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The Effectiveness of Mindfulness-Based Cognitive Therapy in Improving Dental Anxiety

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Abstract

Background and Aim: Dental anxiety, the fifth ranks among common stressors, is a major cause of avoiding dental treatment. This study aimed to evaluate the effectiveness of mindfulness-based cognitive therapy (MBCT) in improving dental anxiety in people referring certain dental clinics in Kermanshah City in 2022.

Materials and methods: This quasi-experimental study had a pretest-posttest design with a control group. A total of 50 subjects were selected via purposive method from 2 dental clinics. Their treatment plan was at least 3 sessions. They were divided into 2 equal intervention and control groups. The intervention group received mindfulness-based cognitive therapy based on the protocol by Segal, Williams, and Teasdale in eight 60-minute sessions. Data collection tool was a dental anxiety inventory by Stouthard, Mellenbergh, and Hoogstraten. Data were analyzed by paired t-test.

Results: There was a significant difference between the intervention and control groups in the post-test , which showed the effectiveness of MBCT in reducing dental anxiety ($p<0.01$).

Conclusion: MBCT significantly decreased dental anxiety. It is, thus, suggested to be used for clients before dental services.

Keywords: Dental anxiety, Dental clinic, Mindfulness-based cognitive therapy (MBCT).

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Introduction

Dental care is an aspect of health but attending a dental office and being in the examination unit is not often easy and comfortable [1]. Dental anxiety is an important reason for avoiding dental clinics with subsequent aggravation of oral and dental health [2]. Those with more decayed and missing teeth often refer less to dental clinics because of fear and anxiety [3]. Fear of dental treatments is common and about 5-6% of the general public suffer from dental anxiety [4]. Dental anxiety is in the fifth rank among the most common anxiety triggers [5]. Dental anxiety begins in childhood, peaks in early adulthood, and decreases with age. Dental anxiety is more common in younger ages (15-25 and 25-35 years) and reach to minimum in 55-56 years [6]. The prevalence of it in adult and young population is 14.9% in Australia, 12.5% in Canada, 12.6% in Russia, and 14.8% in Iran [7].

Dental anxiety makes problems for both patients and dental staff in such a way that it is difficult to control such patients and they often avoid dental treatments [8]. A high percentage of people are stressed and afraid of dental services. Patients with this stress usually enter the dental office with pallor, palpitations, and sometimes tremors. This stress is due to unknown dental procedures, strange tools, turbine noise and previous experience of pain in dental treatment. Anxiety increases when inappropriate anesthetics are used, or inflammation and infection do not allow full anesthesia and the patient experiences multiple painful injections [9]. Although anxiety is an emotional state that helps normal people to adapt to and defend themselves against various dangers, anxiety disorders disturb such adaptive responses and cause maladaptive reactions in extreme situations [10].

The etiology of dental anxiety is unknown [11]. Given that dental anxiety is multidimensional and complex, only one single factor is not involved in its emergence [12]. Personality traits; fear of pain; pain sensitivity; painful or traumatic dental experiences, especially in childhood; the effect of anxiety on family members, friends, and peers, causing fear in patients; fear of blood and injury; and other environmental and psychological features are some factors in triggering this anxiety [13]. Further, many patients complain that dentists make them feel guilty and blame them for their anxiety [14].

Anxiety is sometimes combined with panic in a way that prevents the possibility of providing any service by the dentist due to the lack of coping behaviors in patients [15]. It is, thus, considered as an important reason for avoiding dental care [16], less follow-up, and sometimes refraining from continuation of dental treatments. In examinations, repeated occurrence of panics can affect the dentists' efficiency; hence, it is essential to measure the anxiety level of patients [17]. An important advantage of measuring anxiety is that the dentist can identify anxiety-causing factors in patients before starting the procedure and eliminate them as much as possible or prevent patients from being in that situation [18]. It is important to take a history of anxiety which is impossible or very time-consuming for dentists [19]. Given the negative outcome of dental anxiety, it is essential to identify people with severe

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anxiety and use effective methods to reduce and manage it [20].

Today, various non-pharmacological methods and techniques have been considered and tested to manage stress and anxiety. Some of these interventions are a combination of measures such as increasing knowledge about stressors and anxiety, relaxation training, deep breathing, detecting dysfunctional thoughts, cognitive restructuring, problem-solving training, self-assertiveness training, anger management, time management, and mindfulness [21]. The results of a study on the effects of a mindfulness-based stress reduction program on anxiety disorders demonstrated that a group of mindfulness meditations in an educational program could effectively decrease the symptoms of anxiety and panic attacks. In this study, the researchers concluded that an 8-week mindfulness-based stress reduction program could cause long-term effects in the treatment of patients with anxiety disorders [22]. Mindfulness refers to paying attention in a specific way, on purpose, at the present moment, and without judgment. It means being at the present moment with everything that exists, without judgment on what is happening. In other words, mindfulness refers to experiencing pure reality without any explanation [23].

