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Posttraumatic Stress Disorder and Related Factors Among COVID-19 Survivors Two Years After the Pandemic: A Web-based Cross-sectional Survey in Kurdistan, Iran

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Abstract

Background: The coronavirus disease 2019 (COVID-19) pandemic is a threatening and potentially traumatic event, causing psychological problems among communities. So far, few studies have evaluated the long-term psychological impact of COVID-19 on mental health.

Objectives: This study aimed to assess the frequency of posttraumatic stress disorder (PTSD) among people living in Kurdistan province, Iran, more than two years after the beginning of the pandemic, and to determine factors related to adverse mental outcomes.

Methods: Using the convenience sampling method, a web-based cross-sectional survey was conducted from 21 March to 21 May 2022. A total of 2,705 respondents completed the Post Traumatic Stress Disorder Checklist for DSM-5 (PCL-5), and 2,669 cases were included in the study. We used the multivariable logistic regression analysis to detect factors associated with PTSD.

Results: The mean age of the participants was 34.98 ± 10.84 years, and the overall prevalence of PTSD was 38.9%. The potential factors associated with PTSD included younger age, the history of isolation, previous psychiatric disorders, and loss of relatives or friends due to COVID-19 ($P < 0.05$).

Conclusions: According to our results, the COVID-19 pandemic had a negative effect on the mental health of a relatively high percentage of the general population in Kurdistan, Iran. Given the possible long-term mental health effects of the outbreak of acute infectious diseases, planning to improve mental health in vulnerable groups should be considered for the post-COVID-19 era.

Keywords: COVID-19, Iran, Kurdistan, Posttraumatic Stress Disorder, Survivors

1. Background

Posttraumatic stress disorder (PTSD) can occur following exposure to a traumatic or stressful event beyond the scope of common human experiences, such as natural disasters, torture, accidents, violent physical attacks, and rape. The typical symptoms include the persistence of the trauma, intrusive thoughts, emotional numbness, the avoidance of relevant stimuli, and physiological hyperarousal (1).

Several studies during past epidemics, such as severe acute respiratory syndrome (SARS) and H1N1 influenza, examined the psychological effects of epidemics and reported that a relatively high percentage of survivors experienced PTSD and other mental problems at some time during the outbreak (2-4). The coronavirus disease 2019 (COVID-19) pandemic, as a traumatic event posing a significant threat to life, has led to the hospitalization or death of many patients (5). Several studies have evaluated mental health problems during the COVID-19 pandemic due to biological and psychosocial factors (6-8). According to the results of a study in Iran, in the first months of the outbreak, the overall prevalence of COVID-19-related PTSD among the general population over 18 years of age was 62.4%, and the general mental health burden was 43.6% (9). Furthermore, some countries examined the psychological impact of the COVID-19 pandemic on the population's mental health in the long run. After one year from the beginning of the COVID-19 pandemic, the disease underwent a low transmission period. During this time, the Chinese participants had a mean PCL-5 score of 13.65, and probable PTSD symptoms occurred in 9.28% of them (10). It can be concluded that the general population may suffer the long-term psychological health impact while exposed to acute infectious diseases.

2. Objectives

So far, few studies have investigated the long-term psychological effects of the pandemic on the population. Accordingly, the main aim of this study was to evaluate the frequency of PTSD and the related risk factors more than two years after the beginning of the COVID-19 pandemic in Kurdistan province, Iran. It is hoped that physical and mental healthcare policymakers can use our results as a reference in their future planning and decision-making.

3. Methods

3.1. Study Design and Participants

This descriptive cross-sectional study was carried out among the general population over 18 years living in Kurdistan province, Iran, in 2022. A web-based survey was distributed among the target population using various social media (including WhatsApp and Telegram) to collect data. Similar to several previous studies during the current pandemic (9, 10), we used the convenience sampling method. The questionnaire was online for two months, from 21 March 2022. All subjects reported their demographic data, answered the PTSD Checklist for DSM-5 (PCL-5) based on their experience of the COVID-19 pandemic, and indicated the level of each problem. Finally, out of 2,705 completed questionnaires, 39 were removed based on the exclusion criteria, including age under 18 years or living outside of Kurdistan province, and 2,669 cases were included in the study.

