

Effectiveness of Psychotherapy Interventions on the Mental Health of Children and Adults during COVID-19: A Systematic Review Meta-analysis

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Abstract

Background: Numerous studies have been conducted to investigate psychological interventions on COVID-19-related anxiety and depression. However, the literature review revealed no meta-analysis that has thoroughly reviewed the effects of psychological interventions on COVID-19-related anxiety and depression.

Objectives: The present review aimed to examine the effectiveness of psychological interventions on anxiety and depression level during the COVID-19 outbreak.

Methods: The search strategy was to screen the relevant original English clinical trials in the electronic databases of PubMed, Cochrane Library, Web of Science, and Scopus published from January 30, 2020 to March 5, 2022.

Results: The number of studies included for anxiety, depression, and stress were three, four, and two, respectively. Based on the random effects model, the mean scores (95% confidence interval [CI]) of anxiety in the intervention group before and after the intervention were 13.29 (9.22, 17.35) and 6.89 (2.88, 10.90), respectively. Moreover, the mean scores (95% CI) of depression based on the random-effects model in the intervention group before and after the intervention were 9.86 (7.35, 12.36) and 9.13 (4.38, 7.89), respectively. The random effects model for stress was also calculated. The mean scores (95% CI) of stress before and after the intervention were 22.06 (11.43, 32.68) and 17.50 (8.64, 26.37) in the intervention group and 21.68 (12.21, 31.14) and 20.97 (4.65, 37.28) in the control group, respectively.

Conclusion: The results of this review study showed that psychological interventions during the COVID-19 outbreak might be effective and more practical for the improvement of resilience, hope, and spiritual health in order to enhance mental health.

Keywords: Chil, COVID-19, Mental health, Meta-analysis, Psychosocial intervention, Systematic review

1. Background

Acute Respiratory Distress Syndrome due to Coronavirus Disease 2019 (COVID-19) Infection spread rapidly all over the world from China. Following the news and announcement of the World Health Organization on January 30, 2020, COVID-19 became a public health emergency (1, 2). The COVID-19 primarily attacks the respiratory system, with its main clinical symptoms being myalgia, fever, cough, and shortness of breath (3, 4). Due to its mysterious and uncontrollable nature, in addition to physical health, COVID-19 has led to the development of psychological problems in people (1). In the context of COVID-19 epidemic, there appears to be a significant increase in anxiety (4) and depression, emotional distress (5) domestic abuse, (6), loneliness, and domestic violence (7). This concern is so significant that the United Kingdom has issued a Psychological First Aid Guide to the Mental Health Organization (8). Accordingly, treatment protocols for COVID-19 patients should address both the physiological and psychological needs of patients. Providing treatment and psychological support may reduce the burden of

concomitant mental illness (9).

In this regard, some countries, including China, have widely deployed psychological counseling services through telephone and Internet for counseling or intervention during the COVID-19 epidemic. Numerous studies have been conducted to investigate the effects of psychological interventions on COVID-19-related anxiety and depression. However, the literature review revealed no meta-analysis that has thoroughly reviewed the effect of psychological interventions on COVID-19-related anxiety and depression.

2. Objectives

In this regard, the present meta-aimed to better estimate the possible effects of Psychological-Behavioral Intervention on mental health by pooling all available data. Furthermore, meta-analysis is important in Psychological-Behavioral intervention to provide a more reliable answer to a clinical research questions. Therefore, the present review examined the effects of psychological interventions on anxiety and depression during the COVID-19 outbreak.

3. Methods

Search strategy

The research question was: "What are the types of psychological interventions for managing psychological problems during the outbreak of COVID-19 in patients and what are their consequences?" The search strategy was to screen the relevant original English clinical trials in the four databases of Web of Science, Cochrane Library, PubMed, and Scopus published between January 30, 2020 and March 5, 2022 based on the MeSH terms and keywords of (psychological intervention OR mental intervention OR psychological disorders OR mental disorders OR anxiety OR depression) AND (COVID-19 OR CORONAVIRUS).

