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# Effectiveness of cognitive-behavioral therapy on mental health, life expectancy, and happiness in patients receiving methadone maintenance treatment

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## Abstract:

**BACKGROUND:** Nowadays, the issue of substance abuse is one of the major problems facing most countries in the world. The present study aimed to evaluate the effectiveness of cognitive-behavioral therapy (CBT) on mental health, life expectancy, and happiness in patients receiving methadone maintenance treatment (MMT).

**MATERIALS AND METHODS:** The present study was performed from February 2021 to January 2022. The study was a clinical trial in which 60 people under MMT in psychology clinics in Kashan (Iran) were randomly assigned to the intervention and control groups (30 in each group) using purposeful sampling. Data were collected using the General Health Questionnaire, Schneider Hope Questionnaire, and Oxford Happiness Questionnaire in three stages: baseline, post-treatment, and follow-up. The data were analyzed using a mixed repeated-measures analysis of variance.

**RESULTS:** The results showed that CBT is effective in improving mental health ( $P < 0.001$ ), increasing life expectancy ( $P < 0.001$ ), and increasing happiness ( $P < 0.001$ ) in patients receiving MMT.

**CONCLUSION:** Mental health, life expectancy, and happiness are important and influential issues in the lives of patients under MMT, which are promoted with CBT plus MMT. Therefore, in general, it can be concluded that CBT plus MMT has a significant effect on mental health, life expectancy, and happiness.

## Keywords:

Cognitive behavioral therapy, happiness, life expectancy, mental health, methadone

## Introduction

Substance abuse is a major public health problem that has affected millions of people worldwide and has imposed heavy financial and social costs on communities.<sup>[1]</sup> Substance abuse is more prevalent in developing and third-world countries.<sup>[2]</sup> The extent to which society considers substance abuse to be a moral or legal problem and the

extent to which substance use causes problems for the consumer are issues that concern all professionals.<sup>[3]</sup> According to the announced statistics, it is very necessary to think of an appropriate measure to address the issues that can be helpful in the prevention and treatment of substance abuse among youth.<sup>[4]</sup> With the acceleration of environmental changes and diversity in the cultural structure of societies and also the increasing complexity of harms, the degree of ambiguity and uncertainty of

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the existing conditions on the problems of societies is added. Accordingly, substance abuse is one of the causes of disorder in human societies that have destructive effects on individual and social life. Substance abuse is a social harm, and drug abuse is a threat to public health. At present, the problem of substance abuse is a global crisis.<sup>[5]</sup>

Efforts to understand, predict, prevent, and treat substance abuse continue today, leading to greater attention to psychological concepts such as mental health, life expectancy, and happiness. Mental health has a significant correlation with economic, social, cultural, health, and medical issues in society.<sup>[6]</sup> Public health is a measure of a person's ability to cope with environmental, social, emotional, or physical demands. Therefore, mental health should not be confused with mental illness. Mental health is the study of a person's mental state. In this way, mental health reveals the mental state that is determined through peace, harmony, and mental capacity and is characterized by the absence of signs of disability and weakness in any mental and physical dimension.<sup>[7]</sup>

The feeling of happiness not only is achieved in the absence of negative emotions and moods but also requires the existence of a feeling of happiness, positive moods, and states and satisfaction with life with oneself and others.<sup>[8]</sup> Seligman *et al.*<sup>[9]</sup> argue that happiness is far more beneficial than just feeling good. Happy people

are healthier and much more successful and have more engagement and social commitment. The term happiness is sometimes used to mean positive emotion minus negative emotion.

Hope is also one of the most important indicators of health and well-being. Hope is one of the basic factors promoting the power of adaptation and a sign of physical and mental health. Numerous factors such as psychological structure and psychological state, positive and negative emotions, ability to adapt to environmental conditions, genetics, level, and quality of life affect the level of hope and psychological well-being.<sup>[10]</sup> Making mental and emotional health as a scientific action focuses on understanding and explaining happiness and mental health and accurately predicting the factors that affect psychological well-being.<sup>[11]</sup>

