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

Fatemeh Rahmati, Robabe Khalili[1]

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

Health Research Center, Life Style Institute, Baqiyatallah University of Medical Sciences, Tehran, Iran, [1]Behavioral Sciences Research Center, Life Style Institute, Faculty of Nursing, Baqiyatallah University of Medical Sciences, Tehran, Iran

Address for correspondence:
Dr. Robabe Khalili, Behavioral Sciences Research Center, Life Style Institute, Nursing Faculty, Baqiyatallah University of Medical Sciences, Tehran, Iran. E-mail: khalili1120@gmail.com

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.[1] On January 30, 2020, the World Health Organization declared a global health emergency due to the widespread prevalence of the virus worldwide.[2] 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.[3]

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

How to cite this article: Rahmati F, Khalili R. Investigating the effectiveness of psychological interventions in response to stress, anxiety, and depression in coronavirus disease 2019 patients: A systematic review. J Edu Health Promot 2022;11:203.

this disease is the prevalence of psychological problems. Spread rate, inappropriate condition of isolated patients in the intensive care unit with acute respiratory problems, the lack of effective drug treatment, and the resulting mortality rate are among the most important factors that can affect the mental health of people at different levels of society, including patients, health-care staff, families, children, students, patients with mental disorders, and even the personnel of different occupations. Hence, discussion about psychological effects of this contagious viral disease on the mental health of people is very important.[4-8]

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%).[9] 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.[8] 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.[10-20] 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.[10,12,18,20,21,22]

Long-term quarantine is one of the reasons for psychological problems such as anxiety and depressive disorder.[23] 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.[24] 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%).[16,17,19] 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.[14]

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.[25] 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.[18,26] 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.[27]

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),[28-30] USA (one study),[31] France (one study),[32] Italy (two studies),[33,34] Iran (One study),[35] and Canada (one study).[36] 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
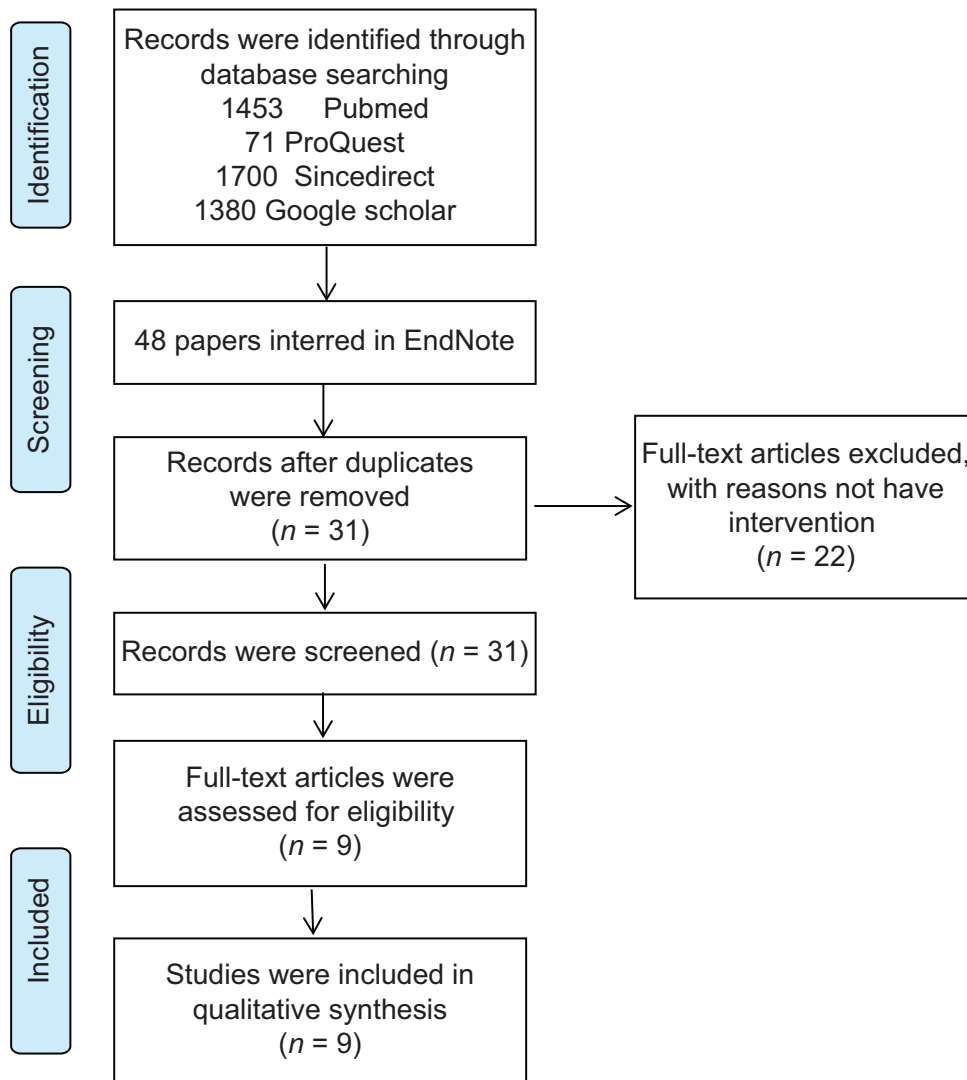

