

An Investigation of the Effects of Anxiety and Early Depression on the Chances of Contracting the COVID-19 Infection among the Personnel of Outpatient Hospitals

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Abstract

Anxiety and depression are among the most prevalent psychiatric problems that can be associated with patients' physical issues and illnesses. Consequently, the current study aimed to investigate the effect of anxiety and early depression on the chances of contracting the COVID-19 infection among the personnel of outpatient hospitals. Thus, 241 members (136 male and 105 female employees) of the personnel in Moharrari Hospital, Iran, took part in the study and returned the DASS-21 questionnaire. Moreover, follow-up procedures lasted for a year. Out of the overall sample, 62 members contracted the COVID-19 in that year, and 6 members were hospitalized. The findings indicated that the contraction rate of the people who had scored higher in terms of depression and anxiety was significantly higher than that of the people with no symptoms of depression and anxiety. Moreover, the findings showed that having a history of physical illnesses had a significant relationship with anxiety and depression. Finally, no significant difference was observed between men and women in terms of suffering from depression and anxiety. The findings implied that psychiatric and physical problems can have mutual relationships with each other, and considering it can help select and develop more effective and optimal interventions.

Keywords: COVID-19, Depression, Anxiety, Stress.

INTRODUCTION

The spread of the coronavirus (the COVID-19), particularly after it was declared as a global pandemic by the WHO on March 2020, made considerable impacts on humans' lives around the world (1). According to the official data of the WHO, the mortality rate of the COVID-19 was nearly 5.2 million cases in 2020, and more than 19 million cases of contraction (with more than 0.5 million deaths) have been reported since August 2020 (2). It is obvious that collective crises like the COVID-19 remarkably disturb humans' routine performance and threaten their mental health by increasing their anxiety and fear (3). Moreover, the nonstop flow of news about the high rates of infection and rather high cases of mortality increase people's anxiety and worries concerning the COVID-19 crisis (4), and people are particularly worried about their own and their friends' and acquaintances' health (5). Furthermore, fears arising from unemployment, debts, professional-occupational failure, and extensive economic crises are profoundly worrisome (6). Thus, the COVID-19 brought about a psychiatric epidemic, and the potential consequences of this unusual situation on humans' mental health were identified as a significant issue since the beginning of the pandemic (7). Indeed, the WHO issued a set of guidelines to support humans' mental well-being on March 2020 (8).

Furthermore, the COVID-19 posed a significant challenge for healthcare services and increased the limitations of such systems more than ever (9, 10). Thus, healthcare workers (HCW) were exposed to stressful factors and various events like a rapid increase in their work volumes, sudden changes in their roles and responsibilities like the cases of critical decision-making (11), and the observation of a large number of patients and deaths related to the virus (12, 13). Moreover, the typical sources of available social support decreased for many healthcare workers due to changes in their schedules or the adoption of social distancing measures (11, 13). Holmes et al. (14) have recently stressed the importance of dealing with the psychological effects of the pandemic on hospital personnel as a significant research priority in the field of mental health. Like the situation that arose

during the spread of SARS or Ebola pandemics (9), healthcare workers faced intense psychological issues during the COVID-19 pandemic (15, 16). Thus, the personnel who work at the frontlines of detecting and treating COVID-19 patients may experience mental disturbances and other issues related to mental health (15, 17). The large numbers of positive and suspected cases, the unproportioned volume of work, the shortage of medicine, being under the spotlight of media, and the feeling of receiving insufficient assistance may expose them to emotional pressure (17, 18).

Previous studies have reported that healthcare workers are afraid that their family members, friends, and colleagues may contract diseases from them (18). They have also reported feelings like insecurity and shame, lack of interest in their work, resignation thoughts (19), and often anxiety and depression (20). Thus, investigating the short-term and long-term psychological impacts on healthcare workers seems necessary (10). Based on the concept of Health-related Quality of Life (HRQoL), it seems that psychological symptoms and disorders can influence humans' physical and mental states and predict their undesirable physical and clinical consequences (21, 22). For instance, depression (as a field that has attracted a lot of researchers' attention) can predict consequent disorders in humans' physical performance even after the modification of the base performance and the related variables (23, 24). In this regard, studies have shown that psychological disturbances are strong predictors of undesirable clinical consequences like relapse, re-hospitalization, and death among patients suffering from coronary artery disease, and depression can predict a higher rate of mortality during 24 months following a myocardial infarction (25). It is also related to a more than 3-fold increase in the rate of hospitalization during an 18-month period (26). Another study showed that a positive emotional style is a significant predictor in contracting the flu (27). Moreover, the evidence obtained from the recent pandemics (e.g., SARS and MERS) showed that an individual's weaker status in terms of mental health before the quarantine was a significant risk factor for the intensification of the psychiatric consequences after the quarantine (28, 29).

