Investigating the effectiveness of psychological interventions in response to stress, anxiety, and depression in coronavirus disease 2019 patients: A systematic review

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Abstract:
Coronavirus disease 2019 (COVID-19) has caused different kinds of psychological consequences. Identifying and providing psychological plans and protocols can be effective in promoting patients’ mental health. The study was conducted to investigate the effect of psychological interventions in response to stress, anxiety, and depression in COVID-19 patients. The present study was performed based on a systematic review. The studies were done by using different combinations of keywords in databases such as Science Direct, ProQuest, PubMed, and Google scholar search engines and in Persian databases such as Magiran, SID, Iranmedex from July 25 to September 7, 2020. Out of 4533 articles that were found after extensive search, 9 articles were evaluated and qualitatively analyzed for data extraction with the 2010 consort checklist. The final articles were from different countries of China, the USA, France, Italy, and Iran and were about COVID-19 patients and their health-care providers. Interventions ranged from relaxation, music therapy to mental health and extensive psychological skills including adaptation methods, mindfulness and self-care, and crisis management. Anxiety was the highest and then stress and depression were the next indicators. The results showed a positive effect of these interventions on stress, anxiety, depression, and even the quality of life, sleep and family and child function. The number of studies in this field is increasing. We see a variety of psychological and educational interventions every day. It is hoped that by designing standard protocols for psychological intervention, effective steps can be taken to improve the mental health of patients and health-care providers.

Keywords:
Anxiety, coronavirus disease 2019, depression, psychological health, stress

Introduction
The severe acute respiratory syndrome coronavirus (SARS-CoV-2), formerly known as the Novel coronavirus, was first detected on December 31, 2019, in Wuhan, China. On January 30, 2020, the World Health Organization declared a global health emergency due to the widespread prevalence of the virus worldwide. The RNA virus, which causes coronavirus disease 2019 (COVID-19), has been present worldwide since its inception until October 20, 2020, with the registration of more than 40,251,950 infected and 1,116,131 deaths in the world and 534,631 infected and 30,712 deaths in Iran, it has become a global epidemic.

COVID-19 had many important economic, political, social, and even military consequences in all countries of the world, and one of the important consequences of
In the meta-analysis by Salari in the general population during the COVID-19 pandemic, there were psychological factors such as stress (29.6%), anxiety (31.9%) and depression (33.7%). In a review study by Karimi et al. on the prevalence of psychiatric disorders in the COVID-19 epidemic, the results showed that the most common psychiatric disorders in different segments of society are depression and anxiety. In various studies all around the world, moderate-to-severe anxiety level (6% to 65.6%) among the people in the community, patients, and health-care staff have been reported in the COVID-19 epidemic. Evidence from all around the world also shows that symptoms of depression were moderate to severe (8.4%–50.4%) in quarantined individuals, patients, medical staff, and the affluent community during the COVID-19 epidemic.

Long-term quarantine is one of the reasons for psychological problems such as anxiety and depressive disorder. People who are quarantined at home suffer from loneliness due to the lack of space for physical activity, stress due to limited social interactions, and anxiety due to the fear of transmitting the infection to family members, and thus, their mental health needs more attention. In various studies, the stress amount during the COVID-19 epidemic, in quarantined people, the rich class and the general public have been reported to range from 8.1% to 73.4%). The need for timely and effective psychological interventions along with medical care is necessary for the patients, especially patients with pneumonia who need serious quarantine.

In Iran, Eisazadeh et al. showed in a research that there are psychosocial consequences such as the feeling of exclusion from society and reduced contact with family and society and the experience of social stigma following the COVID-19 disease in a person or his family members. Some evidence suggests that social support and social activity in the community reduces the level of depression and anxiety and improves mental health in the epidemic. In this way, in some countries, including China, psychological counseling services, like telephone and Internet became wider for counseling or intervention programs, and the state council of the people’s republic of China has announced that it is launching online institutions in response to the epidemic.

