DOI: https://doi.org/10.54393/pjhs.v4i05.714

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 4, Issue 5 (May 2023)

Original Article

Nurses Knowledge Regarding Personal Protective Equipment in Intensive Care Units at a Public Tertiary Care Public Hospital, Peshawar

Kashif Khan[1*], Shafaat Ullah[2], Jalal Khan[1], Aniqa Narmeen[3], Anny Ashiq Ali[1], Gulnazar[3] and Ihsan Ullah[1]

[1]School of Nursing and Midwifery, Aga Khan University, Karachi, Pakistan
[2]Shifa Tameer E Millat University, Islamabad, Pakistan
[3]Department of Nursing, Khyber Medical University, Peshawar, Pakistan

ARTICLE INFO

Key Words:

Personal Protective Equipment, COVID-19, HIV, Standard Precautions, PPE

How to Cite:

Khan, K. ., Ullah, S. ., Khan, J. ., Narmeen, A. ., Ali, A. A. ., Nazar, G. ., & Ullah, I. . (2023). Nurses Knowledge Regarding Personal Protective Equipment in Intensive Care Units at a Public Tertiary Care Public Hospital, Peshawar: Nurses Knowledge Regarding Personal Protective Equipment. Pakistan Journal of Health Sciences, 4(05), 129–134. https://doi.org/10.54393/pjhs.v4i05.714

***Corresponding Author:**

Kashif Khan
School of Nursing and Midwifery, Aga Khan University, Karachi, Pakistan
kashifadmissions97@gmail.com

Received Date: 21st April, 2023
Acceptance Date: 28th May, 2023
Published Date: 31st May, 2023

ABSTRACT

PPE is designed to protect Health Care Workers (HCWs) from workplace infections and injuries and the most commonly used equipment including goggles, masks, medical gloves, and respirators. **Objective:** To determine nurses' knowledge regarding PPE in intensive care units at a Public Tertiary Care Hospital, in Peshawar, Pakistan. **Methods:** A cross-sectional study was directed using convenient sampling. A structured questionnaire from the literature was used to collect the data. Responses of the participants as good/Average/Poor were recorded. The data were collected from the Nurses who have five or more than five years of experience in the intensive care units of Hayatabad Medical Complex, a Public sector tertiary care Hospital. **Results:** The mean age of the participant was evaluated which was 30.09 years with a standard deviation of 7.04 years. The professional experience of the participants was 6.78 years with a standard deviation of 5.85 years. Our study shows that 65.4% had good knowledge or an acceptable knowledge level, 30.9% had average knowledge, and 3.7% of the participants had poor knowledge. **Conclusions:** The study concluded that most of the participants have good knowledge of Personal Protective equipment but a significant number of participants had average knowledge and some have poor knowledge as well. Therefore, regular sessions should be given to enhance the knowledge level.

INTRODUCTION

Implementation of PPE (Personal Protective Equipment) is one of the utmost noteworthy tactics for healthcare providers to shield themselves from, various airborne, blood born, or other body fluid infections in a healthcare setting. PPE is designed to protect Health Care Workers (HCWs) from workplace infections and injuries and the most commonly used equipment including goggles, masks, medical gloves, and respirators [1]. It creates a fence between the potentially communicable bugs and the healthcare member of staff to avert infection [2]. For supreme prevention of contagion among Health Care Workers (HCWs); appropriate wearing and removal of PPE is recommended [3]. The literature emphasizes that PPE shall be used properly by all who provide care to patients in situations where they contact with blood and body liquids [4]. A disruption in PPE usage contributes to the transmission of infection from clients to HCP, other clients, and entourages [5]. The WHO guesses that about 2.5% of HIV and 40% of HBV and HCV cases amongst HCWs globally are the results of these contacts [6]. According to the center for disease control, universal precaution is customary for actions that are required to prevent infections from bloodborne or body fluid-borne infections [7]. PPE is designed to protect healthcare providers from