Process of selection of studies

Process of selection of studies was performed by two reviewers independently. Any disagreements between the two reviewers were resolved by discussion. In addition, other references from original articles and related reviews were searched and reviewed in these databases. Duplicate studies were excluded based on screening titles. The full texts of all selected articles were evaluated for eligible articles. Electronic databases were searched manually in seminars, conferences, congresses, references, and journals.

The search was performed manually and electronically in the references and citations of related articles. If an article was published in multiple sources, the article published in the source with less credibility was removed from the study.

Inclusion and exclusion criteria

Inclusion criteria were being randomized controlled clinical trials, experimental studies, and controlled pilot studies evaluating the effects of psychological interventions on the levels of anxiety, depression, stress, and other psychological problems in healthy individuals without COVID-19 or in patients with COVID-19.

Exclusion criteria were non-English articles, letters to the editor, and unpublished studies.

Data extraction table

The Cochrane's data extraction form was used for systematic review. The two authors separately extracted information from the included studies and reached a consensus after an exchange. Required information included first author, year of publication, country of study, type of study design, intervention measures, including sample size in each group, educational content, sessions and their duration, and study findings (Table 1).

Risk of bias in individual studies

The Jadad scale was used for the assessment of

the quality of trials. The range of Jaded scale is from 0 to 5 points and includes randomization, blinding, and withdrawals and dropouts (Table 2) (10) Two independent authors appraised the quality of studies. Disagreements between the authors were resolved through discussion.

Statistical analysis

Heterogeneity was tested using the Tau2 test and I² statistics. Heterogeneity test was performed for each of the variables (anxiety, depression, and stress). If chi-square test was significant, the results of the random effects model were reported.

4. Results

Based on the results of Table 3 and Figure 1, the mean scores (95% confidence interval, 95% CI) of anxiety based on the random effects model in the intervention group before and after the intervention were 13.29 (9.22, 17.35) and 6.89 (2.88, 10.90), respectively. The mean scores (95% CI) of anxiety in the control group before the intervention based on the random effects model and after the intervention based on the fixed effects model were 12.82 (8.78, 16.85) and 10.59 (9.70, 11.47), respectively. The results also showed that the decrease in the mean anxiety score in the intervention group was different from that in the control group. In fact, the difference before and after the test in the intervention group (6.4) was greater than that in the control group (2.23).

The results of Table 3 and Figure 2 showed that the mean scores (95% CI) of depression based on the random effects model in the intervention group before and after the intervention were 9.86 (7.35, 12.36) and 9.13 (4.38, 7.89), respectively. The mean scores (95% CI) of depression in the control group before the intervention based on the random effects model and after the intervention based on the fixed effects model were 9.61 (8.02, 11.20) and 8.35 (7.63, 9.07), respectively. The results showed that the decrease in the mean score (95% CI) of depression in the intervention group was different from that in the control group. In fact, the difference before and after the test in the intervention group (0.73) was less than that in the control group (1.26). The results of Table 3 and Figure 3 showed that the mean score (95% CI) of stress based on the random effects model in the intervention group before and after the intervention was 22.06 (11.43, 32.68) and 17.50 (8.64, 26.37), respectively. The mean score (95% CI) of stress in the control group before and after the intervention based on the random effects model was 21.68 (12.21, 31.14) and 20.97 (4.65, 37.28), respectively. The results showed that the decrease in mean stress score in the intervention group was different from the control group. In fact, the difference before and after the test in the intervention group (4.56) was greater than the control group (0.71).

Two studies were not included in meta-analysis. The first one is a study performed by Malboeuf-Hurtubise and Léger-Goodes, in which the score of anxiety in elementary school children as measured by three item anxiety (P=0.26) were not significantly different between the two intervention groups (mandala drawing intervention and emotion-based

directed drawing intervention). Moreover, the type of intervention group had no impact on levels of depression. The patients with COVID-19 experienced high levels of anxiety, depression, and stress. Subjects with a history of insomnia may be vulnerable to stressful events during their lives (15) (Table 2).

