IMPACT ON MENTAL HEALTH OF UNDERGRADUATES AND THE WAYS TO COPE STRESS DURING COVID-19 PANDEMIC

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ABSTRACT

Objective: To evaluate the mental health status of undergraduate's students of three different programs. To correlate the related factors influencing GAD-7 score and to assess the coping methods practiced by under-graduates during COVID-19 outbreak.

Study Design: Cross-sectional survey.

Place and Duration of Study: COVID-19 lock down period among public and private universities in Karachi, from 10th May to 30th May 2020.

Methodology: It was conducted among the medical, dental and engineering students of private sector universities of Karachi. The GADS-7 (Generalized anxiety disorder scale 7-items) validated tool was used along with the demographic variables, related stress factors and the coping skills practiced. Total 571 questionnaires were found completed in all sections.

Results: From the total students 132 (23.1%) experienced mild, 343 (60.1%) moderate and 78 (13.7%) had severe anxiety level on GADS-7. All related stressors were significantly associated with GAD-7 scale at *p*-value of <0.01. Moreover the results depicted that there was a moderate positive correlation found (0.489, 0.342, 0.310 and 0.328) for all related stressors. Taking breaks from watching, reading news about outbreak of COVID-19, meditation and engaging in some other activities were the most frequently used coping strategies among undergraduates'.

Conclusion: Study has shown 96.9% drastically augmented level of anxiety. There was significant difference found in mental health of all three cohorts. There was a moderate positive correlation found for all related stressors. Taking breaks from watching, reading news about the outbreak of COVID-19 was the most frequent coping behavior practiced by all students.

Keywords: Coping method, COVID-19, Dental undergraduates, Medical undergraduate, Mental Health.

INTRODUCTION

The COVID-19 termed as novel COVID-19 has aggressively expanded in entire world from China in December 2019[1] and in Pakistan from 26th February 2020[2]. The COVID-19 expressed as acute pneumonic infections[1]. It is termed as novel due to its typical features of previously unknown MERS (Middle East respiratory syndrome) in 2011 and SARS-COV-2 (Severe acute respiratory syndrome coronavirus 2) in 2002 to 2003. On 30th January 2020; WHO declared public health emer-gency of international concerns[2].

Worldwide; COVID19 causes 432,437 fatali-ties till 15th June 2020 according to the global data on Govt of Pakistan reports[3]. These escalating fig-ures placed a huge burden on healthcare system worldwide including Pakistan. There were total 2,729 deaths, 144,478 confirmed cases, 53,721 rec-overed cases of COVID-19 in Pakistan till 15th June 2020[3]. The development of vaccination or treatment against the pandemic of COVID-19 is formidable challenge for international commu-nity of developed and developing countries.

Strict precautionary measures are imposed in majority of countries where case incidences and case fatalities are increasing not on daily basis but on hourly basis[2]. The precautionary measures inc-ludes closure of educational institutes, physical distancing, frequent hand washing for 20 second, wearingmask, social-isolation and lock down is been practiced worldwide. The COVID-19 pande-mic has dreadful consequences on every aspect of human life such as economical, healthcare,

educational, social and cultural[2]. In Pakistan the educational institutes were closed from 18th March 2020 to implement physical distancing and to prevent the local transmission of COVID-19 among students. Therefore complete lock down was imposed from 23rd March 2020 which was converted into smart lock down on 9th May 2020 in Pakistan[4].

Fear is a virus which has completely infected the general population due to poor information processed on social media. People all around the world are facing various mental disorders during this COVID-19 outbreak such as anxiety, post traumatic disorder during self-isolation and quarantine because of the uncertain consequences of this outbreak[5]. Recent study revealed the crucial role of psychiatrists to assess the psychological status of vulnerable population such as healthcare personnel, older people, children[5]. The mental health of college students were assessed in recent study conducted in China; in which 24.9% of college students were experiencing anxiety during the COVID-19 crisis[6]. The mental health of the undergraduate student is also affected during this public health emergency due to the risk factors such as academic delays, economic influence, daily life influence and lack of social support according to the study conducted in Faisalabad, Pakistan on pharmacy student[4]. However; the association of loneliness during this pandemic outbreak is unclear[7]. Though the impact of COVID-19 on psychological health of undergraduates'medical, dental and engineering students and the related stressors in Karachi Pakistan is unattended in literature to date and indeed it was the rationale of this study. There are various anxiety assessment tools used in literature to assess the psychological health of dental undergraduates[8,9].

