Prevalence and Associated Factors of Depression, Anxiety, and Stress among the General Population during COVID-19 Pandemic: Cross-Sectional Study in Lahore, Pakistan

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Abstract

Background: The COVID-19 pandemic has been critically affected the psychological health of people and the mental health of community during such emergency situation is prime important. The objective of current research is to assess the level of stress, anxiety and depression among the general population in the period of COVID-19 pandemic in Lahore, Pakistan.

Methods: The current study employed snowball sampling technique and it was an online survey that collected data regarding basic demographic profile, knowledge, physical symptoms, and history of contact and precautionary measures with respect to COVID-19. Depression, Anxiety and Stress Scale (DASS-21) was used for assessing the mental health status.

Results: The current study comprised of 382 study participants from Lahore, Pakistan. The overall prevalence of depression, anxiety and stress symptoms were 20.7%, 35.3% and 37.7 percent respectively. Age less than 35 years and male gender were statistically significantly associated with the increased likelihood of depression (p < 0.05) and the increased level of stress and anxiety (p < 0.05) was statistically significantly associated with the female gender respectively.

Conclusion: In COVID-19 pandemic, staff related to medical care, teachers, students and people living at homes had mental health issues and there is a requirement for the care and recovery programs related to mental health.

Keywords: COVID-19; Psychological Health; Snowball Sampling; DASS-21

Introduction

A pandemic of novel coronavirus associated pneumonia started in Hube, a province of China. In the beginning of year 2020 this novel coronavirus started spreading across the whole country. The quick raise in affected people and deaths caused by it lead to onset of anxiety, apprehension, and low mood not only in health professionals but also in general public [1]. This disease affected all the world, generally Europe and specially Spain were hit by this disease.

In Pakistan, the first patient of COVID-19 was reported on February 26th 2020 [2]. The number of cases began increasing rapidly and to avoid rapid spread of COVID-19,

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on 23rd March 2020, a total lockdown was executed in the whole country. This total lock down was changed into 'smart lockdown' on 9th May, 2020. But, educational institutes and shopping centres and all community spaces were kept locked. In addition to poor effects on health, it has huge psychological and social effects. As the recent condition was unexpected, it is problematic to exactly determine the psychological effects of COVID-19.

Researches done in China, the first region hit by novel coronavirus, expressed increased risk of terror and insecurity and caused onset of psychological issues like stress, apprehension, unhappiness, unusual response to disease, and irrational conducts [2,3]. According to study conducted during the start of COVID-19 occurrence among 1,210 people in 194 cities of China showed that the 16.5% of the individuals enrolled in study had symptoms of depression varying from moderate-to-severe; 28.8% had moderate-to-severe symptoms of anxiety while 8.1% expressed moderate-to-severe levels of stress. The high degree of stress, anxiety, and depression showed that being unhealthy had bad impact on mental health [4,5]. Anyhow, 7% of the inhabitants, or 2.6 million people, were highly stressed [6,7]. Similarly, across the whole world, anxiety of COVID-19 is extremely higher compared to epidemics of seasonal flu, though the later has led to more deaths. A few chief causes of risk markedly affected the psychological health of people were false beliefs and reproaches, implausible broadcasting of social media related to COVID-19 pandemic, application of community lockdown, and economic loss to families and lacking of individual space in home [8].

Various studies have been conducted on depression, anxiety and stress during COVID-19 pandemic among general public, healthcare professionals and students [6,8]. Anyhow, according to best of our information, no research have been done yet for evaluation of level of stress, anxiety and depression during COVID-19 pandemic among general public in Lahore, Pakistan [8,9]. Hence the current research is designed to assess the prevalence of depression, anxiety and stress in Lahore, Pakistan. This research can aid government organizations and healthcare workers in the protection of the psychological health of general population during the period of COVID-19 spread in Pakistan and across different geographic regions.

Methods

The current study employed the online cross-sectional survey design with respect to evaluate the psychological response of general population living in mainland of Lahore, Pakistan during the period of COVID-19 pandemic. A snowball sampling technique was utilized. The current online cross-sectional survey was initially circulated to students of

various universities and after that they were requested to pass it to others as well. This web-based questionnaire was completely on voluntary basis and was non-commercial in nature.

Study participants gave answers of the questions without showing their identity using internet during period of June 30, 2020 to October 25, 2020. All participants provided their demographic profile, data regarding COVID-19, and filled three standardized questionnaires for assessment of depression, anxiety and stress. Moreover the questionnaires that were filled in less than 1 minute or more than 60 minutes were disqualified from study. About 400 questionnaires were filled online by participants, 382 out of which were valid and recovery rate was 95.5%.

