

Research Paper



Comparing Emotionally Focused Therapy vs Transcranial Direct Current Stimulation on Anxiety, Life Quality in CAD Patients During COVID-19

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ABSTRACT

Introduction: The COVID-19 pandemic has increased psychological distress and impacted the diagnosis and treatment of noncommunicable diseases. This study aimed to examine the comparative effectiveness of emotionally focused therapy (EFT) and transcranial direct current stimulation (tDCS) on the anxiety and quality of life (QoL) in patients with coronary artery disease (CAD) during the COVID-19 pandemic.

Methods: A total of 45 participants who met the criteria for a current episode of CAD, referred to Shahid-Rajaei Heart Hospital in Tehran City, Iran, were chosen by convenience sampling method. They were randomly assigned to a 9-week/60-minute EFT (n=15) group therapy, a 5-week/20-minute tDCS (n=15) experimental group, and one control group (n=15). They were assessed at pre-test, post-test, and 3-month follow-up. The study subjects completed the self-reported reliable and valid Persian version of questionnaires, Beck anxiety inventory (BAI), and health-related quality of life (HRQOL). Then, repeated measures analysis of variance was used to measure inferential statistics.

Results: There were significant improvements in anxiety and QoL scores in both EFT and tDCS groups over the post-test and follow-up period ($P \leq 0.01$). However, a difference was found when EFT had a greater effect on the anxiety and QoL.

Conclusion: These results showed that EFT and tDCS have effective interventions in reducing anxiety and improving the QoL of CAD patients, but improvements with EFT were greater than those with tDCS.

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Highlights

- Both emotionally focused therapy (EFT) and transcranial direct current stimulation (tDCS) methods can reduce the anxiety of patients with coronary artery disease (CAD).
- Both EFT and tDCS methods can improve the QoL of patients with CAD.
- EFT is more effective than tDCS in reducing anxiety and improving QoL in patients with CAD.

Plain Language Summary

Patients with CAD, in addition to having physical problems and pain, suffer from psychological disorders such as anxiety, which affect their QoL. The COVID-19 pandemic exacerbated their conditions. Various interventions have been used to improve their problems. This study aimed to compare the effects of emotionally focused therapy in group format (for 9 weeks) and tDCS (for 5 weeks) on the health-related anxiety and QoL of these patients during the COVID-19 pandemic. The results showed that both methods reduce anxiety and improved QoL of patients, where emotionally focused therapy had a greater effect on them compared to tDCS.

1. Introduction

COVERID-19 is a worldwide crisis with a significant impact on health systems, and cardiovascular complications, especially acute coronary syndromes, effective factors in the mortality rate of COVID-19 subjects (Kermani-Alghoraishi, 2021). The resulting deaths of coronary artery disease (CAD) by the year 2030 will reach about 23.6 million people; the majority will be from South Asia (Saha et al., 2021).

In coronary syndrome, the manifestations of which are physical-psychological, in addition to pain and vomiting, patients suffer from stress (Li et al., 2020) and psychological injuries (Shao et al., 2020) like anxiety (Mirbolouk et al., 2020). Anxiety is functionally related to actual confrontation with danger, not simply the detection of and preparation for danger (Chorpita & Barlow, 1998), which can lead to many serious consequences (Chen et al., 2019) and may affect the quality of life (QoL) of these patients (Tang et al., 2021).

Considerable agreement exists that QoL is multidimensional. Coverage may be categorized into five dimensions: physical well-being, material well-being, social well-being, emotional well-being, and development and activity (Felce & Perry, 1995). According to a study by Drewes et al. (2021), coronary heart disease patients experience lower health-related QoL levels due to physical and psychological problems.

Depending on the problems of CAD patients, various interventions have been used to improve their problems. However, emotionally focused therapy (EFT) and transcranial direct current stimulation (tDCS) have not been addressed in previous research. EFT combines systemic, humanistic, and attachment theory perspectives (Zwack & Greenberg, 2020). Strengthening emotional, interpersonal bonds, which is the primary focus of all forms of EFT, can help restore emotional balance, thereby protecting people from chronic feelings of isolation and the host of health problems they can cause (Greenman & Johnson, 2022). Reinitz (2018), in a systematic review, claimed that EFT may be an effective treatment for couples suffering from symptoms of anxiety and depression.

Also, tDCS is a non-invasive brain stimulation technique increasingly used to modulate neural activity in the living brain (Fonteneau et al., 2019) which was first introduced in animal and human experiments in the 1950s and added to the standard arsenal of methods to alter brain physiology as well as psychological, motor, and behavioral processes and clinical symptoms in neurological and psychiatric diseases about 20 years ago (Stagg et al., 2018). According to research results, tDCS can improve anxiety (de Oliveira et al., 2019). Given the above, no research has compared the effectiveness of EFT and tDCS on health-related anxiety and QoL in CAD patients. While both methods have advantages, it is questionable which treatment is more effective in reducing the psychological and emotional problems of CAD patients, and whether they are effective in the COVID-19 pandemic.

