A Survey of Psychological Distress Among the Community in the COVID-19 Epidemic: A Cross-Sectional Study

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Abstract

Aim

The ongoing COVID-19 outbreak has not only had an impact on physical health but also on psychological health. The aim of this study was to measure the prevalence and severity of psychological distress in the community due to the COVID-19 pandemic.

Methods

This cross-sectional survey was conducted in February and March 2020 in Tehran, Iran. We analyzed demographic characteristics and assessed depression, anxiety, and stress levels in 241 people using convenience sampling and the DASS-21 questionnaire. All statistical analyses were performed using R.

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Results

The study population included 241 community-dwelling participants, of whom 145 were women and 96 were males. The mean age was 49.16 ± 8.01 years. Approximately two-thirds of participants (n = 158) reported no history of comorbid illness. The mean scores of depression and stress were at a "severe" level, while anxiety levels were at an "extremely severe" level. The prevalence of severe and extremely severe depression readings was 51.45 and 38.17%, respectively. In the anxiety subscale, the prevalence of severe and extremely severe depression was 95.90 and 4.1%, and in the stress subscale the prevalence was 48.97 and 4.98%, respectively.

Conclusion

In this study, people reported experiencing severe and extremely severe psychological distress. Therefore, there is an urgent need to implement mental health intervention policies to cope with this ongoing challenge. We suggest that the incorporation of molecular biomarker tests into the algorithm could aid in assessment of patients and guide the most appropriate therapeutic response.

Keywords

Anxiety · Coronavirus · COVID-19 · Depression · Iran · Psychological distress · Stress

22.1 Introduction

On 19 February 2020, the first patient with COVID-19 infection was identified in Iran. The increasing number of coronavirus cases and its geographical expansion has raised significant concerns around the world. The mental health of the community is also at risk due to the highly infective nature of the disease, the epidemiological characteristics, the lack of preparedness of the health authorities and healthcare systems, and an insufficient supply of protective equipment [1]. In addition, the absence of a comprehensive and definitive treatment protocol or vaccination program against this disease led to the introduction of home quarantine to limit transmission of the virus on the basis of recommendations from health organizations [2]. This resulted in the closure of all schools, universities, and recreation centers and restrictions on commuting were also imposed. These conditions can lead to various negative psychological impacts, such as post-traumatic syndrome disorder (PTSD), confusion, and anger in society. Quarantine, fear of infection, frustration, boredom, lack of information, loss of property, and stigma are known stressors that can affect psychological health [3].

The fear of the unknown effects of the novel 2019 coronavirus raised anxiety levels in healthy persons as well those with preexisting mental health conditions [4]. One study has shown the persistence of these mental disorders 4–6 months after the Middle East respiratory syndrome

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(MERS) epidemic [5]. The underlying causes for the continued anxiety and stress included worries about symptoms, inadequate equipment, absence of social networking, and a history of psychiatric illness. It has been suggested that these individuals need psychological help and long-term follow-up. Anxiety and stigma were also reported as the most important psychological issues in the severe acute respiratory syndrome (SARS) epidemic [6]. In addition, pharmaco-epidemiological studies have confirmed an increase in the rate of prescription and use of antidepressant drugs after various disasters and natural events, which reflect increased anxiety and depression among the population [7]. In addition to the above effects of the MERS and SARS outbreaks, the COVID-19 pandemic has led to reduced face-to-face communication, associated with a range of mental disorders such as panic, stress, and depression. For the first time, we are facing a widespread epidemic in the Iranian community. Therefore, we need to provide a concrete basis for tailoring and implementing relevant mental health intervention policies to cope with this challenge efficiently and effectively.

So far, there is no epidemiological data on mental health and psychological outcomes of COVID-19 infection. The main aim of this study was to measure the prevalence and severity of psychological distress to compute the current mental health burden of COVID-19 pandemic on Iranian society.

22.2 Material and Methods

22.2.1 Study Design

This cross-sectional survey was conducted in February and March 2020.

22.2.2 Setting

Since Tehran is the capital city in Iran and people from all over Iran live there, it was selected for sampling.

22.2.3 Participants

All adults over the age of 18 who were interested in participating in the study and who could read and write with no known physical disability or mental disorder were selected using available sampling.

