

ADDRESSING DENTAL PHOBIA TO IMPROVE ORAL HEALTH: EVIDENCE FROM A QUASI-EXPERIMENTAL STUDY IN PUNJAB

Sidra Afzal¹, Rubeeza Zakar², Mahira Afzal³

¹PhD Scholar, Department of Public Health, Institute of Social and Cultural Studies, University of the Punjab, Lahore, doctorsidraafzal@gmail.com

² Chairperson Department of Gender Studies, Professor of Public Health. University of the Punjab, Lahore.

³ Communications Specialist Regional Office for Asia and the Pacific. Food and Agriculture Organization of the United Nations (FAO)

ABSTRACT

Background: Despite increasing awareness about oral health needs and treatment-seeking behaviors, dental phobia often leads to the avoidance of dental care; therefore, it warrants clinical intervention aimed at reducing the fear.

Aim: Current research aimed to assess the efficacy of Cognitive Behavior Therapy (CBT) in reducing adults in Punjab.

Methods: Initially, 1000 participants, 919 females and 81 males, were selected for the study through a purposive sampling strategy. For pre-assessment, participants were given the Modified Dental Anxiety Scale (MDAS)¹ along with a demographic performa. Participants whose scores were within the moderate (9-12) or high (13-14) range of dental phobia were considered eligible for the intervention phase. Screening indicated that 108 participants had moderate dental anxiety and 189 had high dental phobia, resulting in 297 participants being eligible for the intervention phase. Only 20 participants provided informed consent for the therapy sessions.

Results: The results of the study revealed that the scores of the participants reduced significantly after the intervention*** $p < .001$.

Conclusion: The results of the study suggested that it is incumbent on dental practitioners to integrate CBT-based interventions into their routine practice to improve overall health care outcomes for the patients.

KEY WORDS: Dental phobia, behavioral therapy, cognitive behavior therapy, adults, oral health

INTRODUCTION

Despite the significant advancement in dental technology and the practice of medical science, dental treatment evokes considerable unpleasant emotional sensations and discomfort among individuals. Dental phobia is described as a constant, exaggerated and unreasonable fear of the presence or anticipation of a clearly defined stimulus, which typically leads to avoidance behavior toward the dentist until such time that either painful physical problems arising from untreated disease occur or psychological distress related to this phobia becomes intolerable². Researchers have identified many common factors that contribute to fear, including fear of physical injury, fear of the unknown (which in turn can cause panic attacks), losing control over one's behavior or situation, and helplessness and dependence. Additionally, the threshold for pain tolerance varies from person to person, influenced by several underlying factors such as the current emotional state, previous negative experiences of an individual, social rumors, and fear of injection and needles³.

Given the impact of dental phobia and treatment-seeking behaviors, numerous research studies have identified the prevalence of dental phobia affecting individuals across culturally diverse settings. A plethora of research studies reported the widespread occurrence of dental phobia, with varying prevalence rates across different geographical regions. For instance, a study conducted in China reported that 35% of adults experience dental phobia⁴. Furthermore, in an overall meta-analysis and systematic review, the prevalence rates of severe Odontophobia reported among adults were 15.3%, 12.4% and 3.3%, respectively⁵. Consistent with these findings, the World Health Organization estimates that 10% to 20% of the adult population suffers from dental phobia. In another study conducted in America, 20 % of the population avoid dental treatment due to fear. Similarly, evidence from Pakistan indicates a greater burden of dental phobia, with prevalence rates ranging from 21% to 50%⁶.

Despite increasing awareness about dental phobia, it is one of the major barriers to seeking dental care. There are several sociodemographic and socioeconomic determinants that are connected with the development and maintenance of dental phobia. Age, gender, education, and denying access to dental care have been closely associated with dental fear. Females are generally reported to be more prone to dental phobia as compared to men. Women are more expressive about the experience of pain; men, on the other hand, hide their emotions due to sociocultural expectations. Likewise, level of education also influences dental fear due to greater awareness and understanding of treatment modalities. In contrast, limited awareness could either reduce the anticipatory anxiety of dental treatment or contribute

to misconceptions that reinforce the avoidance behavior in patients. Financial condition also plays an important role in propagating dental phobia. Financial constraints and concerns regarding the treatment cost could aggravate dental phobia and discourage routine dental visits. Furthermore, lack of access to dental care is associated with poor oral health⁷. Inadequate access to dental services, including limited insurance coverage, transportation barriers, particularly in rural areas, and poor living conditions. Dental hygiene appointments are important in maintaining good oral health⁸. However, most of the patients only visit the dentist due to excruciating pain or glaring dental issues. The more invasive the treatment, the more resources and visits to the dentist are required, causing greater anxiety and dental phobia. This pattern is most common and is called the “*vicious model of dental fear maintenance*”. This model explains the relationship between avoidance of dental treatment, poor oral health, and the need for extensive treatment due to deteriorating oral health, heightened fear, ultimately perpetuating dental phobia and poor oral health outcomes⁹.

