IJBS

10.30491/IJBS.2021.279945.1521

International Journal of Behavioral Sciences

Original Paper

Predicting Post-Traumatic Stress Disorder Based on Mental Health, Covid-19 Anxiety and Sleep Quality in University Students

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Submitted: 21 September 2021
Accepted: 1 November 2021

Int J Behav Sci. 2021; 15(3): 219-225

Abstract

Introduction: Studying the predictors of Post-Traumatic Stress Disorder (PTSD) during the Covid-19 pandemic is a new research field. The current study was conducted in order to evaluate the predictors of PTSD based on mental health, Covid-19 anxiety and sleep quality in the students of the Lorestan province, Iran.

Method: In order to carry out this study, 200 students (143 females and 57 males) were selected by convince sampling and participated in this study. The participants completed the Pittsburgh Sleep Quality Index (PSQI), Covid-19 Anxiety Scale, Post-Traumatic Stress Disorder Checklist, General Health Questionnaire (GHQ-12) and demographic information questionnaire. The data was analyzed by independent t-student and stepwise regression using SPSS 24.

Results: Findings revealed that there is a significant positive relationship between Covid-19 anxiety, general sleep quality and mental health with PTSD symptoms ($p<0.05$). Also, stepwise regression analysis showed that sleep quality and mental health were predictors of PTSD and mental health is the best predictor of PTSD and could determine 0.27 of PTSD variance. Finally, the 46.5 % prevalence of PTSD symptoms in students was an important finding of this study.

Conclusion: Necessity to pay attention to dimensions of mental health as an influential factor in the spread of other psychological disorders is recommended. Due to the high prevalence of PTSD symptoms, the inclusion of health-oriented programs becomes more important.

Keywords: Mental Health, Covid-19 Anxiety, Sleep Quality, PTSD Symptoms

Introduction

The Covid-19 virus pandemic, which first broke out in China in late December 2019, has spread throughout the world, causing many infections and more than 2,500,000 deaths worldwide in one year. There is growing evidence that the global Covid-19 virus pandemic could have serious effects on a person's mental health and can cause mental disorders such as acute stress, PTSD, depression and anxiety, both now and in the coming future [1]. Since the early Covid-19 pandemic, public health experts have warned of an increased likelihood of PTSD in the general population [2]. These concerns are supported by historical evidence of symptoms of trauma following previous pandemics, such as the outbreak of Severe Acute Respiratory Syndrome (SARS) [3]. In order to prevent further transmission of this virus, paying attention to students' mental health is important during the Covid-19 pandemic. Regarding the global closure announced by the government of Iran, many public places

including schools, colleges, universities and other institutions are remaining to be closed until the situation is under better control. This uncertain situation has damaged individuals' daily routines, and has put their mental health at risk for developing PTSD [4]. PTSD is defined as the symptoms and chronic distress of experiencing or observing a life-threatening event such as a pandemic. Common symptoms include agitation, re-experiencing and avoiding accidents[5].

People who experience PTSD may be at particular risk for adverse outcomes during a pandemic. Individuals with PTSD show significant clinical avoidance symptoms, which may prevent them from seeking vital resources such as health and mental health care. . Protective instructions may also increase the awareness about the dangerous world and reinforce avoidance behaviors [6]. Therefore, crisis management in this group of people and reducing the dimensions of this disease will not be possible without bearing in mind all the dimensions and aspects of human issues.

For discovering the underlying mechanisms involved in PTSD in students, it is essential to look at mental health indicators during pandemic-induced social distancing. Quarantine is a necessary act to reduce the transmission of Covid-19 [7]. However, people in quarantine report more depression and anxiety symptoms than people who are not in quarantine [8]. Existing psychiatric disorders may lead to more psychological distress associated with Covid-19 [9]. For example, people with a history of anxiety, depression or bipolar disorder are more likely to experience severe mental disorders during Covid-19, such as PTSD individuals, compared to those without a history of mental disorders [10, 11]. During the Covid-19 outbreak, like other pandemics, anxiety and worry were the major psychological consequences [12-14]. Covid-19 anxiety included anxiety caused by being infected with the Covid-19 virus. Research shows that people who suffer from covid-19 anxiety are at higher risk to PTSD [15, 16]. For example, people with acute Covid-19, experience more severe PTSD symptoms than people with mild Covid-19 about three months after partial recovery [17, 18]. Covid-19 virus is highly associated with conditions that may interfere with sleep [19]. Casagrande et al. [20] suggested that Covid-19 can lead to sleep disorders and poor sleep quality. Low sleep quality is also associated with PTSD during Covid-19 outbreaks. Evidence suggests that sleep problem is not simply a secondary symptom of PTSD but is a risk factor for severe symptoms [21]. For example, insomnia a month after exposure to a traumatic event predicts the fast progression of PTSD six weeks, six months, and a year after exposure [22]. Research by Liu et al. [23] revealed that participants with better sleep quality or fewer repetitive wakefulness episodes reported lower PTSD during the Covid-19 outbreak .

