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Original Article

The Effects of Cognitive-behavioral Therapy Based on Virtual Intervention on Health Anxiety and Optimism Levels of Families at Risk of COVID-19 Under Family Counseling at the Welfare Center of Shahrekord, Iran

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Abstract

Introduction: The COVID-19 pandemic exacerbated psychological disorders due to quarantine, insufficient support, and limited medical care, significantly impacting health anxiety and optimism among families. Given the restrictions on direct contact, this study aimed to evaluate the effectiveness of cognitive-behavioral therapy (CBT) delivered through virtual platforms in improving health anxiety and optimism levels in families at risk of COVID-19 through counseling at the Welfare Center of Shahrekord.

Methods: This quasi-experimental study was conducted on 64 COVID-19 patients who had previously received consulting at the Welfare Center of Shahrekord. Participants were selected via convenience sampling and divided into control and intervention groups. Data collection tools included a demographic questionnaire, a health anxiety questionnaire by Salkovskis and Warwick, and the Life Orientation Test-Revised (LOT-R2). Virtual CBT interventions were implemented during 6 sessions, covering disease etiology, symptoms, hygiene, social distancing, health anxiety concepts, relaxation techniques, cognitive errors, and positive-negative thought recording. Training materials were provided, and follow-ups clarified any ambiguities. Both groups completed the health anxiety and life orientation questionnaires again after 2 months via WhatsApp. Data were analyzed in SPSS version 22 using descriptive and analytical statistics, including independent *t*-tests and ANOVA.

Results: Before the intervention, health anxiety scores of the participants were 47.47 ± 7.6 in the intervention group and 46.51 ± 5.35 in the control group, with no significant difference ($P > 0.3$). The results of repeated measures ANOVA showed a significant reduction in health anxiety in the intervention group after the intervention ($P < 0.01$). Similarly, optimism scores before the intervention were 19.47 ± 2.57 and 21.31 ± 5.35, with no significant difference ($P > 0.095$), but a significant increase was observed after the intervention ($P < 0.01$).

Conclusion: Virtual psychological interventions via platforms like WhatsApp, complemented by follow-ups, effectively reduced health anxiety and increased optimism among families affected by COVID-19, proving beneficial when in-person interventions were unfeasible.

Keywords: Health anxiety, Optimism, COVID-19, Virtual education

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Introduction

COVID-19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first emerged in Wuhan, China, in December 2019 and swiftly became a global crisis, affecting both physical and mental health (1, 2). In Iran, its rapid spread contributed to heightened anxiety levels in the community (3). Clinical symptoms of COVID-19 vary from mild to severe, including fever, cough, respiratory distress, and gastrointestinal issues (3). Uncertainty about the nature of the virus and a lack of precise medical information exacerbated health anxiety in many individuals (4).

People sought more information to alleviate their anxiety; however, this sometimes resulted in exposure to misinformation and unreliable sources (5). Anxiety is a significant factor in patients suffering from chronic

respiratory disorders, often diminishing their quality of life (6). Studies indicate that clinical anxiety affects up to two-thirds of patients with chronic respiratory diseases, reducing their physical functionality (7). Moreover, health anxiety negatively impacts the immune system, making individuals more susceptible to diseases such as COVID-19 (8).

Quarantine was recognized as one of the most effective strategies for controlling the pandemic (9). However, quarantine conditions, such as inadequate support, limited medical knowledge, restricted access to healthcare, and social isolation, intensified psychological issues (8). Additionally, health anxiety pressured family dynamics and exacerbated psychological distress (10).

One crucial factor in mitigating anxiety is fostering optimism, which is defined as a positive expectation about the future and is associated with favorable psychological outcomes (11). Optimistic individuals tend to employ more effective coping strategies, such as cognitive reappraisal and problem-solving, and generally demonstrate greater resilience in managing stress (12). Studies have shown that optimism positively correlates with physical and mental health, enhancing motivation, life expectancy, overall satisfaction, and adaptation to chronic diseases (13).

Cognitive-behavioral therapy (CBT) is one of the most effective approaches in managing health anxiety (14). Recent research highlights the success of CBT, especially in virtual formats, in reducing anxiety and improving optimism in patients (15). Cognitive restructuring, a core component of CBT, enables individuals to identify and modify distorted thoughts and maladaptive beliefs (16).

