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Original Article

Prevalence of Stress and its Effects on the Physical and Dental Health of Medical, Dental, and Engineering Students in Lahore, Pakistan

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ABSTRACT

Stress can contribute to or influence the development of psychological disorders like depression and anxiety, as well as physiological issues like high blood pressure and slow wound healing. **Objectives:** To find out the prevalence of stress and its oral and physical manifestations in medical, dental, and engineering students of Pakistan. **Methods:** This cross-sectional questionnaire-based study was carried out in Rashid Latif Medical Complex and Clapp trust Lahore, Pakistan. The study included 326 male and female students from medical, dentistry, and engineering universities. **Results:** The majority of them were females 68.7% as compared to males 31.3%. The mean age of the students was 21.9±4.17 years. The persistent headache had the highest frequency among physical problems due to stress with 84.5% of the participants responding. In a comparative analysis, the t-test showed gender to be significant for disturbed sleep, difficulty breathing persistent headaches, and muscular pains while the ANOVA test showed a significant association of age with weight gain, pain in TMJ, and ulcers in the oral cavity. Regression analysis showed a significant relationship between weight gain and age. **Conclusions:** This study demonstrated that the stress of studying is making students more susceptible to problems with their physical and oral health, which is lowering their quality of life.

INTRODUCTION

There are numerous definitions for the term "stress". For a layman, pressure, tension, unpleasant external forces, and physical strain may come under stress [1]. Any change that causes physical, emotional, or psychological strain in an individual is referred to as stress. It is the physiological response of an individual's body to situations that require attention or action [2]. Stress is defined as a feeling of a disparity between environmental demands and individual capacities to meet those needs. It occurs when a person is confronted with a circumstance that they believe to be overwhelming and with which they are unable to cope [3]. Stress is defined as an aberration in human behavior, psychology, emotional outburst, constraint in daily ordinary labor, or physiological changes [4]. In short, any event or circumstance that strains or exceeds an individual's ability to cope is called stress which in turn impacts an individual's quality of life by compromising mental, physical, and oral health. Stress that is kept to a specific level is known to improve function and is referred to as positive stress. Distress occurs when this limit is exceeded and is not resolved by coping. Stress can contribute to or influence the development of psychological disorders like depression and anxiety, as well as physiological issues like high blood pressure and slow wound healing [5]. Individually, stress at home, school, and job may be quite mild, but when combined, it can cause

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significant strain. A student's life is impacted by a variety of stressors, including academic pressure and the expectation of achievement, an unclear future, and anticipated challenges in integrating into the system. Stress can be caused by assignments, examinations, educational environment, financial issues, workload, high parental expectations, and patient handling [6]. These students are dealing with social, emotional, physical, and family issues that are affecting their capacity to study and academic achievement [4]. Stress stops pupils from concentrating and enjoying their studies, from functioning in a peaceful manner, and from expressing their own skills. Stress builds up over time, causing frustration, despair, and anxiety, as well as attention deficit hyperactivity disorder, substance addiction, antisocial conduct, and even violence [7]. Stress has multiple deleterious effects on the physical health of an individual. A significant relationship has been reported between stress and physical illness [8]. Atrophy of brain mass and decreased size of the brain has been reported to be associated with chronic stress leading to detrimental effects on memory [9]. Stress has a negative impact on immune system by altering the processes in the central nervous system and neuroendocrine system [10]. Stress can also affect the cardiovascular system by increasing blood pressure, heart rate, and oxygen demand [11]. Chronic stress can also lead to gastrointestinal problems, for example, Crohn's disease, peptic ulcers, and an increase/ decrease in appetite [12, 13]. Stress can not only affect the physical health of an individual but can also negatively affect the dental health of an individual. Excessive stress can lead to poor oral hygiene behavior leading to increased plaque scores and gingivitis [14]. Increased prevalence of caries has been reported in high perceived stress score individuals [15]. Increased prevalence of myofascial pain dysfunction syndrome, burning mouth syndrome and xerostomia has been reported to be associated with stress [16]. Medical, dental, and engineering education can be a significant source of stress in students. The emotions experienced due to stress can be related to crucial outcomes, such as academic transformation and success, and the student's health and holistic well-being. Nevertheless, factors such as anxiety and stress can induce poor academic performance as well as physical and oral health problems in students. Stress has been frequently observed among students. The prevalence of stress is 80% worldwide among students [17]. A study conducted on Pakistani students reported that 75% of students suffered from stress [18]. Previous studies reported that the prevalence of stress in medical students was 54% while in dental students the prevalence was reported as 54.7% [19, 20]. The prevalence of stress in engineering students was reported as 56.7% [21].

The present study aimed to find out the prevalence of stress and its oral and physical manifestations in medical, dental, and engineering students of Pakistan.