Substance abuse treatment is one of the most challenging issues that clinicians face because patients are resistant to treatment.<sup>[12]</sup> Substance abuse, especially opioid dependence, is a major global problem, and many therapeutic approaches have attempted to address the problems associated with opioid use in recent decades. Long-term replacement therapy with opioids such as methadone is one of these therapies, which has been successful in improving the recurrence of these problems.<sup>[13]</sup> Methadone maintenance therapy (MMT) has been shown to effectively reduce the use of other drugs, high-risk and criminal activities, mortality, and human immunodeficiency virus transmission.<sup>[14]</sup>

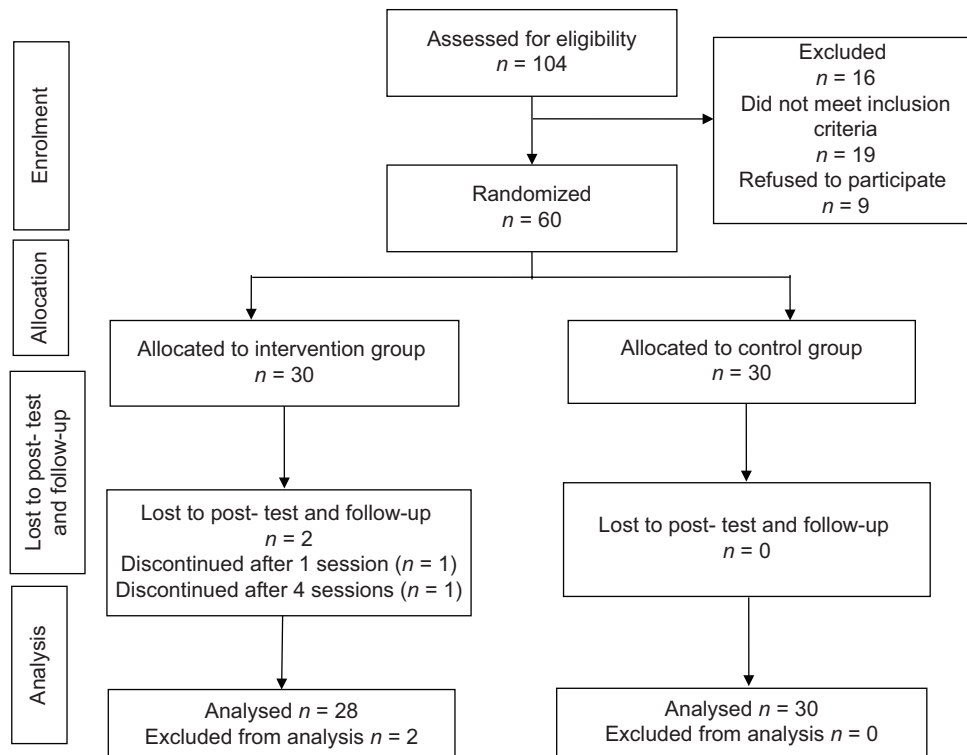


Figure 1: Participant's flowchart

Despite the effectiveness of methadone in clinical use, some psychological studies claim that MMT has negative effects on attention, memory, information processing, and problem-solving.<sup>[15]</sup> Since substance abuse is a multi-factorial phenomenon, several courses of treatment must be performed to fully recover. The two main categories of substance abuse treatment are medication and psychotherapy.<sup>[16]</sup> Nowadays, therapies that are based only on detoxification or acute intervention are gradually giving way to newer therapies that reduce the risks and have fewer side effects on patients' lives.<sup>[17]</sup> Given that medication has always been a front-line treatment in the treatment of this group of people, substance abusers have recurrences.<sup>[18]</sup> Drug therapies have a positive effect on improving the symptoms of substance abuse; however, they are not able to change the patient's feelings, emotions, or negative attitudes toward their illness and their pathological role.<sup>[19]</sup> Although the results of research consider MMT as one of the most common and effective approaches,<sup>[19]</sup> because of the greater emphasis on the physical symptoms and less attention to psychological, social, and environmental dimensions, the need for treatments in the above areas is necessary.<sup>[12]</sup>

One of the innovations in psychological therapies, especially for substance abuse, is cognitive-behavioral therapy (CBT).<sup>[20]</sup> This treatment helps patients identify distorted patterns of thinking and dysfunctional behaviors.<sup>[21,22]</sup> To be able to change these distorted thoughts and dysfunctional behaviors, regular discussions and precisely organized behavioral tasks are used.<sup>[23,24]</sup> Substance dependence is one of the chronic and recurring disorders that make a person susceptible to serious problems such as acquired immunodeficiency syndrome (AIDS), hepatitis, and other chronic disorders. The high degree of coexistence of this disease with psychiatric disorders such as depression, anxiety, and personality disorders leaves severe effects on the health of patients. Implementing psychological interventions with a focus on correcting attributional styles, challenging irrational beliefs, calming down, and teaching coping skills are some of the strategies in CBT. Therefore, this study aimed to investigate the effects of CBT on mental health, life expectancy, and happiness in patients under methadone maintenance treatment (MMT).