Over the past two decades, digital technology has played a growing role in the treatment of psychological disorders. Internet-based cognitive-behavioral therapy (ICBT) has demonstrated notable efficacy in treating anxiety and depression (17). Studies have suggested that ICBT is as effective as in-person therapy for disorders like phobias, social anxiety, and generalized anxiety disorder (18). Due to its affordability and accessibility, ICBT serves as a viable option for many patients.

Given the significance of health anxiety during the COVID-19 pandemic and the role of optimism in psychological well-being, the present study explores the effectiveness of virtual CBT in reducing health anxiety and fostering optimism among at-risk families. With a focus on virtual interventions, this research aims to provide a scientific framework for addressing the psychological challenges posed by the pandemic.

Materials and Methods

Study Design

This quasi-experimental study was approved by the Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1399.139).

Sampling and Randomization

In this study, convenience sampling was initially employed, whereby all accessible individuals who met the study criteria were selected as participants. Subsequently, based on a random number table, participants were allocated to either the case or control group using even and odd numbers, proportionate to the size of each group. Based on the study by Moravian et al, titled "The Effect of Cognitive-Behavioral Intervention Based on Lifestyle Modification on Left Ventricular Ejection Fraction in Patients After Coronary Artery Bypass Graft Surgery" (19) and considering a mean difference of 7 in ejection fraction before and after the intervention, with standard deviations of 8.61 (pre-intervention) and 6.7 (post-intervention), a type I error of 0.05, and a type II error of 0.01, the minimum required sample size per group was calculated to be 28 using the following formula.

Inclusion and Exclusion Criteria

Inclusion criteria consisted of the following items

1. Having received counseling services from the Welfare Counseling Center of Shahrekord
2. Having an active counseling file at the Welfare Center of Shahrekord
3. Being a member of the WhatsApp counseling group and actively utilizing the guidance of the group
4. Being a recognized family member (father, mother, or children)
5. Having no diagnosed psychiatric disorders and not undergoing treatment with psychotropic medications
6. Adhering to all rules and regulations related to the virtual group
7. Possessing sufficient literacy and familiarity with the use of virtual software applications

Exclusion criteria consisted of the following items

Non-cooperation with the research team, leaving the WhatsApp counseling group, traveling outside the province, and developing severe physical or psychological disorders.

Data Collection Tools

The data collection tools in this study included a demographic questionnaire, the Salkovskis and Warwick Health Anxiety Questionnaire, and the Life Orientation Test-Revised (LOT-R2).

Health Anxiety Questionnaire: This self-report scale consists of 18 items measuring symptoms of health anxiety or hypochondriasis. Participants rate each item on a 4-point scale (0–3), yielding a total score between 0 and 54. Scores above 18 indicate anxiety, while scores exceeding 37 indicate a clinical health anxiety disorder. The questionnaire has demonstrated high validity and reliability, with a Cronbach's alpha of 0.89 and convergent validity confirmed in previous studies (17). Moreover, Rabiei et al reported a Cronbach's alpha of 0.92 for this scale (13).

LOT-R: This 6-item scale (3 positive statements and 3 negative statements) assesses individual optimism levels. Responses are scored on a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree". Negative

statement scores are reverse-coded, with a total score range of 0–24, where higher scores indicate greater optimism (18). The reliability of this questionnaire, reported in the study of Ferrando, demonstrated Cronbach's alpha values between 0.78 and 0.85 (20).

Results

After the study protocol was approved and the ethics code was obtained, the Health Anxiety Questionnaire and the LOT-R2 were initially distributed via WhatsApp to participants in both groups. Once completed by eligible family members (parents or a child enrolled in the counseling group), the questionnaires were returned to the research team through the same platform. Following receipt of the completed questionnaires, a 6-week virtual CBT-based counseling intervention was implemented. The program consisted of one session per week (6 sessions) (Table 1), covering etiology and clinical symptoms of the disease, caregiving principles with an emphasis on personal hygiene and social distancing, health anxiety awareness, relaxation techniques, cognitive distortions (identifying thought errors), problem-solving strategies, and positive/negative thought recording. Educational materials, including illustrated guides and full relaxation technique videos, were uploaded for the intervention group. Participants could also contact the research team, especially the team psychologist, via phone for clarification or further questions. The effects of intervention were monitored after the intervention for two months. After this follow-up period, the study questionnaires were readministered, and the collected data were analyzed.