3.2. Ethical Statement

The Ethics Committee of the Kurdistan University of Medical Sciences, Sanandaj, Iran, approved this study (Code: IR.MUK.REC.1400.189). All participants were required to read an informed consent document and answered the questionnaires anonymously. The participants were free to withdraw from the survey at any stage before submitting the online questionnaire.

3.3. Measures

3.3.1. Demographic Information

The questionnaire, in the first part, collected sociodemographic data, including gender, age, education level, marital status, income, occupation, the history of COVID-19 infection, the history of psychiatric disorder and/or hospitalization in participants, the history of death due to COVID-19 in family members or close friends, and the history of home staying during the pandemic.

3.3.2. The Posttraumatic Stress Disorder Checklist for DSM-5

The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) is a 20-item self-report questionnaire based on DSM-5, which is used to assess the severity of PTSD symptoms over the past month. It has four subscales: intrusion, avoidance, negative alterations in cognition/mood, and alterations in arousal/reactivity. The participants answered the questions based on a 5-point Likert scale from 0 (not at all) to 4 (extremely). The obtained scores showed strong internal consistency (α = 0.94), test-retest reliability (r = 0.82), convergent validity (rs = 0.74 to 0.85), and discriminant validity (rs = 0.31 to 0.60) (11). The PCL-5 score range is 0 - 80, and a preliminary cut-off score of 33 indicates the presence of PTSD (12). This questionnaire has been validated in Iran with good reliability and validity (13).

3.4. Statistical Analysis

First, the sociodemographic characteristics of the participants were summarized using mean, standard deviation, frequency, and percentage. Second, the prevalence of COVID-19-related PTSD was calculated, and its relationship was evaluated with the studied factors (univariate analysis) using the Pearson chi-square test (χ^2) and independent samples *t*-test. Third, multivariate logistic regression models were performed to explore the potential influencing factors. The adjusted odds ratio (OR) and 95% confidence interval (CI) were calculated for all studied variables. We used the Statistical Package for Social Sciences (SPSS) version 24.0 for data analysis, and a P-value less than 0.05 was considered statistically significant (two-sided tests).

4. Results

Out of 2,705 answered questionnaires, 2,669 were included in the analysis. The mean age of the respondents was 34.98 years (SD = 10.84), with 1,539 (57.7%) being female and 1,749 (65.5%) being married. Table 1 illustrates the sociodemographic characteristics of the participants. The overall prevalence of PTSD with a cut-off point of 33 was 38.9%. Table 2 shows the results for the PTSD prevalence stratified by variables. In the multivariate logistic regression models, younger age was more likely to develop PTSD (P-value = 0.019). Besides, the history of psychiatric disorder (AOR = 2.696, 95% CI: 2.137 - 3.402), the history of quarantine (AOR = 1.767, 95% CI: 1.433 - 2.179), and the history of the death of family members or friends due to COVID-19 (AOR = 1.598, 95% CI: 1.354 - 1.886) were among the effecting factors related to COVID-19-induced PTSD, as shown in Table 3.