## Materials and Methods

### Study design and setting

The study was a clinical trial in which 60 patients were randomly assigned to the intervention and control groups using purposeful sampling [Figure 1]. The intervention group received a CBT program [Table 1] plus MMT. The control group received only MMT. The number of sessions, duration of each session, method of conducting

the session, randomization (random placement in the test and control groups), the confidentiality of information, and the right to leave the research at any time were explained at baseline.

### Study participants and sampling

Participants included all patients undergoing MMT from February 2021 to January 2022. Participants in both groups answered the measures (mental health, life expectancy, and happiness questionnaires) at baseline, immediately after the intervention, and after 3 months of follow-up. It is noteworthy that all the participants in the study had the same conditions in terms of the history of leaving, history of slipping, and history of imprisonment.

### Inclusion criteria

Inclusion criteria were diagnosed by a psychologist or psychiatrist as substance use disorder based on the structured clinical interview for DSM-5, hospitalized for at least 1 month, and the absence of severe psychiatric disorders such as major depression and bipolar mood disorder.

### Exclusion criteria

Exclusion criteria included morphine test positive at the time of enrollment and in at least three weeks (recurrence), absence of more than two sessions of treatment, failure to do homework, chronic physical illnesses (hepatitis, AIDS, etc.), suffering from a range of severe psychiatric disorders (psychosis, bipolar, and suicidal ideation), and change in methadone dose during the study.

### Data collection tool and technique

SPSS<sub>2020</sub> software (USA, 2020) was used in the present study. At first, descriptive statistics and inferential statistics were used. Due to the parametric test conditions in the inferential statistics section, the analysis of variance with repeated measures was used to investigate the effects of CBT on the dependent variables in the post-test and follow-up. The condition for using the analysis of variance test with repeated measures is the equality of variances in the study groups and the normality of the distribution of scores in the two groups. Equality of variance using Maunchley's test and normal distribution using the Kolmogorov-Smirnov test was also performed. Finally, an analysis of covariance was used for each level of variables.

### Ethical consideration

During the first visit, the researcher gave the participants information about the research to comply with the ethical codes. Participants were informed that participation was voluntary, and they signed written assent and consent forms before enrollment. Also, this study has been approved by the code (IRCT20170314033079N3) in Iran Clinical Trial Registration Center.

## Questionnaires

### *Demographic questionnaire*

This questionnaire comprised age, level of education, type of substance consumed, history of recurrence, employment status, marital status, duration of substance abuse, and the history of imprisonment, which was completed by a researcher during a structured interview.

### *Structured Clinical Interview for DSM-5 (SCID-I)*

Structured Clinical Interview for DSM Axis I disorders (SCID-I) has a screening form including 24 items evaluating symptomology for various axis I disorders.<sup>[25]</sup> Diagnostic agreement between test and re-test SCID administration was fair to good for most diagnostic categories in Iranian society.<sup>[26]</sup> The overall weighted  $\kappa$  was 0.52 for current diagnoses and 0.55 for lifetime diagnoses. The specificity values for most psychiatric disorders were high ( $>0.85$ ); the sensitivity values were lower.<sup>[27,28]</sup> In the present study, the Cronbach's alpha method was used to determine the reliability of the general health questionnaire, which was equal to 0.82 for the whole questionnaire, which indicates the optimal reliability coefficients of the questionnaire.