Table 1. Demographic and clinical characteristics of the patients included in the studies

First author	Publication date	Country	Intervention group/control group	Age	Type of interventions/frequency	Control	Outcome
Kong et al. (11)	2020	China	Patients affected by COVID-19 13/13	15-85 years old	Psychological-behavioral intervention (PBI)	Control group only received treatment as usual	Depression/Anxiety
Wei et al. (12)	2020	China	Patients affected by COVID-19 13/13	40-48 years old	Mindfulness (refuge)	Just supportive care	Depression/anxiety
Shaygan et al. (13)	2021	Iran	Patient affected by COVID-19 26/22	36 years old	Stress management ⁹ , mindfulness-based, cognitive behavioural techniques	Telephone-based psychological counseling if needed	Stress
Malboeuf-Hurtubise et al. (14)	2021	Canada	Elementary school students N=37	5 to 12 years	Philosophy for children mindfulness-based interventions	-	Basic psychological needs, anxiety level
Catherine Malboeuf-Hurtubise et al. (15)	2021	Canada	Elementary school children N=22	5-12 years old	Emotion-based directed drawing intervention and a mandala drawing intervention	-	Child anxiety, depression, inattention, and hyperactivity symptoms
Li et al. (16)	2020	China	Patients affected by COVID-19 47/46	48 years old	Cognitive Behavioral Therapy-	Chinese Management Guidelines	Depression, anxiety, and stress
Shapira et al. (3)	2021	Canada	Older people during the COVID-19 64/186	5-90 years old	wait-list control group	behavioral and cognitive techniques	loneliness and depression symptoms

Table 2. Evaluation of the quality of the study studies in systematic review

Name of authors	If randomization is mentioned	Randomization		If blinding is mentioned	Blinding		Dropouts/Withdrawals
		Randomization method is appropriate	Randomization method is not appropriate		Blinding method is appropriate	Blinding method is not appropriate	
Catherine Malboeuf-Hurtubise et al. (14)	+	+	-	-	-	-	+
Catherine Malboeuf-Hurtubise et al. (15)	+	+	-	-	-	-	+
Wei et al. (12)	+	+	-	-	-	-	+
Shaygan (13)	+	+	-	-	-	-	+
Kong1. et al. (11)	+	+	-	-	-	-	-
Li et al. (16)	+	+	-	-	-	-	+
Shapira et al.	+	-	+	-	-	-	+

The second study was conducted by the same author, Malboeuf-Hurtubise, who compared the effect of online mindfulness-based intervention (MBI) and philosophy for children (P4C) interventions on mental health during COVID-19 pandemic on elementary school students (N=37). ANCOVAs

revealed a significant effect of the P4C intervention on mental health difficulties, controlling for baseline levels. Participants in the P4C group showed lower scores on the measured symptoms at post-test than participants in the MBI group. Positive effects of the MBI on levels of BPN were reported. Patients in

Table 3. Estimated mean values and the 95% confidence intervals of anxiety, depression, and stress. Estimation was performed based on random and fixed effect model.

Variable	N	Time	Intervention	P-value of Heterogeneity test ¹	Control	P-value of Heterogeneity test ¹
Anxiety	3	Pre- test	13.29 (9.22, 17.35)*	<0.001	12.82 (8.78, 16.85)*	<0.001
		Post- test	6.89 (2.88, 10.90)*	<0.001	10.59 (9.70, 11.47)**	0.065
Depression	4	Pre- test	9.86 (7.35, 12.36)*	<0.001	9.61 (8.02, 11.20)*	0.012
		Post- test	9.13 (4.38, 7.89)*	<0.001	8.35 (7.63, 9.07)**	0.310
Stress	2	Pre- test	22.06 (11.43, 32.68)*	<0.001	21.68 (12.21, 31.14)*	<0.001
		Post- test	17.50 (8.64, 26.37)*	<0.001	20.97 (4.65, 37.28)*	<0.001

¹Chi-squared test *Random- effect model (95% CI) **Fixed-effect model (95% CI)