Table 1. Sociodemographic Characteristics of the Participants (N = 2,669)

Demographic Variables	Category	No. (%)
Sex	Male	1130 (42.3)
	Female	1539 (57.7)
Marital status	Single	841 (31.5)
	Married	1749 (65.5)
	Divorced/widowed	79 (3.0)
Education level	Lower than diploma	485 (18.2)
	Diploma/associate's degree	951 (35.6)
	Bachelor's/master's degree	1094 (41.0)
	PhD and higher	139 (5.2)
Employment	Unemployed	303 (11.4)
	Housewife	707 (26.5)
	Part-time employee	330 (12.4)
	Full-time employee	829 (31.1)
	Retired	132 (4.9)
Occupation	Student	365 (13.7)
	Health worker	266 (10.0)
	Non-healthcare worker	2403 (90.0)
Income (Tomans/mo)	No income	1199 (44.9)
	< 3 million	453 (17.0)
	3-10 million	848 (31.8)
	> 10 million	169 (6.3)
History of psychiatric disorder	Positive	371 (13.9)
	Negative	2298 (86.1)
History of COVID-19 infection	Positive	1471 (55.1)
	Negative	1198 (44.9)
History of hospitalization due to COVID-19	Positive	189 (7.1)
	Negative	2480 (92.9)
History of quarantine	Positive	1913 (71.7)
	Negative	756 (28.3)
History of COVID-19 mortality in family or friends	Positive	1109 (41.6)
	Negative	1560 (58.4)
Age, y (mean ± SD)		34.98 ± 10.84

5. Discussion

This population-based survey aimed to assess the COVID-19-related PTSD among people living in Kurdistan province, Iran, more than two years after the beginning of the COVID-19 outbreak. We also identified the related risk factors.

According to our results, the overall prevalence of PTSD was 38.9% in the population over 18 years of age. Moreover, the overall prevalence of PTSD was higher in females, people of younger ages, single people, unemployed individuals, people with a history of COVID-19 disease, quarantined people, people with psychiatric disorders, and those who experienced the death of relatives due to COVID-19.

Multivariate logistic regression analyses showed that the potential influencing factors associated with COVID-19-related PTSD included the following: younger age, the history of quarantine, the history of psychiatric disorders, and the history of the death of family members or friends due to COVID-19.

The COVID-19 pandemic is associated with multiple psychiatric problems due to biological and psychosocial factors, dramatically impacting all aspects of people's lives worldwide. Fear of illness and death, social isolation, uncertainty about the future, economic problems, and loss of job and usual activities are among the psychological stressors that may lead to mental health burdens and stress-related disorders (14).

A previous study on COVID-19 at the beginning of the pandemic among the Iranian population reported that about 62.4% of the participants had COVID-19-related PTSD. This result was observed by administering the Impact of Event Scale-Revised (IES-R) and a cut-off score of 24 points, which is the diagnostic requirement for PTSD (9). We found that many individuals in Kurdistan province still had high PCL-5 scores, which is the diagnostic requirement for PTSD, even two years after the onset of the pandemic. It may be concluded that COVID-19 survivors need more targeted interventions due to psychiatric injuries associated with COVID-19.

In our study, female respondents had higher PCL-5 scores compared to males. This is consistent with previous studies, which showed that the prevalence of mental health burden and PTSD was higher in females than males during the COVID-19 pandemic (9, 15, 16). The reason can be the greater prevalence of common risk factors in females, consisting of anxiety disorders and preexisting depressive, chronic environmental stress, fluctuations in ovarian hormone levels and hypersensitivity to emotional stimuli, and domestic violence, which may be exacerbated during a pandemic (9, 10).

A number of studies have confirmed demographic characteristics to be significant variables influencing the predisposition to PTSD (9, 10). Similarly, our study highlighted the greater possibility of higher PCL-5 scores in younger adults, consistent with several previous studies conducted during the COVID-19 pandemic (9, 17, 18). Although the measurement tools were different in these studies, they all showed a higher mental involvement rate in young people during the pandemic. In our study, the mean age of respondents was 34.98 ± 10.84 years; this age

Table 2. Overall Prevalence of PTSD in the Participants Stratified by Different Variables (N = 2,669)