### *General Health Questionnaire (GHQ-28)*

The purpose of this 28-item questionnaire is not to achieve a specific diagnosis in the hierarchy of mental illness, but its main purpose is to distinguish between mental illness and health. The GHQ-28 has four sub-scales: physical symptoms, anxiety and insomnia, social dysfunction, and depression. The overall validity coefficient of this test in an Iranian community was 88%, and the coefficient of validity of sub-tests was 50% to 81%. The validity of this questionnaire was obtained by internal consistency (Cronbach's alpha) for comparisons of physical symptoms (85%), anxiety and insomnia (78%), social dysfunction (79%), major depression (91%), and the total questionnaire (85%).<sup>[29]</sup> In the present study, the Cronbach's alpha method was used to determine the reliability of the General Health Questionnaire, which was equal to 0.87 for the whole questionnaire, which indicates the optimal reliability coefficients of the questionnaire.

### *Schneider Hope Questionnaire (SHQ)*

The SHQ consists of 12 four-choice questions in which the subject chooses between completely incorrect, partially incorrect, partially correct, and completely correct answers. The internal consistency of the whole test is 0.74 to 0.84, and the reliability of the open test is 0.80. The reliability of this test on four sample groups was 0.84, and the reliability of the re-test 10 weeks later was 0.80. This scale measures two items: motivation (having a solution) and will (reaching a solution). The reliability of this scale in Iranian society was 0.73.<sup>[30]</sup> In the present study, Cronbach's alpha was used to determine the

reliability of the questionnaire, which was 0.84 for the whole questionnaire, which indicates the optimal reliability coefficients of the SHQ.

### **Oxford Happiness Questionnaire (OHQ)**

The 29-item OHQ scores ranged from 0 to 3. The highest score of 87 indicates the highest level of happiness, and the lowest score on this scale is 0, which indicates dissatisfaction with life and depression. This questionnaire was revised by Hills and Argil (2002) with the validity of the questionnaire as 0.91 and its internal correlation as 0.4 to 0.65.<sup>[31]</sup> Alipour and Agah (2007) reported the validity of this questionnaire in Iranian society as 0.91.<sup>[32]</sup> In the present study, Cronbach's alpha was used to determine the reliability of the questionnaire, which was 0.88 for the whole questionnaire, indicating the optimal reliability coefficients of the questionnaire.

## Results

In this study, 60 patients under MMT were studied. Table 2 presents the mean, standard deviation, and statistics for the demographic characteristics of the groups. The results of Table 2 show that the studied groups have no significant relationship with demographic variables ( $P > 0.05$ ). In other words, the variables of age, level of education, type of substance consumed, history of recurrence, employment status, marital status, duration of substance abuse, and the history of imprisonment do not act as confounding variables. Before interpreting the results of the tables, it should be noted that the results of the Shapiro-Wilk test showed that the distribution of all variables considered by different groups and times was almost normal. Also, the results of the Mauchly test of sphericity showed that the sphericity assumption was not valid for all variables, so Greenhouse-Geisser or Huynh-Feldt results were used. Analysis of descriptive findings by  $t$ -test showed that the difference between the mean of quantitative variables was not significant, except for the methadone dose. Also, the difference in the frequency ratio of qualitative variables through Chi-square showed that the difference between the two groups was not significant for these variables. The demographics and characteristics of the participants are shown in Table 2.

The results showed that the interaction of the time group was significant for all variables ( $P < 0.05$ ). In other words, according to the results, the means of mental health, happiness, and hope in both experimental and control groups at baseline were low. This is because in the post-test, the average of these three variables in the experimental group has increased compared to the control group, and this trend is also evident in the follow-up, which shows more effectiveness in the present study [Table 3].

## Discussion

The present study aimed to investigate the effectiveness of CBT on mental health, life expectancy, and happiness of patients under MMT. The results showed that CBT improved mental health in patients under MMT. The finding is consistent with the results of research by Ghasemi *et al.*,<sup>[33]</sup> Sohrabi and Moser,<sup>[34]</sup> and Hosseini.<sup>[35]</sup>

Accordingly, it can be said that for most people who are born and raised in addicted families, drug use by family members is considered to be normal, and the fear of experiencing drug abuse disappears in the long term. What is significant is the normalization and pattern of substance use in the family environment, which contributes to the deviant attitude of other family members. Parents play an important role in