DOI: https://doi.org/10.54393/pjhs.v4i05.714

serious workplace injuries or illnesses [8]. The Centers for Disease Control has suggested that standard protections are used on all clients, regardless of their information about their contagion status [9]. PPE creates a barricade between the potentially transmittable bugs and the healthcare operative to thwart infection [1]. PPE comprises "gloves, gowns, head covers, masks, respirators, eye protection, face shields, and goggles" [10]. For determined avoidance of infection among HCWs, CDC indorsed accurate wearisome and Removal of PPE, moreover, If the HCWs will not follow the guideline then they will get an infection even if they use PPE [11]. Needle-stick or other sharps harm, a squish of blood or other body liquids into the eyes, nostrils, or buccal mucosa, or blood interaction with non-intact skin are the communal means of occupational exposure to blood [12], such processes not only defend the client but also the HCWs and the surroundings. The most important pathogens related to universal precautions are HIV, HBV, and HCV [13]. According to the USA, there is 9 to 42 per million death of health workers occurs due to occupational infections annually [14]. According to WHO, there are approximately 3 million HCWs out of 36 million obtain an injury with a sharp tool, thus consequential in 20 lakhs infected with HBV and 10 lakhs with HCV worldwide per year [15]. Several studies have reported in Pakistan that there were 0.8% HBV and 3.2% to 5.6 HCV cases among the HCWs [16]. Several studies have reported that there were partial (50%) of the respondents had no information about PPE; more than one-third (37%) had ordinary awareness of PPE while 13% had virtuous knowledge. Awareness of PPE was premier amid doctors than nurses [17]. According to the USA, there is 9 to 42 per million death of health workers occurs due to occupational infections annually [14]. In Pakistan that there were 0.8% HBV and 3.2% to 5.6% HCV cases reported among the HCWs [18]. From the available literature, compliance with the PPE among nurses in the Tertiary care Hospitals of KPK has not been evaluated. Therefore, we conducted this study to evaluate the knowledge level among nurses of PPE in the course of their duties at tertiary care hospitals. Implementation of PPE is one of the most important strategies for health care providers to protect themselves from various blood born or other body fluid infections in a health care setting. Nationally, there is a paucity of literature regarding compliance with PPE among nurses. Therefore, this study was undertaken to explore the knowledge of PPE among nurses working in ICUs at tertiary care hospitals.

METHODS

The design of the study was an institutionally based cross-sectional study design as the purpose of the study is to determine nurses' knowledge regarding PPE in intensive care units at two tertiary care hospitals, in Peshawar. The participants in this study consisted of all of the registered nurses who are currently employed at the Tertiary Care Public Hospital in Peshawar, Pakistan. The study is conducted at Hayatabad Medical Complex, a public tertiary care hospital in Peshawar, Pakistan. It provides medical and allied as well as surgical and allied services to people. It has about 1280 beds occupancy and currently, about 450 registered nurses are providing their services as of November 15, 2022. HMC achieved ISO 9001-2015 certification recently on 28 January 2023 for its quality care. Data were collected through an adopted questionnaire. The questionnaire consisted of 26 items. 21 items were related to the knowledge regarding PPE and 5 items were related to HIV transmission to healthcare providers. All the questions were clear and easy to understand. ≤ 50% score was a poor knowledge level, >50% to ≤ 75% was average and >75% was a good knowledge level. The study duration was 6 months that is started from May 2019 to October 2019. To calculate the required sample size, we utilized the Open EPI program and the single population proportion population formula, along with a confidence interval of 95%, a proportion of 50%, and a margin of error of 5%. To recruit nurses for this research, a probability convenient sampling approach is used. 81 Nurses responded to the questionnaire based on explaining the purpose and taking informed consent regarding data collection. Sampling was done through a convenient sampling technique and the sample size was calculated using Raosoft software with a 95% confidence interval and 5% margin of error. The nurses who were directly involved in patient care and who had equal or more than 5 years of experience and work in intensive care units.Nursing Students, administration nursing staff, and Nursing Internees were excluded.Nurses who have less than 5 years of experience were excluded from the study. Approval from the graduate studies committee, advanced studies, research board of KMU, and university ethics committee is obtained before commencing data collection. Administrative permission from the hospital in Peshawar is obtained. Participants are enrolled in the study. Informed consent is obtained from all the participants after explaining the purpose and benefits of the study and ensuring the confidentiality of the included subjects. All willing participants are interviewed after obtaining informed consent. An adopted, structured questionnaire was used to gather data for this research. The questionnaire was provided to the participants in hard copy form. Their responses were recorded on the questionnaire, and a unique form number was assigned to each questionnaire to ensure accurate identification and