Data were collected via self- administered questionnaire. The questions included in the structured questionnaire covered several areas, such as: (1) demographic data; 2) COVID-19 related Characteristics which include physical health status, contact history, knowledge and concerns and preventive measures against COVID-19 and (3) psychological state screening scales. The current study survey was developed from various previous studies associated with the depression, anxiety and stress on healthcare workers and general population during the COVID-19 outbreak. Occupation included the following four types: (1) Health care workers included "medical" (physicians, nurses) and "non-medical" personnel (allied health professionals, pharmacists, technicians, administrators, clerical staff, and maintenance workers), (2) Children (3) The teachers and students, which involved teachers or students from universities, middle schools, or elementary schools; and (4) Household members [10-13].

Depression, anxiety and stress were analyzed by means of DASS-21, that is a authenticated screening tool for applying on patients and public. It is a self-reported 21-item questionnaire giving separate methods of depression, stress and anxiety with suggested rigorousness verges for the depression, stress and anxiety measurements. The totals for each of the three parts were assessed by adding the scores for related questions, and multiplying by two to find the total. Cut-off score range of > 9, >7 and > 14 illustrate the presence of depression, anxiety and stress, in the same order. On the DASS-21 depression scoring system, scores of 10–13 denote "mild", 14–20 show "moderate", 21–27 as "severe", and 28–42 as "extremely-severe" depression. The DASS-21 anxiety score was analyzed as "mild" (8–9), "moderate" (10–14), "severe" (15–19), and extremely severe" (20–42). The DASS-21 stress subscale score was separated into categories as "mild" (15–18), "moderate" (19–25), "severe" (26–33), and "extremely severe" stress (34–42) [14-16].

In the data analysis, a frequency distribution for these categorical variables and mean (± standard deviation) for the explanation of continuous data with the frequency of depression, anxiety and stress were represented. Chi-square and Fisher's exact tests for categorical variables were applied for comparison of difference among groups. Third, uni-variate and multivariate binary logistic regression models were done by means of backward stepwise method to find out the possible explanation of characteristics for signs of depression, anxiety and stress during COVID-19 occurrence. Odds ratio (OR), adjusted odds ratio (AOR), and 95% confidence interval (95% CI) were found by logistic regression models and the all variables taken significant at p-value 0.25 on bivariate analysis were entered into multivariate model. Goodness-of-fit for the final model was analyzed by means of Hosmer and Lemeshow test and all data were assessed by means of Statistical Package for Social Sciences (SPSS) version 24.0 and also p-values of >0.05 were taken as statistically important (2-sided tests).

Results

In this study total 382 patients were enrolled. The mean age of the patients was 30.87 ± 7.82 years. 205 (53.66%) of study participants had age between 18-29 years, 106(27.7%) participants had age between 30-39 years while 71 (18.5%) participants had age 40 and above. 220(57.6%) patients were males whereas 360(94.2%) participants were Muslims (Table 1).

For the physical symptoms, 58(15.2%) respondents had persistent fever within previous two weeks, 117(30.9%) had cough, 12(3.1%) had difficulty in breathing, 62(16.2%) had chronic illness. Around 31(8.1%) had recent history of hospitalization, 22(5.8%) had recent history of COVID-19 testing whereas 89(23.3%) study participants had recent history of quarantine in the past 14 days. Overall 39(10.2%) study participants were found to be in contact with an individual with confirmed COVID-19 (Table 2).

The results of Table 2 showed that the television 241(63.1%) was the main health information source about COVID19 and majority of respondents 231(60.5%) were contented about the extent of information of health available regarding COVID, 203(53.1%) study participants were required regular most up-to-date information regarding COVID-19 whereas 240(62.8%) were required regular most up-to-date information about ease of use and efficacy of medicines/ vaccines against COVID-19.

Regarding preventive actions taken by study participants, most frequently were 235(61.5%) cleaning hands after contact with touching infected substances, using a mask in spite of the existence or nonexistence of COVID-19 symptoms 219(57.3%), avoiding sharing of utensils

204(53.4%) and wrapping the mouth during coughing or sneezing 200(52.4%) (Table 2).