Whereas there is evidence that various sections of society have developed psychiatric disorders during the course of infectious diseases as well as COVID-19, therefore, identification and treatment of infected people are essential. According to studies, so far, no study has been conducted to evaluate psychological interventions in patients with psychiatric disorders in the COVID-19 epidemic to identify and present appropriate and targeted psychological programs and protocols to promote effective mental health in patients. Hence, the present study was performed as a systematic review with the aim of investigating the effect of psychological interventions in response to the stress, anxiety, and depression of patients in COVID-19.

Materials and Methods

This study was conducted by a systematic review. The search strategy was introduced by designing clinical questions based on the population, intervention, control, and outcomes model. Articles that were published in foreign databases such as Science Direct, PubMed, ProQuest, and Google scholar search engines and Persian databases such as, Magiran, SID, and Iranmedex were used.

Keywords include (1) “COVID-19” OR “2019-nCoV” OR “coronavirus” OR “SARS CoV-2” AND (2) “stress” OR “anxiety” OR “depression” OR “resilience” OR “coping” OR “crisis intervention” OR “mental health intervention” OR “mental health care” OR “education” OR “psychological intervention,” (3) (intervention * or program * or education * or support * or group * or therapy *), and their persian equivalent was searched in the period between July 25 and September 7, 2020.

The following search terms were used in PubMed: coronavirus or COVID-19 or 2019-n CoV disease or COVID-19 or SARS-CoV-2 or 2019-nCoV or n-CoV and stress or anxiety or depression or resilience or coping crisis intervention or mental health intervention or mental health care or education or psychological intervention or program or therapy filters: Clinical Trial; published in the past 5 years; Humans. It is important to note that from the mesh of PubMed and keywords of similar articles were finally compiled in this way. In addition, the reference list of the obtained articles was examined to identify the articles that were not obtained by using the above methods. In the initial search, 1453 articles were obtained from PubMed, 1700 from Science Direct and 1380 from Google Scholar, 71 articles from
ProQuest, and finally, 9 articles entered the final analysis according to Figure 1.

Inclusion criteria consisted of main articles and studies in the field of psychological interventions in response to stress, anxiety, and depression due to the exposure to COVID-19. Exclusion criteria consisted of descriptive studies and reviews of articles that were presented in the conferences and the inability to access the full text of the article. The 2010 consort checklist was used to assess the quality of the articles. This checklist consists of 6 general sections including 25 subcategories, which include title, abstract, introduction, implementation method, results, discussion, and other information. Due to the small number of interventional studies, first the titles and then the abstracts were reviewed and the studies that were in non-English languages were excluded. First, the titles of the articles were reviewed and then the related abstracts were studied and intervention articles were included in the study. Psychological interventions unrelated to COVID-19 were excluded. The data were entered in the EndNote X8 software (Thomson Reuters 2018). The mentioned project is illustrated by the School of Nursing of Baqiyatallah University of Medical Sciences and the code of ethics is IR. BMSU.REC.1399.225.