2. Materials and Methods

Study sample

The present study was applied in terms of purpose and quasi-experimental with a pre-test-post-test and a 3-month follow-up design with a control group. The statistical population of this study comprised all patients with CAD referred to [Shahid Rajaee Heart Hospital](#) in Tehran City, Iran, in 2020. By available voluntary sampling (non-random selection and random replacement), 45 patients with CAD based on inclusion and exclusion criteria were selected. The inclusion criteria in the research include conscious consent to participate in the study and age range between 35 to 70 years. The exclusion criteria include having history of psychological illnesses (examination through medical records), use of psychiatric and psychotropic drugs, more than two sessions absence from in therapeutic sessions, and drug abuse and smoking. They were divided into two experimental groups and one control group (15 patients in the EFT group, 15 patients in the tDCS group and 15 patients in the control group).

In a similar study, the number of 15 subjects was suggested to be appropriate ([Sarmad et al., 2004](#)); in this study, the number of 15 people was selected and assigned to each research group. The EFT group received 9 60-minute sessions of EFT, and the tDCS group received 5 20-minute sessions of tDCS. In this study, no dropout occurred in any of the experimental and control groups, and the number of people in each group remained constant until the end of the study.

Psychometric instruments

The beck anxiety inventory (BAI)

The BAI is a single-factor, non-subscale list of 21 questions. The response indicates how much they have been bothered by each symptom over the past week. It was developed as a measure adept at discriminating between anxiety and depression ([Beck & Steer, 1990](#)). The grading method is on a 4-point Likert scale (0 to 3). In Iran, the internal consistency reliability (the Cronbach $\alpha=0.92$) and validity ($r=0.83$, $P<0.001$) of the Persian version of BAI have been confirmed ([Kaviani & Mousavi, 2008](#)).

MacNew heart disease health-related QoL questionnaire

MacNew's health-related QoL questionnaire has 27 questions that measure the three components of physical, emotional, and social functions. Fourteen questions are about physical functioning, 14 about emotional function-

ing, and 13 about social functioning and QoL of cardiac patients. The time frame for the MacNew is the previous two weeks. The questionnaire is graded on a 7-point Likert scale from 1 to 7. Convergent and divergent validity of the Persian version of MacNew was confirmed, and internal consistency reliability (the Cronbach $\alpha=0.94$) was calculated by [Abbasi et al. \(2017\)](#).

EFT

In this study, there are 9 sessions of EFT based on Johnson and Greenberg's theory and [Bowlby's \(1969\)](#) attachment theory that people in the experimental group were trained. The validity of these sessions has been confirmed in the research of [Johnson \(2008\)](#) and [Johnson \(2012\)](#).

During sessions 1 to 3, the facilitators familiarized the participants with the objective of the intervention. They explained the general rules of treatment, introduced the principles of EFT, and performed the pre-test. Unrecognized emotions that underlie interactive situations were identified. They focused more on the needs, emotions, and fears of attachment. The experiences, attachments, needs, and desires of participants were validated. The therapy was focused on the secondary emotions revealed in the interactive cycle, and explored them to identify essential and unknown emotions. Initial emotions were discussed and processed, and awareness of the participants' primary emotions and hot cognitions was raised.

During the fourth to sixth sessions, the facilitators restated problems regarding underlying feelings and attachment needs. They emphasized participants' ability to express emotions, explained the impact of fear and its defense mechanisms on cognitive and emotional processes, and described the cycle in the context and field of attachment. The subjects were encouraged to identify rejected needs and aspects of self-denial, to draw their attention to how they interact with each other, to express attachment needs, and to identify denied needs and increase acceptance of corrective experience. Facilitators informed participants about underlying emotions and revealed each person's relationship position. They emphasized accepting the individual's experiences and new ways of interacting, highlighting and re-describing attachment needs, and pointing to their health and naturalness.