Thus, the psychological consequences of the COVID-19 have turned into a global challenge (particularly for highly vulnerable people), and it is necessary to detect these demographic groups and make sure that they receive convenient health services (7). As healthcare workers are exposed more significantly to the virus and experience more pressure, they should be investigated more carefully. Particularly, the identification of the psychological consequences of the COVID-19 is important, though few studies have been conducted in this regard. Thus, the current study aimed to investigate the effects of anxiety and early depression on the chances of contracting the COVID-19 infection among the personnel of an outpatient hospital.

Material and methods

Sample

This cross-sectional survey received approval from the human research ethics committee of Shiraz University of Medical Sciences (SUMS) and Moharreri Hospital in Shiraz, Iran. The source population of the sample was all moharreri hospital staff that RT-PCR for covid-19 was done for all of them and those who were covid-negative and vaccinated, examined for depression and anxiety with DASS test. All demographic characteristics and the presence or absence of previous physical and psychiatric disorders were recorded.

The reason for choosing this hospital is the large number of samples and strict monitoring of compliance with health protocols, as well as non-referral for covid-19.

All individuals completed the questionnaire with satisfaction and after completing the informed consent form, were tested for covid-19 and followed up within a year. It should be noted, those who had RT-PCR positive for covid-19 were considered as covid-positive. All subjects who became infected with covid-19, before being vaccinated, as well as those who had not been vaccinated before being infected, are excluded from the study as confounding factors to eliminate the effect of previous infection and vaccination. Then, statistical analysis was used to investigate the relationship with the risk of covid-19 infection.

Procedure

Demographic, social and personal characteristics of the participants were assessed by a questionnaire. In addition, the DASS test assessed participants' anxiety and depression during this year.

Statistical analysis

Data analysis was performed by SPSS software version ..., in which data were analyzed using subgroup analysis and adjusted analysis methods as well as Chi-square and Cronbach-alpha tests.

Result

A total of 241 people participated in this study, of which 136 (56.4%) were men and 105 (43.6%) were women, between the

ages of 23 and 65 years old. Of these, 86 (35%) were nurses, 15 (6.2%) were physicians, 33 (13.7%) were maids, and 19 (7.9%) were psychologists. Demographic, social and personal characteristics of the participants are summarized in table 1.

Of the 241 participants in the study, 33 (13.7%) had past medical history but 208 (86.3%) did not report any physical problems in the past. Also, none of the participants in the study mentioned a history of psychiatric problems. Among 241 participants, 62, or 25.7% were positive for covid-19, in this study and during this one-year follow-up. It should be noted that 6 patients (2.5%) developed severe covid-19, which led to hospitalization.

Table 1: Demographic, social, and personal characteristics

		Frequency	Percent
Gender	Male	136	56.4
	Female	105	43.6
Job	Janitor	33	13.7
	Nurse	86	35.7
	Doctor	15	6.2
	Official	40	16.6
	Practical nurse	33	13.7
	Facility	7	2.9
	Psychologist	19	7.9
	Guard	5	2.1
	Other	3	1.2
Physical illness Hx.	Yes	33	13.7
	No	208	86.3
Psychiatry hx.	Yes	0	0
	No	100	100
Covid	Yes	62	25.7
	No	179	74.3
Hospital covid	Yes	6	2.5
	No	235	97.5

Also, based on the study, there is no significant relation between age and risk of depression, anxiety, and stress. Other relation between psychiatric problems were mentioned in table2. Likewise, there is no relation between gender and psychiatric problems but there is a relation between existence of past medical history and risk of psychiatric problems. As, those participants who had previous medical illness, are more susceptible to develop depression (mean13.57, std. deviation: 7.47, P value: 0.013), anxiety (mean: 13.12, std. deviation: 7.90, P value: 0.007), and stress (mean: 13.90, std. deviation: 7.64, P value: 0.023; Table 3)