Mindfulness can be described as a way of "being" or a way of "understanding" that necessitates perceiving personal feelings [24]. Mindfulness can help establish proper communication between the patient and the dental staff [25]. Sattari and Kaffashzadeh (2015) conducted a study on the effect of mindfulness on test anxiety among secondary school females in Saveh City and confirmed the effect of mindfulness on anxiety reduction [24]. Bayrami et al. (2015) confirmed the effectiveness of mindfulness-based cognitive therapy in reducing social anxiety and dysfunctional attitudes in adolescents [25]. Taghvaei and Jahangiri (2016) reported that mindfulness training significantly decreased anxiety and pain intensity resulting from dental procedures in children [26]. Sedighi et al. (2021) indicated that MBCT can reduce negative emotions such as depression and anxiety in divorced women [27]. Kahrizi et al. (2017) concluded that mindfulness decreased depression and anxiety and could be effective in improving somatic symptoms in patients with asthma [28]. Additionally, Zadkhosh et al. (2019) reported that mindfulness was effective in reducing anxiety and enhancing the athletic performance of young football players [29].

There are few studies regarding the effects of MBCT on dental anxiety. Since dental anxiety has a significant prevalence and negative consequences for people, effective educational interventions can cause positive results for patients and dental staff. The present study aimed to investigate the effectiveness of MBCT on dental anxiety intensity in individuals referring to 2 dental clinics of Kermanshah in 2022.

Methods

This quasi-experimental study with pretest-posttest design and a control group was conducted in 2 dental clinics of Kermanshah in 2022. Its protocol was confirmed by the ethics committee of Tehran Islamic Azad University of Medical Sciences with an ethical code (IR.IAU.TMU.REC.1400.329). Study population consisted of all clients referring to dental clinics in Kermanshah.

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The sample size was calculated at a confidence interval of 0.95 with the power of 0.80 based on related formula for interventional study in two groups [30]. Mean and standard deviation for the calculation were obtained from a similar study [31]. The minimum sample size was calculated 22 but 25 subjects were allocated to each group because of 10% attrition.

Inclusion criteria were the age of 15 to 55, score of 60 or higher in the Dental Anxiety Inventory (DAI) (moderate to severe anxiety), dental treatment duration, more than 3 sessions for therapy (at least one month to cover training sessions), no substance abuse (self-reported), and no drugs for psychiatric disorders (self-reported). Absence in two or more sessions of training sessions excluded the subjects form the study.

From all 10 public and private dental clinics in Kermanshah (A1 to A10), 2 private clinics (one for the control group and another for the intervention group) were randomly selected in the Excel program in such a way that their clients were not in contact with each other during the study. The subjects were then selected with purposive sampling method and, after explaining the research purpose and methodology, their oral consent was obtained. The dental anxiety inventory was distributed among all clients at their first visit for treatment. When they were in the waiting room for 15-30 minutes, their anxiety was measured using the inventory. During this period, one of the researchers was present in the room to answer possible questions.

Those with scores above 60 or anxiety greater than average were considered as participants. After measuring anxiety, the participants were contacted via phone numbers in their inventories and invited to participate in the intervention program. Mindfulness was, then, taught to the intervention group in eight 60-minute sessions twice a week via a group in WhatsApp (by online classes and uploading videos in groups with 3 to 4 subjects) (Table 1). Online sessions were presented by one of the researchers and the training content and videos were approved by a team of psychologists and psychiatry experts. Moreover, 24 hours after the end of the intervention, the inventory was given to control and intervention groups to investigate the effect of MBCT. Finally, interpretations and conclusions were made through data analysis. To comply with the ethical principles, educational packages of the intervention were given to the control group at the end of study.

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Table 1: Content of mindfulness-based cognitive therapy (MBCT)

Sessions	Content of sessions
1	Explaining the reason for holding the session; introducing the members; a brief description of 8 sessions; doing body scan meditation; and discussing the experience of it
2	Doing body scan meditation; and discussing the experience of it; discussing assignments, practice obstacles, and mindfulness program solutions for it; and doing meditation while sitting
3	Calm and mindful movements of yoga as ways to decrease physical symptoms of stress and anxiety and be aware of subtle body movements; practicing seeing and hearing; and sitting meditation, as well as breathing with attention to bodily senses
4	Doing sitting meditation with an emphasis on attention to breathing, body sounds, and thoughts; discussing stress responses and reactions to difficult situations and alternative attitudes and behaviors; practicing mindful walking
5	Doing sitting meditation; and presenting and performing mindful body movements
6	A three-minute breathing space exercise; discussing assignments; presenting an exercise, called creating, thinking, and separating views with the theme that the content of thoughts are mostly unreal; Four consecutive meditation exercises for an hour
7	Four-dimensional meditation, and awareness of everything that comes into consciousness at the moment; Providing a practice in which the participants determine which events of their lives are pleasant or unpleasant, and how to make plans with enough pleasant events; A three-minute breathing space exercise
8	Body scan; three-minute breathing space exercise; and discussing ways to cope with meditation obstacles