Figure 1: The process of searching and evaluating articles according to the Prisma pattern

Table 1: Characteristic of founded articles

First author Publication year and Country Study type and Quality	Sample size Age (mean±SD) (years)	Intervention Sessions Time Duration	Content	Instruments	Results
Li[37] 2020 China RCT and 23	51 (2 groups) 50.41±13.04	N sessions: 5 Time: 20-30 min Duration: 5 days	Jacobson's relaxation techniques	STAI, SRSS	Anxiety ↓ Sleep quality↑
Xiao Chun-Xiu[30] China RCT and 20	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	↓Anxiety ↓Depression l Sleep quality↑
Sotoudeh H G[35] 2020 Iran RCT and 19	30 (2 groups) Range: 20-70	N sessions: 4 Time: 60 min Duration: 1 month	Crisis intervention package	WHO-QOL-BREF, DASS21, SCL-25	Depression,↓ Anxiety, ↓ Stress↓ Quality of life↑
Wei N[29] 2020 China Prospective RCT and 22	26 (2 groups) 40.8±13.5 48.5±9.5 (Thombs group)	N sessions :14 Time: 50 min Duration: 2 weeks Every day	Breath relaxation training, mindfulness refuge skills, butterfly hug method	PHQ-9, GAD-7, 17-HAMD, HAMA	Depression and anxiety symptoms ↓
James Riegler L[31] 2020 USA 21	41 Finally 22 -	1. Pro-Tips N sessions: 6 Time: 30 min 2. Telepsychotherapy Time=60 min Duration: 3 part 3. Intervention therapists Duration: 3 days in-person training	Parenting pro-tips (OPPT), child development positive parenting	Depression Scale (CES-D; Radloff, 1977), 12-item GF, FAD; Epstein, Baldwin, and Bishop, 1983), 3rd ed..,; PSI; Abidin, 1995), GF, The Eyberg Child Behavior Inventory, Strengths, Difficulties Questionnaire	Depression↓ Parenting stress↓ Family dysfunction↓ Child behavior↑
Pizzoli[33] 2020 Italy Protocol and 17	252 84 per 3 group	Time: 7 min	Audio clip First group: Regulation of breathing frequencies Second group: Body scan meditation Third group: Natural sounds	STAI form-trait subscale (STAI-Y) Subscale physical concerns of the ASI-3 6 I require (worry physical sensations) BVS	Not mentioned
Giordano F[34] 2020 Italy 15	22 women 12 men Range: 22-59	MT Duration: 5 weeks		MTC-Q1	↑Intensity of tiredness, sadness, worry, fright
Weiner[32] 2020 Randomized, open and parallel group-controlled 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	Resilience to stress and preventing mental health problems - Psychoeducation, functional behavioral and cognitive coping strategies mindfulness	PSS-10	Not mentioned
Thombs [36] (PN-RCT(Canada Protocoly and 24	162	N sessions: 3 Time: 60-90 min Duration: 1 month	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 Sleeps Quality Index scale, DASS21=Depression, Anxiety and Stress Scale, SCL-25=Symptom Checklist-25, WHO=World Health Organization, QOL=Quality of life, HAMD=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.[36] 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[35] 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[30,37] 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.[35] 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.[31] 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[29-31,35] was studied. In a study in Iran, stress, anxiety, and depression were measured together as variables.[35] 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[30,37] 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.[41] 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,[42] 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.[34] 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.[43] 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.[43] 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.[29,32] Warren *et al.* in a meta-analytic study showed that mindfulness is effective in preventing recurrence of depression in patients.[44] In a review study, Carlson described mindfulness as an effective method in reducing stress in people with a variety of physical and mental illnesses.[45] 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.[29,33] Because psychological interventions such as yoga, meditation, and breathing exercises can have a positive effect on the prevention and treatment of the SARS-COVID19 infection by strengthening the immune system,[46] 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.[32] 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.[47] 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.[48] 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.[36] 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.[49] 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.