The detrimental effect of dental phobia extends beyond oral health, significantly affecting an individual's quality of life and socio-emotional functioning of an individual. Poor oral health conditions could lead to severe psychological trauma and distress¹⁰. Studies have reported that poor oral health has a more pronounced impact on women effecting their self-esteem and self-worth. Women have to bear different roles in society as a professional, mother and spouse, making oral health relevant to social interactions and public appearances. Therefore, poor oral health may increase the risk of social isolation and diminished interpersonal relationships in females as compared to males¹¹⁻¹². Furthermore, depression is one of the most reported psychosocial problems associated with oral health problems. Evidence suggests that it affects 10% of the population, which adversely affects an individual's thoughts, emotions and behaviors. Depression further intensifies the pain perception and reduces tolerance towards pain. Patients have reduced energy and diminished motivation for oral hygiene procedures¹³. Consequently, dental phobia becomes one of the propelling causes in neglecting oral health care and exacerbating mental health problems in patients¹⁴.

Given the far-reaching consequences of dental phobia, researchers have proposed several theoretical explanations of Dentophobia. The Advocates of the Unconditioned Response perspective believed that dental phobia is a learned response acquired through previous negative experiences. In contrast, the cognitive perspective explains dental phobia as the Interpretation of an event as disgusting, dangerous and Uncertain, which contributes to the negative evaluation of the situation and development of dental phobia. Contemporary researchers support a multifactorial etiology of dental phobia¹⁵. This perspective suggests that dental phobia arises from the interplay of several factors that include cognitive processes, conditioning experiences, personality variables, and genetic predisposition; collectively, these factors contribute to the development of dental phobia.

Conclusively, the current understanding of the prevalence and sociodemographic determinants of dental phobia draws attention towards the urgent need for developing evidence-based intervention strategies to improve oral health outcomes and to reduce the burden of oral health diseases. These intervention studies improve attitudes towards dental treatment and oral health literacy among patients.

Several research studies have been conducted to demonstrate their effectiveness in reducing dental phobia. For instance, a study conducted by Boman et al¹⁶ displayed that behavioral therapy techniques enhance the acceptance of dental treatment, emphasizing the importance of a comprehensive treatment plan to reduce the symptoms of dental phobia. Similarly, Shahnavaaz et al¹⁷ carried out a study to demonstrate the efficacy of cognitive behavioral therapy among adults with dental anxiety. 8 males and 22 females were included in the randomized controlled trials of cognitive behavioral therapy. The participants received ten hours of manualized CBT program delivered by trained psychologists in a clinical setting. Baseline assessment was carried out for three months before the initiation of the therapy. The results of the study revealed that 73% of the patients showed improvement in dental phobia in follow-up sessions. The outcome of the study highlights that CBT is effective in reducing dental phobia and it should be made accessible in the field of dentistry. Shafakhah et al¹⁸ investigated the role of educational videos in reducing dental phobia among adults seeking root canal treatment (RCT). A total of 50 patients were selected; 25 participants were assigned to the intervention group and 25 to the control group. Firstly, a baseline assessment was carried out about dental phobia. Afterwards, the intervention cohort took part in the video-assisted sessions. The study demonstrated that after the training, dental phobia reduced significantly, including less avoidance of dental phobia, and reduced physical symptoms of anxiety, as compared to the control cohort. Studies have highlighted that educational sessions were conducive in managing dental phobia for patients getting treatment for RCT. Likewise, Al Swayyed et al¹⁹ studied the effect of educational awareness techniques in patients experiencing endodontic procedures. The dental anxiety was assessed utilizing MDAS. Afterwards, the intervention cohort received audiovisual tools to explain the RCT procedure, while the patients in the control group were provided with a written description of the procedure. The results highlight that significant anxiety was reduced in the intervention group. The study concluded that appropriate awareness and education about the dental procedure can reduce fear among patients. Collectively, these findings indicate that both psychological interventions, particularly cognitive behavioral therapy, and educational approaches are effective strategies for reducing dental phobia. However, evidence regarding such interventions remains limited in developing countries, including Pakistan, highlighting the need for culturally appropriate intervention studies to improve oral health behaviors and reduce dental fear among adults.