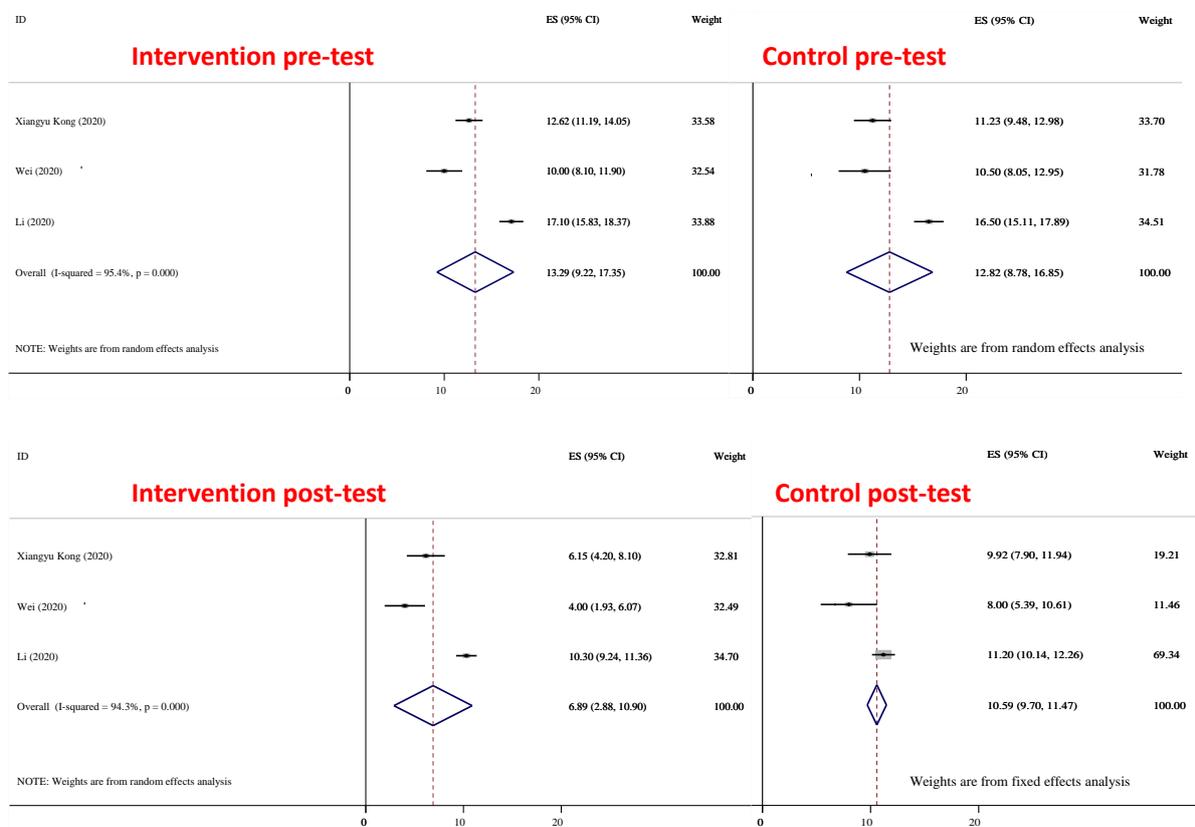


Figure 1. Forest plot showing weights (%) for each of three studies of anxiety for intervention group pre-test (on the top of left-hand side), control group pre-test (on the top of right-hand side), intervention group post-test (on the bottom of left-hand side), and control group post-test (on the bottom of right-hand side) with pooled mean (random or fixed-effects model)

the MBI intervention reported greater BPN satisfaction, compared to patients in the P4C intervention (14-16).

5. Discussion

Findings from the studies in this analysis showed that, in general, the most important mental health disorders include loneliness, stress, depression, and anxiety. In the present analysis, three studies on stress were reviewed. In the studies performed by Shaygan et

al. and Shapira et al., the subjects who used online multimedia psychoeducational interventions had statistically significant differences with the control group (3, 13). In a study conducted by Li et al., significant decreases were found for stress scales in both Cognitive Behavioral Therapy (CBT) and control groups. However, since participants in the intervention group underwent a higher reduction, differences between the two group were not statistically significant. Patients with no chronic disease reported a larger reduction in stress score, compared to patients

with chronic disease. The length of hospital stay had a significant relationship with anxiety levels (17). Klatt et al. conducted a single arm study with a pre-post design. Participants in Mindfulness in Motion (MIM) reported a significant decrease in scores based on the Perceived Stress Scale (18).

