patient reported postoperative pain in the acromioclavicular joint, while another patient developed reflex sympathetic dystrophy. A third patient incurred an iatrogenic rotator cuff injury, resulting in reduced range of motion and pain during follow-up. This condition was further confirmed by magnetic resonance imaging, which revealed the rotator cuff injury. Segmüller et al., reported four complications after orthoscopic treatment [12]. Similarly, Baums et al., reported pain in the acromioclavicular joint after arthroscopic release [13].

CONCLUSIONS

Arthroscopic release demonstrated effective results in alleviating pain and improving range of motion, establishing its efficacy as a treatment for adhesive capsulitis.

Authors Contribution

Conceptualization: UNG
Methodology: UNG, JHR, MS, AS, JK, KA
Formal analysis: UNG, JHR, MS, AS, JK, KA
Writing-review and editing: UNG
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Severe and Frequent Loneliness Mars Adults with Hearing Loss

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ABSTRACT

There is a high prevalence of hearing loss in community and need of research to address this gap into the health-related issues of hearing loss like loneliness, anxiety and depression, hence current study was conducted. **Objective:** To determine the subjective loneliness in adults with hearing loss and association with clinico-demographic variables. **Methods:** This cross-sectional study was conducted at Isra University Islamabad. Study recruited N=377 patients with hearing loss utilizing convenience sampling from Sir Ganga Ram and Mayo Hospitals, Lahore, Pakistan from January - June 2020. The sample included both genders, aged 20 to 65 years with moderate to profound hearing loss of at least 1-year duration. The basic demographic sheet and University of California, Los Angeles (UCLA) Loneliness Scale Version 3 were used for data collection. Data were analyzed using SPSS Version 26 & Chi-square was utilized to determine any association with $p<0.05$ taken to be significant. **Results:** Study revealed severe loneliness in 279(74%) and frequent loneliness in 98(26%). Severity categories of loneliness revealed association with age ($p=0.049$), gender ($p=0.043$), smoking ($p=0.049$), type of hearing loss ($p<0.001$), degree of hearing loss ($p=0.008$), hearing aid use ($p<0.001$), hours and days of hearing aid use ($p<0.001$). **Conclusions:** It is concluded that hearing loss results in severe and frequent loneliness. Factors including age, gender, smoking, type of hearing loss, degree of hearing loss, hearing aid use, hours and days of hearing aid use are associated with loneliness in adult population of Punjab, Pakistan.

INTRODUCTION

Hearing loss (HL) is a common chronic condition of global health concern defined as a hearing threshold greater than 20 dB in both ears, while disabling HL is defined as a loss of more than 35 dB in the better hearing ear. It is a highly prevalent condition with a prevalence of 466 million (m) with 432m adults and 34m children. This accounts for around 6.1% of the world population, with possible escalation to 700m cases with disabling HL by the year 2050 [1]. In the United States alone, the prevalence of HL doubles with 10 years' increment in age [2], with a very high prevalence reported in an Egyptian school-based study [3]. A local study by Zahra et al., reported significant association of hearing handicap with advancing age [4] with predominance of conductive HL (50%), followed by mixed variety (30%) and sensorineural hearing loss (SNHL) (20%) [5]. While another local study reported positive correlation of severity of HL with age with moderately severe HL being the commonest followed by severe HL [6]. Adulthood is a large segment of an individual's life span, booming with physical and intellectual maturity with early adulthood extending around 25-45 years, middle between 45-65 and then comes older adulthood [7]. Individuals in different age groups suffer psychological issues quite differently and elderly suffer various psycho-social issues

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influenced by different factors like daily activities and occupational circumstances etc. [8]. Normal hearing is essential for the normal healthy development of an individual with increase in HL resulting in decreased language acquisition and functioning [9]. HL in adult population can affect quality of life (QoI) in terms of communication difficulties leading to hardships in relationships as well as at work resulting in adverse social, psychological, and economic impact on the individual and family (2). Adult population with HL is at risk of development of mental health issues [10]. With a major segment of society facing this health dilemma, research into HL related outcomes in older adults is need of the hour [11]. Loneliness is a subjective situation where individual lacks the preferred affection as well as closeness with others who are intimate or family and friends and differs from objective state of living alone [12]. There is dearth of studies on loneliness, despite its presence in adolescents in Institutions resulting in aggression [13]. It is important to study loneliness since it is a can predict the results in mental disordered people [14] and can result in a number of psychiatric issues including abuse of alcoholic drinks, child abuse, depression, sleep issues as well as changes in personality [15]. Hence, keeping in view high prevalence of HL in the community with need of research to address this gap into the health-related issues of HL [2], like loneliness, anxiety, depression, stress and deficient knowledge of evidence based treatment.

The current study was designed to determine the Subjective Loneliness in Adults with Hearing Loss and association with clinico-demographic variables. It is an important area of research since it can provide baseline knowledge for taking clinical decisions and provision of policy making to set the background for future research.

METHODS

The current cross-sectional study enrolled N=377 patients with hearing loss by convenience sampling over a period of six months from 1st January 2020 to 30th June 2020 from out-patient department of Sir Ganga Ram Hospital and Mayo Hospital, Lahore, Pakistan. The sample included patients of both genders, aged 20 to 65 years with moderate to profound hearing loss of at least 1-year duration. Cases with psychotic disorders and multiple handicaps were excluded from the study. A Sample of N=377 was calculated using Raosoft online sample size calculator with 5% error margin, 95% confidence level, and response distribution of 50%. Basic demographic sheet and University of California, Los Angeles (UCLA) Loneliness Scale Version 3 were used for data collection. UCLA loneliness scale Version 3 is a 20 item, valid and reliable tool having a α value varying from 0.89 to 0.94. Its psychometric properties confirm it to be a reliable assessment tool to assess loneliness in a wide variety of population types and methods for data acquisition [16]. The study was initiated after obtaining ethical approval of Institutional research board of Isra Institute of rehabilitation sciences, Isra University vide Reg. No. 1809-M Phil HS-004, and informed consent of participants for inclusion in the study keeping their anonymity preserved. Data were collected from the recruited patients using the questionnaires and it was analyzed using SPSS Version 26.0. Descriptive statistics were utilized and Chi-square was used to see any association with $p<0.05$ taken to be significant.

RESULTS

The current study revealed that majority 279(74%) of the sample population was severely lonely with mean UCLA scale score of 44.2 (SD 8.7), while the remaining 98(26%) felt frequently lonely with mean score of 26.52±3.15 with no participant who was rarely lonely (Figure 1).

Table 1: Descriptive Statistics of Severity of Loneliness (n=377)

Severity off Loneliness	f (%)	Mean ± SD
Rarely	0 (0)	0±0
Frequently	98 (26)	26.52±3.15
Severe	279 (74)	44.2±8.7

Clinico-demographic features (Table 2) revealed that majority 151(40.1%) of the population was 51-65 years old followed by 130(34.5%) in 20-35 years age group with most 222(58.9%) being males. Majority 251(66.6%) belonged to middle class and were graduates 75(13.3%). Most 219(58.1%) had SNHL with least 93(24.7%) using hearing aids out of which 64(16.97%) were using hearing aids for more than 12 hours and 54(14.3) were using HAs for 3-4 days a week. Also majority 292(77.5%) never smoked and their partners were alive 229(60.7%). In majority 117(31%) isolated medical problems were present. 125(33.2%) had psychological issues while only 32(8.5%) were using coping strategies for it.

Table 2: Sociodemographic & Clinical characteristics of sample population (N=377)

Variable	Group	Frequency (%)
Age (Years)	20-35	130 (34.5)
	36-50	96 (25.5)
	51-65	151 (40.1)
Gender	Male	222 (58.9)
	Female	155 (41.1)
Economic Status	Low	124 (32.9)
	Middle	251 (66.6)
	High	2 (0.5)
Education	No Formal Education	72 (19.1)
	Under Matric	76 (20.2)
	Matric	89 (23.6)
	Intermediate	50 (13.3)

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	Graduation	75 (19.9)
	Post-Graduation	15 (4)
Type of Hearing Loss	CHL	54 (14.3)
	SNHL	219 (58.1)
	MHL	104 (27.6)
Degree of Hearing Loss	Moderate	96 (25.5)
	Severe	223 (59.2)
	Profound	58 (15.4)
Hearing Aid User	Yes	93 (24.7)
	No	284 (75.3)
Hearing Aid Usage in Hours/ Day	Less than 8 hours	9 (2.4)
	8-12 hours	20 (5.3)
	More than 12 hours	64 (17)
	Not HA user	284 (75.3)
Hearing Aid Usage in Days/ Week	1-2 days	13 (3.4)
	3-4 days	54 (14.3)
	More than 4 days	26 (6.9)
	Not HA user	284 (75.3)
Smoking Status	Current	55 (14.6)
	Former	30 (8)
	Never	292 (77.5)
Partner Status	Live	229 (60.7)
	Dead	30 (8)
	Separated	30 (8)
	Unmarried	88 (23.3)
History of Medical Problems	Isolated Medical Problem	117 (31)
	Vision Problem	73 (19.4)
	Multiple Comorbidities	81 (21.5)
	No problem	106 (28.1)
Any Psychological Issue	Yes	125 (33.2)
	No	252 (66.8)
Any Coping Strategy	Yes	32 (8.5)
	No	345 (91.5)

Among Socio-demographic variables (Table 3), age revealed significant association with p=0.049 with severity categories of loneliness with higher UCLA scores for age below 36 years and above 50 years. Gender also revealed significant association (p=0.043) with severity of loneliness with higher scores for male gender. Socioeconomic status did not reveal significant association with severity of loneliness however UCLA score was highest for lower class. Educational status also did not reveal association with severity of loneliness; however, scores were highest for post graduates. Smoking status showed significant association (p=0.049) with severity of loneliness with higher frequency of current smokers affected who also had highest UCLA score. However, partner status did not reveal significant association.

Table 3: Socio-Demographic Characteristics * Severity of Loneliness & UCLA Score. Cross Tabulation (n-377)

Socio-Demographic		Severity			UCLA Score
Variable	**Group**	**Frequently (21-30) (n=98)**	**Severe (31-40) (n=279)**	**Chi-Square Association (X2, p-value)**	**Mean ± SD**
Age (Years)	20-35 (n=130)	26	104	5.93 0.049	42.10±10.07
	36-50 (n=96)	33	63		36.21±10.02
	51-65 (n=151)	39	112		39.61±11.59
Gender	Male (n=222)	49	73	4.319 0.043	40.77±10.96
	Female (n=155)	49	106		37.94±10.64
Economic Status	Low (n=124)	34	90	0.866 0.649	40.7±11.08
	Middle (n=251)	64	187		39.12±10.81
	High (n=2)	0	2		31.50±0.71
Education	None (n=72)	14	58	9.089 0.106	40.17±10.52
	Under Matric (n=76)	27	49		37.47±11.15
	Matric (n=89)	28	61		37.98±11.48
	Intermediate (n=50)	11	39		41.34±10.70
	Graduation (n=75)	16	59		39.12±10.05
	Post-Graduation (n=15)	2	13		44.40±9.51
Smoking Status	Current (n=55)	11	44	4.78 0.049	42.67±10.48
	Former (n=30)	13	17		36.33±11.95
	Never (n=292)	74	218		39.36±10.77
Partner Status	Live (n=229)	63	166	1.521 0.677	38.69±10.77
	Dead (n=30)	7	23		39.63±11.58
	Separated (n=30)	9	21		42.40±11.26
	Unmarried (n=88)	19	69		41.03±10.74

Clinical characteristics (Table 4) revealed that type of hearing loss had significant association (p<0.001) with severity of loneliness with highest UCLA score for SNHL and lowest for conductive HL. Similarly degree of hearing loss was significantly (p=0.008) associated with severity of loneliness with highest UCLA scores for severe hearing loss and lowest for moderate HL. Hearing aid use was also significantly (P<0.001) associated with severity of loneliness with more cases not using HA suffering loneliness and highest scores for those not using HA. Hours of HA use per day and Days per week were associated (P<0.001) with severity of loneliness with higher scores for those not using HA and those using hearing aids for longer time both in terms of hours and days. History of medical problems and psychological issues and coping strategies use did not reveal significant association with severity of loneliness.