In Pakistan, dental phobia is attributed to a multitude of factors leading to a lack of access to dental care. The underlying causes of dental phobia in Pakistan are poverty, scarcity of resources, lack of provision of basic oral health needs in rural areas, shortage of trained professionals, coupled with a dentist-to-patient ratio (1:10)²⁰. All these aforementioned factors make the situation alarming in Pakistan, with 90% of the population suffering from dental caries and 17% at risk of losing their teeth. This increasing prevalence could be attributed to unmet oral health needs and lack of a conducive environment for health care²¹. Few intervention studies have been carried out in Pakistan to understand the nature of dental phobia; however, empirical research on intervention studies remains limited. A study carried out by Faisal et al ²² identified dental anxiety among patients visiting public and private hospitals in Karachi. The dental anxiety was observed more in patients visiting private hospitals. Furthermore, Waheed et al ²³ assessed the usefulness of music and aroma therapy for managing pain and Fear of dental treatment. 60 participants were selected for the study, residing in Peshawar. During treatment, one group was given aroma therapy and the other was given music therapy. The results highlighted that patients receiving music therapy have lower levels of pain and dental anxiety as compared to aromatherapy. Furthermore, Hodge and Nadir ²⁴ argued that cognitive behavioral therapy aligns with the cultural norms of the Islamic tradition and values, making it a potentially effective therapeutic approach for Muslim patients based on their faith and belief system. Among the available psychological interventions, Cognitive Behavioral Therapy (CBT) is widely recognized as the first-line treatment for specific phobias because of its robust empirical support and sustained therapeutic benefits. CBT targets the maladaptive cognitions, avoidance behaviors, and Autonomic activation that maintain phobic responses through structured techniques such as cognitive restructuring, graded exposure, relaxation training, and behavioral experiments. Unlike pharmacological approaches, which primarily provide temporary symptom relief, CBT facilitates long-term improvement by altering the underlying cognitive and emotional processes responsible for fear maintenance. Therefore, adapting CBT-based interventions for the Pakistani cultural context represents a promising strategy for reducing dental phobia and improving oral health behaviors among adults.

To summarize, it is important to develop an intervention-based program for the Pakistani community to increase awareness and encourage preventative measures to address oral health diseases and associated irrational beliefs related to dental care. In this regard, Cognitive behavioral therapy has been established as a first-line treatment for the management of dental phobia; unlike pharmacological intervention that suppresses symptoms temporarily, CBT provides a long-lasting impact on patients through modification of the cognitive processes.

THEORETICAL FRAMEWORK

Dental phobia is a multidimensional condition that cannot be explained through a single etiological factor. Individuals with dental phobia exhibit maladaptive cognitive processes and catastrophize dental visits and perception of pain, accompanied by heightened arousal and anxiety, and avoidance of oral health care. Past traumatic experiences and sociocultural factors also contribute to the development of negative thinking patterns and dental phobia ²⁵.

Therefore, the present study is grounded in the cognitive-behavioral therapy model of dental phobia that proposes that maladaptive thoughts, emotions and behaviors interact and become a vicious cycle of dental phobia ²⁶. This model argues that the perception of dental procedures as threatening, painful and unpredictable causes emotional distress in patients. Consequently, avoidance of dental care becomes a coping strategy and temporary relief from the pain. Cognitive behavior therapy interrupts this vicious cycle of thoughts, behavior and emotions by targeting dysfunctional beliefs and improving emotional regulation of the patients ²⁷. Substantial research evidence supports the effectiveness of cognitive behavior intervention programs in reducing dental phobia and improving compliance towards treatment and oral health care¹⁶⁻¹⁷. Furthermore, the cognitive-behavioral perspective is embedded in the understanding of socio-cultural factors, beliefs and values that are deep-rooted and transmitted through familial experiences. Therefore, the CBT model provides intervention strategies that understand the role of culturally relevant health-related belief systems to reduce dental phobia²⁴ (Hodge & Nadir, 2008).

Aims and objectives

The following aims and objectives were developed for the study:

1. To evaluate the effectiveness of a cognitive behavioral therapy-based intervention program in reducing dental phobia and improving oral health outcomes among adults of Punjab.
2. To determine the baseline severity of dental phobia in the treatment and control group.
3. To compare the pre-intervention and post-intervention levels of dental phobia between the treatment and control group.

MATERIAL AND METHODS

Study design and Setting

In the current research study Quasi experimental design was used. It is a design used to determine the efficacy of intervention studies without randomly assigning the participants to the intervention group²⁸. Therefore, in the current research, to demonstrate the efficacy of cognitive-behavioral strategies, a quasi-experimental design was employed.

Instrument

Demographic Performa

A demographic information sheet comprising of age, gender, and level of education was given to the participants.

Modified Dental Anxiety Scale

The modified dental anxiety scale (MDAS)¹, a five-point Likert scale, was used in the research to carry out the baseline assessment of the participants with dental phobia. It assesses emotional responses of the participants prior to and during the dental treatment. The scale has good internal consistency with an alpha reliability of .89.

Population and Sample

The data collection was carried out after obtaining informed consent from the authorities and participants; the baseline (pre-intervention) assessment was carried out. Initially, a total of 1000 participants, 919 females and 81 males (M , 32.18; SD , 11.67), were selected for the study. The data was collected through door-to-door visits in individual settings. The participants were selected through a purposive sampling strategy. It is the type of sampling in which the participants are selected based on certain criteria and judgment of the researcher to achieve the study's objective²⁹.

Before participation, all individuals were informed about the ethical considerations relevant to the research. Written informed consent was obtained from the participants. During the baseline assessment phase, participants were given the Modified Dental Anxiety Scale (MDAS) along with a demographic performa.