Variables	Frequency	Percentage
Age (Years)	30.87 ± 7.82 years	
18 – 29	205	53.66
30 – 39	106	27.7
40 and above	71	18.5
Mean ± SD	30.87 ± 7.82	
Gender		
Male	220	57.6
Female	162	42.4
Religion		
Muslim	360	94.2
Christian	22	5.8
Place of residence		
Urban	331	86.6
Rural	51	13.4
Marital status		
Unmarried	182	47.6
Married	130	34.0
Separated	17	4.5
Divorced	49	12.8
Widowed	4	1.0
Educational level		
No schooling	11	2.9
Up to primary school	16	4.2
Up to secondary school	45	11.8
Up to college	60	15.7
Up to university	250	65.4
Employment status		
Employed	278	72.8
Unemployed	104	27.2
Occupation		
Healthcare worker	158	41.4
Teacher	98	25.7
Student	71	18.6
Household member	55	14.4
Household size		
One person	42	11.0
Two person	109	28.5
Three to five people	148	38.7
Six person and more	83	21.7

Table 1: Socio-demographic details of respondents (N = 382).

Physical health status	N	%
Persistent fever		
Yes	58	15.2
No	324	84.8
Cough		
Yes	117	30.6
No	265	69.4
Difficulty in breathing		
Yes	12	3.1
No	370	96.9
Chronic illness		
Yes	62	16.2
No	320	83.8
Recent hospitalization in past 14 days		
Yes	31	8.1
No	351	91.9
Recent testing for COVID-19 in past 14 days		
Yes	22	5.8
No	360	94.2
Recent quarantine in past 14 days		
Yes	89	23.3
No	293	76.7
Contact History		
Close contact with an individual with confirmed COVID-19		
Yes	39	10.2
No	343	89.8
Contact with an individual with suspected COVID-19		
Yes	50	13.1
No	332	86.9
Knowledge and concerns about COVID-19		
Main source of health information		
Television	241(63.1)	63.1
Radio	44(11.5)	11.5
Internet	68(17.8)	17.8
Newspaper	20(5.2)	5.2
Family members	9(2.4)	2.4
Satisfaction with amount of health information available about COVID-19		
Yes	231	60.5
No	151	39.5
Need for regular updates for latest information about COVID-19		
Yes	203	53.1
No	179	46.9
Need for information about availability and effectiveness of medicines/ vaccines against COVID-19		
Yes	240	62.8
No	142	37.2

Precautionary measures		
Covering mouth when coughing and sneezing		
Yes	200	52.4
No	182	47.6
Avoiding sharing of utensils		
Yes	204	53.4
No	178	46.6
Washing hands after touching contaminated objects		
Yes	235	61.5
No	147	38.5
Wearing mask regardless of presence or absence of symptoms		
Yes	219	57.3
No	163	42.7

Table 2: COVID-19 related Characteristics of Respondents (N=382).

The depression, anxiety and stress levels among study participants were assessed by using the DASS 21-item scale. For depression sub-scale, the samples mean score was 14.89 (4.806%). 39(10.2%) had normal score (score: 0–9); 99(25.9%) had mild depression (score: 10 12); 204 (53.4%) had from moderate depression (score: 13–20) whereas 36 (9.4%) were measured to suffer from severe and 4 (1.0%) were suffer from extremely severe depression (score: 21–42).

For the anxiety subscale, the samples mean score was 13.34 (4.957%). The results showed that 35 (9.2%) respondents had a normal score (score: 0–6); 39 (10.2%) were thought to experienced mild anxiety (score: 7–9); 173 (45.3%) had moderate anxiety (score: 10–14); and 88(23.0%) had severe anxiety whereas 47 (12.3%) were suffered from extremely severe anxiety (score: 15–42).

For the stress subscale, the samples mean score was 24.06 (7.381%). The results showed that 46 (12.0%) study participants had normal score (score: 0–10); 51 (13.4%) were thought to experienced mild stress (score: 11–18); 109 (28.5%) were thought to be suffering from moderate stress (score: 19–26); and 130 (34.0%) had severe stress and 46 (12.0%) were suffering from extremely severe stress (score: 27–42). We then divided the respondents into positive groups and negative groups according to whether they were positive or not of the assessment scales and compared the demographic and Covid19-related characteristics of the two groups.

According to the study result, highly statistically significant difference was found between age, gender and depressive symptoms (p-value=0.001).Statistically significant difference found between the age, gender and religion and the anxiety symptoms (p-value < 0.05). Highly statistically significant difference found between the gender, occupation, house-hold size, and the stress symptoms (p-value <0.000) (Table 3).