Five studies on the effect of Psychological-Behavioral Intervention (PBI) on depression were reviewed. In a study carried out by Kong et al., depression in patients with COVID-19, as measured by Hospital Anxiety and Depression Scale-Depression

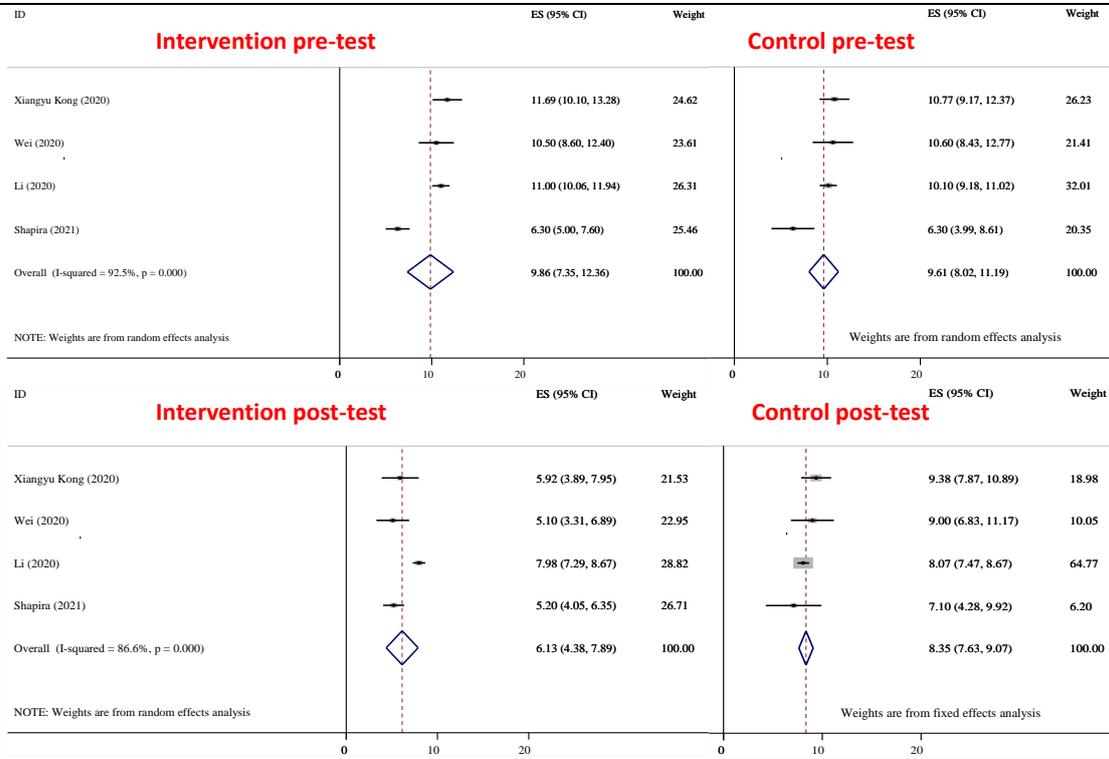


Figure 2. Forest plot showing weights (%) for each of three studies of depression for intervention group pre-test (on the top of left-hand side), control group pre-test (on the top of right-hand side), intervention group post-test (on the bottom of left-hand side), and control group post-test (on the bottom of right-hand side) with pooled mean (random or fixed-effects model)