Afterwards, the MDAS scores of the participants were analyzed. Participants whose scores were within the moderate (9-12) or high (13-14) range of dental phobia were considered eligible for the intervention phase. Screening indicated that 108 participants had moderate dental anxiety and 189 had high dental phobia, resulting in 297 participants being eligible for the intervention phase. After the screening of the participants, the next step was to contact the participants; as most of the participants were females, they were reluctant; therefore, house address was the primary source of follow-up. These participants were motivated to attend counseling sessions. The remaining participants declined the request to attend the counselling session due to transportation problems, difficulty in managing time and stigma associated with counselling sessions; only 20 participants showed willingness for the sessions.

Respondents

The Subjects were selected based on the following inclusion and exclusion criteria:

Inclusion criteria

1. Both male and female participants were selected for the study.
2. Participants between the ages of 18 and 60 years were selected for the study.
3. Participants belonging to the Urban and Rural areas of Lahore were selected.
4. Study individuals with dental problems, such as tooth decay, dental caries, missing teeth, malocclusion, Dentin hypersensitivity, pulpitis, Dental plaque, Dental calculus, gingivitis, and periodontitis, were included in the sample.

Exclusion criteria

1. Participants with any type of physical health condition such as hearing impairment, vision loss, and paralysis were excluded from the study.
2. Participants with oral health conditions such as oral cancer, autoimmune disease, cleft lip and palate, and noma were excluded from the study.
3. People with complicated oral health conditions like oral cancer and autoimmune disease.

Intervention

Session plan

Before carrying out the intervention, a session plan was formulated for the research participants. A total of four sessions, for two weeks, were conducted with the 10 participants in each group, meeting twice a week for 1 hour and thirty minutes.

The first session was conducted to normalize the patients and psycho educate them about dental phobia. Firstly, the participants were warmly greeted and informed about the nature and purpose of the research. To normalize the participants, an icebreaker activity "*Get to know each other*" was conducted in pairs. In this activity, participants interviewed each other about their hobbies and likes/dislikes. This activity helped participants feel relaxed and comfortable within the group. Furthermore, to build rapport, the "*life highlight activity*" was carried out. The participants were asked to reflect on their lives and share positive memories of their lives. This activity enabled participants to reduce their resistance and discuss dental phobia openly. Lastly, the participants were psycho educated about dental phobia through explaining the vicious cycle of dental phobia. It was explained that several psychosocial factors contribute to the avoidance of dental treatment. Factors such as guilt, embarrassment, and anxiety causes delaying of the dental treatment, which contributes to the deterioration of oral health conditions, making the treatment procedure more painful, thereby reinforcing dental phobia and avoidance of the dental procedure. The session was

concluded by highlighting the significance of oral health care, timely checkups, and taking preventative steps before the problem worsens.

During the second session, the participants were familiarized with the concept of relaxation to reduce their anxiety and fear. *Progressive Muscular Relaxation Technique* and its rationale were explained to the participants. They were informed that frequent practice of this technique can modify the brain's response to stress and tension into relaxation and calmness. The participants were encouraged to practice it on a daily basis. Subsequently, participants were introduced to the concept of deep breathing in reducing stress and normalizing the breathing pattern. Lastly, the participants were introduced to the concept of behavioral management techniques, with particular emphasis given on the concept of positive reinforcement. They were encouraged to use verbal praise and self-reward to keep them motivated towards their goals. At the end of the session, feedback was obtained and their queries were resolved.

In the third session, cognitive strategies were introduced. Firstly, the *Cognitive Vulnerability Model* i.e. negative evaluation of the situation evoke vulnerability schema, consequently aggravating the dental phobia, was explained to the participants. To reduce these vulnerabilities, cognitive strategies such as distraction, reframing and positive coping would be helpful. Furthermore, the cognitive behavior therapy model was explained to the participants. It was explained that negative thoughts about the situation generate negative emotion accompanied by the physical symptoms of anxiety and avoidance of the situation. After explaining both models, the concept of distraction was given. To break the cycle of thoughts, emotions and behavior, participants were encouraged to divert their attention towards something productive. In the next activity, the concept of a positive coping statement was introduced. The participants were encouraged to use positive coping statements in their daily life to develop a positive outlook on the situation. In the next activity, participants were taught the concept of reframing their negative thoughts. It involves countering the negative thoughts with a more balanced positive aspect of the situation. Lastly, the concept of observational learning/modelling was given to them. The participants were shown videos of dental procedures and equipment. As well as interviews of patients who had undergone dental treatment, using different coping strategies to reduce their dental fear. Through the examples, participants were encouraged to use observational learning in their daily practice to overcome dental phobia.

The fourth session comprised closure and termination of the group therapy session. In this session, a comprehensive overview of all the activities was given before the closure. They were encouraged to practice these skills daily to maintain them and generalize them in different situations of life. Afterwards, the MDAS was given, following the intervention and the group session was officially terminated.