Variables	Depression Yes N (%)	Depression No N (%)	p-value	Anxiety Yes N (%)	Anxiety No N (%)	p-value	Stress Yes N (%)	Stress No N (%)	p-value
Age (Years)									
Less than 35 years	42 (11.0)	238 (62.3)	**0.01**	75 (19.6)	205 (53.7)	**0.001**	113 (29.6)	167 (43.7)	0.07
More than 35 years	37 (9.7)	65 (17.0)		60 (15.7)	42 (11.0)		31 (8.1)	71 (18.6)	
Gender									
Female	26 (6.8)	194 (50.8)	**0.001**	39 (10.2)	181 (47.4)	**0.001**	66 (17.3)	154 (40.3)	**0.001**
Male	53 (13.9)	109 (28.5)		96 (25.1)	66 (17.3)		78 (20.4)	84 (22.0)	
Religion									
Muslim	72 (18.8)	288 (75.4)	0.184	123 (32.2)	237 (62.0)	**0.05**	136 (35.6)	224 (58.6)	0.894
Christian	7 (1.8)	15 (3.9)		12 (3.1)	10 (2.6)		8 (2.1)	14 (3.7)	

Occupation									
Healthcare worker	35 (9.2)	123 (32.2)	0.823	58 (15.2)	100 (26.2)	0.397	37 (9.7)	121 (31.70	**0.001**
Teacher	19 (5.0)	79 (20.7)		31 (8.1)	67 (17.5)		60 (15.7)	38 (9.9)	
Student	12 (3.1)	59 (15.4)		22 (5.8)	49 (12.8)		37 (9.7)	34 (8.9)	
Household member	13 (3.4)	42 (11.0)		24 (6.3)	31 (8.1)		10 (2.6)	45 (11.8)	
Household size									
One person	9 (2.4)	33 (8.6)	0.228	14 (3.7)	28 (7.3)	0.37	30 (7.9)	12 (3.1)	**0.001**
Two person	17 (4.5)	92 (24.1)		33 (8.6)	76 (19.9)		21 (5.5)	88 (23.0)	
Three to five people	38 (9.9)	110 (28.8)		60 (15.7)	88 (23.0)		56 (14.7)	92 (24.10	
Six person and more	15 (3.9)	68 (17.8)		28 (7.3)	55 (14.4)		37 (9.7)	46 (12.0)	

Table 3: Statistical analysis by Chi-square and Fisher's exact tests to find out association depression, anxiety and stress and sociodemographic variables (N = 382).

Age less than 35 years (OR=0.265, 95%CI: 1.527-4.631, p=0.001),male gender (OR=2.894, 95%CI: 1.673-5.005, p=0.000), history of recent hospitalization in past 14 days (OR=2.984, 95%CI: 0.759-11.728, p=0.117), contentment with the degree of information of health existing regarding COVID-19 pandemic (OR=1.504, 95%CI: 0.866-2.61, p=0.147),cover mouth during coughing and sneezing (OR=1.675, 95%CI: 0.977-2.871, p=0.061) and avoiding sharing of utensils (OR=1.231, 95%CI: 0.719-2.107, p=0.448) were the predisposing factors for depression (Table 4).

Variables	β	Depressive symptoms AOR	Depressive symptoms (95% CI)	p-value category	p-value overall
Age (years)					
<35	0.978	**2.65**	**1.527-4.631**	**0.001**	**0.000**
>35			Reference		
Gender					
Female	1.063	**2.894**	**1.673-5.005**	**0.000**	**0.000**
Male			Reference		
Recent hospitalization in past 14 days					
Yes	1.093	2.984	0.759-11.728	0.117	0.265
No			Reference		
Recent testing for COVID-19 in past 14 days					
Yes	-1.209	0.298	0.087-1.025	0.055	0.184
No			Reference		
Satisfaction with amount of health information available about COVID-19					
Yes	0.408	1.504	0.866-2.612	0.147	0.218
No			Reference		
Need for information about availability and effectiveness of medicines/ vaccines against COVID-19					
Yes	-0.479	0.620	0.349-1.098	0.101	0.161

No			Reference		
Covering mouth when coughing and sneezing					
Yes	0.516	1.675	0.977-2.871	0.061	0.030
No			Reference		
Avoiding sharing of utensils					
Yes	0.208	1.231	0.719-2.107	0.448	0.189
No			Reference		
Washing hands after touching contaminated objects					
Yes	-0.213	0.808	0.256-2.549	0.717	0.065
No			Reference		
Wearing mask regardless of presence or absence of symptoms					
Yes	-0.261	0.771	0.440-1.348	0.361	0.145
No			Reference		

Table 4: Risk Factors for depression identified by Multivariable binary Logistic Regression Analysis (N=382).