Casagrande et al. [20], showed growing evidence which support a clear link between the Covid-19 pandemic and mental health problems [24]. However, there is little information on the trend of psychological trauma in university students at different stages of the pandemic. Also, the effect of psychological factors on PTSD is not well understood in the conditions associated with the prevalence of highly infectious and deadly diseases. Therefore, further research in different populations seems to be necessary to understand the psychological challenges associated with Covid-19 [11]. Besides, in order to identify the potential risk factors for PTSD in students during the Covid-19 epidemic, this study was carried out in order to predict the symptoms of post-traumatic stress based on mental health, Covid-19 anxiety and sleep quality and to determine the proportion of each one of these variables in predicting post-traumatic stress.

Method

The present study was a descriptive-analytical cross-sectional study carried out simultaneously with the Covid-19 pandemic from June to July 2020. The study population included all students in Khorramabad, Lorestan province. The sample size included 200 individuals. The sample size of the Green formula (1991) was obtained for regression 8m + 50. Given that m is the number of predictor variables with respect to the three predictor variables of mental health, Covid-19 anxiety and sleep quality, 74 samples were the minimum required. Considering the possible loss of participants in the survey, the sample size increased to 200 people. Due to the need to reduce social contact in order to prevent the spread of Covid-19, the available sampling method and Internet implementation were used. The method is that the questionnaire link was made available to users online on WhatsApp and Telegram social networks.

The inclusion criteria included being a student and being a cyberspace user. The exclusion criteria included dissatisfaction for participating in the research and incomplete completion of the questionnaires. Participants in the study were instructed to refrain from writing their names on the questionnaires and were assured that all questionnaires would be collected for statistical analysis and their information would remain confidential. Whenever they did not want to continue, they could withdraw the research. The present study is the result of a research project with the ethical code of IR.BMSU.REC.1399.585, which was approved in the Baqiyatallah University of Medical Sciences (BUMS). In descriptive statistics, statistical indicators such as frequency, mean and standard deviation were used, and in inferential statistics, student's t-test, one-way analysis of variance, Scheffe post hoc test, Pearson correlation and stepwise regression were used to compare and evaluate the relationship between variables. Data were analyzed using SPSS software version 24.

The tools used in this study were as follows:

Pittsburgh Sleep Quality Index (PSQI): The scale was developed in 1988, by Buysse et al. Pittsburgh Sleep Quality Index measures subjective sleep quality and sleep patterns among adults during last month exactly. This questionnaire measures seven parameters including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication and daytime dysfunction and includes 18 items. Participants should respond to a range of responses from less than once per week (score=0), once per week

(score=1), twice per week (score=2), and three times or more per week (score=3). Notably, a total score higher than 5% shows poor sleep quality [25]. Psychometric characteristics showed that the validity of PSQI is 80% and its reliability is between 93-98% and Cronbach's alpha coefficient of this questionnaire is 78-82% [26]. In the present study, the reliability by Cronbach's alpha method was calculated 0.76.