Conflicts of interest
There are no conflicts of interest.

References

1. Zhu H, Wei L, Niu P. The novel coronavirus outbreak in Wuhan, China. Glob Health Res Policy 2020;5:6.
2. Organization WH. Iran (Islamic Republic of) Situation 2020/10/17. Available from: https://covid19.who.int/region/emro/country/ir.
3. Organization WH. Rolling updates on coronavirus disease (COVID-19 25 May 2020. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen.
4. Liu D, Ren Y, Yan F, Li Y, Xu X, Yu X, et al., Psychological Impact and Predisposing Factors of the Coronavirus Disease 2019 (COVID-19) Pandemic on General Public in China. 2020.
5. Bo HX, Li W, Yang Y, Wang Y, Zhang Q, Cheung T, et al. Posttraumatic stress symptoms and attitude toward crisis mental health services among clinically stable patients with COVID-19 in China. Psychol Med 2021;51:1052-3.
6. Lima CK, Carvalho PM, Lima IA, Nunes JV, Saraiva JS, de Souza RI, et al. The emotional impact of coronavirus 2019-nCoV (new coronavirus disease). Psychiatry Res 2020;287:112915.
7. Yao H, Chen JH, Xu YF. Patients with mental health disorders in the COVID-19 epidemic. Lancet Psychiatry 2020;7:e21.
8. Karim l, khalili R, Sirati Nir M. Prevalence of various psychological disorders during the COVID-19 pandemic: Systematic review. J Mil Med 2020;22:648-62.
9. Salari N, Hosseinian-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: A systematic review and meta-analysis. Global Health 2020;16:57.
10. Qiu J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. Gen Psychiatr 2020;33:e100213.
11. Yang L, Danjuan Wu, Yanbin Hou, Xunqiang Wang, Ni Dai, Guanjun Wang, et al. Analysis of psychological state and clinical psychological intervention model of patients with COVID-19. medRxiv 2020;1-8.
12. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open 2020;3:e203976.
13. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. Int J Environ Res Public Health 2020;17:E1729.
14. Liu S, Yang L, Zhang C, Xiang YT, Liu Z, Hu S, et al. Online mental health services in China during the COVID-19 outbreak. Lancet Psychiatry 2020;7:e17-8.
15. Qi J, Xu J, Li BZ, Huang JS, Yang Y, Zhang ZT, et al. The evaluation of sleep disturbances for Chinese frontline medical workers under the outbreak of COVID-19. Sleep medicine. 2020 Aug 1;72:1-4.
16. Kwok KO, Li KK, Chan HH, Yi YY, Tang A, Wei WI, et al. Community responses during the early phase of the COVID-19 epidemic in Hong Kong: Risk perception, information exposure and preventive measures. medRxiv preprint 2020.
17. Jiang Y. Psychological impact and coping strategies of frontline medical staff in Hunan between January and March 2020 during the outbreak of coronavirus disease 2019 (COVID19) in Hubei, China. Med Sci Monit 2020;26:e924171.
18. Xiao H, Zhang Y, Kong D, Li S, Yang N. Social capital and sleep quality in individuals who self-isolated for 14 days during the coronavirus disease 2019 (COVID-19) outbreak in January 2020 in China. Med Sci Monit 2020;26:e923921.
19. Li S, Wang Y, Xue J, Zhao N, Zhu T. The impact of COVID-19 epidemic declaration on psychological consequences: A study on active Weibo users. Int J Environ Res Public Health 2020;17:E2032.
20. Pieh C, Budimir S, Probst T. Mental health during COVID-19 lockdown: A comparison of Austria and the UK SSRN Electron. J. 2020;. 10.2139/ssrn. 3592372. [Epub ahead of print].
21. Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 epidemic in China: A web-based cross-sectional survey. medRxiv 2020; 288:112954.
22. Ying Y, Ruan L, Kong F, Zhu B, Ji Y, Lou Z et al. Mental health status among family members of health care workers in Ningbo, China during the coronavirus disease 2019 (COVID-19) outbreak: A Cross-sectional Study. BMC psychiatry. 2020 Dec;20(1):1-10.
23. Hall RC, Hall RC, Chapman MJ. The 1995 Kikwit Ebola outbreak: Lessons hospitals and physicians can apply to future viral epidemics. General hospital psychiatry. 2008 Sep 1;30(5):446-52.
24. Valencia-Garcia D, Simoni JM, Alegría M, Takeuchi DT. Social capital, acculturation, mental health, and perceived access to services among Mexican American women. Journal of consulting and clinical psychology. 2012 Apr;80(2):177.
25. Eisazadeh F, Dehkordi MA, Aghajanbigloo S. Psychological consequences of patients with coronavirus (COVID-19): A qualitative study. Biquarterly Iran J Health Psychol 2020;2:9-20.