Table 4: Clinical Characteristics * Severity of Loneliness & UCLA Score. Cross Tabulation (n-377)

Clinical Variables		Severity			UCLA Score
Variable	**Group**	**Rarely Lonely (n=156)**	**Being Lonely (n=221)**	**Chi-Square Association (X^2, p-value)**	**Mean ± SD**
Type of Hearing Loss	CHL (n=54)	28	26	22.82 0.000	33.24±0.19
	SNHL (n=219)	51	168		41.07±11.53

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	MHL (n=104)	19	85		39.83±0.11
Degree of Hearing Loss	Moderate (n=96)	32	64	9.752 0.008	36.85±9.99
	Severe (n=223)	45	178		41.44±11.16
	Profound (n=58)	21	37		37.14±10.04
Hearing Aid User	Yes (n=93)	51	42	53.39, 0.000	32.05±9.69
	No (n=284)	47	237		42.08±10.41
Hearing Aid Usage in Hours Per Day	< 8 hours (n=9)	9	0	65.81, 0.000	21.87±0.64
	8-12 hours (n=20)	14	6		29.85±2.72
	> 12 hours (n=64)	28	36		34.41±0.47
	Non user (n=284)	47	237		41.95±10.48
Hearing Aid Usage in Days Per Week	1-2 days (n=13)	2	11	50.36, 0.000	47.00±00
	3-4 days (n=54)	35	19		29.20±5.44
	> 4 days (n=26)	14	12		39.42±12.15
	Non user (n=284)	47	237		41.58±10.47
History of Medical Problems	Isolated Medical Problem (n=117)	35	82	44.31, 0.23	38.38±10.70
	Vision Problem (n=73)	20	53		38.17±10.87
	Multiple Comorbidities (n=81)	14	67		42.23±11.46
	No problem (n=106)	29	77		39.93±10.45
Any Psychological Issue	Yes (n=125)	31	94	0.139 0.803	40.48±10.11
	No (n=252)	67	185		39.17±11.27
Any Coping Strategy	Yes (n=32)	10	22	0.502 0.528	40.69±11.50
	No (n=345)	88	257		39.51±10.96

DISCUSSION

Loneliness has a high prevalence range of 25-29% in adult US population with similar estimates in other countries including Asian states [12]. The current study revealed that majority of adult population with hearing loss (HL) 279 (74%) was severely lonely with mean scores on University of California, Los Angeles (UCLA) Loneliness Scale Version 3 at 44.2 (SD 8.7), while the remaining 98 (26%) felt frequently lonely with mean score of 26.52 (3.15). Similarly, a study by Bott & Saunders clarified that HL was a risk factor associated with both loneliness as well as social isolation and remedial measure to improve hearing might help address these issues [17,18]. Different age groups revealed varying level of association of HL and psychological well-being with loneliness reported to be a problem mainly in age group between 18 to 30 years [19]. Similarly in a study by Sung et al., revealed that younger age was associated with increased loneliness [20]. However, in the current study age revealed significant association (p=0.049) with severity of loneliness with higher scores for age below 36 years and above 50 years. In contrast a study by Mick et al., reported significant association of social isolation in females of 60-69 years of age with no significant association in remaining age and gender groups [21]. In current study gender also revealed significant association (p=0.043) with severity of loneliness with higher USLA score for males. While Shukla et al., in their study reported a stronger association of HL with loneliness in females [18]. Similarly, Ramage-Morin reported higher prevalence of isolation in females (16%) compared to males (12%) [22]. In the present study, socioeconomic status did not reveal any association with loneliness however UCLA score was highest for lower class. Similarly, a study by Nakahori et al., reported no association of socioeconomic status in terms of blue- or white-collar jobs with HL [23]. Literature reveals association of lower level of education with HL in the elderly, while present study shows no association (p=0.106) of educational status with severity of loneliness, however UCLA scores were higher for post graduates. Smoking status also revealed significant association (p=0.049) with severity of loneliness with higher frequency of current smokers affected who also had highest UCLA score indicating loneliness leads to smoking or vice versa. However, partner status did not reveal significant association though literature reveals association of loneliness and social isolation with HL [18]. In present study, the type of hearing loss was significantly (p<0.001) associated with severity of loneliness with highest score for sensory-neural hearing loss (SNHL) and lowest for conductive HL. Similarly, Ramage-Morin reported association of loneliness with moderate degree of SNHL [22]. The degree of HL was significantly (p=0.008) associated with severity of loneliness with highest scores for severe and lowest for moderate HL. The study by Sung et al., posits higher degree of HL associated more loneliness [20]. The chances of acquiring severe to very severe loneliness is significantly augmented by 7% for each decibel of signal to noise ratio drop in hearing [19]. The augmentative assistive devices for auditory support like hearing aids (HA) usage improves the hearing and speech comprehension of the hearing-impaired population therefore its usage decreases loneliness [24]. In compliance to current study, it was found that HA use was also significantly (p<0.001) associated with severity of loneliness with highest scores for those not using HA. The hours of HA use per day and days per week are also associated (p<0.001) with loneliness and higher UCLA scores were noted for those not using HA in terms of hours and days. The duration/ time related dose effect was reported by Weinstein et al., in moderate to severe HL cases using hearing aids [24]. Applebaum et al., also reported that subjective loneliness in adult HI and cochlear implant users was useful in reducing the loneliness level [25]. Dawes et al., also reported that HA use was weakly associated with increased social isolation [26]. The history of medical problems, psychological issues and coping strategies did not reveal significant association with severity of loneliness. In contrast, a study by Warringa et al., revealed that frequency of use of ample coping behaviors including verbal strategies was significantly associated with reduced loneliness [27].

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CONCLUSIONS

It is concluded that hearing loss results in severe and frequent loneliness. Factors including age, gender, smoking, type of hearing loss, degree of hearing loss, hearing aid use, hours and days of hearing aid use are associated with loneliness in adult population of Punjab, Pakistan.

Authors Contribution

Conceptualization: NM
Methodology: AI, GS
Formal analysis: AI, TD
Writing-review and editing: NM, GS, AA
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Comparative Efficacy of Diode Laser System versus Intense Pulse Light (Ipl) In Management of Unwanted Hair

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ABSTRACT

Unwanted hair growth can be caused by several factors, including genetics, systemic illness, and even drug reactions. According to the underlying medical condition, excessive hair growth was labelled as either hirsutism or hypertrichosis. **Objective:** To compare the efficacy of diode laser system versus intense pulse light in the management of unwanted hair among female patients. **Methods:** Patients in this randomized controlled study had hirsutism. Group A received powerful pulse light therapy for three sessions, one month apart, while Group B received diode laser treatment. To determine the effectiveness and side effects in both groups, patients were monitored for four months and subsequently assessed clinically. **Results:** Out of these total 60 patients, intense pulse light system was more efficacious in achieving patient satisfaction (73.3%) at the end of three months as compared to diode laser (26.7%) (p value < 0.001). **Conclusions:** This randomized controlled trial showed that intense pulse light therapy was more efficacious in management of unwanted hair compared to diode laser therapy.

INTRODUCTION

Heredity, systemic disease, and even pharmacological reactions can lead to unwanted hair growth. Excessive hair growth was classified as hypertrichosis or hirsutism based on the underlying medical condition [1]. A study reported that after the third session, 31% of patients chose diode laser and 66.20% preferred IPL [2]. The characteristic of the female disorder hirsutism is an overabundance of terminal hair arranged in a pattern reminiscent of men [3]. The majority of hirsutism instances are reported by women who have preexisting medical conditions. It is possible to lessen facial hair development in people with hirsutism by treating the underlying systemic diseases that cause it [4]. Nevertheless, this medical disease has been treated with a variety of local and systemic approaches [5]. There are a number of medical issues that can manifest as unwanted facial hairs, and numerous topical treatments have been developed and put into therapeutic use to alleviate this problem. Neerja Puri examined the efficacy of laser and intense pulsed light treatments for hirsutism in 2015[6]. Diode laser treatment, she reasoned, could work best on dark-skinned patients. But in 2015, Jo et al., set out to study the function of long-pulsed dye laser (LPDL) for hair

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removal, which addresses the method's insufficient patient application [7]. Research comparing the efficacy and safety of Nd: YAG and IPL in reducing hair among hirsutism patients was carried out by Szima et al. in 2017[8]. According to their results, this therapy method has been successful with few adverse effects. Their main finding was that the two therapies did not differ significantly from one another. There were fewer side effects and more patient satisfaction with IPL treatment. Locals here have a history of being extremely self-conscious about their looks, and they still go to extreme lengths to hide any facial blemishes that require medical attention. Doctors treating skin disorders in Pakistan often refer to international recommendations because there is a paucity of locally collected data. Rizwan et al., investigated the efficacy of medroxyprogesterone acetate (MPA) iontophoresis in treating idiopathic facial hirsutism in a group of patients residing in Islamabad, Pakistan. Iontophoresis with monophenyl amine (MPA) was determined to be a safe, effective, and well-tolerated treatment for idiopathic face hirsutism by the study's authors [9]. The purpose of this study was to compare efficacy of diode laser system versus intense pulse light in the management of unwanted hair among female patients as there has been relatively little research done on IPL and diode laser for hirsutism in our setting, therefore, we conducted this study to determine which method was more effective in getting rid of unwanted facial hair in females.

METHODS

It was a randomized controlled trial (ClinicalTrials.gov having ID: NCT05739799) conducted at the Department of Dermatology, CMH Abbottabad, from May 2022 to Nov 2022. Ethical approval (Ref: CMHAtd-ETH-18-DERM-22) was obtained from the Ethical Committee. Using an 80% power of test and a 5% significance level, the sample size was determined using the WHO Sample Size calculator. The proportion of patients' satisfactory responses for diode laser therapy was 31% [1], whereas the proportion for intense pulse laser therapy was 66.20%. The sample for this study was collected using a nonprobability sequential sampling strategy. The study comprised female patients identified with hirsutism by a consultant dermatologist based on clinical presentation, who were between the ages of 18 and 50 and had no apparent underlying cause. Exclusion criteria included the following: pregnancy or lactation, keloid or hypertrophic scarring propensity, history of treatment for undesirable facial hair within the past two years, hormonal imbalance, and polycystic ovary syndrome. Once all participants had been adequately explained the study, they were asked to sign an informed consent form. A consulting dermatologist made the diagnosis of unwanted facial hair based on the patient's symptoms. In order to guarantee that the patients were randomly assigned to the study groups, the lottery method was employed. Prior to beginning the trial, a series of baseline examinations were performed, including blood tests for hormones including luteinizing hormone (LH) (normal levels 2-15 IU/L) and follicle-stimulating hormone (FSH)(normal levels 1-10 IU/L), as well as ultrasounds of the abdomen and pelvis. Patients in Group B used a diode laser system for treatment, whereas those in Group A used intense pulse light (IPL). While the diode laser used three different wavelengths (1064, 810, and 755 mm), the 690 nm frequency was used for IPL. All told, there were three sessions, with a month separating each. The reduction in hair count on the affected side of the face was evaluated by a consultant dermatologist who measured the thickness of the hair and the number of hair follicles in a 1cm2 area on both sides of the face before the first session and again at the end of therapy in the fourth month. With the patient's permission, we took pictures of them both before and after the research period. There were four levels of hair loss severity: less than 25%, 25%-50%, 50-75%, and >75%. Satisfaction was evaluated using a 0–10 scale for patients adopted by Załęska et al [13]. For the technique, a score greater than 6 was considered enough satisfaction. Efficacy in both groups was ascertained in terms of hair reduction > 75 percent, and patient satisfactory response (>6 on patient satisfaction scale was labeled as sufficient satisfaction) and fewer side effects (transient erythema, photosensitivity, hyperpigmentation, moderate pain, and skin burns) were confirmed on physical examination of the affected area at the end of final session in the 4th month. We used SPSS 23.00, the Statistical Package for the Social Sciences, to do all of our statistical analyses. The demographic and clinical characteristics of the patients in both groups were characterized using descriptive statistics. In order to compare the two sets of data, we utilized the chi-square test for qualitative features and the independent t test for quantitative variables, with p-values < 0.05 serving as the significance criterion.

RESULTS

A total of 60 patients with unwanted facial hair were divided into two groups. 30 patients were managed by intense pulse laser therapy, while 30 patients were managed by diode laser therapy after the randomization. Table 1 shows that in Group A, mean + SD for age was 26.30 + 5.370 years while in Group B, mean + SD for age 32.0 + 7.92 years. (p-value 0.001). In Group A, 23 (76.7%) patients were recorded in < 30 years age group while 07 (23.3%) patients were recorded in > 30 years age group. In Group B (DL), 17(56.7%)

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patients were recorded in < 30 years of age group while 13 (43.3%) patients were recorded in > 30 years age group. (p-value 0.100). In Group A, mean + SD for FSH was 10.16 ± 2.4 mIU/while in Group B, mean + SD for FSH was 13.7 ± 3.01 mIU/mL (p-value: 0.000). In Group A, mean + SD for LH was 9.23 ± 2.8 while in Group B, mean ± SD for LH was 7.77 ± 1.65, p-value: 0.018. (Table 1).