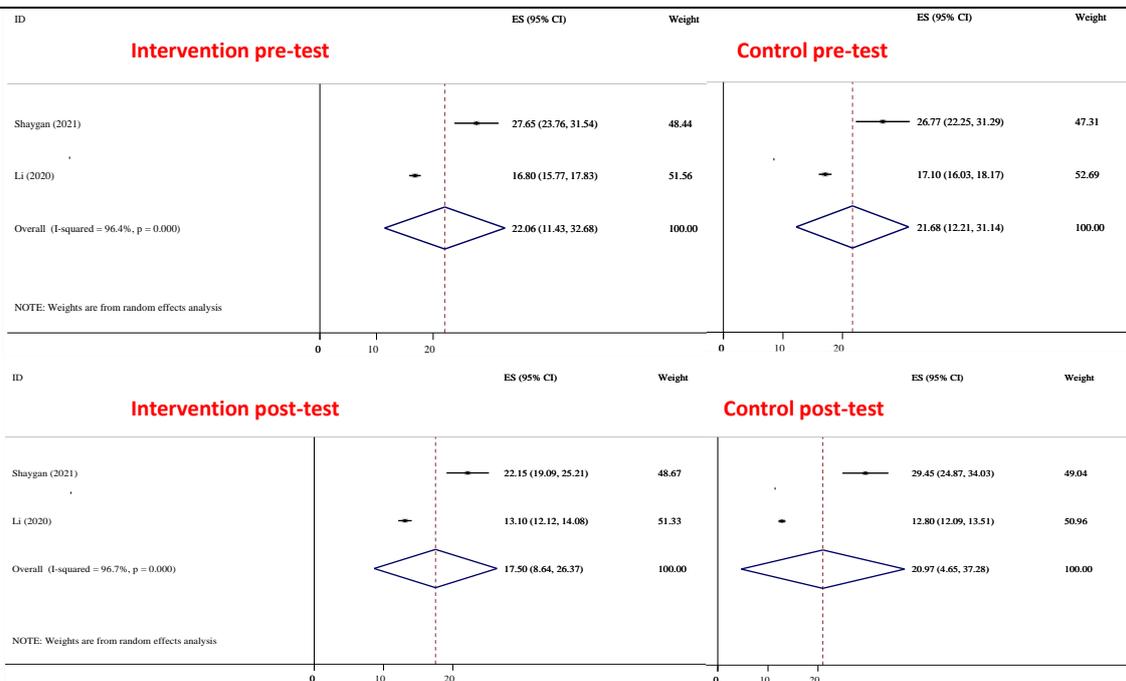


Figure 3. Forest plot showing weights (%) for each of three studies of stress for intervention group pre-test (on the top of left-hand side), control group pre-test (on the top of right-hand side), intervention group post-test (on the bottom of left-hand side) and control group post-test (on the bottom of right-hand side) with pooled mean (random or fixed-effects model)

(HADS-D), was significantly lower after the PBI program, compared to those in the control group after a 10-day treatment (11). In a study performed by Wei et al, the depression score was measured by the 17-Hamilton Depression Rating Scale. They found that the depression score was significantly lower in patients with COVID-19 in the focus group at the end of the first and second weeks, compared to patients in the control group. It should be noted that only patients with mild to moderate depression or anxiety symptoms were recruited (12).

Shapira et al. observed a significant improvement in the level of depression of the intervention group, compared to the control group after a group intervention performed by video conference on 82 patients aged 92-60 years. However, the number of samples in the aforementioned study was limited and did not match the allocation; therefore, only available individuals were studied (3).

In a study carried out by Li et al, significant decreases were found for scales of depression in both CBT group and control group. However, since participants in the intervention group had a higher reduction, differences between the two groups were non-statisticant (17). In contrast to the above-mentioned psychological intervention, in the study performed by Malboeuf-Hurtubise and Léger-Goodes, scores of depression of elementary school children, as measured by five items, were not significantly different between two intervention groups (mandala drawing intervention and emotion-based directed drawing intervention). Moreover, the intervention had no significant effect on depression levels (15).

Four studies related to the evaluation of the effect of PBI on anxiety were investigated. Wei et al. compared the anxiety scores of patients affected by COVID-19 and those of the control group measured by HAMA. They found that the anxiety scores were significantly low in the mindfulness group, compared to the control group at the end of the first and second weeks (11). In a study conducted by Li et al, significant decreases were observed for stress scales in both CBT and control groups. However, patients reported a higher reduction and differences between the two groups were non-significant (17).