The GAD-7 (Generalized Anxiety Disorder Scale) is 7 item validated tool used for screening and diagnosis of anxiety disorders. The GAD-7 is a modified version of "Patient Health questionnaire-PHQ" which was the first developed self-reported questionnaire to screen the general anxiety disorders in primary health care settings[6]. The GAD-7 tool is easy to score and takes approximately less than 3 minutes[6]. Now; GAD-7 is widely used in research and in clinical practice to screen anxiety disorders because of its efficiency and diagnostic reliability[6,10].

It was hypothesized that mental health of the undergraduate students is gravely affected during this public health emergency of COVID-19 outbreak. Therefore it is vital to address their stress coping ways and indeed it was the rationale of study Hence the primary objective of this study was to evaluate the levels of anxiety on GAD-7 scores. The secondary aim was to correlate the related factors influencing level of anxiety and to assess preferred coping methods practiced by dental, medical and engineering students of Karachi during COVID-19 outbreak.

METHODOLOGY

This cross sectional survey was conducted online among dental, medical and engineering undergraduates' university students of private sector in Karachi through consecutive sampling technique. This study was executed from 10th May to 30th May 2020 after approved from Bahria University Medical and Dental College (BUMDC) Karachi numbered; 50-2020. The administrative permission was obtained verbally before executing the study in engineering institute. The engineering students were included in the study to assess more comparative results. The inclusion criteria include the current medical, dental and engineering students of Private Sector Universities; repeaters and students from various allied subjects were excluded. Study consent was obtained from the participants by providing rationale of the study and anonymity of the subjects was assured. The sample size was calculated by standard formula for sample size calculation $N = (Z) 2 \times P (1-P)/d^2$ by keeping the prevalence of 24.9%[6]. The calculated sample size was 288 but as to bring more significant results and keeping in mind the 20% wastage; the augmented sample size was 600.

The questionnaire comprised of five sections; in first section the participants were requested for con-sent and rationale of the study was written.

The second section comprised of the demographic parameters such as age, gender, undergraduate course, steady family income, live with parents and any relative infected with COVID-19. The third section was regarding the psychological assessment based on GAD-7 questionnaire. The GADS-7 is a validated tool and has established internal consistency of Cronbach's = 0.911)[6]. The psychological assessment was rated as normal, mild, moderate and severe. The minimum and maximum score was 0 and 21. The 0 score is rated as normal, 1-7, 8-14 and 15-21 scores were rated as mild, moderate and severe respectively. The fourth section was regarding the preferred stress coping method/behavior during COVID-19 lockdown period and nine options were provided. The options wereas take breaks from watching, reading or listening to news/stories regarding pandemic, take deep breaths and stretch, meditate, exercise regularly, get plenty of sleep, try to do some other activities you enjoy, connect with others and any other coping skills apart from the mentioned options. The last section was inquired about the related stressors of anxiety and the responses were based on four point likert scale as

study tool was reviewed by five public health experts of the institutes and the corrections was incorporated before conducting the pilot study among fifteen students of physiotherapy. The results of pilot study were not incorporated in final data analysis. Total 600 questionnaires were emailed among the targeted students. Total 571 questionnaires were found completed in all sections.

The data was analyzed on SPSS version 23. A p-value <0.05 was considered as statistically sig-

Table-I: Undergraduates students with levels of anxiety on GAD-7.

Levels of Anxiety	n (%)
Normal	18 (3.2)
Mild	132 (23.1)
Moderate	343 (60.1)
Severe	78 (13.7)

nificant. Mean was calculated for age, frequency was calculated for gender, undergraduate course, steady family income, lived with parents and any relative infected with COVID-19. Kolmogorov-Smirnov and Shapiro-Wilk test was used to check the normality of data. The parametric tests were

Table-II: Levels of anxiety and demographic factors of students during COVID-19 pandemic.