Data Analysis

Frequency and percentage were used to describe qualitative variables, while quantitative variables with normal distribution were expressed as mean ± standard deviation. The Kolmogorov-Smirnov test was used to assess normality of distribution. Group comparisons were performed using Fisher's exact test and Chi-square test for qualitative variables, and independent *t*-test, paired *t*-test, and repeated measures ANOVA for normally distributed quantitative data. A significance threshold of $P \leq 0.05$ was used for all analyses, which were conducted using SPSS software version 22. The CONSORT flow Figure 1 is given below.

The findings indicate that the subjects in the two groups did not show statistically significant differences in terms of gender, age distribution, marital status, education level, or relationship to the patient (Table 2).

Based on the findings presented in Table 2, there was no statistically significant difference between the two studied groups in terms of demographic variables such as gender, age, level of education, and relationship to the patient.

There was no significant difference between the two groups in the mean scores of optimisim before the intervention. However, after the intervention and follow-up, the difference became significant. In the intervention group, optimism scores increased, while they decreased in the control group (Table 3).

The results of independent *t*-test indicated no statistically significant difference in the mean optimism scores between the two groups before the intervention, but a statistically significant difference was observed after the intervention. Additionally, repeated measures ANOVA revealed an increasing trend (time, group, and time and group) in the mean optimism scores during the intervention process.

The mean scores of health anxiety did not show a significant difference between the two groups before the intervention. However, after the intervention and follow-up, the difference became significant. In the intervention group, health anxiety decreased, whereas it increased in the control group (Table 4).

The results of the independent *t*-test showed no statistically significant difference in the mean health anxiety scores between the two groups before the intervention, but a statistically significant difference emerged afterward. Furthermore, repeated measures ANOVA demonstrated a decreasing trend (time, group, and time and group) in the mean health anxiety scores in the intervention group.

Discussion

The findings of this study indicate that virtual CBT was effective in improving the mental health of families at risk during the COVID-19 pandemic, leading to increased optimism and reduced health anxiety. Therefore, in situations where in-person interventions are not feasible, virtual CBT can serve as a highly effective alternative for enhancing psychological well-being.

These results are consistent with those of previous studies. For instance, Jabbari et al examined the effectiveness of internet-based CBT in reducing

Table 1. Content of Psychological Intervention Sessions

Session	Content
Session 1	COVID-19: etiology, clinical symptoms, treatment protocols, nursing care principles, latest Ministry of Health guidelines, social distancing, and hygiene practices (especially handwashing)
Session 2	Understanding health anxiety, defining cognitive-behavioral concepts, and daily thought recording exercises
Session 3	Hierarchical exposure to health anxiety, physiological components, and its relationship with negative thoughts
Session 4	Relaxation training and practicing relaxation techniques for management of anxiety
Session 5	Identifying cognitive distortions, completing thought distortion recording tables, and continued hierarchical exposure
Session 6	Cognitive challenge techniques, problem-solving strategies, and review of the topics of the prior session