Sessions 7 to 9 involved developing needs and desires. The expectations and early emotional experiences were expressed, and internal needs and relationships were recognized. Facilitators tried to create new attachments with secure bonds. Interactive situations between

Table 1. Mean±SD of research variables in pre-test, post-test and follow-up

Variables	Group	Mean±SD		
		Pre-test	Post-test	Follow-up
Anxiety	Control	29.92±4.23	30±4.83	31.64±6.17
	EFT	29.73±4.52	10.2±5.3	11.73±4.54
	tDCS	29.07±7.18	16.57±5.4	17±4.97
QoL	Control	116.21±34.14	115.71±32.62	114.78±31.99
	EFT	134±12.63	80.4±15.93	79.6±10.6
	tDCS	131.85±13.73	95.14±13.38	95.92±12.67

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Notes: Table 1 presents the mean scores of the study variables. In general, as it is known, the means of anxiety and QoL in three study groups in the pre-test were close to each other. The mean scores in the post-test phase decreased in the EFT and tDCS groups, where the decrease was more in the EFT group.

people were made, and they tried to end old interactive patterns. Attachment needs were clarified and recalled. The changes that have taken place during treatment were strengthened. The differences between current and old interactions were highlighted. A relationship based on a secure link was formed so that discussed problems and searched solutions do not harm them. Changes were evaluated, and facilitators implemented a post-test.

tDCS

The tDCS protocol followed the method reported by Loo et al. (2010) and was given thrice weekly (Monday, Wednesday, Friday) at 9:0 in the morning. The 15 subjects were treated using a continuous current electric stimulator (Caputron Activa Dose II, Gilroy, USA). The montage was bifrontal with the anode over F3 (left dorsolateral PFC) and the cathode over F4 (right dorsolateral PFC) according to the international 10/20 EEG system. Conductive rubber electrodes (7×5 cm=35 cm²) were placed in saline-soaked surface sponges. The amount of saline per sponge was standardized (15–20 mL per sponge). After careful skin cleaning, the electrodes were secured with an elastic tubular netting. A conductive electrolyte gel was used between the electrode and the skin. Stimulation was given at 1 mA for 20 min for five treatment sessions.

At the end of the last session, subjects answered Beck's anxiety test and health-related QoL questionnaire.

Data analysis

The data obtained from the questionnaires were analyzed using SPSS software, version 24 (IBM Corp., Armonk, NY, USA) in two descriptive and inferential sections (repeated measures analysis of variance [ANOVA]).

3. Results

Demographic information and descriptive statistics, including frequency, Mean±SD, are reported in this section. The Mean±SD age in the EFT group was 55.40±10.43; in the tDCS group, the Mean±SD age was 50.42±9.27; and in the control group, the Mean±SD was 55.07±10.38. Also, among the sample members in the experimental group, 53.3% were male and 46.7% female; in the group of tDCS, 42.9% were male and 57.1% were female. Table 1 presents the Mean±SD of the study groups in pre-test, post-test, and follow-up.

4. Discussion

This study aimed to compare the effectiveness of EFT and tDCS on anxiety and QoL of patients with CAD. According to the results of Table 2, which showed the effectiveness of EFT and tDCS on anxiety, it can be concluded that one way to reduce anxiety is to use EFT throughout the lives of these patients. In addition, they can benefit from tDCS. Also, according to the results of Table 3, which shows the effectiveness of EFT and tDCS on QoL, it is necessary to benefit from these two treatments for patients' greater well-being and create favorable conditions for patients with heart disease.

Table 2. Results of within-subject test for the anxiety variable (Greenhouse-Geisser test)

Variables	SS	df	MS	F	P	η^2	Test Power
Time	372.31	1.67	223.03	10.72	0.0001	0.29	70.97
Time×group	523.17	1.67	313.41	15.06	0.0001	0.37	0.99

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Notes: As shown in Table 2, there was a significant difference among pre-test, post-test and follow-up scores of anxiety ($P \leq 0.01$). Also, the interaction effect of time and group was a significant on anxiety ($P \leq 0.01$). These results indicate the effectiveness of tDCS in reducing anxiety patients over time. Based on the effect size (η^2), 37% of the changes in the variance of anxiety were due to tDCS.

In general, anxiety is high in patients with heart disease (Meyer et al., 2019; Ryan, 2020a). Regarding the effectiveness of psychological interventions and treatment of tDCS in reducing anxiety syndrome, the results of the present study are consistent with the study of Naeim et al. (2021) and Ski et al. (2019). In addition, the effectiveness of EFT compared to other therapies is consistent with the results of a meta-analysis by Rathgeber et al. (2019). New concepts and ways of understanding emotion help us work with it more effectively, and many of these new ways offer an exquisite fit with EFT interventions to demonstrate less neural reactivity to rejection situations and suffer less from severe anxiety and depression (Johnson, 2019). Chen et al. (2021) also showed that because of the high frequency of anxiety and depression after percutaneous coronary intervention in patients with CAD and its effect on performance and treatment, the recovery requires special attention to this issue and efforts to Investigating effective and appropriate factors and strategies to reduce it.