Table 1: Demographic characteristics of patients in both groups (n=60)

Quantitative Variable	Study Groups		p-value
	Group A (n=30)	Group B (n=30)	
Mean + SD			
Age	26.80 + 5.70	32.20 + 7.9	0.001
FSH	10.16+2.4	13.7+3.01	0.000
LH	9.23+2.8	7.77+1.65	0.018
Qualitative Variable	**Group A (n=30)**	**Group B (n=30)**	
Age Groups, n (%)			
< 30 Years	23 (76.7%)	17 (56.7%)	0.100
> 30 Years	07 (23.3%)	13 (43.3%)	

Table 2 shows that as per final clinical evaluation in both groups after three sessions in the 4th month, in Group A (IPL), 04 (13.3%) had <25% of hair reduction, 3 (10.0%) patients had 25-50% of hair reduction, 05(16.7%) patients had 50-75% of hair reduction and 18 (60.0%) patients had >75% percent of hair reduction while in Group B (DL), 08 (26.7%) had <25% of hair reduction, 06 (20.0%) patients had 25-50% of hair reduction, 09 (30.0%) patients had 50-75% of hair reduction and 07 (23.3%) patients had >75% percent of hair reduction. (*p*-value < 0.040). In Group A (IPL), 4 (13.3%) patients had transient erythema, 6 (20.0%) patients had photosensitivity, 8(26.7%) patients had hyper-pigmentation, 6 (20.0%) patients had moderate pain and 6 (20.0%) patients had skin burns while in Group B (DL), 2(6.7%) patients had transient erythema, 4(13.3%) patients had photosensitivity, 11(36.7%) patients had hyper-pigmentation, 08 (26.7%) patients had moderate pain and 5(16.7%) patients had skin burns(p-value 0.751). Finally, as per patients' response, intense pulse light therapy was more efficacious in achieving patients' satisfactory response (73.3%) after three sessions in the 4th month as compared to diode laser (26.7%) (p value < 0.002). It was interesting to note that intense pulse light therapy was effective on thick hair whereas diode laser was effective on thin hair of patients in both groups.

Table 2: Final clinical evaluation of various outcome variables in both groups (n=60)

Outcome Variables	Study Groups		p-value
	Group A (n=30)	Group B (n=30)	
Hair Reduction, n (%)			
< 25 %	4 (13.3%)	08 (26.7%)	0.040
25-50	3 (10.0%)	06 (20.0%)	
51-75%	5 (16.7%)	09 (30%)	
> 75 %	18 (60.0%)	07 (23.3%)	
Side Effects, n (%)			
Transient Erythema	04 (13.3%)	02 (6.7%)	0.751
Photosensitivity	06 (20.0%)	04 (13.3%)	
Hyperpigmentation	08 (26.7%)	11 (36.7%)	
Moderate Pain	06 (20.0%)	08 (26.7%)	
Skin Burns	06 (20.0%)	05 (16.7%)	
Patients Response, n (%)			
Satisfactory	22 (73.3%)	10 (33.3%)	0.002
Unsatisfactory	08 (26.7%)	20 (66.7%)	

Table 3 shows that intense pulse light therapy was superior to diode laser (73.3% vs 26.7%; p value 0.002) in the management of unwanted hair among female patients.

Table 3: Efficacy in both groups (n=60)

Outcome Variables	Study Groups		p-value
	Group A (n=30)	Group B (n=30)	
Efficacy, n (%)			
Hair Reduction > 75% and PSS >6	22 (73.3%)	10 (33.3%)	0.002
Hair Reduction < 75 % and PSS <6	08 (26.7%)	20 (66.7%)	

DISCUSSION

Unwanted hair is a very upsetting problem for women, particularly younger ladies. A number of metabolic or endocrine diseases may cause it, or it may be present independently. Researchers Moghadam, Behboodi Moghadam *et al.*, and others finished a thorough evaluation in 2018 [14]. Regardless of the procedure used to eliminate facial hair, people with an illness that causes it to grow reported a reduction in quality of life, according to an intriguing study by Alizadeh *et al* [15]. Their primary goal in studying the effects of laser treatment for hirsutism was to enhance quality of life rather than reduce hair growth. They concluded that laser therapy improves the quality of life for these women by reducing hirsutism. When it comes to managing female pattern baldness, this is just one of several options. But there is very little data on what might benefit our people. The safety and effectiveness of long-pulsed Nd: YAG Laser (1064 nm) over IPL-755 nm for the treatment of idiopa Shrimal thic facial hirsutism was determined by Shrimal *et al.*, while our study differs from theirs [16]. Nonetheless, we contrasted IPL with a laser treatment. When it came to eliminating unwanted hair in women, we discovered that IPL was both more effective and well-tolerated than Diode Laser. This phenomenon, however, could be better understood with additional studies using bigger samples. The incidence of treatment-related side effects, such as transient erythema and pain, were comparable in both groups, which is noteworthy given that there were no statistically significant differences between the groups. Thaysen-Petersen *et al.*, and Załęska *et al.*, both reported that laser and IPL treatments can cause transitory redness of the skin, mild to severe local pain, hyperpigmentation, skin irritation, burns, and hypersensitivity as side effects [12, 13]. Previous research by Goh *et al.*, examined the efficacy and safety of two hair removal systems, one using a short-wavelength strong pulse light system and the other using a

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long-pulsed Nd: YAG (1064nm) laser, on a variety of skin types in 2003 [17]. We were able to conduct IPL using a 690 nm frequency and a diode laser with triple wavelengths (1064, 810, and 755 mm) thanks to the equipment mentioned earlier. However, he found that patients with darker skin types had better results when using the 1064 nm Nd: YAG laser, which has a long pulse width and can reach the entire length of the hair follicle by penetrating five to seven millimeters into the dermis. Another study found that because IPL improved patient happiness, increased primary results, and decreased side effects, 42.4% of patients were very delighted with it. However, powerful pulse light therapy did achieve statistically significant efficacy in terms of superior patient satisfaction response (p-value 0.002), which contradicts the current study's findings. However, there was no statistically significant difference (p=0.3) in the amount of patient satisfaction created by the two methods. Large multicentered randomized control trials should be conducted to obtain strong results and generalize them to the total population of this province, as this study is primarily limited by its small sample size and single center design [19, 20].

CONCLUSIONS

This comparative study demonstrated that intense pulse light therapy was more efficacious in terms of hair reduction and patients' satisfactory response in the management of unwanted facial hair.

Authors Contribution

Conceptualization: SI
Methodology: BM, MAS, SI
Formal analysis: MAS, KG
Writing-review and editing: MH, SI, DS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Risk of Injury Based on Fundamental Movement Pattern among Non-Professional Adolescent Soccer Players

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ABSTRACT

Soccer is a competitive sport and necessitates the adept performance of fundamental movement patterns to prevent injuries during game. Increasing trends of soccer in Pakistan makes the players most prone to risk of injury which is why the fall risks should be explored and awareness about each should be raised. **Objective:** To assess the risk of injury based on fundamental movement patterns among non-professional adolescent soccer players. **Methods:** A descriptive cross-sectional study was conducted on 50 non-professional adolescent Soccer players aged between 10 to 19 years. Players were selected using non-probability convenient sampling from two different clubs. Risk of injury was assessed by using Functional Movement Screen (FMS). Data were analyzed by using Statistical Package for the Social Sciences (SPSS) version 21.0. Variables were correlated by using Pearson Correlation. **Results:** Among the participants, 7 out of 24 (29.2%) athletes had the greater risk of injury in while 17 out of 24 (70.8%) athletes had less risk of injury in one club. Among the participants, 14 out of 26 (53.8%) athletes showed the greater risk of injury while 12 out of 26 (46.2%.) athletes had less risk of injury. **Conclusions:** The study concluded that non-professional Soccer players had greater risk of injury due to flawed Fundamental Movement Pattern (FMP).

INTRODUCTION

Soccer is considered as a high intensity and intermittent activity [1-3]. There are two sessions each of forty-five minutes with 15 minutes interval at half time in this sport game. This holds the repute of being the most popular and most played sports and is approximately being played in 211 countries. Fundamental movement patterns are series of consecutive, interconnected movements of particular body parts in space [4, 5]. Fundamental movement pattern includes Deep Squats, Hurdle Steps, In-line Lunge, Shoulder Mobility, Active straight leg raises, Trunk Stability Push-up and Rotary Stability [6, 7]. The transfer of energy and connection of movement between upper and lower extremities have important impact during trunk movement [8, 9]. It is believed that trunk function is a predictor of athletic performance. Some researches demonstrate an important relationship of trunk function with athletic performance i.e., soccer players [10]. From the available literature, we have come to learn that there are multiple factors which affecting basic motor skills in soccer athletes [11]. These include age and relevant experiences. Amongst known risk factors for any sports injury, literature lists a difference in nervous system structure,

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musculoskeletal systems i.e. high porous bones and plasticity, laxity of ligaments, inadequate bone growth, hormonal differences etc [12, 13]. Mental features i.e., low attention span, inappropriate coordination of hand and eye, low awareness and motivation for sports related training are also considered as few of the major risk factors [14, 15].

The current study assessed the functional outcomes of male soccer athletes who have attained various skill levels in reference to analyzing their potential risk of injury to the motor system. The aim of the current study was to determine the differences in the status and risk of injury among soccer player and indicate any deficits among them if any. This would help us provide deeper insight to the severity of training the soccer players need. Through this study a prediction of chances of injury in soccer players can also be made.

METHODS

This study was a cross-sectional descriptive study and was conducted at Model Town Soccer Club (MTFC) and Fame Soccer Club (FFC) in a duration of about six months i.e., from May 2019 to November 2019. Sample size (n=45) was calculated through WHO Sample size Calculator using values from a previously published research paper because no known population of soccer players in Pakistan was reported till date. The values were as follows: Confidence Level – 95%, Margin of error: 5% and Population proportion: 50%. 50 non-professional soccer players were enrolled in the study from MTFC and FFC was included. Non probability convenient sampling was used as sampling technique. Athletes with any other medical disease which affected the athlete's performance and the FMS movements: Autoimmune Disease, Asthma and Anxiety etc. were excluded. The study was approved by LCPT Ethical Review Committee under the reference Number - LCPT/DPT/1245 on 22-05-2019. Each research participant was interviewed before assessment for inclusion and exclusion criteria. Assessment of the fundamental movement pattern was done utilizing Functional Movement Screen (FMS). Functional Movement Screen (FMS) measures the risk of injury by performing the 7 fundamental movement patterns by athletes including Deep Squat, Hurdle Step, Inline Lunge, Shoulder Mobility, Active Straight Leg Raise, Trunk Stability, Pushup and Rotary Stability. Reliability of FMS is 0.81. Analyses was done using software SPSS version 21.0. Data were presented in the form of frequency and percentages.

RESULTS

Participants of the current study had mean age of 21.56 ± 1.41 years, height; 168.09 ± 5.64 cm and weight; 53.86 ± 9.76 kg. Among non-professional soccer players, players with dominance of right were reported to be n= 45 (90%) and left were n=5 (10%) as shown in table 1.

Table 1: Demographical characteristics of respondents

Variables	Characteristics
Age	21.56 ± 1.41 years
Height	168.09 ± 5.64 cm
Weight	53.86 ± 9.76 kg
Right side Dominance	45 (90.00%)
Left side Dominance	5 (10.00%)

As shown in table 2, on assessment of Deep squats, n=5 were unable to complete movement, n=20 were able to complete their movement but with compensation and n=25 performed movement perfectly without any compensation. Amongst all respondents, n=2 were unable to complete and perform right hurdle steps, n=28 were found to be able to complete movement but compensated in some way, whereas n=20 reported that they performed their movement without any compensation. N=33 were found to be able to complete movement in left side hurdle steps but compensated in some way, n=1 were found to be unable to complete movement pattern and n=16 performed movement perfectly. N=24 were found to be able to complete their right side in line lunge with any compensation, n=20 performed their movement perfectly without any compensation and n=6 were unable to complete their movement. N=30 were found to be able to complete their left side in line lunge with any compensation, n=25 performed their movement perfectly without any compensation and n=5 were unable to complete their movement. N=35 were found to be able to complete their right shoulder mobility perfectly and n=4 completed their movements but compensated. N=37 were found to be able to complete movement in left shoulder mobility but compensated in some way, n=3 were found to be unable to complete movement pattern and n=10 performed movement perfectly. N=48 were found to be able to complete movement in right side active straight leg raise but compensated in some way. N=5 respondents were found to be able to complete movement. N=45 respondents performed left side active straight leg raise accurately.