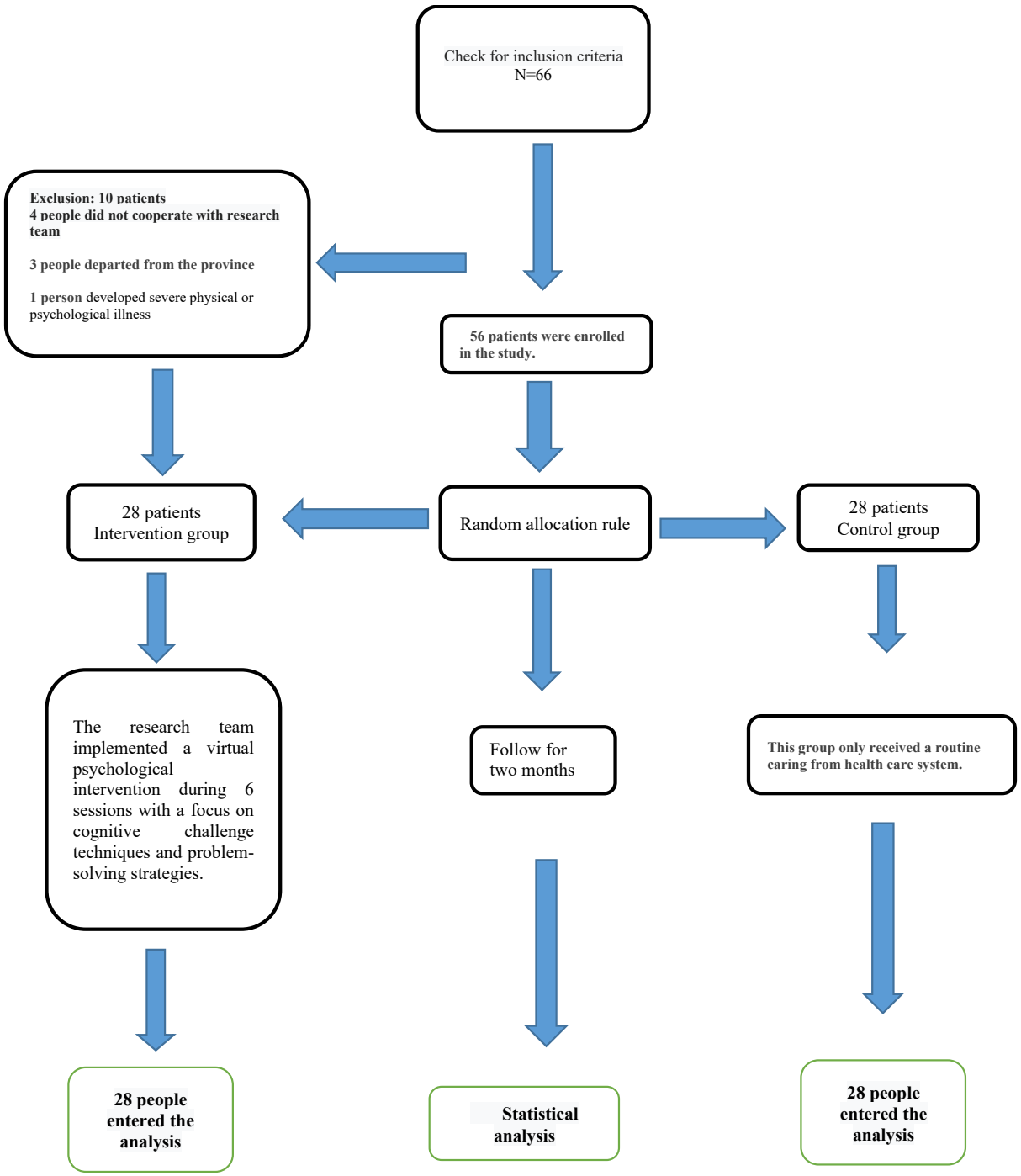

Figure 1.

COVID-19-related anxiety among healthcare workers in Parsabad. Their findings demonstrated that online CBT significantly decreased anxiety levels among medical staff. Similarly, another study reported that CBT was an effective intervention for reducing health anxiety among patients attending healthcare centers in Islamshahr (21).

In line with these findings, in a review study on the psychological effects of COVID-19, Shahyad and Mohammadi reported that the pandemic not only increased public health concerns but also triggered various psychological disorders, including anxiety, fear, depression, stigmatization, sleep disturbances, and post-traumatic stress disorder (PTSD). Therefore, their study emphasized the critical need for cognitive-behavioral interventions in affected individuals (22).

Moreover, Shahed-HaghGhadam et al investigated the psychological outcomes and interventions during the COVID-19 pandemic. Their review highlighted a general decline in mental health, particularly among frontline healthcare workers, and stressed the necessity of rapid, consistent, and timely psychological interventions, especially through telemedicine and online platforms. Their results suggested that online psychological services were more beneficial than traditional face-to-face therapy during the pandemic (23).

The present study aligns with existing research, demonstrating that virtual cognitive-behavioral interventions enhance well-being while reducing anxiety

and stress, sometimes even outperforming in-person therapy.

Supporting these findings, Coneo et al conducted a cross-sectional study on the effects of optimism, social support, and anxiety on aggression in dermatology patients. Their results indicated an inverse relationship between optimism and both aggression and anxiety. The researchers concluded that perceived social support and optimism play a crucial role in psychological adaptation to skin diseases (24).

Similarly, Ahangarzadeh et al found that positive thinking training significantly reduced depression, anxiety, and stress in patients with coronary artery disease (25). Additionally, Mohammadi et al conducted a clinical trial to assess the impact of optimism training in cardiac patients. Their intervention resulted in significant improvements in optimism, hope, life satisfaction, and anxiety. The researchers recommended further studies to explore optimism and its clinical outcomes (26).