DOI: https://doi.org/10.54393/pjhs.v4i05.714

maintain participant anonymity. The data were then entered into Epi data software for further processing. The questionnaire used in the research has its content validity and was evaluated, and it has also been pilot tested on 10% of the total sample size drawn from the population. In terms of reliability, Cronbach's alpha coefficient is utilized to be significant, so that consistency can be measured. The appropriateness of the instrument is determined through the utilization of a pre-testing exercise, and to analyze and finalize the instrument before it is put into use, a variety of expert reviewers are solicited for assistance. Data were analyzed by using SPSS version 22.0. In descriptive statistics, frequencies and percentages were calculated for categorical variables while mean and standard deviation were calculated for continuous variables.

RESULTS

The mean age of the participant was evaluated which was 30.09 years with a standard deviation of 7.04 years as shown in table 1. The professional experience of the participants was 6.78 years with a standard deviation of 5.85 years shown in table 1. Age and Professional experience were the study's quantitative variable so their mean and standard deviation was calculated and is shown in table 1.

Table 1: Demographic Data Related to Age and professional experience

Variables	Mean ± SD
Age (years)	30.09 ± 7.04
Professional Experience	6.78 ± 5.85

The table 2 consists of all the qualitative demographic variables. That is the Gender, Qualification, and Designation of the participants. Frequencies and percentages were calculated for all the qualitative variables as shown in table 2. A total of 81 participants participated in the study of which 18 were male nurses and 63 were female nurses with a percentage of 22.2 and 77.8% as shown in table 2. More female nurses were working in the organization which is why more female nurses participated in the study in contrast to male nurses. The qualification of the participants was such that 38 nurses were diploma holders who obtained 3 years General Nursing diploma degree with one year of specialization after the completion of the diplomat program. The percentage of diploma holders was 46.9% as shown in table 2. The intensive care environment enriched the Bachelor of Science in Nursing which is why they participated more in the study with 41 in number and 50.6 in percentage as shown in table 2. Moreover, the intensive care environment is hectic and tough which is why the organization placed competent nurses in the intensive care environment due to their higher qualifications and experience. Only 2 Master's degree holders in the profession participated in the study with a percentage of 2.5 as shown in table 2, the main reason was fewer organizations offering Master of Science in nursing programs in Nursing in Pakistan and only a few graduates come to the clinical bedside area after completion of their degree program. Most of the participants were staff nurses according to their designation, so 74 staff nurses participated in the study with a percentage of 91.4% and only 6 head nurses and 1 shift supervisor participated in the study with a percentage of 7.4 and 1.2% as shown in table 2.

Table 2: Demographic Data Related to Gender, Qualification, and Designation of the Participants

Variables	Mean ± SD
Gender	
Male	18(22.2)
Female	63(77.8)
Qualification	
Diploma in Nursing	38(46.9)
Bachelor in Nursing	41(50.6)
Masters in Nursing	2(2.5)
Designation	
Staff Nurse	74(91.4)
Head Nurse	6(7.4)
Shift Supervisor	1(1.2)

This study found that 65.4% had good knowledge or an acceptable knowledge level, 30.9% had average knowledge, and 3.7% of the participants had poor knowledge as shown in table 3. The mean knowledge score was 16.04 with the standard deviation of 2.52.