Table 2: Movement patterns screening of soccer players

Movement patterns	Frequency (%)
Deep squats	
Unable to complete movement	5 (10.00%)
Able to complete movement with compensation	20 (40.00%)
Able to perform movement without compensation	25 (50.00%)
Hurdle steps	
Right hurdle steps	
Unable to complete movement	2 (4.00%)
Able to complete movement with compensation	28 (56.00%)
Able to perform movement without compensation	20 (40.00%)

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Movement patterns	Frequency (%)
Left hurdle steps	
Unable to complete movement	1 (2.00%)
Able to complete movement with compensation	33 (66.00%)
Able to perform movement without compensation	16 (32.00%)
In Line Lunge	
Right side In Line Lunge	
Unable to complete movement	6 (12.00%)
Able to complete movement with compensation	24 (48.00%)
Able to perform movement without compensation	20 (40.00%)
Left hurdle steps	
Unable to complete movement	5 (10.00%)
Able to complete movement with compensation	30 (60.00%)
Able to perform movement without compensation	15 (30.00%)
Shoulder Mobility	
Right Shoulder Mobility	
Unable to complete movement	4 (8.00%)
Able to complete movement with compensation	35 (70.00%)
Able to perform movement without compensation	11 (22.00%)
Left Shoulder Mobility	
Unable to complete movement	3 (6.00%)
Able to complete movement with compensation	37 (74.00%)
Able to perform movement without compensation	10 (20.00%)
Active Straight Leg Raise	
Right Active straight Leg Raise	
Unable to complete movement	1 (2.00%)
Able to complete movement with compensation	41 (82.00%)
Able to perform movement without compensation	8 (16.00%)
Left Active Straight Leg Raise	
Unable to complete movement	0 (0.00%)
Able to complete movement with compensation	5 (10.00%)
Able to perform movement without compensation	45 (90.00%)
Rotary Stability Test	
Right Rotary Stability	
Unable to complete movement	0 (0.00%)
Able to complete movement with compensation	3 (6.00%)
Able to perform movement without compensation	47 (94.00%)
Left Rotary Stability	
Unable to complete movement	2 (4.00%)
Able to complete movement with compensation	38 (76.00%)
Able to perform movement without compensation	10 (20.00%)

Amongst all the 50 soccer players, 17 (34.00%) were found out to be on a greater risk of injury whereas 23 (46.00%) were found to have a lesser risk of injury as shown in figure 1.

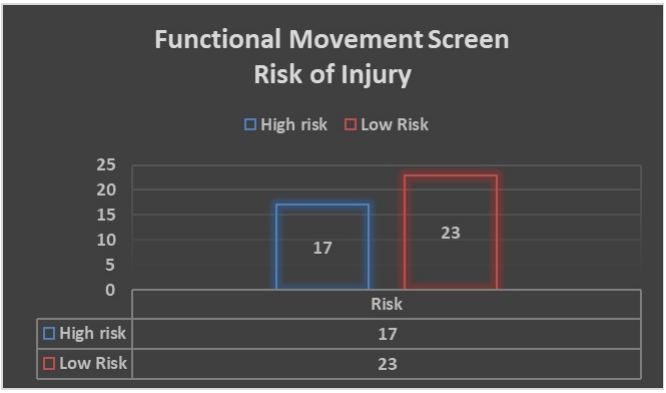

Figure 1: Functional Movement Screen Test

DISCUSSION

The aim of the study was to assess the risk of injury based on fundamental movement pattern among non-professional adolescent soccer athletes. Those athletes who have score of FMS <14, are at high risk of injuries in future. Recent studies have shown the risk of future injuries with low FMS scores as prediction [16-18]. During the current course of study, risk of injury among adolescent non-professional soccer players was done by the Functional Movement Screen (FMS) scores [13]. Athletes have high risk of injuries in future who have the scores <14 after assessment. Current study demonstrated that the FMS is used to predict the risk of injuries among non-professional adolescent soccer athletes. Results of the present study are consistent with the previous study that the athletes who have scores <14 have greater risk of injuries in future [7]. A previous study concluded that, among the high school athletes, FMS scores were the poor predictor of risk of injuries in future as they showed varying levels of motor control, motor development and maturity regarding their age and FMS is not appropriate test tool to predict the risk of injuries among this population. Results of the present study were in accordance to those conducted by Portas which concluded that maturity has substantial effects on FMS performance [14]. The functional Movement Screen test assesses the risk of injury as evident and as per the previous research, evidences say that a score of 14 or less increases the risk of injury in the near future considerably which even can be 50% (15, 16, 19, 20). The results of this study also indicate that a detailed analysis of all trials should be conducted and the players should participate in specialized functional training with an aim to reduce risk of injury by enhancing players mobility, stability, control and by adapting correct fundamental pattern of movements. Numerous extrinsic factors have also reported to be a cause of injury or are somewhere related to the injury. Inadequate workload distribution, improper warm up and a reduced muscle regeneration are few of the very commonly cited extrinsic

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risk factors for injury (12, 14, 17). The results of this study were found to be consistent with those of this study.

CONCLUSIONS

Soccer players are at a greater risk of injury according to the results of Functional Movement Screen test and should adopt accurate positioning and movement patterns in order to avoid injury.

Authors Contribution

Conceptualization: FH
Methodology: SA2
Formal analysis: SA1
Writing-review and editing: FH, SA1, SA2, HMA, SW

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Role of Teachers' Engagement in Student's satisfaction with Medical College: A Comparison of Private and Public Sector Colleges

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ABSTRACT

Student satisfaction is a complex result influenced by the standard of instruction, available resources, the campus community, support services, and the overall atmosphere of the institution. Since teacher engagement has a significant impact on students' learning experiences, educational institutions should give priority to strategies that increase teacher engagement. **Objective:** This study investigates the ever-changing elements that impact student satisfaction at our higher education institution by conducting in-depth interviews with a varied range of students. **Methods:** The sample size kept in the study was 30 (15 from public and 15 from private sector). The researchers utilised thematic analysis to extract significant findings from the participants' replies to inquiries regarding teaching excellence, available resources, community involvement, support services, and institutional regulations. **Results:** The results involve the presence of a robust sense of belonging and comprehensive support services, coupled with the various problems encountered by students, offered multifaceted insights into the whole educational journey. It has been examined that teachers have an important and major role in satisfaction of students in both private and public sector. The findings provide useful insights for institutional decision-makers seeking to improve student satisfaction and the overall learning environment. **Conclusions:** Students' satisfaction was affected by many complex factors. Customized feedback, a variety of teaching styles, and easier access to specialized resources were suggested, but engaging teaching methods, helpful faculty, and well-equipped resources were praised.

INTRODUCTION

Understanding the elements that affect student satisfaction is crucial for schools dedicated to offering a comprehensive and rewarding educational experience in the always-changing field of higher education [1]. In light of the ongoing movement in the educational paradigm towards student-centred approaches, there is a growing significance placed on the creation of settings that support academic achievement, well-being, and engagement. In the context of higher education, this study aims to investigate and evaluate the various factors that influence student satisfaction. A wide range of characteristics, including the calibre of the institution's support services and teaching and learning materials, as well as the feeling of community it fosters, have an impact on the complicated phenomena of student satisfaction [2,3]. Understanding how these elements interact is crucial for educational institutions hoping to draw in and keep students while promoting their academic achievement. To satisfy the

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changing demands of their student body, schools must adjust their approach as the educational landscape continues to diversify and as expectations from students change [2]. The aim of this research is to examine the role of teacher's engagement in the satisfaction of students with medical college by comparing private and public sector colleges. This study attempts to explore the subtle elements that affect students' satisfaction by incorporating knowledge from previous research, empirical investigations, and student experiences. By illuminating these variables, this research aims to provide educators, policymakers, and educational institutions with important information that will enable them to make well-informed decisions that will improve the general calibre of the college experience for all students. The success and ongoing development of higher education institutions are significantly impacted by our understanding of the elements that affect student satisfaction [4]. This study is important for a number of reasons. As the field of higher education gets more competitive, universities that put a high priority on improving student satisfaction will be in a better position to draw in and keep students. Students who are happy with their education are more likely to stick with it, which boosts institutional retention rates and fosters a sense of loyalty within the student population [5].

The research's conclusions can influence institutional behaviours and policies. Institutions can better meet the needs and expectations of their various student populations by customising their approaches to teaching, resources, and support services by understanding the individual aspects that lead to student satisfaction.

METHODS

There are different research designs employed in research, including quantitative and qualitative design, depending upon the nature of the research. The research design followed in this research is qualitative. While quantitative research gathers numerical data and may involve intervention or the introduction of therapies, qualitative research fosters idea generation, exploration, and understanding of quantitative data [6]. In this study, a qualitative research design is employed. Qualitative data on the role of teacher engagement and student satisfaction is collected. The ability of qualitative research to shed light on elusive human behaviour patterns and processes is one of its strongest points. In the context of research, data collection is the process of gathering information for analysis and interpretation. The validity of the results and the capacity to draw relevant conclusions are directly impacted by the correctness and dependability of the data utilised in a study [7]. The data collection in this research is primary collection through interviews. Qualitative research methods, such as data collecting through interviews, permit in-depth investigation and comprehension of people's experiences, viewpoints, and ideas. When researching what influences students' levels of satisfaction, interviews are a great way to get detailed information straight from the people who know best: the students. A sense of community, resource availability, instructional quality, and satisfaction with support services are among the many topics covered by the questions. The interview included 10 questions. They were conducted within 2 days on 15th and 16th December 2023. The interviews were conducted with students, and the sample size of this study was 30. As the research focused on private and public sector medical colleges, hence the sample of students were taken from both of the institutes. 15 students were selected from public, and 15 from private medical colleges. Random sampling was done in the colleges. No specific students or groups were selected. The students were selected at random and then interviewed. In academic research, data analysis is often used to define the process of carefully looking at data and making sense of it to find patterns, insights, and conclusions that are relevant to the study's goals [8]. The data analysis method utilised is thematic analysis. The themes were evaluated based on the responses of participants regarding the student satisfaction and teacher engagement. One way to look at data is with thematic analysis, which includes finding recurring patterns (themes) and then describing those patterns. Finding important themes and patterns in interview-based qualitative data is a breeze with this methodical and adaptable technique [9]. Important and relevant study themes were evaluated from the responses and findings presented.

RESULTS

After the collection of responses from the participants, the results were interpreted. Different viewpoints on the elements impacting students' satisfaction with the university were obtained from the student interviews. Positive parts of their overall experience were emphasised by many participants, who cited supportive professors and engaging classes as major factors in their satisfaction. Regarding the experience and satisfaction, a respondent replied: *"There have been issues with communication and administrative procedures, even though I have valued the variety of course options and extracurricular activities. Enhancing openness and streamlining processes make the experience for students more seamless".*

Another participant said: *"Sadly, uneven instruction and scant resources have characterised my tenure at this university. My overall satisfaction has been hampered by*

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some faculty members' lack of engagement and antiquated facilities. Resolving these concerns could greatly improve students' educational experiences".

Regarding the quality of teaching and the effect of resources on student satisfaction, a respondent said: *"Different teachers have different styles of instruction; some show a strong dedication to their students' achievement by providing interesting lectures and one-on-one counselling. On the other hand, there are times when assignment objectives could be clearer, and grading procedures could be more balanced. Standardised evaluation standards could improve transparency and fairness".*

The responses evaluated were positive and negative, too. A respondent said: *"I am quite happy with the resources that the organisation has made available. The state-of-the-art laboratories, well-stocked libraries, and cutting-edge technology all greatly enhance my educational experience. Having access to internet information and collaborative areas has proven especially advantageous. Nonetheless, more readily available specialist software would help students in particular fields much more".*

Another respondent said: *"The resources of the institution are insufficient for the wide range of needs that students have. The entire learning experience is hampered by some laboratories' antiquated technology and the library's restricted access to pertinent information. Enhancing the collection and adding new materials would make a big difference in the learning environment".*

Regarding the challenges faced by students at the institute and the institute's response to them, a respondent said: *"Throughout my voyage, I encountered academic difficulties, but the institution's response was excellent. I was able to overcome obstacles with the help of academic counselling and tutoring services. My satisfaction in overcoming these obstacles was greatly influenced by the institution's proactive efforts and the faculty's prompt communication".*

Another participant said: *"Although I faced difficulties in my studies, the school's response was sometimes different. Although there were support programs available, their efficacy varied. For students who are having academic difficulties, better communication and a more proactive approach to recognising and resolving common issues will improve their overall satisfaction".*

Hence, several difficulties were evaluated from the transcription of responses, such as heavy workload and getting used to new learning settings. The degree of satisfaction with institutional support was also variable. Positive comments on the institution's diversity and inclusivity were given, along with suggestions for more overt diversity programs.