Data analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) v.26. To analyze the demographic information, descriptive statistics were used. To demonstrate pre and post intervention comparison, a paired sample t-test was used in the research study.

RESULTS

Demographic Information of the participants (N=1000)

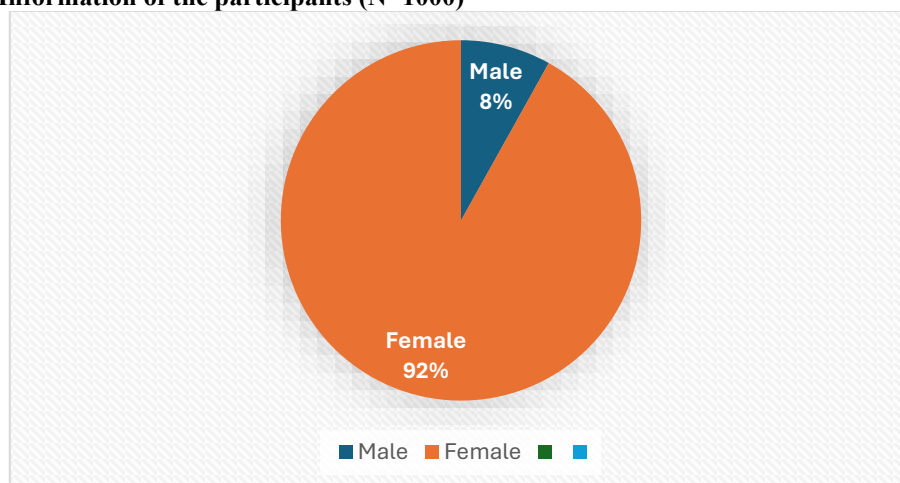


Fig1: frequencies of gender of the participants

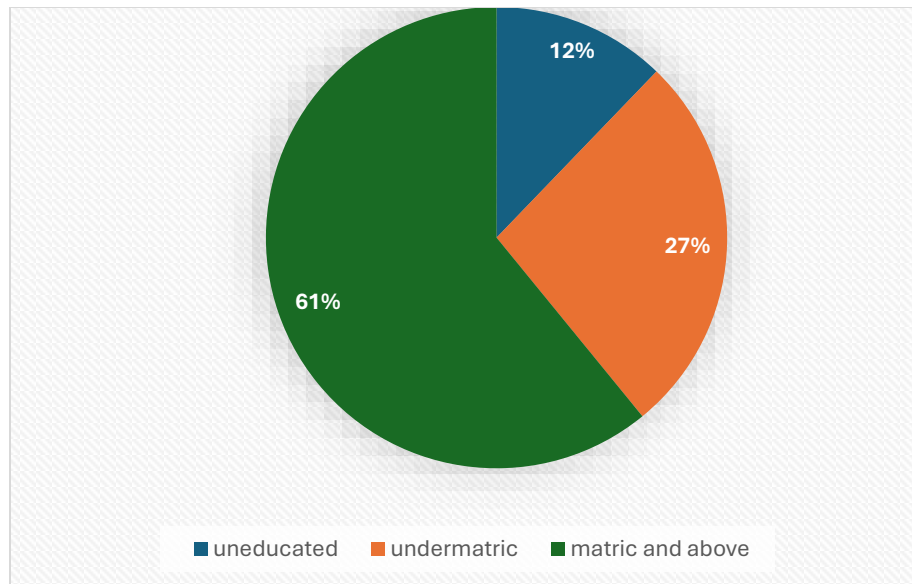


Fig 2: frequencies of education levels of participants

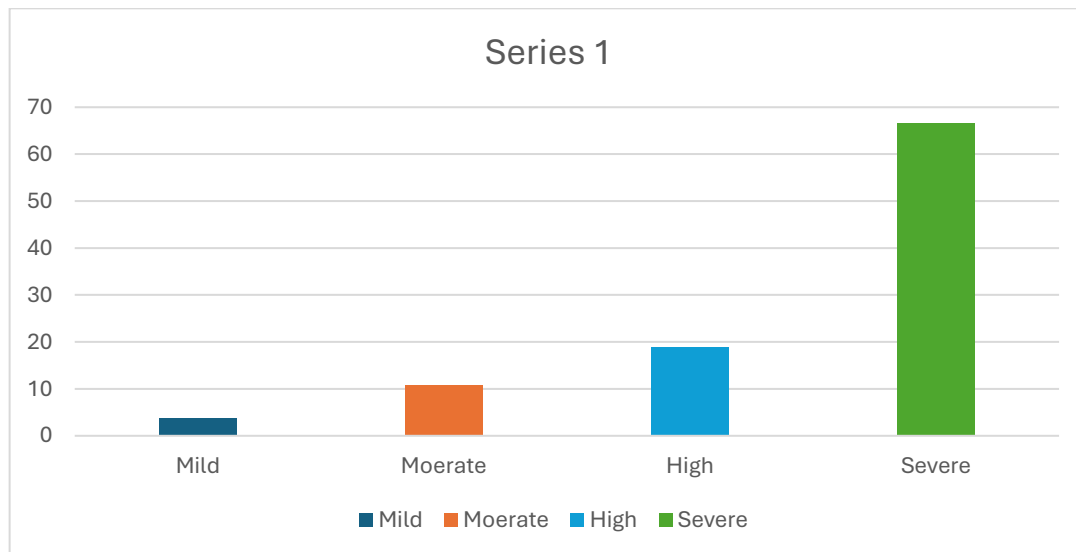


Fig 3: frequencies of severity levels of dental phobia

The results of the pie chart showed that there were 92% females and 8% males in the sample. There was a predominantly higher proportion of females in the sample as compared to males. Most of the participants were between the ages of 21 to 30 years (36%) and 31 to 40 years (27%). The education level of most of the participants (61%) was matric and above.

Graphical Representation of Severity Levels of Dental Phobia

Figure 1 describes the severity levels of dental phobia of the participants. 3.7% of the participants have a mild level of dental phobia, 11% of the participants have a moderate level of dental phobia, 19% of the participants have a high level of dental phobia and 66% of the participants have a severe level of dental phobia.

H1: It is hypothesized that cognitive behavioral strategies will reduce moderate dental phobia after the intervention.

H2: It is hypothesized that cognitive behavioral strategies will reduce severe dental phobia after the intervention.

Table 2: Means, Standard deviations, *t* and *p* values of participants with Moderate (*n*=10) and Severe (*n*=10) Dental Phobia

	Moderate				Severe			
	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Pre-Int	10.54	1.13	9.97	.001***	13.45	.51	20.37	.001***

Post-Int	5.44	.52			7.20	1.36		