A two-part questionnaire consisting of demographic information and dental anxiety inventory by Stouthard, Mellenbergh & Hoogstraten was used to collect data. This inventory comprised 36 items on a 5-point scale (1= very low to 5= very high). It also had no subscale and was single-factor. Its score ranged from 36 to 180; a higher score indicated higher anxiety. Based on the total anxiety score, the anxiety of patients was classified as mild (score of 36-60), moderate and higher (61-120), and severe (above 120). Stouthard et al. reported its internal consistency as 0.96 to 0.98 using Cronbach's alpha. Test-retest reliability of the inventory also ranged from 0.84 to 0.87 in different groups [32].

In a study in Iran, Yousefi and Piri (2017) evaluated and confirmed its face and content validities in 10 patients. The reliability of dental anxiety inventory was evaluated using internal consistency and test-retest. Based on the results, the internal consistency of its items was 0.94 by Cronbach's alpha and 0.94 by split-half method, indicating strong internal consistency. Furthermore, the reliability coefficient of the tool was 0.71 by test-retest, indicating the desirable reliability [33]. The reliability of the tool was also

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evaluated with internal consistency (Cronbach's alpha) in the present study where the inventory was given to 20 subjects before sampling and then, its consistency was measured after completing the inventory. The Cronbach's alpha was calculated 0.81 which was regarded acceptable. It is worth noting that these subjects were not included in the groups.

The items of the questionnaire were first coded, and the collected data were analyzed with SPSS. Descriptive statistics and paired as well as independent t-tests were used for data analysis according to the objectives. The significance level was 0.05 in all tests.

Results

A total of 50 subjects between 18 and 53 (mean 32.4±8.2) were selected and assigned in 2 equal groups, referring to 2 dental clinics. 58% of them was female. Table 2 presents their demographic information.

Table 2: Participants' demographic information

Demographic information		Intervention		Control	
		Frequency	Percentage	Frequency	Percentage
Gender	Female	16	64	13	52
	Male	9	36	12	48
Education level	High school diploma	8	32	3	12
	Associate degree	5	20	0	0
	Bachelor	11	44	16	64
	Master and higher	1	4	6	24
Age	25 and Lesser	4	16	2	8
	26-35	6	24	5	20
	36-45	9	36	13	52
	46 and older	6	24	5	20

The anxiety level as the research variable was analyzed by parametric tests based on the significance level of the Kolmogorov-Smirnov test and its normal distribution (Table 3).

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Table 3: The result of the normality test of dental anxiety data distribution

Variable	Group	Skewness	Skewness error	Kurtosis	Kurtosis error	Test statistic	P-value
Anxiety	Before intervention	0.121	0.337	-0.337	0.662	0.153	0.109
	After intervention	-0.205	0.337	-0.258	0.662	0.148	0.113

Based on the data in Table (3), the significance level of the Kolmogorov-Smirnov test is greater than 0.05 for dental anxiety before the intervention (0.109) and after the intervention (0.113); hence, they have a normal distribution. Table 4 presents the dental anxiety levels in two groups and two times of measurement.

Table 4: The patients' dental anxiety levels before and after cognitive therapy

Variables		Intervention		Control	
		Before	After	First time	Second time
Anxiety	Mean	96.12	43.01	110.52	108.76
	Sd	1.633	2.178	1.943	1.424

Based on Table 4, the mean of dental anxiety level before cognitive therapy was 96.12 with a standard deviation of 1.633 in the intervention groups, and the mean anxiety score of the control group was 110.52 with a standard deviation of 1.943 at the first time of measurement. The dental anxiety level was evaluated in the intervention group after cognitive therapy (Mean=43.01, SD=2.178) and in the control group for the second time (Mean=108.76, SD=1.424).

The results of paired t-test did not indicate any significant difference between the means of dental anxiety levels of the control group before and after the intervention (P=0.116), but the difference was significant in the intervention group (P=0.001). Based on the mean values, the dental anxiety levels were significantly decreased in the intervention group (Table 5).

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Table 5: A comparison of mean values of dental anxiety before and after cognitive therapy

Variable		Intervention	Control	Independent t-test (df=48)
Anxiety	Before	96.12±1.633	110.52±1.943	t= 0.473, P=0.638
	After	4301±2.178	108.76±1.424	t=-3.766, P=0.001
Paired t-test (df= 24)		t= 5.02, P=0.001	t= 1.631, P=0.116	

The results of the independent t-test indicate no significant difference between the mean dental anxiety in the intervention and control groups before cognitive therapy (P=0.638) but there was a significant difference after cognitive therapy (P=0.001). Based on the mean values, the mean dental anxiety was decreased in the intervention group.