A participant said: *"The organisation recognises the value of diversity and inclusivity, but there is still an opportunity for development. Although certain steps are in place, the institution's commitment to fostering an inclusive atmosphere might be strengthened by a more all-encompassing strategy, such as focused recruitment efforts and greater representation in senior positions".*

DISCUSSION

It has been evaluated that one important element that surfaced was the calibre of instruction, with praise going to dynamic and passionate teachers. There were, however, some recommendations for enhancements, such as the need for more customised feedback and a range of instructional approaches. While some students demanded greater access to specialised resources, most students expressed satisfaction with the learning materials offered, complimenting well-stocked libraries and cutting-edge technology [10]. Studies repeatedly indicate that greater levels of student happiness and academic achievement are substantially correlated with teachers who are involved in their work [11,12]. Students are more likely to be interested, motivated, and satisfied with their learning experiences when teachers actively participate in the educational process, exhibit enthusiasm for their subject matter, and use interactive and student-centred teaching approaches. Active educators foster an environment that goes beyond the simple dissemination of knowledge; they arouse students' curiosity and enthusiasm for learning. Research has indicated a strong correlation between student satisfaction and the teacher's perceived quality of instruction, as well as their capacity to foster an inclusive and supportive learning environment [13]. Emotionally committed educators do more than impart knowledge; they function as mentors, offering students direction and support, which eventually raises student satisfaction and academic success. Furthermore, teacher engagement influences students' pleasure outside of the classroom. Positive institutional cultures are frequently influenced by engaged professors, and this can have an impact on things like student retention and general campus morale [14]. A sense of community and dedication to academic goals are established when students see their teachers as personable, committed, and truly interested in their success. Setting aside time for faculty members' ongoing professional development is a sensible way to promote teacher involvement in medical colleges. Teachers must keep up with the most recent developments in medical research, technology, and pedagogy because the medical industry is always evolving [15]. Medical colleges can enable their instructors to continuously improve their abilities and expertise by providing opportunities for workshops, conferences, and ongoing training. This helps the teachers as well as improving the standard of medical

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education that students receive in general. Encouraging and praising educators' work is essential to maintaining high engagement levels [16]. It is recommended that medical colleges implement a comprehensive recognition program that encompasses prizes and public recognition for exceptional pedagogical achievement and institutional accomplishments. This fosters a culture of gratitude among academic community members as well as providing positive reinforcement for individual teachers. Bringing attention to the significance of excellent teaching in medical education will help to increase teacher involvement even further [17]. To encourage educators to invest in their teaching positions, it is important to set clear objectives for effective teaching, provide resources for pedagogical training, and cultivate a culture that supports creative and student-centred approaches to learning. Acknowledging and presenting the best methods of education within the organisation can encourage others, resulting in a positive feedback loop that highlights the importance of education in medical colleges. The complicated terrain of student happiness in higher education is influenced by a number of factors. A crucial component is the calibre of instruction and the total educational process. Student happiness is greatly influenced by a curriculum that is in line with their interests and career aspirations, approachable teachers, and effective and engaging teaching techniques [18]. The accessibility of resources, both extracurricular and academic, is also quite important. Modern technology, state-of-the-art labs, and ample libraries all support a productive learning environment. Higher levels of satisfaction are typically reported by students who have a sense of belonging to their peers, teachers, and the campus community [19]. Student happiness is influenced by administrative response and efficiency as well. Good administrative management, prompt communication, and clear policies all help to create a favourable impression of the organisation [20]. Students' general satisfaction is also influenced by elements like campus safety, hygiene, and the availability of welcoming and conducive learning environments. Positive participant experiences that emphasised inclusive campus events and encouraged peer interactions demonstrated a strong sense of belonging. However, recommendations for better-organised community-building programs were made. Positive comments were made about the support services, especially about accessible counselling and efficient academic advice. On the other hand, requests were made for more resources related to career counselling. The participants expressed gratitude for the institution's ability to match their goals with opportunities, but they suggested more specialised programs for more specific aims. Many participants had positive opinions about administrative procedures; however, some recommended simplification for increased effectiveness. Students made improvement suggestions that included more extracurricular activities, more information about institutional changes, and a call for greater group decision-making. These many viewpoints offer insightful information that the institution can consider as it works to improve the general learning environment and student satisfaction.

CONCLUSIONS

The study has examined the complex variables affecting students' satisfaction. The participants' varied points of view illuminated features that are both positive and contribute to satisfaction, as well as areas that need attention and improvement. While suggestions for improving customised feedback, a diversity of teaching styles, and easier access to specialised resources were made, engaging teaching techniques, helpful faculty, and well-equipped resources were emphasised as strengths. Student satisfaction was found to be significantly influenced by the importance of community-building initiatives, inclusive support services, and matching individual aspirations with institutional opportunities. Problems in juggling a heavy workload and acclimating to unfamiliar learning contexts were noted, highlighting the significance of specialised institutional support.

Authors Contribution

Conceptualization: SH
Methodology: SH, BH, FMK, MJK
Formal analysis: BS, FD
Writing-review and editing: BS, MH

All authors have read and agreed to the published version of the manuscript.

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Original Article

Ischemic Stroke and its Correlation with Low Blood Cholesterol Levels

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ABSTRACT

Ischemic stroke occurs as a result of blockage of blood supply to the brain. It causes damage of brain tissue due to less availability of oxygen and nutrients. HDL-C is a significant risk factor for ischemic stroke. **Objective:** To evaluate the low HDL-C levels in ischemic stroke hospitalized patients. **Methods:** It is a descriptive cross sectional retrospective study conducted at Liaquat University Hospital, Hyderabad, Pakistan. The anticipated association of abnormal HDL-C levels in ischemic stroke was assessed in 200 cases. The data were collected from hospital records, patients were confirmed for stroke on the basis of CT scan. This descriptive analysis was performed based on the lab findings of patients from hospital records. Medical history, CT scans and demographic information of patients was obtained from hospital records after taking data collection permission from hospital. **Results:** A low level of HDL-C was identified in 126 patients (64%) according to the study's results. When the HDL-C values of ischemic stroke patients were compared using the Chi-Square Test, the p value obtained was 0.0001. **Conclusions:** The majority of ischemic stroke patients had low serum HDL-C levels. This study suggests an association of low serum HDL-C levels with susceptibility or risk for ischemic stroke.

INTRODUCTION

Eighty-seven per cent of all stroke deaths are from "ischemic stroke," making stroke the second most common cause of death worldwide. An ischemic stroke occurs when a blood clot blocks any blood vessel that supplies blood to the brain, disrupting blood flow and causing a sudden loss of brain function [1]. HDL-Cholesterol (HDL-C) is a significant risk factor for ischemic stroke and is highly modifiable in connection to atherosclerosis among the various pathological processes that cause ischemic stroke [2]. The term "high-density lipoprotein" is HDL. It's a kind of lipoprotein that travels through your bloodstream. Lipids, fats, and proteins combine to form lipoproteins. Their primary function is to move lipids, such as cholesterol, to the body's cells where they are needed. Because of their chemical makeup, fats cannot flow through your blood on their own; they require a ride. To reach where they need to go, lipoproteins must assist them [3]. There is only one HDL and that is HDL-C. When discussing these particles and their impact on cardiac health, most of the people use both terms. Even while HDL particles include proteins and fats, people are more familiar with them because of the type of fat they carry i.e., cholesterol [4]. We do know that HDL particles can return extra cholesterol from the bloodstream to the liver. After that, the liver breaks down this cholesterol, which is then eliminated from body through faeces [5, 6]. HDL is a beneficial cholesterol because it helps eliminate excess cholesterol. But it accomplishes more than just that. To keep your cells healthy, HDL cholesterol also combats oxidants and inflammation. Additionally, it helps avoid blood clots, which

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in turn prevents stroke. Professional guidelines have advised the use of several systems and scales for the FAST6 (Face, Arms, Speech, Time) detection of stroke. These include the American Stroke Association, the National Stroke Association (US), the Department of Health (United Kingdom), Los Angeles pre-hospital stroke screen (LAPSS7), and the Cincinnati Pre-hospital Stroke Scale (CPSS8) [7]. The HDL-C Atherosclerosis Treatment Study (HATS) states that niacin is the medicine of choice for increasing serum HDL levels. In the US, stroke causes 134,000 fatalities and 795,000 cases of incidence each year. It is the leading cause of death in Brazil, and it has the highest mortality rates among Americans [8]. Khan et al. reported 43.2% of the ischemic stroke patients suffered low HDL-C levels in Pakistan [9]. Low HDL-C levels are a significant and highly changeable risk factor for ischemic stroke, which is caused by a variety of pathogenic processes. Currently, the most effective way to raise serum HDL-C levels is to combine statins with long-acting niacin.

The purpose of this study was to evaluate low HDL-C levels in ischemic stroke patients hospitalized in medical wards of Liaquat University Hospital in Hyderabad.

METHODS

This Descriptive Cross-sectional, retrospective study was carried out in Medical Wards of Liaquat University Hospital (LUH) Hyderabad. The anticipated frequency of HDL-Cholesterol (HDL-C) levels in ischemic stroke was assessed in 200 cases. The normal range of HDL-C is 35-65mg/dL for men and 35-80mg/dL for women for adults having age 20 years or above [10]. Convenient sampling technique was used to collect the samples. Patients older than 12 years of age and either sex with ischemic stroke were included in the study while the patients with hemorrhagic stroke and psychiatric disease were excluded from the study. The data were collected from hospital records. Patients were confirmed for stroke on the basis of CT scan after getting permission from Hospital. Reports of CT scans were also taken from the hospital records. The medical information regarding the patient's conventional risk factors, prescription use, and medical history was obtained. This study was conducted based on the lab findings. The data were analyzed using SPSS version-21.

RESULTS

Based on the age group stratification, it can be observed that 7 (3.5%) of the patients were under 35 years old, 26 (13%) were between the ages of 36 to 50, 78 (39%) were between the ages of 51 to 65, 77 (38.5%) were between the ages of 66 to 80, and 12 (6%) were older than 80 years. (Table 1).

Table 1: Age Distribution of the Patients

Age (years)	Frequency (%)
< 35	7 (3.5)
36-50	26 (13)
51-65	78 (39)
66-80	77 (38.5)
> 80	12 (6)

The gender distribution of the patients in our study reveals that 61% of the patients were males and 39% were females (Table 2).

Table 2: Gender Distribution of the Patients

Gender	Frequency (%)
Male	122 (61.0)
Female	78 (39.0)

In terms of clinical representation, 28% of patients had left-sided hemiplegia (paralysis of limbs on the left side of the body), 46% right-sided hemiplegia (paralysis of limbs on the right side of the body) and 52% aphasia (a language disorder)(Figure 1).

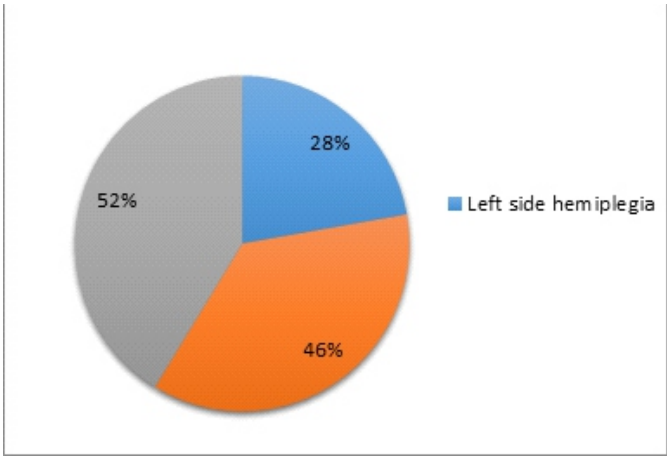

Figure 1: Clinical Representation of the Patients

A low level of HDL-C was identified in 126 patients (64%) according to the study results. When the HDL-C values of ischemic stroke patients were compared using the chi-square test, the p-value was found to be 0.0001 (Table 3).