-----------------	------	-----	--	--	------	------	--	--

Note. “Pre-Int = pre Intervention group”, “post-Int = post intervention group”, $df=9$, $***p>.001$

The results revealed that after the application of cognitive behavioral strategies, there was a significant reduction in the scores of participants with moderate and severe dental phobia $***p<.001$.

Graphical Representation of Pre and Post-Assessment

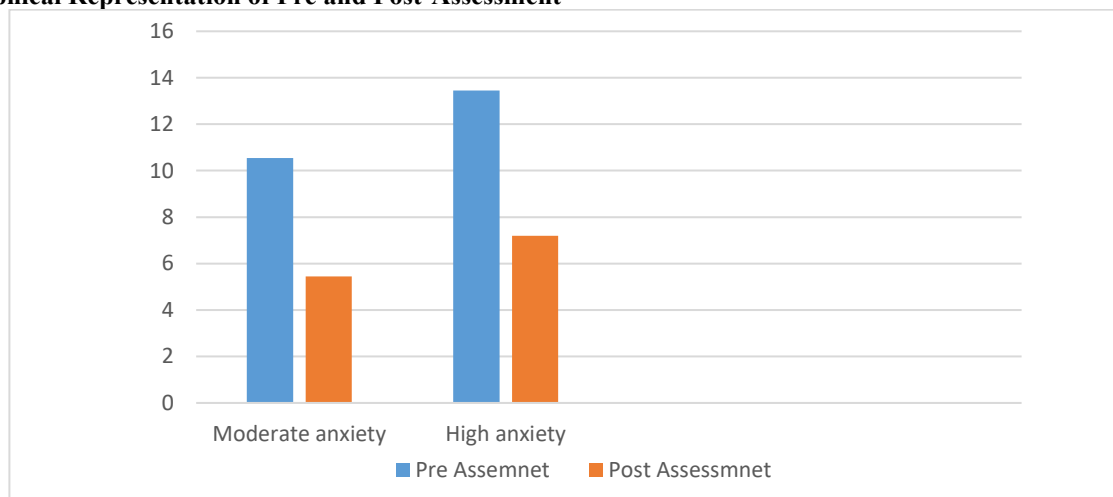


Fig 5: Showing pre and post-assessment results of moderate and high levels of anxiety

DISCUSSION

Dental phobia is a strong negative emotional response associated with Oral treatment. The reported Occurrence rate of dental phobia in children and adolescents is approximately 24%, making it an issue that warrants increased clinical attention and research³⁰. Dental phobia is associated with serious psychosocial repercussions, negatively affecting the general health of an individual and overall quality of life. Individuals with dental phobia tend to exhibit maladaptive and distorted cognitions, negative appraisal of past experiences and dental procedures, all of which contribute to the exaggerated perception of pain, leading to heightened arousal, intense dental phobia and avoidance of dental treatment³¹.

Dental phobia is best understood as the dynamic interaction of cognitive, emotional, and environmental factors. Consequently, the management in clinical dentistry should include a broad spectrum of behavioral and psychological strategies to the adjunct pharmacological line of treatment³². Furthermore, collaborative models, evidence-based treatment and care plans are required to tailor the cultural and socio-economic determinants of dental phobia to improve patients' outcomes. Therefore, the aim of the current research was to provide evidence-based cognitive intervention to reduce dental phobia in adults³³.