**Table 1: Content of the cognitive-behavioral group therapy protocol**

Sessions	Contents
Session 1	Skills to distract from self-destructive behaviors, self-relaxation, and creating cognitive relaxation plans
Session 2	Conscious breathing, self-affirmation sentences, creating new adaptation strategies, and creating an immediate adaptation program
Session 3	Recognizing emotions and overcoming obstacles to healthy emotions
Session 4	Reducing physical vulnerability, exercise, identifying self-destructive behaviors, and reducing cognitive vulnerability
Session 5	Recognizing and connecting to a higher power and living in the present moment
Session 6	Using adaptive thoughts of self-encouragement, fundamental acceptance, using the possibilities of overcoming thoughts, and balancing thoughts and feelings
Session 7	Dealing with emotion, working against emotional desires, and problem-solving. List of enjoyable activities, paying attention to emotions without judging, increasing positive emotions, and controlling thoughts and emotions.
Session 8	Focusing on a single minute, focusing on a single object, and recording a few minutes of thoughts
Session 9	Internal-external experience, description of emotions, list of commonly felt emotions, change of concentration, and conscious breathing
Session 10	Fundamental acceptance, negative judgment, judgment against the present, and conscious communication with others
Session 11	Being conscious in daily life, resistances, and obstacles to mindfulness exercises
Session 12	Paying attention to the vastness and tranquility, mindfulness, and returning to tranquility and silence
Session 13	Considerable attention, passive and aggressive behavior, defining and determining their style and pattern, and techniques of influencing others
Session 14	Risk assessment and risk planning
Session 15	Balancing emotion and making simple requests
Session 16	Talking, analyzing problems in interactions, and applying specific listening skills, and saying no

Cognitive-behavioral group therapy protocol included 16, one-hour weekly sessions

**Table 2: Demographic features of the sample**

	Intervention (n=30)	Control (n=30)	Statistics
Mean Age (SD)	33.05 (5.02)	33.09 (4.05)	1.24 <sup>F</sup>
Marital status (Single/Married/Divorced or separated)	n=13/15/2	n=14/13/3	1.8 <sup>2</sup>
Mean years of education (SD)	11.24 (1.02)	11.76 (1.08)	0.88 <sup>2</sup>
Number with comorbid diagnoses (%)	7 (23.3%)	6 (20%)	1.2 <sup>2</sup>
Number with Previous engagement with psychotherapy (%)	6 (20%)	4 (13.3%)	1.3 <sup>2</sup>
Methadone dose received (in CC)	16.08 (2.08)	17.04 (2.62)	2.3 <sup>t</sup>
Age of onset of use	21.14 (4.07)	20.65 (4.02)	0.62 <sup>t</sup>
Method of use			
Food (%)	12 (40%)	14 (46.6%)	1.2 <sup>2</sup>
Fumigation (%)	18 (60%)	16 (53.4%)	1.2 <sup>2</sup>

**Table 3: Descriptive statistics for the measures over the three-time periods assessed in this study by condition**

Measure	Intervention group (n=28) Mean (SD)			Control group (n=30) Mean (SD)				Condition*time interaction	
	Pre-test	Post-test	Follow-up	Pre-test	Post-test	Follow-up	Main effect of time		Main effect of condition
Mental Health	24.80 (10.86)	33.71 (12.38)	32.71 (12.74)	26.06 (13.09)	27.27 (12.84)	26.16 (12.34)	F=14.08 P<0.001	F=1.08 P=0.168	F=11.62 P<0.001
Happiness	54.40 (7.01)	74.86 (11.93)	71.14 (12.25)	56.06 (8.29)	55.60 (7.61)	52.41 (8.18)	F=48.22 P<0.001	F=10.36 P<0.018	F=31.14 P<0.001
Life Expectancy	21.08 (5.68)	28.58 (6.55)	26.28 (6.32)	20.16 (5.27)	20.88 (5.14)	21.48 (6.27)	F=32.24 P<0.001	F=29.26 P<0.001	F=23.44 P<0.001

Note: The Intervention Group includes CBT + MMT. The Control Group includes MMT

developing their children's attitudes toward mental health by rewarding appropriate attitudes and setting a good example.<sup>[36]</sup> Additionally, CBT has improved mental health in the dimensions of physical function, physical role, physical pain, social health, vitality, social function, emotional role, and emotional well-being. The basic theory of this approach states that some people are prone to react to certain emotional situations intensely and unusually. Situations are most often found in emotional, family, or friendship relationships. Also, some techniques of CBT such as increasing awareness, mindfulness, controlling impulsive behaviors, identifying self-destructive behaviors, and increasing interpersonal efficiency while reducing the symptoms and consequences associated with substance use can play an important role in improving mental health and increasing positive emotions in substance abusers.<sup>[37]</sup>