Table 3: Ischemic Stroke and Patients with Low HDL-C Levels

Ischemic stroke	Patients with low HDL-C	p-value
200	126	0.0001

DISCUSSION

A prevalent condition with a high death rate in the general population is ischemic stroke. It is a global epidemic that poses a serious threat to public health in many nations. The most frequent kind of stroke is acute ischemic stroke, which accounts for 87% of all strokes. In Brazil, cerebrovascular illness is the leading cause of death and the United States has the greatest mortality rates,

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particularly among the black population and in the most impoverished areas [11-14]. Our goal was to determine whether dyslipidemia—specifically, low HDL-C levels—and ischemic stroke were related. Our study included two hundred individuals to determine the values of HDL-C in ischemic stroke. In our study, every patient was a young adult, older than 12 years, of either sex and never had an ischemic stroke before. Men are more likely than women to have a stroke, but women die from strokes more frequently than men do because women typically have strokes later in life. Gender, age, and heredity can all raise a person's risk of having a stroke [15]. Men are 25% more likely than women to have a stroke. However, women account for 60% of stroke-related deaths. Women tend to live longer than males, therefore when they suffer a stroke, they are often older and die from them more frequently [16]. Men made up 61% of the ischemic stroke cases in our study. The chance of getting a stroke rises dramatically with age. One of the most well-established risk factors for stroke is advanced age, and as the global population ages, there may be an increasing number of people at risk. According to WHO, population trends alone will likely lead to the annual cost of stroke events in EU nations [17]. Odds ratios were found to be significantly different in those with low HDL levels, indicating multivariate substantial variations in stroke risk. The study's findings revealed that 64% of the patients had low HDL-C levels [18]. Since ischemic stroke is a heterogeneous pathogenic entity with widely disparate routes, its clinical appearances might be difficult to differentiate. Strict management of modifiable risk factors such as high blood pressure, poor HDL-C, atrial fibrillation, LVH, diabetes mellitus, heavy smoking, the presence of a carotid bruit, alcohol misuse, and physical inactivity can result in a 99% reduction in stroke incidents [19]. The lipid profile plays a critical role in the effects of major artery atherosclerosis. In our study, reduced levels of HDL-C alone are noted as a critical single risk factor for ischemic stroke, which is corroborated by other studies [20]. Currently, the most effective medications are statins and long-acting niacin, especially when used together, which can increase HDL-C levels by up to 50% [21, 22]. It is important to note the study's shortcomings. The cases in our descriptive case series analysis were taken from medical wards where the patients were suffering from ischemic stroke; the involvement of HDL-C in the development of ischemic stroke is real but underappreciated [23]. High levels of HDL (over 60 mg/dL) have been linked to a lower risk of cardiovascular illnesses such as myocardial infarction and ischemic stroke, according to epidemiological research. Low levels of HDL—less than 40 mg/dL in men and less than 50 mg/dL in women—raise the risk of atherosclerotic illnesses [24]. According to our research, a significant risk factor for ischemic stroke is a low blood HDL-C level. Since none of the patients in our study had ever experienced a previous stroke or coronary artery disease, selection bias—which takes into account patients with severe illness—did not appear to be a contributing factor in our findings. Instead, all of the patients in our study had experienced an ischemic stroke for the first time [25]. Based on the data currently available, individuals diagnosed with atherosclerotic stroke and with HDL-C levels less than or equal to 35 mg/dl are recommended to get combined statin and long-acting niacin therapy to raise their HDL-C levels by 20%. Future research indicates that more advanced HDL-C-directed treatments may be able to raise serum HDL-C levels and enhance HDL-C activity [26].

CONCLUSIONS

According to the study's findings, the majority of ischemic stroke patients had low serum HDL-C levels. Therefore, we suggest a possible association of low HDL-C levels as a risk factor for ischemic stroke. Male gender is also a risk factor in current study.

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Authors Contribution

Conceptualization: MARB
Methodology:MARB
Formal analysis: SR, MARB, MN, MS
Writing-review and editing: SR, MARB, MS

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Conflicts of Interest

The authors declare no conflict of interest.

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Original Article

Sonographic Findings in Children Presenting with Acute Abdominal Pain at Meer Children and Family Clinic, Lahore

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ABSTRACT

Acute abdominal pain is a frequent complaint in children. Acute abdominal pain is severe, sudden, and persistent pain requiring immediate medical attention. Acute abdominal pain can arise in any of the four quadrants of the abdomen. **Objective:** To evaluate sonographic findings in children presenting with acute abdominal pain. **Methods:** Descriptive study was conducted at the Department of Radiology, Meer Children and Family Clinic. Data from 255 participants were designated as done suitable sample method. Data were analyzed by SSPS version-26.0. **Results:** Out of a total number of 255 patients, which presented with acute abdominal pain 56 (41.5%) males and 47 (39.2%) females had a normal scan. The most prevalent disease was splenomegaly which was observed in 10 (3.9%) patients. 8 (3.1%) patients had an inguinal hernia, 8 (3.1%) had lymphadenopathy, 9 (3.5%) had excessive bowel gas, 20 (7.8%) had mesenteric lymphadenopathy, 17 (6.7%) had acute appendicitis and 17 (6.7%) had ascites. **Conclusions:** Our study concluded that most of the children coming for an abdominal ultrasound with acute abdominal pain had a normal scan. The most common sonographic findings were mesenteric lymphadenitis, splenomegaly, and ascites.

INTRODUCTION

Acute abdominal pain is a frequent complaint in children [1]. Acute abdominal pain is severe, sudden, and persistent pain requiring immediate medical attention [2]. Numerous disorders can cause abdominal pain [3]. It is usually a self-limiting, benign condition, such as in gastroenteritis, constipation, or viral illness [4]. The challenge for the physician is to identify children who have uncommon and potentially life-threatening conditions that require urgent evaluation and treatment, such as appendicitis, intussusception, volvulus, or adhesion [5]. However, the most common non-surgical condition for acute abdominal pain in children is gastroenteritis, while appendicitis is the most common surgical condition [6]. Approximately 25% of all children will be brought to medical attention for abdominal pain by the age of 15 years; however, only 5% of the patients will likely require hospitalization, and fewer yet, surgical intervention. As many as 10% of children may experience recurrent abdominal pain. Early diagnosis and treatment of the underlying cause of acute abdominal pain is crucial for symptom relief and improving patients' quality of life [7]. Certain complications can result in response to unattended acute abdominal pain that can be life-threatening. These complications comprise hemorrhage, obstruction, or perforation of the gastrointestinal tract or

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intra-abdominal organs as well as rupture of intra-abdominal organs such as the appendix which can lead to peritonitis. Perforations can lead to various infections in the body infections developing sepsis. Rupture or perforation of intra-abdominal organs can also lead to hypovolemic shock due to excessive blood loss and eventually death. Due to the high risk of life-threatening complications, diagnosing the underlying cause of acute abdominal pain is necessary. Acute abdominal pain in children presents a diagnostic dilemma [8]. Laparoscopy, despite its efficacy in the diagnosis of various acute abdominal conditions, is reserved as a second-line investigation method due to the risk of surgical invasiveness [9]. CT has a few major drawbacks. The patient is exposed to a certain radiation dose. The equipment is bulky and non-mobile; the procedure is time-consuming, requires sedation and the results are sometimes difficult to interpret in children due to the paucity of abdominal fat. These factors limit its use in emergency settings [10]. Radiographs are inexpensive, readily available, and easy to obtain. However, in cases of appendicitis as the underlying cause, radiographs are relatively insensitive and non-specific, particularly regarding the diagnosis. The radiation dose incurred, albeit very small, is also a disadvantage [11]. Sonography is often selected as the initial imaging modality in a child with abdominal pain [1]. It is quick, inexpensive, readily available, and highly reliable [12]. It does not involve the use of ionizing radiation, which is a major advantage [13]. Furthermore, it is a non-invasive procedure and less time-consuming. The ultrasonographic examination gives important information about various organs of the abdomen which includes the biliary tract, gall bladder, liver, spleen, pelvis, and kidneys. Further, it helps in the diagnosis of ascites, conditions of bowel, peristalsis, and abdominal collections. The procedure also doesn't require the need for general Anaesthesia [14]. Sonography is performed in real-time allowing for discourse between the sonographer or radiologist and the patient and parent [15]. This allows for the correlation of sonographic findings with physical examination findings and directed scanning based on information provided by the patient or his or her parent [16]. Ultrasound provides excellent soft tissue contrast and resolution making it a first-line option for direct scanning. Hence, ultrasonography is best suited for children, not only because of its non-invasive nature and cost-effectiveness but also because it doesn't expose children to the danger of radiation [9].

The following study contributes to the body of knowledge regarding sonographic findings in children presenting with acute abdominal pain at Meer children and Family Clinic in Pakistan. The results of this study have indicated that most of the children referred to the sonography department presenting with acute abdominal pain had no significant disease. However, the most common sonographic findings were mesenteric lymphadenitis, splenomegaly, excessive bowel gas and ascites.

METHODS

In this descriptive study, during the time period of 4 months, 255 patients were examined in the ultrasound department at Meer children and Family Clinic, Lahore. The sampling method used in the study was convenient sampling. GE logiq P5 Ultrasound Machine was used. Abdominal Ultrasound followed by sonography protocols was performed on these patients. Patients were scanned in fasting and fed state in supine and lateral positions. Inclusion criteria involved both genders. Patients of ages 1 to 13 years were included in this study. Exclusion criteria focused on patients having a known chronic disease. After the approval of the synopsis, a descriptive study was done at Meer children and Family Clinic, Lahore. Quantitative variables i.e., age and gender were recorded on data collection sheets. All collected data were entered in SPSS version 26.0. After determining if the patient needed an ultrasound, the patient was sent to the radiology department where he or she was scanned in accordance with the Ultrasound guidelines. The ultrasound scans were performed by either an experienced consultant radiologist or sonographer using a convex transducer and long and short axis view. Data were analyzed and presented in the form of tables, bar charts and histograms.

RESULTS

In the period of 4 months, a total of 255 patients presented in the ultrasonography department of Meer children and Family clinic with acute abdominal pain. There were 120 female patients and 135 male patients out of 255 total patients. The minimum age was 1 year, and the maximum age was 13 years. 56(41.5%) of the males had a normal scan, and 47(39.2%) a female had a normal scan, out of 255 patients. The most prevalent disease splenomegaly was observed in 10 (3.9%) patients. 8 (3.1%) patients had an inguinal hernia, 8 (3.1%) had lymphadenopathy, 9 (3.5%) had excessive bowel gas, 20 (7.8%) had mesenteric lymphadenopathy, 17 (6.7%) had acute appendicitis and 17 (6.7%) had ascites. Different results were noted. The following table represents that there were 103 (40.4%) patients had a normal scan, out of which 56(41.4%) were male and 47(39.2%) were female, while pathologies were noted in 152(59.6%) %patients. These pathologies included 2 (0.8%) vesical calculous, 1(0.4%) superficial skin edema, 1(0.4%) GB sludge, 1(0.4%) inguinal canal cyst 4 (1.6%) of the 255 patients had a history of right nephrolithiasis, 1 (0.4%) right hydronephrosis, 5(2.0%) umbilical hernia, 17(6.7%)

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acute appendicitis, 8 (3.1%) inguinal lymphadenopathy, 2 (0.8%) renal cysts, 1 (0.4%) intestine cyst, 3 (1.2%) urolithiasis, 1 (0.4%) lymphoma, 1 (0.4%) left lobe hepatic cyst, 2 (0.8%) solitary gut loops, 2 (0.8%) hepatomegaly, 1 (0.4%) hepatic hemangioma, 3 (1.2%) inguinal abscess collection, 8 (3.1%) inguinal hernia, 1 (0.4%) of the 255 hepatic mass, 2 (0.8%) renal stone, 1 (0.4%) acute cystitis, 1 (0.4%) hernia, 20 (7.8%) mesenteric lymphadenopathy, 10 (3.9%) splenomegaly, 6 (2.4%) pyloric stenosis, 17 (6.7%) ascites, 1 (0.4%) right hydroureter, 6 (2.4%) hepatic cyst, 6 (2.4%) acalculous cholecystitis, 1 (0.4%) ureteric stone, 4 (1.6%) distended gut loops, 3 (1.2%) mesenteric lymphadenitis, 4 (1.6%) GB stone and 9 (3.5%) excessive bowel gas.

Table 1: Frequency distribution of sonographic findings

Ultrasound findings	Male Frequency (%)	Female Frequency (%)	Total
Normal scan	56 (41.5)	47 (39.2)	103
Hepatomegaly	0 (0)	2 (1.7)	2
Hepatic cyst	4 (3.0)	3 (2.5)	7
Hepatic hemangioma	1 (0.7)	0 (0)	1
Hepatic mass	1 (0.7)	0 (0)	1
Cholelithiasis	2 (1.5)	2 (1.7)	4
Acalculous cholecystitis	1 (0.7)	5 (4.2)	6
GB Sludge	0 (0)	1 (0.8)	1
Splenomegaly	4 (3.0)	6 (5.0)	10
Nephrolithiasis	6 (4.4)	3 (2.2)	9
Right hydroureter	1 (0.7)	1 (0.7)	1
Right hydronephrosis	1 (0.7)	0 (0)	1
Ureteric stones	1 (0.7)	0 (0)	1
Renal cysts	1 (0.7)	1 (0.8)	2
Acute cystitis	0 (0)	1 (0.8)	1
Vesical calculous	1 (0.7)	1 (0.8)	2
Inguinal hernia	7 (5.2)	1 (0.8)	8
Inguinal lymphadenopathy	5 (3.7)	3 (2.5)	8
Inguinal abscess collection	2 (1.5)	1 (0.8)	3
Inguinal canal cyst	0 (0)	1 (0.8)	1
Excessive bowel gas	6 (4.4)	3 (2.5)	9
Distended gut loops	1 (0.7)	3 (2.5)	4
Mesenteric lymphadenopathy	11 (8.1)	9 (7.5)	20
Solitary gut loops	0 (0)	2 (1.7)	2
Intestinal cyst	1 (0.7)	0 (0)	1
Pyloric stenosis	4 (3)	2 (1.7)	6
Mesenteric lymphadenitis	2 (1.5)	1 (0.8)	3
Acute appendicitis	10 (7.4)	7 (5.8)	17
Umbilical hernia	5 (3.7)	0 (0)	5
Hernia	1 (0.7)	0 (0)	1
Ascites	3 (2.2)	14 (11.7)	17
Lymphoma	0 (0)	1 (0.8)	1
Superficial skin edema	0 (0)	1 (0.8)	1

Figure 1 and 2 showed sonographic evidences in 2 patients.