Demographic Variables	n (%) 571	Normal (n=18)	Mild (n=132)	Moderate (n=343)	Severe (n=78)	p-value
Gender						
Male	154 (27)	5 (27.7)	28 (21.2)	101 (29.4)	20 (25.6)	0.05**
Female	417 (73)	13 (72.2)	104 (78.7)	242 (70.5)	58(74.3)	
Residential Place						
Urban	453 (79.3)	17(94.4)	117 (88.6)	260 (75.8)	59(75.6)	
Urban rural	87 (15.2)	1 (5.5)	11 (8.3)	62 (18)	13(16.6)	0.01*
Rural	31(5.4)	-	4 (3)	21 (6.1)	6 (7.6)	
Steady family Income						
Yes	401 (70.2)	16 (88.8)	111 (84)	219 (63.8)	56 (71)	<0.01**
No	170 (29.7)	02 (11.1)	21 (16)	124 (36.1)	23 (29)	
Live with Parents						
Yes	501(87.7)	16 (88.8)	126 (95.4)	292 (85.1)	67 (85.8)	0.01**
No	70 (12.2)	02 (11.1)	6 (4.5)	51 (14.8)	11 (14.1)	
Relative or family got COVID-19						
Yes	120 (21)	2 (11.1)	8 (6)	88 (25.6)	22 (28.2)	<0.01**
No	451 (78.9)	16 (88.8)	124 (94)	255 (74.3)	56 (71.7)	

*Chi square, ** Fischer exact test*

0-3 same as the responses of GAD-7 tool. Participants were rated the responses as experienced during last two weeks. The content validity of the

performed when data was normally distributed and non parametric analysis was carried out in case of not normally distributed. Association of

demographic variables in three cohorts of students was analyzed with chi square and fischer exact test. Kruskal Wallis test was performed to compare the GAD-7 score among all three cohorts of undergraduate students. The linear regression analysis was performed for the related stressors such as academic delays, economic influence, social support and daily life influence and GAD-7 scores during COVID-19 among students of three programs and was expressed as R.

RESULTS

The mental health of the students was assessed on GADS-7 scale as normal, mild, moderate and severe levels. From the total majority of students 343 (60.1%) experienced moderate anxiety level on GADS-7 scale (table-I).

Table-III: Comparing the GAD-7 score of three cohorts of undergraduate students.

BDS n=228			*p*-value
Median		10.0	
Percentiles	Q1	7.0	
	Q3	14.0	
MBBS (n=203)			
Median		9.0	
Percentiles	Q1	7.0	0.034*
	Q3	13.0	
Engineering (n=140)			
Median		10.5	
Percentiles	Q1	8.0	
	Q3	14.0	

Kruskal Wallis Test

Table-IV: GAD-7 score and the related stressors of COVID-19.

Related Stressors	GAD-7 Score R	*p*-value
Worried about economic influences	0.489**	<0.01
Worried about academic delays	0.342**	<0.01
Influence on daily life	0.310**	<0.01
Social Support	0.328**	<0.01

*R=Regression analysis***

There were total 203 (35.5%) medical, 228 (39.9%) dental and 140 (24.5%) engineering undergraduates. The mean age of the students was 21.75 ± 2.39. Majority of participants were female 417 (73%) students. From the total subjects 453 (79.3%) lived in urban areas, 401 (70.2%) have

steady family income, 501 (87.7%) lived with parents and 120 (21%) students' relative or acquaintance were infected with COVID-19 (table-II).