Table 3: Participant Knowledge in Percentage

Knowledge Level	Percentage
Good	65.40
Average	30.90
Poor	3.70

DISCUSSION

This study found that 65.4% had good knowledge or an acceptable knowledge level, 30.9% had average knowledge, and 3.7% of the participants had poor knowledge. Comparable research undertaken in China, Jordan, and Saudi Arabia revealed higher levels of knowledge, attitudes, and COVID-19 practices among university students than those found in our study in Pakistan [19]. The result of a cross-sectional study conducted by Pandey *et al.*, in Nepal showed a high level of Knowledge of nurses about PPE in comparison to this study [20]. Moreover, another cross-sectional study conducted in Bangladesh revealed that healthcare workers, including nurses, generally possess adequate knowledge about PPE [21]. A web-based survey in India has also shown that healthcare workers have adequate knowledge regarding PPEs and the results was in like way to our study results [22]. According to a survey by Modi *et al.*, among healthcare

DOI: https://doi.org/10.54393/pjhs.v4i05.714

professionals and students in the Mumbai metropolitan area, 45.4% of respondents were aware of the proper PPE donning and doffing order. In the current study, the outcomes were marginally better; roughly 67.8% of the sample population gave accurate answers [23]. The results of a study directed in a local context in Lahore were not in line with this study, which presented that 50.2 % of the contributors had decent awareness, while 42.8% of the participants had moderate knowledge regarding PPE [24]. Another study conducted by Muhammad *et al.*, in Saudi Arabia, this cross-sectional study assessed the knowledge, attitude, and practice of nurses regarding infection control measures, including PPE usage, in a tertiary hospital in Saudi Arabia. The findings shown that 82.3% of nurses had good knowledge, 92.5% had a positive attitude, and 76.8% exhibited good practice [25]. Moreover, another cross-sectional study aimed to assess the knowledge, attitude, and practices of healthcare professionals towards safety at Gondar University referral hospital. Among the 282 participants, the majority had adequate knowledge (81.6%), favorable attitude (64.2%), and adequate practice (57.4%) scores. However, more than half of the participants were untrained, and there was a high prevalence of needle stick injuries. The study highlights the need for consistent supply of personal protective devices, training, and awareness programs to improve workplace safety in healthcare settings [26]. Furthermore, a cross-sectional study intended to evaluate the knowledge regarding needle stick injuries and the use of personal protective equipment (PPE) among nurses at Dhaka Medical College Hospital, Dhaka. Among the 200 respondents, 65% had good knowledge about needle stick injuries, while 56% had good knowledge about PPE. The study highlights the need for knowledge and awareness programs to advance understanding of needle stick injuries, reporting of incidents, preventive measures, and adherence to infection prevention and control protocols [27]. Similarly, one more cross-sectional study aimed to assess the knowledge and practices of nurses regarding standard precautions at a tertiary care hospital in North India. The study included 134 nurses, and the findings revealed that the majority had adequate knowledge and compliance with standard precautions [28].

CONCLUSIONS

PPEs are vivacious processes that show an imperative part in the stoppage of infection in a hospital scenery. This study clinched that the majority of participants have an average to decent knowledge level which can further be upgraded by official training and sequel of the preventive measures among Health Care Professionals. However poor self-protective practices requisite contemplation and can be upgraded by ensuing firm preventive practices.

Authors Contribution

Conceptualization: KK
Methodology: AN, SU
Formal analysis: IU, GN, AAA
Writing-review and editing: IU, JK, KK

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

The authors received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Verbeek JH, Rajamaki B, Ijaz S, Sauni R, Toomey E, Blackwood B, Tikka C, Ruotsalainen JH, Balci FS. Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. Cochrane database of systematic reviews. 2020 Mar; 4(4): 1-153. doi: 10.1002/14651858.CD011621.pub4.

[2] FDA. Personal Protective Equipment for Infection Control. 2020. [Last Cited: 2nd Oct 2020]. Available at: https://www.fda.gov/medical-devices/general-hospital-devices-and-supplies/personal-protective-equipment-infection-control#:~:text=When%20used%20properly%2C%20PPE%20acts,body%20fluids%2C%20or%20respiratory%20secretions.