METHODS

This cross-sectional questionnaire-based study was carried out in Rashid Latif Medical Complex and Clapp trust Lahore, Pakistan. The study included 326 male and female students from medical, dentistry, and engineering universities. Undergraduate and postgraduate students that had been studying at the University for a minimum of 8 months were randomly selected on a first come first basis between November 2020 to March 2021. The students who reported being diagnosed with depression were excluded from the study. To achieve a power of 95% with a 15% estimated prevalence of depression/anxiety and a two-sided 5% level of significance, the minimum sample size required was n=196 (. openepi.com/Menu/OE_Menu.htm); however, we were able to recruit n=325 students for this study. The questionnaire included basic biophysical questions including age, gender, and questions related to their university studies (type of study, year of study, and grades). For the stress-related part, Fonseca's and Fox's questionnaire was modified to include more oral symptoms for stress [22, 23]. The questionnaire consisted of 10 questions, 3 to check any oral problems related to stress (xerostomia, ulcers in mouth, TMJ issues), 5 questions to check any physical problems related to stress (breathing, weight gain, headache, GIT problems, muscular aches), and 2 questions to check for symptoms of stress (disturbed sleep, depression). The responses to the questions were recorded as 'Rarely', 'Sometimes', 'Often ', and 'Almost Always'. For statistical analysis, the responses were dichotomized with often and almost always as "Yes" and rarely and sometimes as "No". A pilot study was done by presenting a questionnaire to a small group of students. A kappa score of 0.8 was obtained for validity and repeatability. The Ethical Approval from Institutional Ethical Review Board reference # RLDC/000432/19 and verbal consent was taken from the participants, before initiation of the study, and participants were told about their voluntary participation and anonymity of data and results. The questionnaire was handed over to the participant with fifteen minutes given to answer the questionnaire. Data were stored and analyzed using STATA-14 Chicago Inc. Frequency and percentages were used to analyze demographic data, while ANOVA was used to correlate the stress-related questions. A p-value ≤ 0.05 was considered significant.

RESULTS

A total of 325 students responded to the questionnaire. The demographic characteristics of the study population are

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given in table 1. The majority of them were females 68.7% as compared to males 31.3%. The mean age of the students was 21.9 ± 4.17 years. Nearly three-fourths of them were medical students 72.4%, while dental and engineering students represented 17.8% and 9.8% of the total study population respectively. Most of the 43.6% were 1st-year students, nearly 38.3% were postgraduate students. Of the participants, 69.3% had an A+ grade, 24.5% had an A grade while 5.2% and 0.9% of them had B and C grades respectively (Table 1).

Variables		Frequency (%)
Gender	Male	102 (31.3 %)
	Female	224 (68.7%)
Age	18-25 years	262 (80.4 %)
	26-32 years	64 (19.6%)
Type of study	Medical	236 (72.4%)
	Dental	58 (17.8%)
	Engineering	32 (9.8%)
Educational level	1st year	142 (43.6%)
	2nd year	14 (4.3%)
	3rd year	7 (2.1%)
	4th year	30 (9.2%)
	Final year	8 (2.5%)
	Post-graduation	125 (38.3%)
Academic performance	80% and above A+	226 (69.3%)
	70% and above but below 60% A	80 (24.55%)
	50%and above but below 60% B	17 (5.2%)
	40% and above but below 50% C	3 (0.9%)

Table 1: Demographic data of study participants (n=325), n=number of patients

The responses to stress-related questions, out of 325 respondents, 65.3% to having disturbed sleep and 55.7% felt depressed due to their studies. The persistent headache had the highest frequency among physical problems due to stress with 84.5% of the participants responding. GIT problems were the least affected physical issue faced by the participants at 27.1%. Dryness of mouth due to stress was responded in positive by 60% of participants, while TMJ issues and ulcers in the oral cavity were among 42.6% and 39% respectively (Table 2).

Questions	Items	Yes	Percentage %	No	Percentage %
Symptoms of stress	Disturbed Sleep due to stress	212	65.2	113	34.8
	Depressed and stressed due to studies	181	55.7	144	44.3
Physical Problems related to stress	Difficulty Breathing	171	52.6	154	47.4
	Weight Gain	167	51.3	158	48.7
	Persistent Headache	274	84.3	51	15.7
	GIT Problems	88	27.1	237	72.9
	Muscular Pains	233	71.7	92	28.3
Oral Problems related to stress	Dryness of mouth	195	60.0	130	40.0
	Pain in TMJ	138	42.6	187	57.5
	Ulcers in Oral Cavity	127	39.0	198	61.0

Table 2: Frequency of stress-related symptoms among study participants

In a comparative analysis, the t-test showed gender to be significant for disturbed sleep, difficulty breathing persistent headaches, and muscular pains while the ANOVA test showed a significant association of age with weight gain, pain in TMJ, and ulcers in the oral cavity. (Table 3).