Demographic Variables	Category	No PTSD, No. (%)	PTSD, No. (%)	χ^2	P-Value
Sex	Male	732 (64.8)	398 (35.2)	11.39	0.001
	Female	898 (58.3)	641 (41.7)		
Marital status	Single	470 (55.9)	371 (44.1)	14.34	0.001
	Married	1107 (63.3)	642 (36.7)		
	Divorced/widowed	53 (67.1)	26 (32.9)		
Education level	Lower than diploma	280 (67.7)	205 (42.3)	6.36	0.095
	Diploma/associate's degree	602 (63.3)	349 (36.7)		
	Bachelor's/master's degree	565 (60.0)	438 (40.0)		
	PhD and higher	92 (66.2)	47 (33.8)		
Employment	Unemployed	161 (53.1)	142 (46.9)	24.23	0.000
	Housewife	426 (60.3)	281 (39.7)		
	Part-time employee	213 (64.5)	117 (35.5)		
	Full-time employee	523 (63.1)	306 (36.9)		
	Retired	98 (74.2)	34 (25.8)		
	Student	206 (56.4)	159 (43.6)		
Occupation	Health worker	160 (60.2)	106 (39.8)	0.10	0.745
	Non-healthcare worker	1470 (61.2)	933 (38.8)		
Income (Tomans/mo)	No income	700 (58.4)	499 (41.6)	16.12	0.001
	< 3 million	260 (57.4)	193 (42.6)		
	3 - 10 million	558 (65.8)	290 (34.2)		
	> 10 million	112 (66.3)	57 (33.7)		
History of psychiatric disorder	Positive	150 (40.4)	221 (59.6)	77.21	0.000
	Negative	1480 (64.4)	818 (35.6)		
History of COVID-19 infection	Positive	853 (58.0)	618 (42.0)	13.10	0.000
	Negative	777 (64.9)	421 (35.1)		
History of hospitalization due to COVID-19	Positive	108 (57.1)	81 (42.9)	1.32	0.250
	Negative	1522 (61.4)	958 (38.6)		
History of quarantine	Positive	1089 (56.9)	824 (43.1)	48.81	0.000
	Negative	541 (71.6)	215 (28.4)		
History of COVID-19 mortality in family or friends	Positive	605 (54.6)	504 (45.4)	33.90	0.000
	Negative	1025 (65.7)	535 (34.3)		
Age, y (mean ± SD)		35.76 ± 11.19	33.66 ± 10.15		0.001

group may have more concerns about the future and be more affected by unemployment, inflation, and business closures. More social involvement might justify the impact of the pandemic on young people.

The current study showed a high prevalence of COVID-19-related PTSD in participants with a history of psychiatric disorders. This is consistent with a previous study conducted on 1,910 participants in Iran at the beginning of the pandemic using the IES-R tool. The study revealed a high prevalence of mental health burden and COVID-19-related PTSD in participants with a positive history of psychiatric disorders (9). Another study also reported that people with psychiatric illnesses were more likely to exhibit higher levels of PTSD, depression, anxiety, and stress during the pan-

Table 3. Multivariate Logistic Regression Results of Association between PTSD and Variables

Variables	AOR [a]	95% CI [b], Lower-Upper	P-Value
Sex			
Male	-	-	-
Female	1.221	0.995 - 1.498	0.056
Age	0.987	0.976 - 0.998	0.019
Marital status			
Divorced/widowed	-	-	-
Married	1.153	0.695 - 1.911	0.582
Single	1.372	0.800 - 2.352	0.250
Education level			
PhD and higher	-	-	-
Bachelor's/master's degree	1.538	0.995 - 2.375	0.052
Diploma/associate's degree	1.271	0.810 - 1.993	0.297
Lower than diploma	1.536	0.955 - 2.471	0.077
Employment			
Retired	-	-	-
Full-time employee	1.276	0.798 - 2.042	0.309
Part-time employee	0.927	0.546 - 1.573	0.779
Student	1.090	0.594 - 2.002	0.781
Housewife	1.136	0.656 - 1.965	0.650
Unemployed	1.481	0.828 - 2.647	0.186
Occupation			
Non-healthcare worker	-	-	-
Healthcare worker	1.076	0.792 - 1.463	0.640
Income (Tomans/mo)			
> 10 million	-	-	-
3 - 10 million	0.953	0.654 - 1.387	0.801
< 3 million	1.338	0.876 - 2.043	0.178
No income	1.133	0.726 - 1.770	0.582
History of psychiatric disorder			
Negative	-	-	-
Positive	2.696	2.137 - 3.402	0.000
History of COVID-19			
Negative	-	-	-
Positive	1.024	0.852 - 1.231	0.798
History of hospitalization due to COVID-19 infection			
Negative	-	-	-
Positive	1.046	0.758 - 1.443	0.787
History of quarantine			
Negative	-	-	-
Positive	1.767	1.433 - 2.179	0.000
History of COVID-19 mortality in family or friends			
Negative	-	-	-
Positive	1.598	1.354 - 1.886	0.000