Covid-19 Anxiety Scale (CDAS): The Covid-19 Anxiety Scale (CDAS) has been developed for measuring Covid-19 in 2020 [27] and includes 18 items. On a four-point Likert scale (0: never to 3: always), participants respond to all items and items are summed to provide a total CDAS score. The range of scores is between 0 and 54, and a higher score indicates more Covid-19 anxiety. A score of 0 to 16 indicates no or mild anxiety, a score of 17 to 29 indicates moderate anxiety, and a score of 30 to 54 indicates severe anxiety. The structural validity of the CDAS was confirmed by factor analysis and its reliability reported by Cronbach's alpha method was 0.91. In this study, Cronbach's alpha was 0.96

Post-Traumatic Stress Disorder Checklist (PCL-5): The PCL-5 was developed by staff at the VA National Center for PTSD in 1993 and includes 20 items on a five-point Likert scale (Scores ranging from 0 to 4). PCL-5 consists of four scales of intrusion (criterion B), avoidance (criterion C), negative changes in mood (criterion D) and over arousal (criterion E), which corresponds to on the DSM-5 symptoms clusters of PTSD. Cronbach's alpha of English version of the PCL-5 is 0.95 and 0.94 for the French version. The English and French versions of the PCL-5 had appropriate convergent and divergent validity [28]. The Persian version of the PCL-5 had acceptable psychometric properties [29]. Previous studies suggested a variety of cutoff scores ranging between 28 and 37 [30]. Since the cut-off point of the PCL-5 was not found in the Iranian population based on researchers' investigations, according to the mean score of PTSD in the present study, a score of ≥33 was considered as a cut off to indicate clinical levels of PTSD. In the present study, Cronbach's alpha was calculated 0.96

General Health Questionnaire (GHQ-12): The GHQ-12 was developed by Goldberg in 1988 [31] and examines a person's mental state during the last month. The questionnaire includes 12 items, six positive items (3, 3, 4, 6, 10 and 12) and six negative items (11, 9, 8, 7, 5 and 1). For each positive item, four options including better than ever, as always, less than always and much less than always (0 to 3) and for each negative item, four options including never, no more than ever, more than ever, much more than ever (0 Up to 3) were considered. The total score is calculated with the total score of the items, so the range of scores is between 0 and 36 and higher scores indicate more inappropriate mental health [32]. Montazeri et al. [33] showed that the questionnaire is standard for measuring mental health in the Iranian population and its reliability coefficient was reported to be 0.87 by Cronbach's alpha method. Also, in the present study, Cronbach's alpha reliability was calculated to be0.68.

Demographic Information Questionnaire: This researcher-made yes / no questionnaire has nine questions in two parts of demographic information: age, gender, marital status, education level, shift work and history of drug or alcohol use) and history of exposure to Covid-19 virus (history of Covid-19 disease, having suspicious symptoms, history of close contact to patient and history of the disease in close relatives). This questionnaire was used to measure demographic information and levels of exposure to Covid-19 in the research sample only.

Results

In order to carry out this study, 200 individuals (143 females and 57 men) participated. The frequency distribution of participants in terms of age, gender, marriage, educational status, residence status and history of drug and alcohol use can be seen in Table 1. Most of the participants in the study were under 35 years old (89%), female (71.5%), single (81.5%) with bachelor's degree (75%) and non-dormitory (90%) and 22% of the participants in the present study claimed to having a history of drug and alcohol use.

The results of independent t-test showed that the severity of PTSD symptoms in individuals under 35 years is more than over 35 years ($t = 2.48$, $p < 0.01$). The severity of PTSD symptoms was higher in single individuals than in married individuals ($t = 3.11$, $p < 0.002$) and higher in individuals with a history of drug or alcohol use ($t = 2.68$, $p < 0.008$). The severity of PTSD symptoms was not significantly related to gender, level of education and residence status.

The results of Table 2 show that 5% of the participants in this study had a history of Covid-19, 51.5% had a history of Covid-19 relatives, 56.5% had a history of suspected symptoms of Covid-19, and 40% had a history of close contact with the Covid-19 patient. Results also showed that 46.5% of students had severe PTSD symptoms (pcl5> 33).

Mean, standard deviation and correlation coefficients between research variables (Table 3) show that the relationship between Covid-19 anxiety, general sleep quality and mental health with the symptoms of PTSD is positive and significant. Also, mental health had the highest correlation with the PTSD symptoms.

Table 4 presents the results of a multivariate regression test with a stepwise model to evaluate the prediction of post-traumatic stress symptoms in students based on the predictor variables of mental health, Covid-19 anxiety and sleep quality.