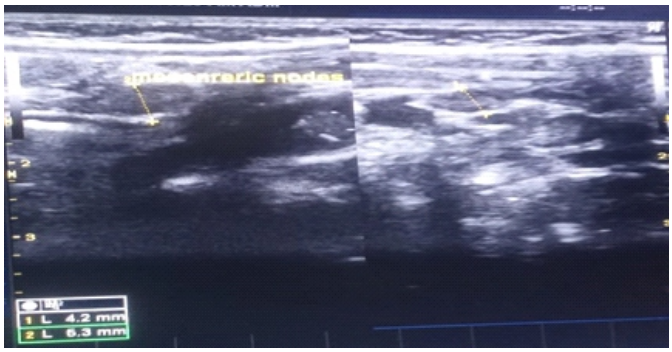

Figure 1: Mesenteric lymphadenitis; patient was 7 years old and had acute abdominal pain

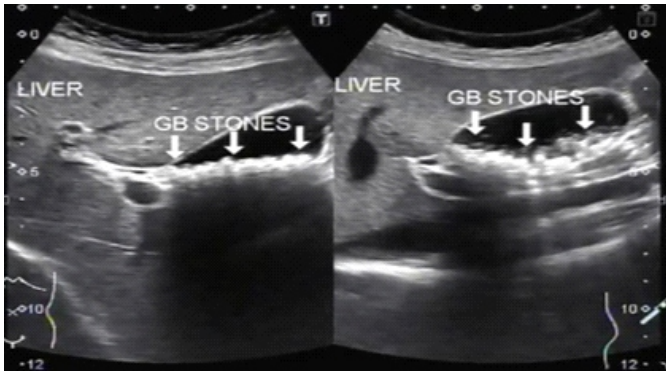

Figure 2: Cholelithiasis; patient was 13 years old and had acute abdominal pain

DISCUSSION

Our research showed vesical calculus in children who came with acute abdominal pain. The table showed that 2 (0.8%) children out of the 255 had a history of vesical calculus. Table 1 of our research demonstrate superficial skin edema and showed that 1 (0.4%) out of the 255 children had a history of superficial skin edema. It also represents that 1 (0.4%) out of the 255 patients had a history of acute cystitis. Certain complications can result in response to unattended acute abdominal pain that can be life threatening. These complications comprise of hemorrhage, obstruction, or perforation of the gastrointestinal tract or intra-abdominal organs as well as rupture of intra-abdominal organs such as appendix which can lead to peritonitis [8]. Table 1 of our research showed acute appendicitis table represents that 17 (6.7%) out of the 255 patients had a history of acute appendicitis. Siegel *et al.*, conducted a study. The aim of this study to determine the ability of ultrasonography to detect appendicitis and to identify other conditions responsible for symptoms in children with acute abdominal pain. Consecutive sample of 178 pediatric patients who were referred for ultrasonography because of suspected acute appendicitis, but in whom the diagnosis could not be definitively established by clinical criteria. Approximately half of children referred for suspected appendicitis will have a

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final diagnosis of abdominal pain of unknown origin. In the remainder, ultrasonography is useful, both to establish the diagnosis of appendicitis and to aid in diagnosing other causes of acute abdominal pain [1]. The ultrasonographic examination gives important information about various organs of the abdomen which includes the biliary tract, gall bladder, liver, spleen, pelvis, and kidneys. Further, it helps in the diagnosis of ascites, condition of bowel, peristalsis, and abdominal collections. The procedure also doesn't require the need for general anesthesia [9] Few tables of our research show gall bladder pathologies in children who came with acute abdominal pain. Table 1 showed gall bladder sludge. The table represents that 1 (0.4) % out of the 255 patients had a history of GB sludge while another table showed gallstones, and this table represents that 4(1.6) % out of the 255 patients had a history of GB stone. One of the tables represents a calculus cholecystitis and represents that 6(2.4) % of the 255 patients had a history of a calculus cholecystitis. Ultrasonography is best suited for children, not only because of its noninvasive nature and cost-effectiveness, but also because it doesn't expose the children to the danger of radiation. Table of our research showed liver pathologies in children who came with acute abdominal pain. One of the tables showed Left lobe hepatic cyst and represents that 1 (0.4) % of the 255 patients had a history of left lobe hepatic cyst. Another study showed hepatomegaly and represents that 2 (0.8 %) of the 255 patients had a history of hepatomegaly while another table represents that 1 (0.4) % out of the 255 patients had a history of hepatic hemangioma. Hepatic masses come to clinical attention when they are perceived by the patient, discovered on physical examination by the physician, or, most commonly, detected on diagnostic radiologic studies [17]. Our research table represents that 1 (0.4) % of the 255 patients had a history of hepatic mass. Another following table represents that 6(2.4%) of the 255 patients had a history of hepatic cyst. The kidneys have a complex internal architecture with a highly variable appearance on US. Ultrasound is also valuable for distinguishing congenital variants and simple cystic lesions from renal masses [18]. Our research demonstrates that 4 (1.6) % of the 255 patients had a history of right nephrolithiasis, 1 (0.4) % of the 255 patients had a history of right hydronephrosis, 2 (0.8) % of the 255 patients had a history of renal cyst, 3 (1.2) % of the 255 patients had a history of urolithiasis and 1(0.4) % of the 255 patients had a history of right hydroureter. Chin-Ling Yip *et al.*, conducted a study in 1998 on value of sonography in assessment of children with acute abdominal pain. The aim of this study was to evaluate the usefulness of sonography in the diagnostic assessment of children with abdominal pain. From July 1988 to October 1996, 676 children who had abdominal pain and were referred for sonography underwent abdominal and pelvic sonographic examination. Of these, 32 children had acute abdominal pain. The mean ages and relative risks of underlying abnormalities were calculated for children with acute abdominal pain [19]. Abdominal sonography is useful in children with acute abdominal pain. Children with Acute abdominal pain had urinary cystitis, intussusception, appendicitis, appendiceal abscess, perforated gut with ascites, gut duplication, thickened gut wall with fluid from severe gastroenteritis [20].

CONCLUSIONS

Our study concluded that most of the children referred to the sonography department presenting with acute abdominal pain had no significant disease. However, the most common sonographic findings were mesenteric lymphadenitis, splenomegaly, and ascites.

Authors Contribution

Conceptualization: SFK, MU
Methodology: ZA, AH
Formal analysis: TA, MF, SMYF
Writing-review and editing: NN, NA, AZ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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Systematic Review

Impact of Quran Therapy as a Complementary and Alternative Medicine in Cancer

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ABSTRACT

Cancer patients suffer from the deleterious effects of the disease and its treatment. Quran Recitation therapy has been used as Complementary and Alternative Medicine (CAM) by Muslims for multiple diseases including cancer. **Objective:** To find the impact of Quran recitation therapy as CAM in the management of cancer. **Methods:** The study included full-text original research articles from a 10-year pooled data (2013 to 2023). The studies were divided into three categories i.e., cancer cell cultures, animal models and cancer patients. **Results:** Quran recitation on cancer cell cultures revealed an inhibition of cancer cell viability, proliferation and migration. Animal studies revealed increased T lymphocyte activity among the cancer cells and human studies revealed a significant reduction of anxiety, stress, depression, pain, nausea and vomiting during cancer management. Thus, the addition of Quran recitation therapy as a complementary medicine along with the standard medical treatment improved the prognosis and reduced the side effects of cancer treatment. **Conclusions:** Based on this evidence, Quran recitation can be used as a safe, non-pharmacological treatment to improve the management of cancer.

INTRODUCTION

Cancer has been defined as any disease in which there is uncontrolled grhowth of abnormal cells which can invade the surrounding tissues and spread to other parts of the body through the vascular and lymphatic systems but histopathological grading and biomarkers have made it easier to predict the prognosis [1]. Cancer is one of the leading causes of death globally [2]. According to estimates from the World Health Organization (WHO) in 2019, cancer was the first or second leading cause of death before the age of 70 years [3]. However, the cost of cancer treatment like Chemotherapy, Surgery and Radiotherapy is very high and is going on increasing even more [4]. Besides the cost, there are multiple complications of the disease and side effects of Chemotherapy. Anxiety, stress, depression, tiredness, pain, hair loss, nausea and vomiting are experienced by more than 80% of patients [5]. Hence less costly, safe and effective treatment options are needed. The use of Complementary and Alternative Medicine (CAM) has been increasing steadily in the last 30 years and has been found to have a significant impact on the health of the patients [6]. This consists of Complementary medicine which is used along with the Standard Medical therapy to improve the overall prognosis whereas Alternative Medicine is used in place of the Standard Medical treatment [7]. Many types of CAM are being widely used by Cancer patients to improve the

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prognosis and reduce the side effects of cancer treatment such as aromatherapy, acupuncture, dietary supplements, spiritual healing etc7. CAM is being used by more than half of cancer patients specially those who are highly educated and have a higher income [8]. Among the Muslim countries like the Middle East the use of CAM is highly prevalent. The most frequent types of CAM were Zamzam (holy water) and Ruqya (Quran reading), use of honey, black seed and cupping therapy [9]. One of the most commonly used Complementary therapy among Muslim patients is listening to Quran recitation [10]. This is a noninvasive, safe, freely and easily available CAM. Listening to the Quran stimulates alpha brain waves which cause relaxation [11, 12]. Thus, listening to Quran recitation reduces anxiety and stress [13, 14]. This spiritual relaxation causes the psycho neuro immunological axis to come into play in which an interaction between the Nervous, Endocrine and immune systems is brought about by the Hypothalamic, Pituitary, Adrenal axis which acts on the immune system to beneficially alter the course of the disease [15]. Quran recitation therapy has thus shown significant improvement of mental and physical conditions [16]. This study was undertaken to evaluate the efficacy of Quran recitation therapy as CAM in the management of Cancer from a pooled data of previous 10-year studies (2013 to 2023).

METHODS

This study is based on a descriptive Literature Review design. It was carried out between April to May 2023. The articles were searched using Google Scholar, PubMed, Wiley online library, and Mendley. The search terms used were Quran recitation therapy and Cancer. The inclusion criteria were all original research articles published in the last 10 years (2013 to 2023) showing the impact of Quran recitation in cancer whereas the exclusion criteria were other diseases besides cancer. Only full-text articles were used for the review. The articles which met the inclusion criteria were divided into 3 categories, studies on Cancer cell cultures, animal studies and studies on cancer patients.

RESULTS

The search on the databases yielded 49 original research articles published from 2013 to 2023. But 3 duplicate articles were removed. Further 36 articles were also removed due to the exclusion criteria because they dealt with the impact of Quran therapy on other diseases besides cancer. One more study was excluded because it did not specify which Quranic text was recited as therapy. Now 10 studies remained for evaluation and were included in the review. This is depicted in the PRISMA flowchart in Figure 1. The 10 studies were divided into 3 groups:1. Studies on cancer cell cultures; 2. Studies on Animal models of cancer and 3. Studies on human cancer patients.