Questions	Items	Age	Gender	Type of Study
		p-value		
Symptoms of stress	Disturbed Sleep due to stress	0.28	<0.001*	0.184
	Depressed and stressed due to studies	0.37	0.25	0.11
Physical Problems related to stress	Difficulty Breathing	0.47	0.002*	0.17
	Weight Gain	0.01*	0.41	0.75
	Persistent Headache	0.51	<0.001*	0.68
	GIT Problems	0.43	0.57	0.49
	Muscular Pains	0.43	<0.001*	0.32
Oral Problems related to stress	Dryness of mouth	0.41	0.32	0.49
	Pain in TMJ	0.03*	0.11	0.02*
	Ulcers in Oral Cavity	0.03*	0.47	0.20

Table 3: Comparison of Stress with Age, Gender, and Type of Study. p-value <0.005 was considered significant

Regression analysis showed a significant relationship between weight gain and age. Younger students were 1.64 times less likely to gain weight due to stress than students in higher grades. Similarly, Medical students were 0.62 times less likely to have TMJ problems when compared to engineering and dental students. Further logistic regression showed significant results for gender-related stress-induced issues in sleeping habits and breathing difficulty. Females when compared to males were 0.38 times less likely to have disturbed sleep and 0.47 times less likely to have breathing difficulties (Table 4).

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Questions	Items	Variables	Odds	p-value	CI
Symptoms of stress	Disturbed sleep due to stress	Gender	0.38	0.0001*	0.23-0.64
Physical Problems related to stress	Difficulty Breathing	Gender	0.47	0.0002*	0.29-0.77
	Weight Gain	Age	1.64	0.01	1.08-2.48
	Persistent Headache	Gender	0.29	<0.001*	0.15-0.64
	Muscular Pains	Gender	0.33	<0.001*	0.19-0.54
Oral Problems related to stress	Pain in TMJ	Type of Study	0.62	0.01	0.42-0.91

Table 4: Regression analysis showing gender-related stress issues. p-value <0.005 was considered significant

DISCUSSION

Stress harmfully upsets not only the physical health of an individual but also affects mental health, psychosocial well-being and as depicted by the results of this study it has deleterious effects on the dental health of an individual. The symptoms of stress according to Fonseca's and Fox's questionnaire were more prevalent in males, according to data, females were 0.38 less likely to have disturbed sleep than males. Prevalence of depression (a symptom of stress), however, was insignificant for gender. Results of the current study are in contrast with the previously done studies [24-26], all of which depict a greater frequency of female students suffering from stress than male students [1-3]. Also, according to the present study, 65.3% of students had disturbed sleep and 55.7% felt depressed due to stress. This data concurs with a previous study that indicated stress in 68.6% of students [26]. However, data from five years ago shows a distinct pattern, with relatively low stress among students, with 10.1, 31.8, and 2.4 percent of students suffering from moderate to severe depression, anxiety, and stress, respectively [1]. As far as physical problems related to stress are concerned, data of this study stated persistent headache in 84.5% and muscular pain in 71.7% of students This is, in contrast, to previously published study which reported headache and cervical muscular pain in 40% and 47% of students respectively and GI problems related to stress were the least of the physical problems affecting 27.1% of students. Other parameters of physical problems related to stress have not been assessed in any other study. This study revealed physical problems like muscular pain, persistent headache, and difficult breathing to be more prevalent in males establishing significant gender predilection, contradictory to previously done study, which reported muscular pain and persistent headache more commonly in females [27]. However, weight gain due to stress was reported by 51.3% of students and it was significantly associated with age, as students of higher age were 1.64 times more likely to have weight gain than lower age. There was no gender predilection for weight gain in the present study, which is opposite to the results of a previously done study which reported that obesity was 14.5% more prevalent in males as compared to females [28]. According to Fonseca's and Fox's questionnaire, oral symptoms related to stress questioned from the participants were dryness of mouth, pain in TMJ and oral ulcers, which were reported by 60%, 42.6% and 39% of students respectively. Data of this study reveals that medical students were 0.62 times less likely to have TMJ problems when compared to engineering and dental students. Increased activity of masticatory muscles under stress leads to TMD which is also associated with parafunctional habits. These results concur with a previous study done in Saudi Arabia reported TMD in 36.99% of students [29]. This study showed relatively lower prevalence of oral ulcers among students (39%) as compared to a previous study in which oral ulcer prevalence was 78.1% [30]. However, these results were close to a previous study done in India [31]. Dental students are more likely to acquire symptoms related to psychosocial distress [32]. Over the years, dentistry students have been studied, but no solutions for reducing stress levels have been developed [6]. Also engineering students encounter similar problems. The introduction to new technical and non-technical subjects, new examination pattern. Semester system requires involvement throughout the year. Assignments, submissions, and regular class assessments add to the study load. Additionally, pupils' inability to manage their time makes things tough [33].

CONCLUSIONS

This study showed that due to stress of study the students are getting more prone to physical and dental health issues that is compromising the quality life of students. Further studies on larger scale are necessary to conduct to have an insight in physical, oral, and mental health of students. Increasing students' stress-management abilities is an important target for better outcome.

Conflicts of Interest

The authors declare no conflict of interest.

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