[3] Mischke C, Verbeek JH, Saarto A, Lavoie MC, Pahwa M, Ijaz S. Gloves, extra gloves or special types of gloves for preventing percutaneous exposure injuries in healthcare personnel. Cochrane Database of Systematic Reviews. 2014 Mar; (3): 1-92. doi: 10.1002/14651858.CD009573.pub2.

[4] McCarthy R, Gino B, d'Entremont P, Barari A, Renouf TS. The Importance of Personal Protective Equipment Design and Donning and Doffing Technique in Mitigating Infectious Disease Spread: A Technical Report. Cureus. 2020 Dec; 12(12): e12084. doi: 10.7759/cureus.12084.

[5] Steuart R, Huang FS, Schaffzin JK, Thomson J. Finding the value in personal protective equipment for hospitalized patients during a pandemic and beyond. Journal of Hospital Medicine. 2020 May; 15(5): 295. doi: 10.12788/jhm.3429.

[6] Ostankova YV, Shchemelev AN, Boumbaly S, Balde TA, Zueva EB, Valutite DE, *et al*. Prevalence of HIV and Viral Hepatitis Markers among Healthcare Workers in the Republic of Guinea. Diagnostics. 2023 Jan; 13(3):

DOI: https://doi.org/10.54393/pjhs.v4i05.714

378. doi: 10.3390/diagnostics13030378.
[7] CDC. Perspectives in Disease Prevention and Health Promotion Update: Universal Precautions for Prevention of Transmission of Human Immunodeficiency Virus, Hepatitis B Virus, and Other Bloodborne Pathogens in Health-Care Settings 1998 Jun; 37(24): 377-88.
[8] WHO. Coronavirus disease (COVID-19): Masks. 2022. [Last Cited: 5th Jan 2022]. Available at: https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-masks#:~:
[9] CDC. Standard Precautions for All Patient Care. 2018. [Last Cited: 26th Jan 2016]. Available at: https://www.cdc.gov/oralhealth/infectioncontrol/summary-infection-prevention-practices/standard-precautions.html.
[10] Physiopedia. Personal Protective Equipment (PPE). 2020. [Last Cited: 29th May 2023]. Available at: https://www.physio-pedia.com/Personal_Protective_Equipment_(PPE)
[11] Phan LT, Maita D, Mortiz DC, Weber R, Fritzen-Pedicini C, Bleasdale SC, Jones RM, CDC Prevention Epicenters Program. Personal protective equipment doffing practices of healthcare workers. Journal of Occupational and Environmental Hygiene. 2019 Aug; 16(8): 575-81. doi: 10.1080/15459624.2019.1628350.
[12] Goel V, Kumar D, Lingaiah R, Singh S. Occurrence of needlestick and injuries among health-care workers of a tertiary care teaching hospital in North India. Journal of laboratory physicians. 2017 Jan; 9(01): 020-5. doi: 10.4103/0974-2727.187917.
[13] Organization WH. Standard Precautions for Prevention of Transmission of HIV, Hepatitis B Virus, Hepatitis C Virus and Other Bloodborne Pathogens in Health-Care Settings. 2009.
[14] Sepkowitz KA and Eisenberg L. Occupational deaths among healthcare workers. Emerging Infectious Diseases. 2005 Jul; 11(7): 1003. doi: 10.3201/eid1107.041038.
[15] Coppola N, De Pascalis S, Onorato L, Calò F, Sagnelli C, Sagnelli E. Hepatitis B virus and hepatitis C virus infection in healthcare workers. World Journal of Hepatology. 2016 Feb; 8(5): 273-81. doi: 10.4254/wjh.v8.i5.273.
[16] Umer M and Iqbal M. Hepatitis C virus prevalence and genotype distribution in Pakistan: Comprehensive review of recent data. World journal of gastroenterology. 2016 Jan; 22(4): 1684. doi: 10.3748/wjg.v22.i4.1684.