Table-II revealed the demographic factors which influenced levels of anxiety during COVID-19 outbreak. Female students were found to have greater levels of severe anxiety as compare to male students. The students lived in urban areas, steady family income, lived with parents experienced mild levels of anxiety at (88.6%, 84%, 95.4%) respectively. Living in urban areas, steady family income, lived with parents were the protective factors towards anxiety. There was statistically significant difference found in levels of anxiety and students' residential place, steady family income and lived with parents during COVID-19 on GAD-7 scale at *p*-value of 0.01, <0.01 and 0.01 respectively. Relative or acquaintance got infected with COVID-19 was a risk factor for anxiety. In our study; (28.2%) students
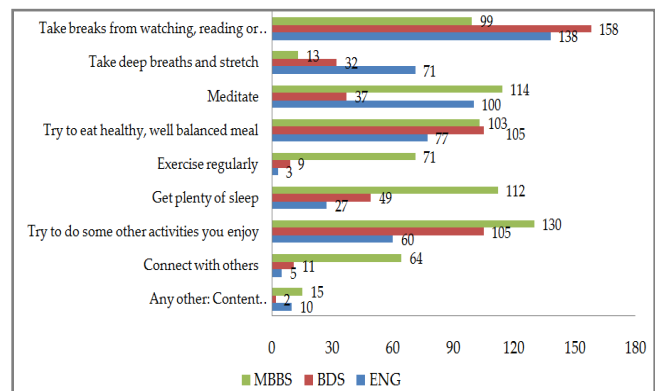

Figure: Coping ways during COVID-19 outbreak practiced by undergraduate students.
Chi-square <0.01

experienced severe level of anxiety as their relatives were infected with COVID-19 and calculated *p*-value was <0.01.

There was statistically significant difference found between the GAD-7 score among all three cohorts of undergraduates at *p*-value=0.034 (table-III).

The related stressors of COVID-19 included economic influence, academic delays, influence on daily life and social support. The linear regression analysis revealed that the GAD-7 scores

were positively associated with the related stressors at *p*-value of 0.000. There was moderate and positive correlation found as (0.489, 0.342, 0.310 and 0.328) for all related stressors and GAD-7 score. Moreover there was highest R score found as 0.489 for worried about economic influence table-IV.

Figure depicted that taking breaks from watching, reading news regarding the outbreak of COVID-19 was practiced by n=395 students; meditation by (n=231) students and engaging in some other activities were the most frequently used coping methods (n=295) practiced by all three cohorts of students. On the other hand meditation and get plenty of sleep was the second most equally used coping behavior in MBBS and engineering students. Eat healthy and well balanced meal was approximately equally enjoyed among all three groups of students. There was statistically significant difference found at (*p*-value ≤0.01) between the copying methods of all three cohorts of students. Therefore the results of the study were accepting the research hypothesis that mental health of the undergraduates was gravely affected during this COVID-19 pandemic.

DISCUSSION

According to various studies; the mental health of undergraduate students was expressed as psychological distress, depression,high level of anxiety and stress due to routine challenges of teaching and assessment[11-14]. However; this study was aimed to assess the impact of COVID-19 outbreak on mental health of undergraduate students. Though this study has shown 96.9% level of anxiety during COVID-19 outbreak. The drastically increased level of anxiety in our study might be related to closure of educational institutes, lock down period and social distancing. Interpersonal communication is decreased in this social distancing phase which is one of the important reasons to deteriorate the mental health of the students[6]. Even if emergency remote teaching has been executed in various educational institutes but it is difficult to conduct clinical content on virtual student environment which might be

the reason of increase level of anxiety and fear of future employment[6]. The similar levels of stress were reported by the study of Kevin A conducted in Karnataka, India in 2020[14]. In this study, potential psychosocial, academic and environmental stressors was assessed by using Perceived Stress Scale (PSS) among n=301 MBBS students. Moreover; in this study John *et al*[14] reported higher PSS score in 2nd year MBBS students and the potential academic stressors were (92.4%) inadequate study leave, (84.1%) vastness of academic curriculum, (70.4%) of poor quality of food in mess or home, (60.1%), accommodation away from home, and (48.5%) students had high parental expectations[14].