22.2.4 Sample Size

We used a first-type error of five-hundredths, a second-type error of two-tenths, and an assumed 50% satisfaction probability to estimate maximum sample size. The sample size was calculated to have 87 people. According to the nature of the study and the probability of dropouts, we allowed for a 20% increase of the calculated size, which resulted in 110 individuals being selected. Cochran's sample size estimation formula in the epidemiologic study was used [8].

22.2.5 Outcomes, Covariates, and Research Tools

We focused on symptoms of depression, anxiety, and stress for all participants, using the Iranian version of validated measurement tools. The Depression Anxiety Stress Scale (DASS-21) was used to collect data. This questionnaire was designed and validated in 1995 to measure psychological distress among the community with 21 items [9]. The scale includes three subscales, and each subscale includes seven questions. In the translated version, each item has choices of never, little, moderate, and many. The lowest score is equivalent to 0 and the highest score is 3. In this questionnaire, questions 2, 4, 7, 9, 15, 19 and 20 are related to anxiety; questions 3, 5, 10, 13, 16, 17, and 21 concern depression; and questions 1, 6, 8, 11, 12, 14, and 18 are for assessment of stress.

(a) Stress: scores from 0 to 7 are considered normal, 8–9 mild, 10–12 average, 13–16 severe, and higher than 17 is very severe.

(b) Anxiety: 0–3 is normal, 4–5 mild, 6–7 average, 8–9 severe, and higher than 10 is very severe.

(c) Depression: a score from 0 to 4 is considered normal, 5–6 mild, 7–10 average, 11–13 severe, and higher than 14 is very severe.

The validity and reliability of this questionnaire have already been established in Iran. For instance, in a study done on 970 students and armies, the authors reported that the translated questionnaire was comparable with the original, with high internal correlations of 0.77, 0.79, and 0.78 for depression, anxiety, and stress, respectively [10]. This was comparable with a study carried out in China, which reported Cronbach's alpha values greater than 0.80 for all scales in an analysis of the effect of the 2008 Sichuan earthquake [11].

Demographic characteristics were self-reported on questionnaire by participants and include sex, age, job, marital status, and educational qualifications.

22.2.6 Ethical Considerations

The study was approved by the Ethics Committee of Baqiyatallah University of Medical Sciences with the code IR.BMSU.REC.1398.441. The objectives of the study were explained, and informed consent was obtained from the participants in the study, and they were assured of confidentiality.

22.2.7 Statistical Analysis

All statistical analyses were performed using R version 3.5.1. The inferential statistical analyses were conducted using parametric tests since the data were found to be normally distributed with homogeneous variances, as shown by screening the data using the Kolmogorov-Smirnov and Levene's tests, respectively. Independent sample t-tests were carried out to test the differences in the mean values of the psychological factors (depression, anxiety, and stress) by gender and marital status, and one-way ANOVA tests were used to determine the mean differences in psychological factors relative to age, job, and educational qualification. The level of statistical significance was set at $P < 0.05$.

22.3 Results

The study population included 241 community-dwelling participants in Tehran. Of these, 145 were women and 96 were men. The participants were between 37 and 74 years of age, and the mean age of the study group was 49.16 ± 8.01 years. In addition, 151 patients were married, 82 had a nongovernmental job, 158 reported no background disease, and the majority had a Bachelor's or higher education degree ($n = 156$). There were no significant differences in "age," "marital status," "history of disease," and "job" variables across the different DASS subscales (Table 22.1). Although female participants showed higher depression scores than males (independent sample t-test; $p = 0.02$), the mean stress and anxiety scores between males and females were not significantly different. However, the mean stress scores were significantly different for the "educational qualification" variable, such that individuals with a higher educational degree (e.g., a PhD or Master's degree) experienced higher levels of stress (Table 22.1).

The mean scores of depression, anxiety, and stress were at a "severe" level. The prevalence of "severe" symptoms of depression, anxiety, and stress w 51.45, 95.90, and 48.97%, respectively (Table 22.2).