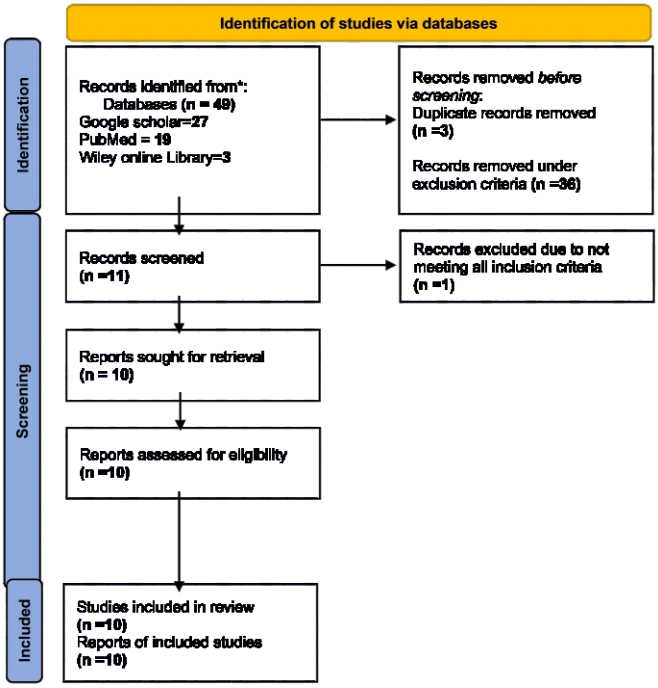

Figure 1: PRISMA Flowchart

Three studies were done to find the impact of Quran recitation on different cancer cell cultures as shown in table 1. In a study published in 2018 by Mehrafsar *et al.*, the impact of cisplatin and Quran recitation was studied on the viability, migration and expression of *BCL2L12* gene in PC3 (prostate cancer) cells [17]. The cell cultures were divided into 4 groups, PC3 cells, PC3 cells treated with cisplatin, PC3 cells exposed to Quran recitation and PC3 cells treated with cisplatin and exposed to Quran recitation. The Quran chapter chosen was Surah Fateha which was repeated 70 times. Significant inhibitory effect was found on Cell proliferation, migration and expression of the *BCL2L12* gene expression in the cells exposed to both cisplatin and Quran recitation compared to the cells exposed only to cisplatin. Cell viability reduced to 43.8%, cell migration was reduced by 18.6% and *BCL2L12* messenger RNA level was reduced by a ratio of 0.2 compared to the control group. Thus, Quran recitation combined with cisplatin significantly reduced cell proliferation, migration and caused down regulation of *BCL2L12* gene expression. In 2019, a study was reported by Mutiah *et al.*, the effect of Quran recitation combined with cisplatin was studied on growth inhibition and cell cycle modulation on HeLa cells (Cervix adenocarcinoma cells) [18]. Quran therapy consisted of 30 minutes exposure to Surah Al Fateha. It was found that the combination of cisplatin and Quran recitation decreased the viability of the HeLa cells to 64.3% compared to 69.9% with cisplatin alone and caused

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apoptosis in the M5 phase and inhibition of the cell cycle in the S, G_2 and M phase. In a study reported by *Bidin et al.*, in 2020, the effect of Ruqyah Sharriyah (Selected verses of healing from the Quran) was studied on the proliferation of Breast Cancer Line (MCF-7 cells) in an experimental group against a control group of MCF-7 cells [20]. The experimental group was exposed to 12 hours and 24 hours of recitation of the Ruqyah Sharriyah verses. At the end of both time periods, the cell proliferation percentage had reduced compared to the control group but this reduction was not significant. The shortcoming of this study is that the result has not been stated in numbers, tables or figures. The authors have accepted that the insignificant result may be due to the short duration of exposure, so a longer duration of exposure may be needed for more accurate results.

Table 1: Studies on cancer cell cultures

First Author and Publication Year	Sample	Groups	Quran Text Used	Time Duration	Outcome
Mehrafsar *et al.*, 2018 [17]	Human Prostate adenocarcinoma Cell Line (PC3)	1.PC3 cells 2.PC3 cells exposed to cisplatin 3.PC3 cells exposed to Quran 4.Pc3 cells exposed to Quran and cisplatin	Al Fateha	2 Hours	Significantly more inhibition on proliferation (43.8%) and migration (18.6%) of PC3 cells treated with Quran and cisplatin compared to only cisplatin. Significant down regulation Of BCL2L12 gene expression (ratio 0.2) by Quran and cisplatin compared to control
Mutiah *et al.*, 2019 [18]	HeLa cells from Cervix adenocarcinoma	1.HeLa cells 2.Hela plus Quran r ecitation 3.Hela plus Cisplatin 4.Hela plus Cisplatin and Quran recitation	Al Fateha	30 Minutes	Decreased viability of HeLa cells Quran=80.1% cisplastin= 69.9% Quran plus cisplastin= 64.3%
Bidin *et al.*, 2020 [19]	Breast Cancer Cell line (MCF 7)	1.Control 2.Treatment	Ruqyah Sharriyah	12 Hours and 24 Hours	Reduction of Cell Proliferation in the Experimental group compared to the Control group

One animal study has been done by Muhammad *et al.*, to find the impact of Quran recitation on T lymphocyte activity to induce programmed cancer cell necrosis in mice models of breast cancer. 24 female mice (*Mus Musculus*) BALB/c strain were randomly divided into 4 groups. The Negative Control (K-) were normal healthy mice, Positive Control (K+) were injected subcutaneously DMBA to induce cancer, P1 group were DMBA mice which received Quran recitation for 2.5 hours daily for 1 week. P2 were DMBA mice which received Quran recitation for 0.5 hours, 5 times daily at the prayer timings, for 1 week. Quran recitation was of Surah Fateha and Al Baqarah. After that the cancer tissue was harvested. A significant difference ($P<0.05$) was found in the T cell lymphocyte activity between the group given Quran therapy 5 times daily at the prayer timings, compared to the other groups.

Table 2: Studies on Animal Models of Cancer

First Author and Publication Year	Sample	Groups	Quran Text Used	Time Duration	Outcome
Muhammad *et al.*, 2022 [20]	24 female mice (Mus Musculus) BALB/c strain	1.Negative control (K-) 2.Positive Control (K+) with DMBA 3.Quran once daily (P1) 4.Quran five times daily (P2)	Surah Fateha and Al Baqarah	1.- 2.- 3.Daily 2.5H for 1 week 4.Five times daily for 0.5H each for 1 week	Significant Difference ($P<0.05$) In t cell lymphocyte activity Between the group given Quran therapy 5 times daily compared to other groups.

Six studies were done on Human Cancer patients to find the effect of Quran recitation therapy in reducing the adverse side effects of cancer and chemotherapy. Three of these studied the effect on anxiety, one each studied the effect on stress, nausea and vomiting and pain as described in table 2. Al Jubouri *et al.*, studied the effect of Quran recitation and music therapy in reducing the chemotherapy induced anxiety in 238 cancer patients [13]. They were randomly assigned to the Control, Quran and Music groups. Pretest and Post test scores showed a significant difference in anxiety reduction in both the Quran and Music groups but no difference was found between the scores of these two groups. So, both methods can be added to the Chemotherapy patients to reduce their anxiety. Fahd *et al.*, in a cross-sectional study on 1054 cancer patients, found that Quran recitation, prayer and religious practices significantly decreased the risk of anxiety and depression in these patients [21]. Rosyidul'Ibad

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et al., studied the effect of Quran recitation therapy on 24 Cancer patients admitted at Aisiyah Islamic Hospital, Malang, Indonesia [22]. Quran therapy was found to significantly reduce the anxiety level of these patients undergoing Chemotherapy. Ernawati *et al.*, studied 50 cancer patients by comparing the Pretest and Post test scores of the stress after three sessions of Combined Quran recitation and aromatherapy [23]. This strategy was found effective in reducing the stress level of cancer patients. Kamian *et al.*, reported the impact of hearing Quran on nausea and vomiting on 31 cancer patients undergoing chemotherapy [24]. There was a decrease in nausea and vomiting but it couldn't reach the level of statistical significance. But Quran therapy significantly decreased the probability of higher grade of nausea. Similarly, Priyanto *et al.*, studied 36 patients of bone cancer [25]. This was a quasi-experimental study using Pre and Posttest design with a control group. Significant reduction of pain and stress was found after the Quran therapy session.

Table 3: Studies on Human Cancer Patients

First Author and Publication Year	Sample	Groups	Quran Text Used	Time Duration	Variable Studied	Outcome
Al Jubouri *et al.*, 2021 [13]	238 cancer patients undergoing chemotherapy	1.Control 2.Quran 3.Music	Surah Yaseen	20 minutes	Anxiety	Significant Difference Between Pretest and Posttest Scores. *No Significant Difference In the reduction of anxiety by Music or Quran
Fahd *et al.*, 2020 [21]	1054 Cancer patients	Cross sectional study	Any part of the Quran	Any duration	Anxiety	Significant Association Between lower levels of anxiety and reciting or listening to the Quran
Rosyidul'Ibad et al., 2021 [22]	24 Cancer patients Undergoing chemotherapy	1 group Pre &Post Test design	Surah Ar Rahman	22 minutes Twice a day	Anxiety	Significant Reduction of anxiety after Quran recitation
Ernawati *et al.*, 2020 [23]	50 cancer patients	1 group Pre & Post test design	Surah Ar Rahman & Aromatherapy	3 sessions of 30 minutes	Stress	Decreased Stress Level By Both Quran recitation And Aromatherapy
Kamian et al., 2019 [24]	31 patients Undergoing chemotherapy	1 group Pre & Post test design	Surah Baqarah: 1-100	30 minutes	Nausea and Vomiting	Listening to Quran significantly Reduced the probability of Higher grade of nausea
Priyanto et al., 2020 [25]	36 Bone cancer patients	1.Control 2.Experimental group	Surah Ar Rahman	20 minutes	Pain	Significant Reduction of pain after Quran therapy

DISCUSSION

It is stated in the Quran: "Surely, in the remembrance of Allah do hearts find peace"; Surah Ar Raad (13:28). The potential healing power of faith has been known for a long time. Listening to the Quran generates alpha waves in the EEG of the brain which cause relaxation [11, 12]. The field of psychoneuroimmunology has shown the importance of mind-body interaction [15]. Quran recitation has been associated with better immune function by increasing the activity of T lymphocytes [20]. Thus, Complementary and Alternative Medicine (CAM) is thought to act through specific nerve pathways and molecules which remove the hormones of stress that can suppress the immune system [26]. The interaction between the Nervous, Endocrine and Immune systems influences the Hypothalamic-Pituitary-Adrenal axis causing the release of Cortisol and Epinephrine which regulate the immune system through Somatostatin and Substance P.27 The Biochemical levels of Neurotransmitters (Serotonin), Hormones (Cortisol, Catecholamines, Endorphins), Cytokines and Peptides may influence the immune system's response to disease [28]. This could be the possible explanation for the six studies on human cancer patients where Quran recitation reduced the adverse side effects of Cancer and its chemotherapeutic management, like anxiety, stress, depression, pain, nausea and vomiting. This is in accordance with many other similar studies done for various medical conditions where Quran recitation therapy was found to be effective. In a study done on 50 insomnia patients it was found that Quran recitation therapy significantly reduced anxiety, depression and improved the quality of sleep [29, 30]. Quran therapy significantly improved the respiratory rate, heart rate and Oxygen saturation of premature infants on mechanical

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ventilation in ICU [31]. In another study it was found that Quran recitation therapy improved the Functional capacity of hemodialysis patients [32] and also reduced their depression [33]. In a systematic review on the impact of Quran recitation on anxiety, 28 randomised controlled trials and quasi experiments revealed reduced anxiety in various settings after listening to the Quran [34]. The pain of coronary heart disease patients was reduced more after Quran recitation therapy than after Music therapy [35]. Similarly, the pain of childbirth was also reduced by Quran recitation therapy during the first phase of labor [36] and also the pain after Caesarian section [37]. The animal study and cell culture studies showed a decrease in cancer cell viability, migration and proliferation when exposed to Quran recitation therapy. There was also an increase in the T lymphocytes which showed enhanced immune response. But, in a study done on rabbit articular cartilage cells it was found that cell viability, growth rate and proliferation were highest in the Quran recitation group compared to the other two groups [38]. Since Chondrocytes have no blood supply so their regeneration capacity is very limited and they have very limited ability to repair themselves so injury often leads to progressive damage. Because of this lack of healing capacity any injury to chondrocytes often leads to secondary osteoarthritis [39]. Cartilage injury remains a major challenge in orthopedic surgery due to the fact that articular cartilage has only a limited capacity for intrinsic healing. However, Quran recitation therapy enhanced cell regeneration and proliferation in damaged chondrocytes [38]. This is in contrast to the effect of Quran therapy on cancer cell cultures where there was decreased cell viability and proliferation of Cancer cells as seen in these three studies done on cancer cell cultures. Extensive research has been done on individual cells or cell cultures to find the impact of sound on growth, apoptosis, immune system and protein activities and it was found that sound affects the physiological processes of cells though the results were disparate for different types of cells but the exact mechanism by which sound causes these physiological changes in the cell are still not clear [40]. Since the individual cells respond differently to Quran therapy, this may be a field for future research where the alteration in the physiological processes of the cell may be used to improve the prognosis of disease.

CONCLUSIONS

Quran recitation therapy used as a complementary therapy along with the standard medical treatment reduces the side effects of cancer and chemotherapy. Studies on animal models and cancer cell cultures show that it significantly reduces the proliferation of cancer cells. being a noninvasive, safe, cheap and easy method, it should be used along with the standard medical treatment to improve the prognosis of cancer patients.

Authors Contribution

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Conflicts of Interest

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