The findings of the current research demonstrated that CBT is effective intervention in reducing dental phobia. A systematic review reported that CBT techniques, e.g., positive self-talk, coping strategies, relaxation training, and psychological education, were significantly effective in reducing dental phobia. The review further indicated that a few sessions of CBT improved patient compliance with treatment, suggesting CBT-based intervention could be integrated into the general practice of dentistry. Similarly, in another study, the results reported that CBT and EMDR interventions have been found to be most effective in reducing high levels of dental phobia³⁴. Cognitively oriented approaches, i.e., cognitive restructuring, and behaviorally oriented approaches, i.e., one-session and five-session exposure, progressive muscular relaxation, and stress inoculation training, showed a moderate effect in uncertainty avoidance and dental phobia. Several randomized controlled trials have also demonstrated that cognitive and behavioral interventions alongside pharmacological treatment are effective in reducing dental phobia and improving treatment outcomes for patients³⁵.

In addition to cognitive behavior therapy, another set of behavioral management techniques has been widely accepted for the treatment of dental phobia, including reinforcement and positive feedback that encourages patients to cope with the stressful situation. Furthermore, relaxation and breathing techniques were found to be useful in reducing dental phobia. The systematic review of several research studies has shown that relaxed breathing has efficacy in reducing pain and negative feelings associated with dental injection. Likewise, the progressive muscular relaxation technique is considered a standardized procedure developed to treat dental phobia. Studies have also suggested that session environment, cooler temperature, vibroacoustic adorned walls, and lighting effects can contribute to lowering dental anxiety in patients² (Steenen et al., 2024).

A systematic analysis synthesizes the evidence from 19 non-randomized trials and 21 randomized controlled trials to demonstrate the efficacy of cognitive and behavioral interventions from the wide array of interventions for dental

anxiety. These interventions were divided into two categories based on their targeted outcome. Strategies such as aromatherapy, patient education about the dental treatment, coping skills, creating a comfortable environment, and relaxation techniques reduce mild forms of dental anxiety³⁶. Whereas gradual in vivo exposure, a set of cognitive therapy techniques and eye movement desensitization (EMDR) therapy were effective in reducing moderate to severe levels of dental phobia³⁷.

From the above-mentioned discussion, it is evident that the results of the research supported the fact that CBT is an effective technique in reducing dental phobia. It is therefore recommended that these techniques should be integrated into clinical dentistry to improve well-being, treatment adherence and overall dental care experiences of the patients.

CONCLUSION

The present study demonstrates the effectiveness of cognitive behavioral intervention in reducing dental phobia among individuals with moderate to severe levels of dental phobia. These findings highlight the significance of early intervention in addressing the psychosocial factors that contribute to dental phobia. It enables patients to modify their maladaptive thoughts, promoting adaptive coping strategies, through incorporating behavioral strategies such as relaxation training, gradual exposure, and cognitive strategies to improve treatment compliance and willingness to undergo dental treatment. The findings of the research are consistent with previous research studies that cognitive behavioral strategies are effective in the treatment of dental phobia. Collectively, the evidence supports the integration of CBT-based intervention into routine dental practice by providing comprehensive patient-centered care to improve overall health care outcomes for the patients.

Implication for Clinical dental practice

The findings of the current research highlight the significance of incorporating cognitive behavioral therapy into the practice of clinical dentistry. Early identification and assessment of patients experiencing dental phobia could help practitioners in taking preventative measures and timely management of dental phobia. The integration of CBT-based interventions also helps in improving compliance with treatment and improving overall quality of life. The implementation of these techniques in the dental setting may strengthen the doctor-patient relationship, reduce treatment avoidance, and thereby reduce the fear of dental procedures. Furthermore, training of dental professionals in CBT-based techniques can improve the quality and efficacy of dental practice.

Limitation of the study

The present study has observed a few limitations that should be taken into consideration: Firstly, the study was limited to a specific geographical area, limiting the generalizability of results to other populations and settings. Secondly, the efficacy of the intervention was assessed over a relatively short period of time; the long-term effect of CBT in reducing dental phobia was not assessed over the period. Additionally, personality traits, previous traumas and dental experience, etc. were not assessed in detail. Therefore, the findings of the results should be assessed and interpreted within the context of these limitations.

Recommendations

The following recommendations were made for future research and clinical practice: follow-up treatment sessions should be conducted to determine the long-term effectiveness of CBT. To improve the generalizability of research, studies should be carried out on diverse samples and socio-economic backgrounds. Furthermore, future studies should be carried out to find out the effectiveness of CBT with other interventions such as Eye Movement Desensitization and Reprocessing (EMDR), mindfulness-based intervention, and exposure therapy to identify the effective treatment approaches in reducing dental phobia. Additionally, specialized training should be provided to dental practitioners in CBT to improve overall patient care and dental health outcomes.