22.4 Discussion

The main purpose of this study is to measure the prevalence and severity of psychological distress and to compute the current mental health burden on society during the COVID-19 outbreak in Iran. The results confirmed that the amount of psychological distress in the community ranged from severe to extremely severe. More than

Table 22.1 Mean (±SD) scores for psychological symptoms in terms of age group, gender, marital status, job, education level, and history of background disease

Variable		Frequency (%)	Anxiety score	Stress score	Depression score
Age	<45 years	107 (44.40)	26.21 ± 4.829	27.51 ± 4.183	26.45 ± 4.616
	46–55 years	98 (40.66)	25.76 ± 4.084	27.35 ± 4.566	26.14 ± 4.114
	>55 years	36 (14.94)	26.33 ± 4.840	26.83 ± 4.494	24.94 ± 4.394
p-value			0.713	0.724	0.206
Gender	Male	96 (39.83)	26.00 ± 4.561	27.21 ± 4.574	25.29 ± 4.372
	Female	145 (60.17)	26.07 ± 4.524	27.43 ± 4.254	26.63 ± 4.344
p-value			0.908	0.695	0.020[a]
Marital status	Married	151 (62.65)	25.83 ± 4.636	27.21 ± 4.473	26.26 ± 4.090
	Unmarried	90 (37.35)	26.40 ± 4.347	27.58 ± 4.224	25.82 ± 4.877
p-value			0.344	0.524	0.451
Job	Governmental	31 (12.86)	26.39 ± 4.688	27.35 ± 4.176	26.97 ± 4.191
	Nongovernmental	82 (34.03)	25.88 ± 4.831	27.44 ± 4.600	26.15 ± 4.691
	Unemployed	64 (26.55)	26.84 ± 4.137	27.16 ± 4.752	26.50 ± 4.335
	Student	49 (20.33)	25.27 ± 4.177	27.55 ± 4.026	24.98 ± 4.023
	Housewife	15 (6.23)	25.33 ± 5.164	26.93 ± 3.283	26.00 ± 4.408
p-value			0.395	0.983	0.295
Qualification	Diploma or lower	26 (10.78)	24.23 ± 4.320	24.85 ± 3.885	25.77 ± 3.892
	Associate	59 (24.48)	26.61 ± 4.222	27.56 ± 4.427	26.61 ± 4.874
	Bachelor	78 (32.37)	26.49 ± 4.339	27.21 ± 4.145	25.13 ± 4.123
	Master's degree or higher	78 (32.37)	25.77 ± 4.899	28.15 ± 4.475[a]	26.79 ± 4.329
p-value			0.105	0.009[a]	0.081
History of background diseases	None	158 (65.56)	25.82 ± 4.391	27.23 ± 4.530	26.08 ± 4.382
	Cardiovascular	10 (4.15)	25.00 ± 4.447	27.60 ± 4.195	25.60 ± 3.748
	Diabetic	16 (6.64)	25.88 ± 4.815	27.63 ± 5.018	25.75 ± 4.553
	Hypertension	21 (8.72)	26.29 ± 3.481	27.81 ± 4.600	26.57 ± 4.106
	Allergy	20 (8.30)	27.30 ± 4.911	27.80 ± 3.302	25.90 ± 4.564
	Chronic kidney	9 (3.73)	27.33 ± 6.164	26.22 ± 2.728	26.89 ± 5.110
	Chronic liver	7 (2.90)	26.86 ± 7.010	27.71 ± 4.536	26.29 ± 6.157
p-value			0.751	0.972	0.992

[a]Statistically significant

Table 22.2 Prevalence and score severity ratings of depression, anxiety, and stress among community population ($n = 241$)

Psychological variable		Frequency	%
Depression	Moderate	25	10.38
	Severe	124	51.45
	Extremely severe	92	38.17
	Mean ± SD	26.09 ± 4.39	
Anxiety	Severe	231	95.9
	Extremely severe	10	4.1
	Mean ± SD	26.04 ± 4.53	
Stress	Mild	5	2.08
	Moderate	106	43.98
	Severe	118	48.97
	Extremely severe	12	4.97
	Mean ± SD	27.34 ± 4.37	

95.9% of the respondents experienced severe anxiety, and around 90% of participants reported depressive symptoms. Furthermore, more than half of the participants had severe or extremely severe stress.

In comparison with the results from a recent study in China which showed that 35% of the respondents experienced psychological distress during the COVID-19 outbreak there, more than half of our participants reported severe or extremely severe psychological distress [12]. Another study reported that SARS survivors experienced similar psychological distress, with anxiety and depressive features occurring in 52.2 and 45.4% of the subjects, respectively [13]. Thus, the observed public fear and anxiety are an expected consequence of COVID-19 pandemic [14].