Discussion

The present study aimed to evaluate the effectiveness of mindfulness-based cognitive therapy (MBCT) on dental anxiety in patients referring to dental clinics of Kermanshah in 2022. Based on the results, the anxiety levels of patients were moderate in the intervention and control groups in the first time of measurement before cognitive therapy. Undoubtedly, higher anxiety and fear from dental treatment can result from the characteristics and previous experiences of patients. As patients with moderate anxiety were investigated in this study, the difference between levels of dental anxiety was insignificant. This is consistent with the results of studies by Ahmadpour, Mohebbi, and Razeghi (2020) [15], but in Shojaeipour and Behrouzpour's study (2008) on patients referring to Kerman Dental school, there was a significant difference in anxiety levels [34]. In studies by Erten et al. on patients at a dental clinic in Turkey [35], and by Ghasempour and Haddadi on medical and dental students at Babol University of Medical Sciences [36], the mean values of dental anxiety and fear were greater than our findings. In fact, these differences in various studies may be related to the various natures of the subjects.

After cognitive therapy, dental anxiety levels became moderate in the intervention group, but remained high in the control group. Saatchi et al. (2015) reported the same results [37]. They indicated a significant difference between the intervention and control groups in terms of anxiety. Thus, it seems that MBCT was effective in reducing dental anxiety.

Comparison of mean values of dental anxiety in the intervention and control groups before and after the therapy as well as intragroup comparisons in the first and second times of measurement indicated the effectiveness of MBCT. The therapy reduces dental anxiety not by changing the content but as a behavioral therapy; it uses mindfulness, acceptance, and cognitive defusion to increase psychological flexibility. In other words, MBCT can increase psychological flexibility by enhancing the ability of patients with dental anxiety to communicate at the moment

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according to their experience and based on what is possible for them at that moment and act in a way that is consistent with their values.

Since MBCT was not studied for dental anxiety to know its consistency with previous studies, its effectiveness was unclear. However, some relatively similar results revealed the effectiveness of mindfulness in reducing stress or anxiety. In this regard, the findings of present study showed consistency with those of Mousavi et al. (2019), Fleming and Kocovski. (2014), Koszycki et al. (2007), and Najdi et al. (2021) [38-41]. In terms of anxiety reduction, the results were consistent with research by Goldin et al. (2012) and Vøllestad et al. (2012) [42-43]. Additionally, emotional regulation could be another possible mechanism for explaining the relationship between mindfulness and depression, anxiety, and stress with the ability to manage negative emotions. This was also consistent with studies by Vøllestad et al. (2012), and Norozi et al. (2017) [43-44].

The present research, to some extent, confirmed the previous results. Owing to positive effects of mindfulness on reduction of anxiety, we can recommend it as an intervention in dental anxiety reduction programs. The obvious differences of this study are the introduction of a non-pharmacological therapy in dental treatments for decreasing anxiety and the acceptance of the costs of delaying dental therapy due to fear and anxiety. Another difference is the continuation of mindfulness training during dental services for patients, leading to therapeutic effects in addition to preventive effects.

This study had some limitations including the impossibility of controlling the participants' social and economic status. Thus, it is suggested to make efforts to control these components in future studies. Due to time limitation of this research, dental anxiety was measured immediately 24 hours after the intervention while the best time for its measurement is from 1 to 6 months after training. The impossibility of long-term follow-up of the effects of the program with a follow-up test was another research limitation. Therefore, for future studies, it is suggested to investigate the long-term effects of MBCT on the reduction of dental anxiety.

Conclusion

The results of the present study indicated the effectiveness of MBCT in reducing dental anxiety of the participants. Therefore, dentists and other specialists are suggested to apply MBCT as an efficient and useful tool to control dental anxiety of the patients as the anxiety is a major barrier in proper dental care and services. It is worth noting that, sometimes, severe anxiety makes patients avoid receiving necessary dental services and endanger or threaten their oral health. Identifying, evaluating, and thus controlling the dental anxiety of patients reduce pain, create a positive attitude toward dental services, and are necessary as an incentive to maintain optimal oral health and follow up therapeutic courses. Based on the results of the study, dentists are suggested to evaluate anxiety levels in patients by dental anxiety inventory as a useful clinical tool on the admission of patients. It would be better to employ a psychiatric nurse or a psychologist in dental clinics to reduce

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anxiety of patients and painful consequences, and prepare a basis for providing suitable dental services in shortest possible time using timely and effective MBCT-based intervention.

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Conflict of interest

The authors declared no conflict of interest in conducting and publishing the research.

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