According to the findings of Table 4 in the first model, at first, mental health entered the regression equation and had the greatest power in predicting the symptoms of post-traumatic stress. The correlation coefficient of mental health with PTSD symptoms was 0.50 and this variable predicted 25% of the changes in the variable of PTSD symptoms. In the second model, after mental health, sleep quality entered the equation. The correlation coefficient of these two variables was 0.52. These two variables predicted 27% of the changes in the variable of PTSD symptoms. The entrance of the sleep quality variable was able to increase the predictive power by 2% and according to the standard beta, mental health had the greatest role in predicting the PTSD symptoms in students.

Table 1. Comparison of the Severity of PTSD Symptoms Based on Age, Gender, Marriage, Education, Residence Status and History of Alcohol and Drug Use

Variables		Frequency	Percent	Mean± SD	f/t	p
Age	35>	22	11	27±11.22	2.48	0.01
	≤35	178	89	32.57±9.76		
Gender	female	57	28.5	33.91±8.15	1.74	0.08
	male	143	71.5	31.18±10.65		
Marital status	single	163	81.5	32.99±9.68	3.11	0.002
	married	37	18.5	27.40±10.5		
Education	Associate degree	۱۵	۷٫۵	13.92±28.93	0.53	0.66
	Bachelor	150	75	32.08±10.11		
	Master	28	14	32.82±7.76		
	PhD	7	3.5	32.42±8.03		
Status of residence	Dormitory	20	10	33.15±7.25	0.55	0.57
	Private	180	90	31.82±10.33		
History of drug or alcohol use	Yes	44	22	35.50±7.13	2.68	0.008
	No	156	78	30.96±10.54		

Table 2. Frequency (percentage) of Variables Related to History of Exposure to Covid-19 and Frequency-percentage of Post-traumatic Stress Severity Based on the Cutting Point

Variable	Frequency	Percentage
History of Covid-19 disease	10	5
History of covid-19 disease in relatives	103	51.5
History of having Covid-19 suspicious symptoms	113	56.5
History of close contact to Covid-19 patient	80	40
Pcl5≥33	93	46.5
Pcl5<33	107	53.5

Table 3. Mean, Standard Deviation, and Pearson Correlation Matrix between Sleep Quality, Covid-19 Anxiety, Mental Health with the Severity of PTSD Symptoms in Students

Variables	Mean± SD	1	2	3	4
1.PTSD symptoms	31.96 ±10.05	1			
2. Covid-19 anxiety	20.33±11.39	0.29**	1		
3. General sleep quality	6.95±3.08	0.33**	0.33**	1	
4. Mental health	14.10±3.78	0.5**	0.34**	0.42**	1

** p<0.05

Table 4. Stepwise Regression to Predict the Severity of the Symptoms of PTSD based on Sleep Quality, Mental Health and Covid-19 Anxiety

MODEL	Predictor variable	B	SE	Beta	T	P	R^2	Adj. R^2	F	P
Step 1	Mental health	1.32	0.16	0.5	8.1	0.0001	0.25	0.24	65.67	0.0001
Step 2	Mental health	1.15	0.17	0.44	6.46	0.0001	0.27	0.26	35.95	0.0001
	Sleep quality	0.48	0.22	0.15	2.21	0.028				

Discussion

This study investigated the predictors of PTSD in students. These preliminary data suggest that there are a number of factors associated with PTSD symptomatology among students. This research builds upon previous research by identifying key demographic variables that are associated with increased likelihood of PTSD symptom severity. To elaborate, the results of independent t-test showed that people under 35 years, the singles and those having history of drug or alcohol use are more prone to the incidence of PTSD symptoms. These results actually show that those students who report they are less than 35 years old are single and have a history of drug use or alcohol were more likely to exhibit PTSD symptom levels. These findings are consistent with studies that have examined the role of demographic variables in the occurrence of PTSD symptoms in other groups [34-40].

Since age is considered as an important variable in increasing maturity and emotion regulation, participants who were younger were more likely to exhibit PTSD symptoms. Gurera et al. [41] in a study, while emphasizing the role of age in emotional regulation, control of negative emotions and the occurrence of emotions such as anxiety, confirms the conceptualization of variables that can be examined over time and in longitudinal studies. So, in younger people, more maturity and mindfulness are needed to control stress and regulate emotions, and in turn more symptoms are visible.