[a] AOR, adjusted odds ratio
[b] Confidence interval

demic (19). Therefore, since outbreaks such as COVID-19 appear to cause a relapse or even worsen an existing mental disorder, it is essential to support this population.

Our results showed that the history of quarantine is a potential influencing factor associated with PTSD. This is in line with the results of studies conducted in previous epidemics, such as severe acute respiratory syndrome (SARS), Ebola, and influenza, which examined the psychological effects of quarantine and reported a high prevalence of mental health burden among them (20, 21). Therefore, it is recommended that when quarantine is deemed necessary, the authorities should only practice it for the necessary time; they should also provide a clear reason for quarantine and protocol information and ensure the provision of sufficient resources.

In the current study, the death of family members or close friends due to COVID-19 infection was another factor associated with PTSD. As the relatives of the COVID-19 victims may be affected by various psychological crises that expose them to a deep sense of loss and emotional shock, measures are needed to recognize and support all different aspects of mental health in these people. Meanwhile, long-term follow-up of the psychosocial burden of these survivors is essential.

The COVID-19 pandemic has led to the unexpected and rapid emergence of fear and has violated socio-emotional ties, thereby restricting one's freedom. These variables should be all considered to prevent any further development or worsening of PTSD symptoms.

Addressing PTSD requires a multifaceted approach. Individuals should recognize their emotions and possible mental health problems, and when they cannot cope with them, seek help from healthcare agencies or the government. The government, mental health professionals, and public health officials should take the initiative to understand the mental health and PTSD status of the population and more effectively identify groups and individuals who are at a higher risk and most in need of interventions in a timely manner. Medical institutions should promote, educate, and provide mental health services to prevent suicide, impulsive behavior, and extreme events and to treat or prevent possible increases in posttraumatic stress for the COVID-19 pandemic and future outbreaks of infectious diseases.

This study had some limitations. First, PTSD was assessed using a self-report screening questionnaire and not through a clinical evaluation of PTSD; therefore, we must be careful about interpreting the results. Second, regarding the fact that depression and anxiety partly overlap with PTSD symptoms, we cannot fully differentiate between PTSD symptoms and other mental disorders. Also, we used a web-based survey using an online system method. Thus,

participants with no access to the Internet or social networks and illiterate people were probably excluded. Therefore, the possibility of selection bias should be considered, and the results may not be generalizable to the whole community. Finally, the relatively small sample size in our study limits the generalization of the results. Despite these limitations, our study provided some new information about the rates of COVID-19-related PTSD two years after the onset of the COVID-19 pandemic in the general population of Kurdistan province, Iran.

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Footnotes

Authors' Contribution: Study concept and design: M.A. and A.M.; Acquisition of data: M.A. and N.A.; Analysis and interpretation of data: K.R.; Drafting of the manuscript: M.A.; Critical revision of the manuscript for important intellectual content: A.M.

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Informed Consent: All respondents were first asked to read an informed consent document and accept the terms. The participants answered the questionnaires anonymously and were free to withdraw from the survey at any time before confirming the final submission at the end of the questionnaire.

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