The results of the current study demonstrated that there were no significant differences between demographic characteristics and psychological distress apart from the level of education. Our findings suggest that the mean stress subscale was significantly different among "educational qualification" levels, such that individuals with a higher educational degree (e.g., PhD or Master's degree) experienced higher levels of stress. This is in concordance with the other two other studies which showed that people with a higher education experience more distress, potentially due to increased self-awareness of their own health as well as other impacts of the virus on the econ-omy, healthcare systems, and society in general [12, 15].

In accordance with the results of other research studies, female respondents showed significantly higher psychological distress (depression) than their male counterparts [12]. This is similar to the results from previous research which concluded that women are more vulnerable to stress and are more likely to develop post-traumatic stress disorder [16].

In our study, there were no differences between age of participants and the psychological stress levels observed. However, another study showed that young adults older than 60 years had the highest distress scores [12, 17]. Also, we showed that there was no significant difference between the presence of various background diseases and psychological distress. To date, the evidence suggests that the two groups of the community who are at a higher risk of getting severe COVID-19 disease are older people (over 60 years old) and those with underlying chronic diseases (diabetes, chronic respiratory disease, cardiovascular disease, and cancer) [18].

The unpredictable nature of the COVID-19 epidemic has been stimulated by myths and inaccurate information, often driven by incorrect news reporting and misunderstanding of public well-being messages, causing anxiety in the community [19]. This suggests that timely mental healthcare needs to be developed specifically for this situation and to help prepare in case of a

second wave of the virus. Public health interventions should be based on a comprehensive assessment of risk factors leading to psychological issues such as the elevation in depressive anxiety and stress-related symptoms seen in this study.

Various countries have implemented different programs, strategies, and protocols for overcoming COVID-19-related psychological distress [20]. In line with this, the Ministry of Health in Iran has instituted various applied management models for overcoming this crisis such as using the capabilities of social media and television for public education (e.g., providing educational clips with more attention to vulnerable groups such as the young, the elderly, women, and migrant workers), training in the use of personal protective equipment, reducing gatherings with the campaign "stay at home" to prevent spreading of the infection, offering training for access to medical resources and the public health service system, and providing governmental financial support for the vulnerable population. There is also a movement toward increased screening, referral, and targeted intervention for reducing psychological distress to prevent further mental health problems. Some of the recommendations to aid in this include ensuring that sources of information regarding the COVID-19 situation are reliable; maintaining contact with family, friends, and colleagues; and seeking help as needed.

In this study, we could not assess the various factors affecting the observed psychological distress, and factors such as history of mental disease were self-reported. It should also be acknowledged that the questionnaire used in this study was optimized for use in Iran and may therefore not be generalizable to other cultures. Finally, these assessments were carried out based on reported symptoms only. We suggest that accuracy could be increased through combined assessment of easily accessible molecular biomarkers. For example, a study in 1999 showed that evening salivary cortisol levels are associated with anxiety, depressiveness, and post-traumatic avoidance [21]. Another study showed that salivary amylase levels could be useful for assessment of individuals working in a stressful and isolated environment [22]. A study showed that increased circulating biomarkers of inflammation such as high-sensitivity C-reactive protein, pro-inflammatory cytokines, and decreased vitamin D levels are associated with post-stroke depression [23]. In line with this, a systematic review found that some circulating inflammatory biomarkers such as interleukin (IL)-6, IL-1β, and IL-5 may be useful for identification of individuals with panic disorder [24]. Finally a number of meta-analyses have confirmed that circulating levels of brain-derived neurotrophic factor (BDNF) are correlated with the course of schizophrenia and depressive disorders [25]. These studies illustrate the connection between the mind and body in the maintenance of physiological homeostasis and mental well-being.

22.5 Conclusions

The results of the study show that the community in Tehran is experiencing severe and extremely severe psychological burdens due to the COVID-19 outbreak. Given that the situation is still ongoing, new mental health intervention policies are urgently needed to help individuals cope. Just as it is important to test for the virus, we also recommend testing for detection of changes in psychological symptoms. This may lead to development of an algorithm which incorporates both symptoms and molecular biomarkers to aid in selection of the most appropriate therapeutic response.

Conflict of Interest The authors declare no conflict of interest with respect to the authorship and publication of this article.