In a study performed by Kong et al, the HADS-A score was significantly lower in patients with COVID-19 who underwent the PBI program, compared to the control group after a 10-day intervention (11). Malboeuf-Hurtubise et al, anxiety score was lower in the P4C group than participants in the MBI group. Anxiety scores reduced from 5.21 to 3.87 in P4C group, whereas anxiety score remained similar in the MBI group (14).

In a study conducted by Li et al., significant decreases were found for anxiety scales of rt in both CBT and control groups. However, since participants in the intervention group had a higher reduction, differences between the two groups were non-

statisticant (17). In a study performed by Cheng et al, subjects who used digital cognitive-behavioral therapy for insomnia (dCBT-I) reported less depression, than those who received sleep education (2). In contrast to the above-mentioned psychological intervention, in the study performed by Malboeuf-Hurtubise and Léger-Goodes, score of anxiety in the elementary school children, as measured by three item anxiety ($P=0.26$) were not significantly different between the two intervention groups (mandala drawing intervention and emotion-based directed drawing intervention). In addition, the type of intervention group had no impact on levels of depression.

The patients with COVID-19 experienced high levels of anxiety, depression, and stress. Subjects with a history of insomnia may be vulnerable to stressful events during their lives (15). In a study carried out by Cheng et al, subjects who used prior dCBT-I years prior to the pandemic reported less general stress than those who received sleep education (2).

Generally, according to the findings of this study, online psychological interventions, including CBT, have been effective for disorders, such as depression, anxiety, and sleep disorders. Moreover, several PBIs on mental health and psychological crises have been used during the epidemic. Subjects who used PBI, mindfulness, behavioral and cognitive techniques, or CBT reported less depression. The MBI Subjects who used online multimedia psychoeducational interventions, namely CBT, dCBT-I, and MIM, experienced less perceived stress (3).

Moreover, cognitive-behavioral therapy can be used to combat beliefs, such as overestimating the risk of infection and fear of dying by helping the person think rationally by challenging these irrational thoughts and trying to replace them with rational thoughts to improve their states of mind. This treatment through the help of desensitization and muscle relaxation methods also teaches people to be able to control their stress and anxiety against coronary heart diseases.

This review found limited studies on the effectiveness of psychological interventions on mental health during the COVID-19 epidemic. Besides, most studies were performed with a small sample size. Types of psychological interventions evaluated in the case study include, mindfulness, cognitive and behavioral techniques, CBT/Mandala painting study and emotion-based painting intervention, as well as Philosophy for children and mindfulness. According to meta-analysis results, psychological interventions/behavioral, mindfulness and cognitive techniques and CBT were effective in reducing depression. However, Mandela's painting intervention and emotionally oriented painting intervention did not affect depression and anxiety symptoms.

6. Conclusion

In a study conducted by Katherine Malboff, which evaluated the online intervention of emotion-based painting and Mandela drawing during 5 weeks of training, the results showed that the emotion-based intervention was more effective than Mandela (7). Based on the results of the present review study, psycho-behavioral/mindfulness/behavioral considerations and CBT techniques have been effective in reducing depression in patients with COVID-19. However, emotionally oriented painting interventions were not effective on depression and anxiety symptoms. The results showed that CBT had positive effects on anxiety (3).

The findings of this review study showed that psychological interventions can be useful. During an outbreak, mental health professionals can actively intervene with cognitive and behavioral training to improve positive skills, such as resilience, hope, and spiritual health to enhance mental health. Based on the findings, COVID-19 led to the prevalence of a wide range of psychological disorders, stress, anxiety, and depression. Stress and mental disorders can become a defective cycle, weaken the immune system, and predispose patients to coronavirus infection, especially in people with severe mental illness.

The main limitation of this research was high heterogeneity between studies. It can be attributed to the lack of uniformity of diagnostic criteria, the methodological and sample difference, and populations. Another limitation was the few number of studies and the small sample size included in the meta-analysis. Finally, the third limitation was the poor methodological quality of the included studies.

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None.

Conflicts of interest

The authors declare no conflict of interest.

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