Table 2: relation between psychiatric problem and age

		Age	Depression	Anxiety	Stress
Age	Pearson Correlation	1			
	Sig. (2-tailed)				
Depression	Pearson Correlation	-0.071	1		
	Sig. (2-tailed)	0.271			
Anxiety	Pearson Correlation	-0.048	0.923**	1	
	Sig. (2-tailed)	0.461	0.000		
Stress	Pearson Correlation	-0.097	0.897**	0.907**	1
	Sig. (2-tailed)	0.133	0.000	0.000	

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Table 3: relation of past medical history and psychiatric problems

Group	Past medical Hx.	N	Mean	Std. Deviation	P-value
Depression	Negative	206	10.26	7.005	0.013
	Positive	33	13.57	7.47	
Anxiety	Negative	204	9.43	7.07	0.007
	Positive	33	13.12	7.90	
Stress	Negative	207	10.63	7.59	0.023
	Positive	33	13.90	7.64	

The main purpose of this article is to investigate the effect of primary depression and anxiety on risk of developing covid-19, in non-referral hospital staff. Therefore, with the results of recent study, all the P values were <0.05, there is a significant and

direct relationship between impact of primary psychiatric problems and the incidence of non-referral hospital staff with covid-19. Thus, the prevalence of covid-19 was higher in staff with primary psychiatric problems, including depression (mean: 19.22, std. deviation: 6.36), anxiety (mean: 17.31, std. deviation:5.85), and stress (mean:19.22, std. deviation: 6.26), than in staff with no history of primary depression (mean: 8.32, std. deviation: 5.72), anxiety (mean: 7.45, std. deviation: 5.91), and stress (mean: 8.31, std. deviation: 5.93; table 4).

Table 4: relation between primary psychiatric problems and prevalence of covid-19

Group	COVID	N	Mean	Std. Deviation	P-value
Depression	No	177	8.32	5.72	0.000
	Yes	62	17.56	6.36	
Anxiety	No	177	7.45	5.91	0.000
	Yes	60	17.31	5.85	
Stress	No	179	8.31	5.93	0.000
	Yes	61	19.22	6.26	

On the other hand, this study examined 6 patients (2.5%) developed severe covid-19, which led to hospitalization. So, there is a significant and direct relationship between primary psychiatric problem, such as depression (mean: 22.83, std. deviation: 6.33, and P value: 0.000), anxiety (mean: 22.83, std. deviation: 5.74, and P value: 0.000), and stress (mean: 24.16, std. deviation: 6.21, P value: 0.000), and even severe covid-19, which led to hospitalization (Table 5)

Table 5: Relation between primary psychiatric problems and severe covid-19

Group	Severe covid-19	N	Mean	Std. Deviation	P-value
Depression	No	233	10.40	6.90	0.000
	Yes	6	22.83	6.33	
Anxiety	No	231	9.61	7.02	0.000
	Yes	6	22.83	5.74	
Stress	No	234	10.75	7.41	0,000
	Yes	6	24.16	6.21	

Discussion and conclusion

The current study aimed to investigate the role of anxiety and early depression in the chances of contracting the COVID-19 among hospital personnel. The main hypothesis of the study was that people suffering from anxiety or depression were more likely to contract the disease due to various influences (e.g., inflammatory factors, a weakened immune system, reduced motivation to observe medical protocols, and the use of non-adaptive strategies to counteract stress). Thus, when the employees with a history of depression, anxiety, or stress were compared to their counterparts without such histories, it was found that the participants with at least one of the above disorders were more likely to contract the COVID-19. Moreover, several participants who had a history of psychiatric disorders (n = 6) were hospitalized due to the COVID-19. However, Brilowskaya et al. (30) found that though the higher levels of positive mental health and stress predicted exhaustion during the COVID-19 pandemic, depression and anxiety did not significantly predict it. On the other hand, the findings of another study (22) were in line with the current study as they showed that the symptoms of mental disturbance like depression, anxiety, and perceived stress predict the failure of physical conditions.