References

1. Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T et al (2020) Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. Lancet Psychiatry 7(3):228–229

2. Fedson DS (2015) A practical treatment for patients with Ebola virus disease. J Infect Dis 211(4):661–662

3. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N et al (2020) The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet 395(10227):912–920

4. Shigemura J, Ursano RJ, Morganstein JC, Kurosawa M, Benedek DM (2020) Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: mental health consequences and target populations. Psychiatry Clin Neurosci 74(4):281–282

5. Jeong H, Yim HW, Song YJ, Ki M, Min JA, Cho J et al (2016) Mental health status of people isolated due to Middle East Respiratory Syndrome. Epidemiol Health 38:e2016048. https://doi.org/10.4178/epih.e2016048

6. Chua SE, Cheung V, Cheung C, McAlonan GM, Wong JW, Cheung EP et al (2004) Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers. Can J Psychiatr 49(6):391–393

7. Han KM, Kim KH, Lee M, Lee SM, Ko YH, Paik JW (2017) Increase in the prescription rate of antidepressants after the Sewol Ferry disaster in Ansan, South Korea. J Affect Disord 219:31–36

8. Kasiulevičius V, Šapoka V, Filipavičiūtė R (2006) Sample size calculation in epidemiological studies. Geron 7(4):225–231

9. Lovibond PF (1998) Long-term stability of depression, anxiety, and stress syndromes. J Abnorm Psychol 107(3):520–526

10. Sahebi A, Asghari MJ, Salari R (2005) Validation of depression anxiety and stress scale (DASS-21) for an Iranian population. J Dev Psychol http://jip.azad.ac.ir/article_512443_en.html

11. Chan RC, Xu T, Huang J, Wang Y, Zhao Q, Shum DH et al (2012) Extending the utility of the depression anxiety stress scale by examining its psychometric properties in Chinese settings. Psychiatry Res 200(2–3):879–883

12. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y (2020) A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: implications and policy recommendations. Gen Psychiatry 33(2):e100213. https://doi.org/10.1136/gpsych-2020-100213

13. Cheng SK, Wong C, Tsang J, Wong K (2004) Psychological distress and negative appraisals in survivors of severe acute respiratory syndrome (SARS). Psychol Med 34(7):1187–1195

14. Rubin GJ, Wessely S (2020) The psychological effects of quarantining a city. BMJ 368:m313. https://doi.org/10.1136/bmj.m313

15. Roberts T, Esponda GM, Krupchanka D, Shidhaye R, Patel V, Rathod S (2018) Factors associated with health service utilisation for common mental disorders: a systematic review. BMC Psychiatry 18(1):262

16. Sareen J, Erickson J, Medved MI, Asmundson GJ, Enns MW, Stein M et al (2013) Risk factors for post-injury mental health problems. Depress Anxiety 30(4):321–327

17. Cheng C, Huang J, Baoyong L (2014) Psychological health diathesis assessment system: a nationwide survey of resilient trait scale for Chinese adults. Stud Psychol Behav 12:735–742

18. World Health Organization (2020) Coronavirus disease 2019 (COVID-19): situation report, 51. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10

19. Bao Y, Sun Y, Meng S, Shi J, Lu L (2020) 2019-nCoV epidemic: address mental health care to empower society. Lancet 395(10224):e37–e38

20. Duan L, Zhu G (2020) Psychological interventions for people affected by the COVID-19 epidemic. Lancet Psychiatry 7(4):300–302

21. Aardal-Eriksson E, Eriksson TE, Holm AC, Lundin T (1999) Salivary cortisol and serum prolactin in relation to stress rating scales in a group of rescue workers. Biol Psychiatry 46(6):850–855

22. Rai B, Kaur J, Foing BH (2012) Salivary amylase and stress during stressful environment: three Mars analog mission crews study. Neurosci Lett 518(1):23–26

23. Levada OA, Troyan AS (2018) Poststroke depression biomarkers: a narrative review. Front Neurol 9:577. https://doi.org/10.3389/fneur.2018.00577

24. Quagliato LA, Nardi AE (2018) Cytokine alterations in panic disorder: a systematic review. J Affect Disord 228:91–96

25. Peng S, Li W, Lv L, Zhang Z, Zhan X (2018) BDNF as a biomarker in diagnosis and evaluation of treatment for schizophrenia and depression. Discov Med 26(143):127–136