[17] Sehsah R, El-Gilany AH, Ibrahim AM. Personal protective equipment (PPE) use and its relation to accidents among construction workers. La Medicina del lavoro. 2020 May; 111(4): 285-95.
[18] Butt AS and Sharif F. Viral Hepatitis in Pakistan: Past, Present, and Future. Euroasian Journal of Hepato-gastroenterology. 2016 Jan; 6(1): 70-81. doi: 10.5005/jp-journals-10018-1172.
[19] Peng Y, Pei C, Zheng Y, Wang J, Zhang K, Zheng Z, *et al*. A cross-sectional survey of knowledge, attitude and practice associated with COVID-19 among undergraduate students in China. BMC Public Health. 2020 Dec; 20(1): 1-8. doi: 10.1186/s12889-020-09392-z.
[20] Pandey S, Poudel S, Gaire A, Poudel R, Subedi P, Gurung J, *et al*. Knowledge, attitude and reported practice regarding donning and doffing of personal protective equipment among frontline healthcare workers against COVID-19 in Nepal: a cross-sectional study. PLOS Global Public Health. 2021 Nov; 1(11): e0000066. doi: 10.1371/journal.pgph.0000066.
[21] Hossain MA, Rashid MU, Khan MA, Sayeed S, Kader MA, Hawlader MD. Healthcare workers' knowledge, attitude, and practice regarding personal protective equipment for the prevention of COVID-19. Journal of Multidisciplinary Healthcare. 2021 Feb; 14(2021): 229-38. doi: 10.2147/JMDH.S293717.
[22] Ojha S, Debnath M, Sharma D, Niraula A. Knowledge of Handling the Personal Protective Equipment by Frontline Allied Health Professionals in COVID-19 Outbreak—A Web-Based Survey Study. Journal of Radiology Nursing. 2021 Jun; 40(2): 167-71. doi: 10.1016/j.jradnu.2020.12.012.
[23] Modi PD, Nair G, Uppe A, Modi J, Tuppekar B, Gharpure AS, *et al*. COVID-19 awareness among healthcare students and professionals in Mumbai metropolitan region: a questionnaire-based survey. Cureus. 2020 Apr; 12(4): 1-15. doi: 10.7759/cureus.7514.
[24] Salman M, Mustafa ZU, Asif N, Zaidi HA, Hussain K, Shehzadi N, *et al*. Knowledge, attitude and preventive practices related to COVID-19: a cross-sectional study in two Pakistani university populations. Drugs & Therapy Perspectives. 2020 Jul; 36: 319-25. doi: 10.1007/s40267-020-00737-7.
[25] Muhammad F, Khan A, Saleem M, Muhammad D, Jamal SF. Personal Protective Equipment Use among nurses in Critical Care Unite Nurses. A Comparative Study in Private and Public Sector Tertiary Care Hospital. Journal of Farkhanda Institute of Nursing and Public Health (JFINPH). 2022 Dec; 2(2): 8-12. doi: 10.37762/jfinph.33.
[26] Yazie TD, Sharew GB, Abebe W. Knowledge, attitude, and practice of healthcare professionals regarding infection prevention at Gondar University referral

DOI: https://doi.org/10.54393/pjhs.v4i05.714

hospital, northwest Ethiopia: a cross-sectional study. BMC Research Notes. 2019 Dec; 12(1): 1-7. doi: 10.1186/s13104-019-4605-5.

[27] Khatun MR, Ashik-Ur-Rahman SA, Shaha AC. Knowledge Regarding Needle Stick Injury & use of Personal Protective Equipment among Nurses at Dhaka Medical College Hospital, Dhaka. International Journal of Medical Science and Clinical Research Studies. 2023 Mar; 3(3): 373-9. doi: 10.47191/ijmscrs/v3-i3-18.

[28] Sharma R, Rohilla KK, Chadha L, Malhotra P, Sharmila S, Jelly P. Strategy to prevent infection from Covid-19 among security officers of tertiary care centre: A preexperimental study. Journal of Family Medicine and Primary Care. 2021 Sep; 10(9): 3257. doi: 10.4103/jfmpc.jfmpc_2609_20.