Results

Out of 4533 searched articles, 9 articles were placed in Table 1 and their quality was evaluated, most of them had an average quality between 15 and 24. In Table 1, we included studies from different countries such as China (three studies), USA (one study), France (one study), Italy (two studies), Iran (one study), and Canada (one study). In three studies, the results were not stated and only the protocol was published. In the case of the participant and the target group, most interventions were performed on COVID-19 patients.
| First author          | Publication year and Country | Sample size Age (mean±SD) (years) | Intervention Sessions | Time Duration                                      | Content                                                                 | Instruments                                      | Results                          |
|---------------------|-----------------------------|----------------------------------|-----------------------|---------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------|----------------------------------|
| Li                  | 2020 China                  | 51 (2 groups) 50.41±13.04        | N sessions: 5        | Time: 20-30 min Duration: 5 days                  | Jacobson's relaxation techniques                                    | STAI, SRSS                                      | Anxiety ↓                        |
| Xiao Chun-Xiu       | 2020 China                  | 79 (2 groups) 58.45±11.08        | N sessions:2          | Time: 15 min Duration: 7 days                     | Progressive muscle relaxation training                              | GAD-7, PHQ-9, PSQI                          | ↓Depression l                      |
| Sotoudeh H G        | 2020 Iran                   | 30 (2 groups) 40.8±13.5          | N sessions: 4         | Time: 60 min Duration: 1 month                    | Crisis intervention package                                         | WHO-QOL-BREF, DASS21, SCL-25                | Depression, ↓                      |
| Wei N               | 2020 China                  | 26 (2 groups) 48.5±9.5 (Thombs group) | N sessions: 14       | Time: 50 min Duration: 2 weeks                    | Breath relaxation training, mindfulness refuge skills, butterfly hug method | PHQ-9, GAD-7, 17-HAMD, HAMA                 | Depression and anxiety symptoms ↓ |
| Riegler L           | 2020 USA                    | -                                | N sessions: 6         | Time: 30 min Duration: 1 month                    | Parenting pro-tips (OPPT), child development positive parenting     | STAI form-trait subscale (STAI-Y) STAI form-trait subscale (STAI-Y) | Depression ↓                      |
| Pizzoli             | 2020 Italy Protocol and 17  | 252 84 per 3 group               | Time: 7 min           |                                                      | First group: Regulation of breathing frequencies                      | MTC-Q1                                         | ↑Intensity of tiredness, sadness, worry, fright |
| Giordano F          | 2020 Italy Protocol and 17  | 22 women 12 men Range: 22-59     | MT                    | Duration: 5 weeks                                  | Resilience to stress and preventing mental health problems - Psychoeducation, functional behavioral and cognitive coping strategies mindfulness | PSS-10                                         | Not mentioned                    |
| Weiner              | 2020 France Protocol and 20 | 92, 46 per group Follow-up: 4 weeks, end of treatment (8 weeks) and at 3 months and 6 months | N sessions: 7         | Time: 20 min Every 72 hours Duration: 8 weeks    | Therapeutic recreation activities, information, anxiety management, social support | PROMIS Anxiety, PHQ-8, PSS, ULS-6, MSBS | Not published                    |

MT: Music therapy, STAI=Spielberger State-Trait Anxiety Scale, SRSS=Sleep State Self-Rating Scale, GAD-7=Generalized Anxiety Disorder-7, PHQ-9=Patient Health Questionnaire-9, PSQI=The Pittsburgh Sleep Quality Index scale, DASS21=Depression, Anxiety and Stress Scale, SCL-25=Symptom Checklist-25, WHO=World Health Organization, QOL=Quality of life, HAM-D=Hamilton Depression Scale, HAMA=Hamilton Anxiety Scale, GF=Global Functioning, STAI=State-Trait Anxiety Inventory, ASI-3=Anxiety Sensitivity Index-3, BVS=Body Vigilance Scale, MTC-Q1=Music Team Care-Q1, PSS=Perceived Stress Scale, PHQ-8=Patient Health Questionnaire-8, ULS=UCLA Loneliness Scale, MSBS=Boredom Scale, RCT=Randomized controlled trial, OPPT Parenting Pro-Tips CES-D=Center for Epidemiologic Studies Depression Scale, FAD=Family Assessment Devise
and health-care providers. One article worked on soldiers[31] and another on anxious COVID-19 patients.[34] Furthermore, most of the interventions were performed on active society members between the ages of 20–60, and the children, elderly, and exceptional COVID-19 patients were less targeted in the interventions. Most of the interventions were in Internet and in the form of audio files or online training. Direct education was conducted in only one studies in Iran[30] and in other studies in China, it was done through the hospital call system and video calls on COVID-19 patients to minimize direct contact with patients.[30,37] In the study, the tele-health was used on soldiers.[31] Direct interventions were performed with fewer sessions. In total, the number of intervention sessions ranged from 3 to a maximum of 14 sessions. The intervention time varied from 5 days to 8 weeks. Interventions that range from muscle relaxation[36,37] and respiratory relaxation,[29,33] music therapy (a song to reduce anxiety and tension and relaxation)[34] to Cognitive Behavioral Therapy (CBT),[32] psychological skills such as anxiety management and seeking social support[36] were widespread. Mobile software was used for intervention in two studies.[29,34] In the Italy study, it was done through social networks,[33] interventions including adjustment skills responsibility and factualism, spirituality) were mentioned in the Iran study.[30] Only the Iranian study included the impact of spirituality in the interventions.