A probable factor in the relationship of depression, anxiety, and stress with the COVID-19 is the disturbed regulation of immune responses that are reflected in the unnatural profiles of anti-inflammatory cytokines in the blood. As Myint (31) stated, a significant relationship exists between psychiatric issues and the higher levels of inflammation, and this affects the brain and other organs. Indeed, the relationship between inflammation and depression is undeniable (32). In addition, a significant increase was observed in the number of immune molecules in the patients with major depression, and this was related to chronic inflammation (33). Increased inflammation rates have been observed in several other psychiatric disorders like bipolar disorder, anxiety disorders, post-traumatic stress disorder, and schizophrenia, as well (33, 34).

A rich set of data has recorded the effects of inflammation on the brain (32). Inflammatory cytokines and their downstream signaling pathways reduce the availability of monoamines by decreasing the rates of synthesis and release and increasing the resorption of serotonin, norepinephrine, and dopamine. The cytokines increase the release of glutamate and reduce its resorption by influencing the functions of astrocytes and microglia and help the overflow of the excess glutamate out of the synapses to be linked with non-synaptic glutamate receptors and bring about stimulatory toxicity. The effects of inflammation on

neurotransmission systems ultimately influence neural circuits. Studies using neural imaging techniques indicate that neural circuits responsible for the regulation of motivation, motor activities, stimulation, anxiety, and warning are significantly influenced (35).

On the other hand, it can be assumed that the higher chances of contracting the COVID-19 among people with a history of psychiatric disorders is related to their higher vulnerability to life conditions. It seems that people with increased levels of depression, anxiety, and stress symptoms are prone to respond inconsistently to new and unclear situations. They are more likely to suffer from rumination and worries and are influenced by situations that are experienced as out of one's control. Thus, the lack of sufficient strategies to counteract increases their exhaustion and helplessness (36, 37). Moreover, the symptoms of depression, anxiety, and stress are accompanied by lower perceived social support and psychological resilience, and this increases their experiences of exhaustion in uncontrollable situations (38, 39). This will have negative effects on physical symptoms and the efficiency of treatments (30); on the other hand, mental health and social, emotional, and mental well-being (40) help to create positive emotions and resilience, reduce negative and undesirable consequences, and nurture adaptive responses to unclear situations (41, 42). Thus, it seems that people suffering from psychological disorders often choose weaker and non-adaptive responses to situations like the COVID-19 pandemic, and this, in turn, weakens their immune system and increases the chance of suffering from physical disorders (particularly among hospital personnel exposed to more environmental stressors and critical situations).

Another result of the study was that the relation of gender with depression and early depression was not found to be significant. As the previous studies have indicated that women are more likely to show the symptoms of depression (43)

, the findings of the current study can be regarded as significant. Thus, the lack of any difference between men and women in the current study can be attributed to women's more considerable efforts to comply with healthcare standards compared to men. Nevertheless, more studies should be conducted in this regard. Moreover, the current study showed people's medical histories can be considered as an important cause of early psychiatric issues like depression, anxiety, and stress. As Sartorius et al. (44) showed that the risk of depression in patients with a history of other psychiatric or medical problems is 9 times higher than that of people with no other medical conditions, it seems that physical problems can make people vulnerable to psychiatric disorders.

Based on the obtained results, it can be argued that psychological disturbances like depression, stress, and anxiety can increase the chances of contracting physical conditions like the COVID-19. Nevertheless, physical conditions can also be considered negative precursors for psychiatric disorders. These findings can be helpful in the introduction of effective medical approaches. Moreover, as few studies have been conducted in this field, researchers can apply the findings of the current study to conduct more studies using different methodological approaches like clinical trials. However, the present study had some limitations that have to be considered. Using a self-report questionnaire brings about some issues and may not reflect every fact about a participant. Thus, using other assessment methods like semi-structured and in-depth clinical interviews can be helpful. In addition, using convenience sampling exposes research designs to the risk of introducing uncontrolled variables to studies, and this can threaten the generalizability of findings. As participant attrition and the loss of the sample are among the problems of longitudinal studies, larger samples should be selected. Furthermore, since longitudinal surveys cannot indicate causal relationships, future researchers should focus on doing controlled experimental studies by applying the findings of the current study.

Conflict of interest disclosure

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