26. Li C, Jiang S, Fang X. Effects of multi-dimensional social capital on mental health of children in poverty: An empirical study in Mainland China. J Health Psychol 2020;25:853-67.

27. Van Bortel T, Basnayake A, Wurie F, Jambai M, Koroma AS, Muana AT, *et al*. Psychosocial effects of an Ebola outbreak at individual, community and international levels. Bull World Health Organ 2016;94:210-4.

28. Xiao H, Zhang Y, Kong D, Li S, Yang N. The effects of social support on sleep quality of medical staff treating patients with coronavirus disease 2019 (COVID-19) in January and February 2020 in China. Med Sci Monit 2020;26:e923549.-1.

29. Wei N, Huang BC, Lu SJ, Hu JB, Zhou XY, Hu CC, *et al*. Efficacy of internet-based integrated intervention on depression and anxiety symptoms in patients with COVID-19. J Zhejiang Univ Sci B 2020;21:400-4.

30. Xiao CX, Lin YJ, Lin RQ, Liu AN, Zhong GQ, Lan CF. Effects of progressive muscle relaxation training on negative emotions and sleep quality in COVID-19 patients: A clinical observational study. Medicine (Baltimore) 2020;99:e23185.

31. James Riegler, L., Raj, S. P., Moscato, E. L., Narad, M. E., Kincaid, A., & Wade, S. L. Pilot trial of a telepsychotherapy parenting skills intervention for veteran families: Implications for managing parenting stress during COVID-19. Journal of Psychotherapy Integration 2020:30(2); 290–303.

32. Weiner L, Berna F, Nourry N, Severac F, Vidailhet P, Mengin AC. Efficacy of an online cognitive behavioral therapy program developed for healthcare workers during the COVID-19 pandemic: The REduction of STress (REST) study protocol for a randomized controlled trial. Trials 2020;21:870.

33. Pizzoli SM, Marzorati C, Mazzoni D, Pravettoni G. An internet-based intervention to alleviate stress during social isolation with guided relaxation and meditation: Protocol for a randomized controlled trial. JMIR Res Protoc 2020;9:e19236.