Female gender (OR=6.508, 95%CI: 4.066-10.416, $p<0.000$), difficulty in breathing (OR=4.618, 95%CI: 0.539-39.57, $p<0.163$), recent hospitalization in past 14 days (OR=2.525, 95%CI: 0.856-7.446, p=0.093), Covering mouth when coughing and sneezing (OR=1.543, 95%CI: 0.959-2.485, p=0.074), avoiding sharing of utensils (OR=1.178, 95%CI: 0.733-1.891, p=0.498) were the predisposing factors for anxiety (Table 5).

Variables	β	Anxiety Symptoms AOR	Anxiety Symptoms (95% CI)	p-value category	p-value overall
Gender					
Female	1.873	6.508	**4.066-10.416**	**0.000**	**0.000**
Male			Reference		
Difficulty in breathing					
Yes	1.530	4.618	0.539-39.57	0.163	0.047
No			Reference		
Recent testing for COVID-19 in past 14 days					
Yes	-0.845	0.429	0.133-1.385	0.157	0.574
No			Reference		
Recent hospitalization in past 14 days					
Yes	0.926	2.525	0.856-7.446	0.093	0.121
No			Reference		
Need for information about availability and effectiveness of medicines/ vaccines against COVID-19					
Yes	-0.277	0.758	0.462-1.244	0.274	0.171
No			Reference		
Covering mouth when coughing and sneezing					

Yes	0.434	1.543	0.959-2.485	0.074	0.033
No			Reference		
Avoiding sharing of utensils					
Yes	0.164	1.178	0.733-1.891	0.498	0.191
No			Reference		
Washing hands after touching contaminated objects					
Yes	-0.115	0.891	0.316-2.518	0.828	0.095
No			Reference		

Table 5: Risk Factors for Anxiety identified by Multivariable binary Logistic Regression Analysis (N=382).

Female gender (OR=2.415, 95%CI: 1.515-3.850, p<0.000) was the predisposing factor for stress (Table 6).

Variables	β	Stress Symptoms AOR	Stress Symptoms (95% CI)	p-value category	p-value overall
Age(years)					
<35	-0.384	0.681	0.388-1.194	0.180	0.075
>35			Reference		
Gender					
Female	0.882	2.415	**1.515-3.850**	**0.000**	**0.000**
Male			Reference		
Occupation					
Healthcare worker	-0.191	0.826	0.371-1.841	0.641	0.000
Teacher	-1.883	0.152	0.067-0.346	0.000	0.000
Student	-1.408	0.245	0.104-0.575	0.001	0.000
Household member			Reference		
Persistent fever					
Yes	-0.121	0.886	0.391-2.007	0.772	0.021
No			Reference		
Chronic illnesses					
Yes	-0.647	0.524	0.285-0.962	0.037	0.006
No			Reference		
Recent hospitalization in past 14 days					
Yes	-0.726	0.484	0.214-1.093	0.081	0.040
No			Reference		
Need for information about availability and effectiveness of medicines/ vaccines against COVID-19					
Yes	-0.172	0.482	0.518-1.368	0.487	0.227
No			Reference		

Table 6: Risk Factors for stress identified by Multivariable binary Logistic Regression Analysis (N=382).

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Discussion

The COVID-19 disease is a great public health issue that affected the whole world and cases are continuously increasing in number and so is the number of deaths in Pakistan and in the whole world. Due to COVID-19, toll of mental health issues is raising including anxiety, agitation, low mood, and loss of sleep, fear of un-known, loss of senses, post-traumatic stress disorder, schizophrenia, and thoughts of ending life. Anyhow, a thorough study of literature showed that no remarkable research has been done yet for evaluation of depression, anxiety and stress associated with COVID-19 occurrence in Pakistan. Hence the present research was designed to address this limitation by finding out the factors related to development of depression, anxiety and stress in COVID-19 pandemic among general population of Lahore, Pakistan [17-19].