Explaining the results, emotionally focused group therapy gives patients the ability to control negative emotions such as anxiety and increase their psychological adjustment by increasing emotional awareness. Emotion group therapy methods try to encourage patients to question their disturbing thoughts during treatment and

examine alternative self-talk to deal with these emotions and ruminations that cause physical and mental disturbance (Judd, 2016). Also, according to emotionally focused group therapy, patients' disturbances are caused and continue by pervasive states of negative emotion and attachment disorders, disregard for inner needs and desires, negative interaction patterns, and inappropriate emotional experiences. Emotionally focused group therapy tries to identify emotions and turn them into understandable and constructive messages. Emotional skills are defined as the ability to recognize and express emotions and empathize with others, reduce anxiety and increase feelings of security, reduce criticism in patients, and are essential in maintaining and maintaining interpersonal communication (Greenberg et al., 2003). EFT, a process-oriented psychotherapy, is an ideal approach to working with relationships during the global pandemic, helping to solidify an "in it together" approach required to survive the pandemic (Allan et al., 2021).

Also, the results show that EFT and tDCS are effective in improving the QoL, and each of them individually can improve the QoL in patients with heart disease. In addition, EFT enhances the QoL more effectively than tDCS. QoL is an essential factor in patients with CAD, so there is a relationship between physical inactivity and QoL in patients with CAD. Thus, physical inactivity can

Table 3. Results of within-subject test for the QoL variable (sphericity assumed)

Variables		SS	df	MS	F	P	η^2	Test Power
Time	Sphericity assumed	37351.36	2	18675.68	155.00	0.0001	0.86	1
Time×group	Sphericity assumed	1329.93	2	664.96	5.52	0.007	0.17	0.83

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Notes: As shown in Table 3, there was a significant difference between among pre-test, post-test and follow-up scores of the QoL ($P \leq 0.01$). Also, the interaction effect of time and group on QoL was significant ($P \leq 0.01$). These results indicate the significant effect of EFT and tDCS on the QoL of heart patients. According to the effect sizes, it can be said that EFT improved the QoL of patients greater than the tDCS.

explain the physical weakness and QoL associated with the health of these patients, which in turn worsens the psychological symptoms in heart patients (Ryan, 2020b; Wardoku et al., 2019). The treatment of tDCS through the blood supply of sedentary patients seems to provide the basis for their mobility (Miuli et al., 2020), and this mobility in heart patients can provide the basis for improving the QoL so that the results show that tDCS enhances the QoL. Each treatment approach, from a specific point of view, has considered individuals and addressed the issue of adaptation and QoL. Among these, EFT integrates experiential and systemic perspectives. People are viewed as constructive, self-organizing beings having inherent tendencies to survive and grow (Greenberg & Johnson, 1988). Johnson et al. (1999) mentioned four key assumptions of EFT. First, emotional responses and interactional patterns are reciprocally determining, and both must be addressed in therapy. Second, partners are stuck in negative patterns that preclude the responsiveness necessary for secure bonding. They are not viewed as immature or unskilled but as needing support to formulate their attachment needs and fears in a manner that promotes secure bonding. Third, emotion is seen as a key element in the definition and the redefinition of close relationships. New emotional experience and new interactions are necessary for change to occur. Fourth, adult intimacy is best viewed as an attachment process.

The result of research by Kazemi Rezaei et al. (2019) show that emotion regulation training helps individuals manage their conflicting emotions by making them aware of feelings and how to use cognitive emotion regulation strategies properly and provides the basis for how emotions can be managed appropriately to improve the QoL of patients with cardiovascular diseases.

5. Conclusion

These results showed that EFT and tDCS have effective interventions in reducing anxiety and improving the QoL of CAD patients, but improvements with EFT were greater than those with tDCS. However, this study randomly divided individuals into two experimental groups and a control group to control the interfering variables and possible biases. Still, the lack of research related to the subject, especially in the country, was one of the limitations of this research in terms of discussing the findings. Also, using self-report questionnaires was another limitation of the present study. Therefore, it is suggested that due to the characteristics of patients with CAD, such as anxiety and behavioral disorders and reduced QoL in special cases, more attention should be paid to the use of EFT. It is also suggested that in future studies, this

research be conducted in various hemodialysis centers nationwide.

Ethical Considerations

Compliance with ethical guidelines

The present study was approved by the Ethics Committee of Najafabad Branch, Islamic Azad University, Najafabad, Iran (Code: IR.IAU.NAJAFABAD.REC.1398.088 on 05/09/2019). The privacy and confidentiality of the collected data were observed. All participants gave their informed consent before their inclusion in the study. The control group was also trained to observe the ethical standards of EFT and tDCS.

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Authors' contributions

Conceptualization and experiment: Shahnaz Gili; Writing the original draft: Sarieh Ebrahimiasl; Review and editing: Shahnaz Gili; Data analysis, assessing scales and final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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