Notably, there was no study that failed to demonstrate the positive effects of virtual psychological interventions on mental health. This further reinforces the findings of the review conducted by Shahed-HaghGhadam, which emphasized that virtual psychological interventions were more effective than in-person therapy during COVID-19, as fear of gatherings and physical contact was a major factor in the transmission of the disease (23).

Table 2. Demographic Characteristics of the Research Participants in the Intervention and Control Groups

Variable	Groups	Intervention group	Control group	(*P*-value)
		N percentage	N percentage	
Gender	Male	12 (42.8)	11 (39.2)	0.29
	Female	16 (57.2)	17 (60.8)	
	Total	28 (100)	28 (100)	
Age	Under 20 years	8 (28.5)	4 (14.2)	0.421*
	20 to 40 years	8 (28.5)	10 (35.8)	
	Above 40 years	12 (43)	14 (50)	
	Total	28 (100)	28 (100)	
Marital status	Married	15 (54)	13 (46)	0.39
	Single	13 (46)	15 (54)	
	Total	28 (100)	28 (100)	
Education level	Literacy	8 (28.5)	10 (35.8)	0.951*
	Below Diploma	4 (14.25)	5 (17.9)	
	Diploma	12 (43)	6 (21.4)	
	University	4 (14.25)	7 (25)	
	Total	28 (100)	28 (100)	
Relationship to Patient	Parent	10 (35.8)	9 (32.1)	0.451*
	Spouse	8 (28.5)	7 (25)	
	Children	8 (28.5)	9 (32.1)	
	Daughter-in-law	2 (7.2)	3 (10.8)	
	Total	28 (100)	28 (100)	

*Fisher's exact test.

Limitations of the Study

Limitations of the study consisted of the following items:

1. Low level of media literacy among participants
2. Low level of health literacy
3. The lack of prevalence/commonness of such educational programs at the time of the intervention
4. Overlap/interference of the training program with educational programs on national media

Table 3. Mean Score of Optimism in the Intervention and Control Groups

Variable	Stage	Intervention group M ± SD	Control group M ± SD	*P*-value (between groups)
Optimism	Before intervention	19.47 ± 2.57	21.31 ± 5.35	0.11*
	Post-intervention	23.92 ± 6.05	20.7 ± 7.8	0.01*
	After flow-up	27.84 ± 5.35	19.2 ± 4.12	0.001*
P-value (within-group)				
Time		0.01	0.1	
Group		0.01	0.125	
Time and group		0.001**	0.06**	

*Independent *t*-test, with a significance level of 0.05. **Repeated Measures Analysis of Variance (ANOVA), with a significance level of 0.05.

Table 4. Mean Score of Health Anxiety in the Intervention and Control Groups

Variable	Stage	Intervention group M ± SD	Control group M ± SD	*P*-value (between groups)
Health anxiety	Before intervention	47.47 ± 7.6	46.51 ± 5.35	0.59*
	Post-intervention	43.2 ± 4.12	47.7 ± 7.8	0.01*
	After flow-up	39.94 ± 5.65	48.2 ± 5.12	0.001*
P-value (within-group)				
Time		0.05	0.4	
Group		0.001	0.16	
Time and group		0.001**	0.12**	

*Independent *t*-test, with a significance level of 0.05 **Repeated Measures Analysis of Variance (ANOVA), with a significance level of 0.05.

Conclusion

Health anxiety is a widespread concern, particularly for vulnerable families. During the COVID-19 pandemic, quarantine played a critical role in preventing disease transmission but also heightened anxiety, often leading to negative thoughts and pessimism. Today, treatment approaches extend beyond conventional medicine, and positive psychology has emerged as an essential factor in improving mental health.

Studies have demonstrated that virtual psychological interventions, such as those conducted via WhatsApp, combined with consistent follow-ups can significantly reduce health anxiety and enhance optimism among families at risk of COVID-19. Therefore, in pandemic conditions where in-person psychological interventions are not feasible, virtual CBT provides an effective approach to addressing mental health concerns.

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Competing Interests

Two authors of this article are among the members of the editorial board of the journal. However, the review and publication process for this article has been conducted in the same manner as that for other articles in the journal, ensuring that there are no differences in the review process.

Ethical Approval

This quasi-experimental study was approved by the Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1399.139).

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