However among medical students the global prevalence of psychosocial disorder was 33.8%[15]. In our study female students were found to be more affected with this pandemic situation comparing to male students. Increased level of anxiety reflecting compromised psychological health and analogous results were revealed from the study conducted in UK[7] during COVID-19 outbreak revealed that being a female of younger student age, having insufficient house hold income and having no employment were the risk factors for severe classification of loneliness and mental health ailments. Conversely no significant gender difference was found in our study as COVID-19 outbreak has similar psychological effects on general population irrespective to gender[6]. It is indicated that demographic factors such as living in urban areas, steady family income, live with parents and any relative or acquaintance got infected with COVID-19 were associated with general anxiety disorder scale-7 items; as living in urban areas has conducive effects on student's anxiety level due to available resources[6,16]. Living with parents and sound family finance has positive effects on the stress level. These results were comparable with the study of China[6]. Moderate anxieties in medical students was found higher and severe anxiety was greater in engineering students in our study. These results were contrary with the study of Naseem in 2017[17] and discovered the high prevalence of depression among

medical students as compare to engineering students. According to literature more stress was observed in medical students as compare to engineering students[18]. According to the study conducted in Peshawar, Pakistan by Ali in 2018[19] revealed that among four medical students every three medical students were experiencing mental stress.

On the other hand; increase psychological distress was found in medical/dental students of clinical years and inunmarried students according to the study conducted in Jeddah[20]. Our study findings demonstrated positive and significant correlation between related stressors and GAD-7 scores on mental health during COVID-19. The worries about economic situation of the families influenced more on mental health of undergraduates than other stressors during the pandemic as people are isolated in their homes and complete and partial lock down was enforced and these results are in consistent with the study of China[6]. In literature[21] social support is known as health promoting agent and act as buffer against all life stressors across all cultures. However literature evident that the most usual effecting stressors were academic concerns, fear of poor performance in examination, lack of recreation, loneliness, living in hostel or rental houses and family problem[21]. In contrast recent study reported that facing financial problem, poor social support, lack of interest in their field of study and unresolved conflict with roommate were the risk factors of stress among engineering students in Ethiopia[22]. To get rid of the stress is really very essential to evade the emotional losses and find the appropriate behavior or skill to deal with public health emergency among undergraduates. Otherwise this stress can ends up in "increased utilization of maladaptive (dysfunctional) coping methods"[22]. The most preferred coping skills practiced by students in this study were taking breaks from watching news and television along with getting engaged in activities they enjoy. According to study conducted in Brazil[23] the escape and avoidance coping skills enable students to mindfully handle the stress. As the alarming sen-

sational headline regarding COVID-19 pandemic have multiply the stress level[6]. However in a non pandemic conditions positive reframing, praying or spiritual activity, followed by watching movies, communication with friends and family support was commonly practiced coping skills[14]. In our study, meditation and get plenty of sleep was the second most equally used coping behavior to reduce the stress caused by this outbreak. Spiritual activity affects negatively and positive thinking helps medical students to reduce stress and surprisingly the strong coping strategy reported was social support. Social support from love partner or friend is buffering stress related problems among youngsters and not the family support[14].

According to the study of Huang *et al*[24] conducted during COVID-19 among nurses to assess their coping strategies and emotional response; it indicated that nurses have strong emotional response and were using problem focus coping strategy.

The limitation of the study cannot be ignored. Due to subjective nature of study it was unfeasible to assess temporal relationship between mental health and steady family income, living with parents, preferred coping skills. The causal sequence can be observed by adding the variables of students of private and public sector, year of undergraduate study, increase sample size, academic performance, and curriculum modification such as remote teaching in public health emergencies and health promoting behavior during COVID-19 outbreak[5], motivation and validated coping tool in future. The data can be generalized to the entire undergraduate students of Pakistan cautiously due to the pandemic outbreak.

It is recommended to start systemic online counseling sessions in this remote educational era so that the students can seek assistance from professional counselors to get appropriate psychological support or care[11]. There are universities having strong mentoring system such as BUMDC; to provide one to one positive reinforcement to every undergraduate. Additionally, uni-

versities should work on to modify the stressful academic content and try to implement necessary changes. As there is a change in learning environment, new engaging strategies of assessment, teaching and learning should be incorporated and a multidisciplinary approach would be fruitful and appropriate.

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CONCLUSION

Study has shown 96.9% drastically augmented level of anxiety. There was significant difference found in mental health of all three cohorts. There was a moderate positive correlation found for all related stressors. Taking breaks from watching, reading news about the outbreak of COVID-19 was the most frequent coping behavior practiced by all students.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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