Singleness, as another variable, is a high risk factor in students and has a positive relationship with PTSD symptoms. One of the comorbidities of anxiety disorders and especially PTSD is depressive disorder. Depression is more common in women and in males who experience more social isolation and loneliness and do not experience long-term intimate relationships. Also, people who have experienced divorce, experience more symptoms of PTSD than people who have experienced deep intimacy[39]. It is worth mentioning that Covid-19

conditions have led to further isolation of students, so these results are not unexpected.

A large body of literature review indicates the fact that history of drug and alcohol use is related to a wide spectrum of psychiatric disorders like depression [42], Generalized Anxiety Disorder (GAD) [43], PTSD[44], and Obsessive Compulsive Disorder (OCD) [45]. Therefore, the results of this study support previous studies about the relationship between substance and alcohol use with psychiatric disorders. According to research, alcohol or drug use among students has increased during the outbreak of Covid-19. Researchers believe that students are looking for external methods of emotional regulation and maladaptive coping mechanisms due to lack of emotional regulation and overcoming negative moods [46, 47].

Findings have revealed that 46.5% of students have experienced severe PTSD symptoms. The prevalence of PTSD in the present study also indicates that the prevalence of PTSD during Covid-19 has significantly increased. Comparison of this rate with the prevalence of it in other regions and countries shows that factors such as comorbidity with other disorders, the severity of trauma, and economic status are involved in increasing the prevalence.

The results of correlation coefficients showed that there were positive correlations between Covid-19 anxiety, mental health and general sleep quality with PTSD symptoms. These findings are consistent with previous studies [39, 44] which had indicated the conceptual relationship of these variables in the occurrence and maintenance of symptoms such as re-experiencing the traumatic event, stress and distress.

Stepwise regression results showed that mental health and sleep quality were significant predictors of post-traumatic stress in students, and among these, mental health was a stronger predictor. These findings are consistent with Ornell et al. [46] and Goncalves et al. [47]. During the outbreak of Covid-19 and quarantine, the elimination of routine life, urban problems and lifestyle changes have affected the dimensions of mental health. Kleber [48] has actually pointed out to the role of physical health dimensions, high quality sleep and emotional regulation in improving symptoms such as emotional dysfunction and aggression and shows how the mental health of students who have been at war is compromised and provides the basis for PTSD symptoms. Therefore, students with poorer mental health and sleep quality are at greater risk of more severe PTSD symptoms. Among the strengths of the present study, we can point out to the incidence of PTSD symptoms in students during university closures, a comprehensive investigation of the most important variables related to PTSD symptoms and determining the contribution of each of them in predicting PTSD symptoms.

This study faced a few limitations. Firstly, the sample size was unique to Khorramabad city, Lorestan province, Iran. An additional concern is that the collected data are correlational thus we can only infer associations and relationships, not causality. Furthermore, although we found an association between age, singleness and drug and alcohol use with PTSD symptoms, it is difficult to interpret such findings. For example, given the cross-sectional study design, we could as well attribute the association to cohort effects as to age itself. Nevertheless, we cannot discount the possibility that the decline of PTSD symptoms in older participants may be a function of higher mortality rates and other psychiatry comorbidities for individuals with high PTSD symptoms.

Conclusion

In conclusion, the results of this study demonstrate that PTSD symptom levels are significantly related with a number of demographic factors. Given that symptom levels were high in the younger, single and drug abuser groups, and regarding the high rate of PTSD symptoms in students, the authorities should plan for an appropriate service provision, as these groups may become even heavier users of medical care. Since the strongest predictor of PTSD in this study is mental health, appropriate planning should be applied to increase students' mental health, and since the predictor variables in the present study predicted 27% of the PTSD symptoms in students it is suggested that in addition to mental health, the contribution of other variables such as examination of reported trauma histories and emotion regulation in predicting PTSD should be evaluated.

Conflict of Interest

The authors declare no conflicts of interest.

Ethical Approval

The present study is the result of a research project with the ethical code of IR.BMSU.REC.1399.585, which was approved in the Baqiyatallah University of Medical Sciences (BUMS).

Acknowledgement

The authors would like to thank the participants for their collaboration in order to conduct this study.

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