Furthermore, the results showed that CBT increased the life expectancy of patients under MMT. The results are consistent with Pan *et al.*<sup>[38]</sup> and Otto *et al.*<sup>[39]</sup> Explaining these findings, it can be said that life expectancy is one of the most important indicators of health and well-being in humans. Hope is also a positive motivational state that is based on a sense of being stable. Life expectancy is one of the basic factors that promote adaptability and is a sign of physical and mental health. Numerous factors such as mental structure and psychological state, positive emotions, the ability to adapt to environmental conditions, genetics, and quality of life affect the level of human hope. The positive psychology approach aims to promote mental and emotional health and focuses on understanding and explaining happiness and mental health and accurately predicting the factors that affect hopefulness. The goal of this approach is to identify the structures and methods that bring human well-being and happiness and try to identify and eliminate the causes and threats to peace and happiness.<sup>[40]</sup> CBT, on the other hand, is a type of intervention that combines the principles of psychological and behavioral learning to shape and encourage desirable behaviors. When group therapy is performed cognitively-behaviorally, the individual begins to change the way they think and how they respond to emotions such as anxiety, sadness, and anger. Unlike other behavioral modification techniques in which the educator is the leader, CBT allows addicts to evaluate progress toward pre-determined or standard goals. Thus, addicts have the power to regulate their activities and determine their success.<sup>[41]</sup> Also, CBT has a special focus on problem-solving skills, which in turn reduces hostility, irritability, anger, and guilt and increases feelings of strength, pride, and a sense of control. In addition, the use of techniques to consider other possible facts, positive inner speech and profit, and loss analysis increases positive emotions such as

alertness, awareness, and desire to use techniques in life and reduces negative emotions such as anxiety.<sup>[21]</sup>

Moreover, the results showed that CBT increased the happiness of patients receiving MMT. This result is in line with the results of the research by Proeve<sup>[42]</sup> and Narimani and Mikaeil.<sup>[43]</sup> In explaining this finding, it can be said that happiness, joy, and cheerfulness are among the most important human psychological needs due to the major effects on a person's life and have always occupied the human mind. Happiness is one of the most important and influential issues in the lives of patients under MMT. Some psychologists believe that positive and constructive relationships with others, purposeful life, personality development, loving others, and life are components of happiness and vitality. Some research considers happiness to be a combination of positive emotion, lack of negative emotion, and life satisfaction. Studies and research by psychologists in recent years show that if people experience and have happy factors (such as a spouse, good friend, good job, entertainment program, and spirituality), satisfaction and happiness increase.<sup>[44]</sup> In this regard, the cognitive-behavioral approach has attracted the attention of researchers and psychologists in recent decades. This approach can help people minimize negative thoughts about their illness. Strong empirical support for the application of CBT for common mental health problems in physical illness, with the provision of modern health care and emphasis on empirically supported therapies, is fully consistent. Many of them are known to be effective in clinical trials. The important role of CBT, which has increased the happiness of patients under MMT, enables them to have a more positive belief in their control.<sup>[45]</sup>

### Limitations and recommendation

Generalization of research findings to other communities should be done with caution. Since this study was conducted in a small group, it is suggested that it be studied in larger groups to generalize the results obtained with more confidence. Moreover, it is highly proposed that emotion regulation therapy applies to people under MMT.

### Conclusion

CBT is one of the appropriate and effective psychotherapies to solve the psychological problems of people under MMT. Although MMT is the most widely used drug treatment for substance abuse disorder, it focuses more on physical problems and has been incapable of psychological problems. Concomitant use of MMT and CBT will have many positive effects. As the results of this study showed, MMT along with CBT promotes mental health, happiness, and hope. Because CBT helps patients identify and modify distorted thinking patterns

and dysfunctional behaviors as well as using regular, well-organized discussions, and behavioral tasks, the use of this type of psychotherapy can also be helpful for other mental disorders.

### Ethics statement

All procedures performed in this study involving human participants were in accordance with the ethical standards of the Local Ethics Committee at the Kashan University of Medical Sciences, Kashan, Iran (IRCT20170314033079N3).

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### Conflict of interest

The authors declare no conflict of interest.

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