The occurrence of symptoms of depression, anxiety and stress among the general population of Lahore were found to be 20.7%, 35.3% and 37.7% respectively. A research conducted in China showed 16.5% moderate to severe symptoms of depression; 28.8% moderate to extremely high anxiety symptoms; and 8.1% showed moderate to severe degree of stress among public. One more study done in China expressed occurrence of GAD and depression in population was 35.1% and 20.1%, respectively. These results are in accordance with conclusion of our research [4,9]. A research was carried out in many countries including Singapore and India showed 5.3% prevalence of medium to extremely high depression, 8.7% for modest to very high anxiety, 2.2% for medium to very high stress in the healthcare professionals during Covid-19 pandemic. The current research expressed raised prevalence of depression, anxiety and stress among general public, this remarkably raised risk validates the harm to public due to COVID-19 occurrence is same as other disasters [6]. Minimal variations in occurrence of depression, anxiety and stress can be because of changes in tools employed for evaluation of depression and anxiety and the environment in which study was conducted and study design.

Bivariate logistic regression was used to evaluate independent factors related to depression, anxiety and stress, and all variables were considered to be significant having p-value 0.25 and were further assessed by multivariate model. After adjusting all confounders, less than 35 years of age and female gender were having remarkable relation with depression. Anyhow, female gender was found to be having more anxiety and stress. As COVID-19 pandemic is widely spread further and the present results will be helpful in the development of guidelines for mental health.

Health-care providers should determine the people who are more vulnerable to mental health disease on basis of social and demographic characteristics. After multivariate logistic regression analyses, our data on the social and demographic profile showed that the level of depression was remarkably high in people whose ages were not more than 35 years (OR=0.265, 95%CI: 1.527-4.631, p=0.001). These results were similar to previous studies which concluded that people with age less than 35 years were having more chance of suffering from depression. As the people with youngest age were mostly those involved in healthcare activities 112(29.3%), symptoms of depression can be due to staying away from home, stress of practicing medical profession, performing duties at COVID-19 pandemic and threat of losing job.

The recent research, concluded that females, when compared to males, were 2.8 times (OR=2.894, 95%CI: 1.673-5.005, p=0.000), 6.5 times (OR=6.508, 95%CI: 4.066-10.416, p<0.000) and 2.4 times (OR=2.415, 95%CI: 1.515-3.850, p<0.000) at raised risk of suffering from depression, anxiety and stress levels respectively [4,9]. Many of already done researches also expressed similar results i.e prevalence of stress, anxiety and depression were higher in female gender. This may be due to the reason that numerous social, traditional, and financial factors in addition to social separation and keeping safe distance in the period of COVID-19 occurrence has more remarkable effect on psychological well-being of ladies [4,13].

Results of our research concluded that preventive strategies used for limiting transmission of COVID-19 were the aggravating factors leading to nervousness. On application of multivariate logistic regression analyses, current research suggested that using preventive strategies during cough or sneeze i.e covering mouth, (OR=1.543, 95%CI: 0.959-2.485, p=0.074), not using crockery used by patient (OR=1.178, 95%CI: 0.733-1.891, p=0.498) were the precipitating factors leading to anxiety. In 2003 SARS-CoV outbreak, investigators concluded that medium degree of anxiety was related to increased practice of protective strategies by general public. The practices adopted during 2003 SARS-CoV outbreak has thought to alter the understanding of people for protective strategies [4,14].

Remarkable effects on mental health were found in outbreaks of different diseases like, severe acute respiratory syndrome (SARS) in 2003 and H1N1 influenza in 2009. WHO recommends that services for improvement of psychological health should be there to help people bring out of mental stress so that can play their roles in community as their mental health is affected during occurrence of this disease [10,14].

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The current research has strengths as well. According to best of our knowledge this is first ever cross-sectional survey done in Lahore, Pakistan that determines the prevalence of depression, anxiety and stress in COVID-19 outbreak. Secondly, this study provides valuable knowledge regarding significance of developing measures for early detection and treatment of patients whose mental health is affected during disease period. Thirdly, the study used large sample size which aided in neutralizing bias and confounding.

A few limitations are present in our study but they don't compromise significance of our research. Firstly, the study employed the cross-sectional design that restricted explanation of the conclusion related to association than causation. Secondly, snowball sampling technique was employed rather than random sampling and population used for research didn't truly represented general public. Thirdly, we think that a prospective cohort or a study involving intervention can better interpret results of our study so that a useful suggestion can be given to the policy makers for designing mental health supporting strategies for affected people.

Conclusion

In summary, prevalence of depression, anxiety and stress symptoms in our research were 20.7%, 35.3% and 37.7% percent in Pakistan and this is extremely high. Female gender and age less than 35 years were remarkably associated with depression, anxiety and stress. Hence, recommendations should be given to policy makers in order to address psychological issues and need for mental support strategies when making strategies for combating an outbreak.

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