Among the methods of coping, stress resilience, mindfulness, and self-care, in an article on medical staff and crisis management training on COVID-19 patients, were among the trainings. The use of an approved protocol or psychological theory was not mentioned in most articles except CBT, which was performed on health-care providers in France.[32]

In one article, the training of soldiers was conducted both individually and in groups, the consequences of which were examined in the soldiers themselves, their families, and children.[31] Follow-up of the interventions was done only in the France article and health-care providers, which showed the strength of the above article.[32] The effectiveness of the study results in other groups, including families and children, was evaluated only in the US article and the soldiers.[30] Anxiety was the most important indicator and then stress and depression were the next indicators. Anxiety scale was measured in six studies,[29,30,33,35,37] in three studies, stress[31,32,35] and in four studies, depression[29,31,39] was studied. In a study in Iran, stress, anxiety, and depression were measured together as variables.[30] In three studies from China and Canada, the sleep index was examined.[30,36,37] Quality of life was studied in the Iran article and the feelings of loneliness and heartache were studied in the Canada article.[35,36]

The results of studies indicate the positive effect of these interventions on stress, fear, anxiety, depression, and even the quality of life and sleep, family and child performance, and parental stress. In an intervention on soldiers, 2.73% had an effect on the soldiers’ depression and 5.58% had an effect on the parenting stress index. It also had an effect on 5.62% of the global functioning scale of family assessment.[31] Other studies did not indicate efficacy, however, all studies showed the effectiveness of the interventions.

Discussion

The present study was performed as a systematic review with the aim of investigating the effects of psychological interventions in response to patients’ stress, anxiety, and depression patients in the COVID-19 pandemic. The results generally showed that these interventions had a positive effect on stress, anxiety, depression, sleeping, family, and child function and even the quality of life. In a systematic review study done by Chew et al. on the topic of psychological response, coping and the prevalence of infectious diseases such as Ebola and H1N1 was performed at the community level. The results showed that behavioral and emotional problems and psychological disorders such as anger, guilt, grief, courage, fear, anxiety, depression, and posttraumatic stress disorder arose due to the prevalence of these diseases in the community. People gravitated toward strategies such as problem-focused coping (seeking alternative solutions, personal protection, and protection of others), seeking social support and a positive assessment of the situation and avoidance which helped reduce the stress and mental pressure that was caused by these diseases.[38]

In the findings of the present study, most of the trainings were in the form of virtual web, mobile smartphones, and audio files, but only one study in Iran was done through a face-to-face and direct training by two clinical psychologists in COVID-19 stress management, reducing anxiety, depression, and the quality of life of the patients (especially women).[35] In a similar study by Cheng and Wong in the 2005 SARS epidemic, the results showed that telephone interviews and trainings in psychological symptom relief and guidance skills for family members were effective for those with mild symptoms of psychological disorders; however, face-to-face training and interviews are only for patients with severe psychological problems.[39] A study in Singapore also found the use of e-learning platforms for quarantined patients and nurses to be very effective, and the use of these online apps strengthened the COVID-19 support peer network in critical situations.[40] However, because of different mutations of the COVID-19 virus and high epidemic capacity, telephone and virtual
training have been more possible. Furthermore, due to maintaining social distance and limiting the number of people participating in face-to-face training in the current situation, most researchers prefer to use distance education for therapeutic intervention of the patients and special groups.

Furthermore, the results of studies in China found that the use of psychological interventions such as progressive muscle relaxation and Jacobson is effective in reducing anxiety and depression in COVID-19 patients. Wilczyńska et al. showed that using these muscle relaxation techniques was effective in reducing anxiety in youth and even the progressive muscle relaxation technique was shown to be more effective in reducing anxiety than the Jacobson’s technique. Of course, progressive muscle relaxation exercises allow the patients to experience different states of sensation along with muscle stretching and relaxation in a sequence that can relax the muscle and keep the whole body in a relaxed state by relieving negative emotions such as, stress and anxiety, which in a way confirms the results of our study. The findings of the present study showed that music therapy reduces the feeling of fatigue, concern and grief of the health-care workers in the COVID-19 crisis. Fallek et al. showed that music therapy plays a prominent role in reducing the physical symptoms and psychological distress of patients who were admitted to the intensive care unit. Confirming the findings of this study, it can be said that music therapy by expressing emotions and feelings can enhance self-awareness, social communication, and personal support. Therefore, this intervention can be used to reduce stress and relax the patients and health-care staff in the COVID-19 epidemic.