34. Giordano F, Scarlata E, Baroni M, Gentile E, Puntillo F, Brienza N, *et al*. Receptive music therapy to reduce stress and improve wellbeing in Italian clinical staff involved in COVID-19 pandemic: A preliminary study. Arts Psychother 2020;70:101688.

35. Gharaati Sotoudeh H, Alavi SS, Akbari Z, Jannatifard F, Artounian V. The effect of brief crisis intervention package on improving quality of life and mental health in patients with COVID-19. Iran J Psychiatry 2020;15:205-12.

36. Thombs BD, Kwakkenbos L, Carrier ME, Bourgeault A, Tao L, Harb S, Gagarine M, Rice D, Bustamante L, Ellis K, Duchek D. Protocol for a partially nested randomised controlled trial to evaluate the effectiveness of the scleroderma patient-centered intervention network COVID-19 home-isolation activities together (SPIN-CHAT) program to reduce anxiety among at-risk scleroderma patients. Journal of psychosomatic research. 2020 Aug 1;135:110-132.

37. Li W, Yang Y, Liu ZH, Zhao YJ, Zhang Q, Zhang L, *et al*. Progression of mental health services during the COVID-19 outbreak in China. Int J Biol Sci 2020;16:1732-8.

38. Chew QH, Wei KC, Vasoo S, Chua HC, Sim K. Narrative synthesis of psychological and coping responses towards emerging infectious disease outbreaks in the general population: practical considerations for the COVID-19 pandemic. Singapore medical journal. 2020 Jul;61(7):350.

39. Cheng SK, Wong CW. Psychological intervention with sufferers from severe acute respiratory syndrome (SARS): Lessons learnt from empirical findings. Clin Psychol Psychother 2005;12:80-6.

40. Ho CS, Chee CY, Ho RC. Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. Ann Acad Med Singapore 2020;49:1-3.

41. Wilczyńska D, Łysak-Radomska A, Podczarska-Głowacka M, Zajt J, Dornowski M, Skonieczny P. Evaluation of the effectiveness of relaxation in lowering the level of anxiety in young adults-a pilot study. Int J Occup Med Environ Health 2019;32:817-24.

42. Aksu NT, Erdogan A, Ozgur N. Effects of progressive muscle relaxation training on sleep and quality of life in patients with pulmonary resection. Sleep Breath 2018;22:695-702.

43. Fallek R, Corey K, Qamar A, Vernisie SN, Hoberman A, Selwyn PA, *et al*. Soothing the heart with music: A feasibility study of a bedside music therapy intervention for critically ill patients in an urban hospital setting. Palliat Support Care 2020;18:47-54.

44. Warren FC, Kuyken W, Taylor RS, Whalley B, Crane C, Bondolfi G, *et al*. Efficacy and moderators of mindfulness-based cognitive therapy in prevention of depressive relapse: An individual patient data meta-analysis from randomized trials. JAMA Psychiatry 2016 E1-E10.

45. Carlson LE. Mindfulness-based interventions for physical conditions: A narrative review evaluating levels of evidence. ISRN Psychiatry 2012:1-21.

46. Bushell W, Castle R, Williams MA, Brouwer KC, Tanzi RE, Chopra D *et al*. Meditation and yoga practices as potential adjunctive treatment of SARS-CoV-2 infection and COVID-19: A brief overview of key subjects. The Journal of Alternative and Complementary Medicine. 2020 Jul 1;26(7):547-56.

47. Main A, Zhou Q, Ma Y, Luecken LJ, Liu X. Relations of SARS-related stressors and coping to Chinese college students' psychological adjustment during the 2003 Beijing SARS epidemic. J Couns Psychol 2011;58:410.

48. Wong TW, Yau JK, Chan CL, Kwong RS, Ho SM, Lau CC, *et al*. The psychological impact of severe acute respiratory syndrome outbreak on healthcare workers in emergency departments and how they cope. Eur J Emerg Med 2005;12:13-8.

49. Raven J, Wurie H, Witter S. Health workers' experiences of coping with the Ebola epidemic in Sierra Leone's health system: A qualitative study. BMC Health Serv Res 2018;18:51.