The results of this study also showed that the use of mindfulness along with other psychological interventions is effective in reducing anxiety and depression in isolated individuals and stress in health-care providers. Warren et al. in a meta-analytic study showed that mindfulness is effective in preventing recurrence of depression in patients. In a review study, Carlson described mindfulness as an effective method in reducing stress in people with a variety of physical and mental illnesses. In addition, the results of the present study showed the application of breath relaxation technique alone or in combination with meditation on the anxiety and depression of quarantined individuals and the general public, respectively. Because psychological interventions such as yoga, meditation, and breathing exercises can have a positive effect on the prevention and treatment of the SARS-COV19 infection by strengthening the immune system using these techniques in the programs to reduce stress and anxiety can be helpful in patients with COVID-19.

In the findings of this review, only one study in France taught coping skills and functional cognitive behavioral (CBT) training in the stress reduction care protocol of health-care workers. Main et al. after the SARS epidemic showed that the number of stressors and avoidance coping strategies predict more psychological symptoms, but active coping is a satisfactory predictor for controlling the stressors. Passive avoidance coping in the acute phase of the disease and the resulting stressors can be effective in reducing distress but its persistence in the long run is harmful. Measures that target coping strategies should also be tailored to uncontrollable stressors and the cultural values and preferences of the community and patients, for example, avoidance coping is more socially accepted and adapted in Chinese society than in Western societies. Wong et al. also found that in the SARS epidemic, through a survey among the health-care workers found that the physicians used planning more than the nurses and health-care assistants, the nurses used disengagement behavioral strategy and the health-care assistants used self-distraction strategy for coping with the stress of the disease. According to the evidence that confirms the results of our study, educational planning and interventions are necessary to promote efficient coping mechanism in the COVID-19 epidemic. Furthermore, social support along with anxiety management training and recreational therapy was used as a care protocol in Canada on anxiety, stress, nostalgia, and sadness in COVID-19 patients. Raven et al. also showed in a qualitative study of the experiences of medical staff and health care during the Ebola outbreak that having a sense of service to family and family support had a significant effect on increasing their psychological adjustment to the conditions and problems that were caused by the disease. Therefore, social support from family, close relatives, neighbors, colleagues, and health-care staff can have a significant impact on reducing the complications and physical and mental problems caused by this epidemic.

The present study is a systematic review of mental health interventions in the study of stress, anxiety, and depression during the COVID-19 pandemic, which shows the innovative aspect of the study.

**Limitation and recommendation**

The limitations of the present study can be related to the lack of initial studies in this field due to the short duration of the COVID-19 epidemic; inevitably, some of the studies presented in this study were reviewed and entered into the study only as a clinical protocol and without mentioning their results. It is suggested that due to the continuing epidemic and the lack of a definitive prevention and treatment approach, such studies should be conducted by researchers to update scientific information and help reduce the resolution.
of problems and psychological disorders that were caused by this epidemic at different levels of society. Some studies of psychological interventions (such as cognitive-behavioral interventions and mindfulness and skills to reduce anxiety and coping stress) were implemented in response to the stress, anxiety, and depression in patients with COVID-19 or the treatment and care staff of COVID-19 as well as the families of COVID-19 victims.

Conclusion

Based on the findings, a variety of approaches such as coping skills training, stress resilience, mindfulness, music therapy, muscle relaxation techniques, breathing meditation, anxiety and depression were used in patients, isolated people who were under quarantine and observed by the health-care staff and some approaches have been presented in the form of care protocols. The present study shows a summary of psychological interventions and indicates the lack of interventional studies that were published during the COVID-19 pandemic so far.

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Conflicts of interest

There are no conflicts of interest.

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