REFERENCES

1. Wong HM, Humphris GM, Lee GTR. Preliminary validation and reliability of the Modified Child Dental Anxiety Scale. *Psychol Rep.* 1998;83(3 Pt 2):1179-1186. doi:10.2466/PRO.1998.83.7.1179-1186.
2. Steenen SA, Linke F, van Westrhenen R, de Jongh A. Interventions to reduce adult state anxiety, dental trait anxiety, and dental phobia: a systematic review and meta-analyses of randomized controlled trials. *J Anxiety Disord.* 2024;105:102891. doi:10.1016/j.janxdis.2024.102891.
3. Mitincu-Caramfil SD, Drima E, Pascu LS, Moroianu LA, Gherghiceanu F. The relationship between alcohol consumption and depression: an analysis of secondary affections and therapeutic interventions. *J Mind Med Sci.* 2025;12:24. doi:10.3390/jmms12010024.
4. Moroianu LA, Curis C, Moroianu M, Stefanescu C, Ciubara A. Optimism as a resource and form of manifesting positive affectiveness in the elderly and young adults pre-pandemic vs. pandemic—comparative study. *BRAIN Broad Res Artif Intell Neurosci.* 2024;15:55-67. doi:10.18662/brain/15.1/549.

5. Perić R, Tadin A. Associations between dental anxiety levels, self-reported oral health, previous unpleasant dental experiences, and behavioural reactions in dental settings: an adult e-survey. *Medicina (Kaunas)*. 2024;60:1303. doi:10.3390/medicina60081303.
6. Farzanegan P, Ghasempour M, Massoodi A, Shirafkan H. Correlation between child's dental fear and anxiety symptoms and evaluating factors associated with dental fear. *Health Sci Rep*. 2025;8(5):e70879. doi:10.1002/hsr2.70879.
7. Hong F, Chen P, Yu X, Zeng J. Prevalence of dental anxiety among adults in China: a meta-analysis. *Hua Xi Kou Qiang Yi Xue Za Zhi*. 2023;41(1):88-98. doi:10.7518/hxkq.2023.01.012.
8. Winkler C, Bjelopavlovic M, Lehmann KM, Petrowski K, Irmscher L, Berth H. Impact of dental anxiety on dental care routine and oral-health-related quality of life in a German adult population: a cross-sectional study. *J Clin Med*. 2023;12(16):5291. doi:10.3390/jcm12165291.
9. Muneer MU, Ismail F, Munir N, Shakoor A, Das G, Ahmed AR, et al. Dental anxiety and influencing factors in adults. *Healthcare (Basel)*. 2022;10(12):2352. doi:10.3390/healthcare10122352.
10. Alsakr A, Gufran K, Alqahtani AS, Alkharaan H, Abushanan A, Alnufaiy B, et al. Pre-treatment and post-treatment dental anxiety in patients visiting intern dental clinic. *Medicina (Kaunas)*. 2023;59(7):1284. doi:10.3390/medicina59071284.
11. Özhayat EB. Influence of self-esteem and negative affectivity on oral health-related quality of life in patients with partial tooth loss. *Community Dent Oral Epidemiol*. 2013;41(5):466-472. doi:10.1111/cdoe.12036.
12. Xiang Q, Pei Y, Wang K, Han S, Wu B. Social isolation, loneliness and accelerated tooth loss among Chinese older adults: a longitudinal study. *Community Dent Oral Epidemiol*. 2023;51(2):201-210. doi:10.1111/cdoe.12727.
13. Dahl KE, Calogiuri G, Jönsson B. Perceived oral health and its association with symptoms of psychological distress, oral status and socio-demographic characteristics among elderly in Norway. *BMC Oral Health*. 2018;18:93. doi:10.1186/s12903-018-0556-9.
14. Anssen DF. On the different species of 'phobia' and 'on the different species of mania' (1786): from popular furies to mental disorders in America. *Med Humanit*. 2021;47(3):365-374. doi:10.1136/medhum-2020-011970.
15. Hassan BH, Abd El Moniem MM, Dawood SS, Alsultan AA, Abdelhafez AI, Elsakhly NM. Dental anxiety and oral-health-related quality of life among rural community-dwelling older adults. *Int J Environ Res Public Health*. 2022;19:7643. doi:10.3390/ijerph19137643.
16. Boman UW, Carlsson V, Westin M, Hakeberg M. Psychological treatment of dental anxiety among adults: a systematic review. *Eur J Oral Sci*. 2013;121(3 Pt 2):225-234. doi:10.1111/eos.12052.
17. Shahnava S, Hedman E, Grindefjord M, Reuterskiöld L, Dahllöf G. Cognitive behavioral therapy for children with dental anxiety: a randomized controlled trial. *JDR Clin Trans Res*. 2016;1(3):234-243. doi:10.1177/2380084416664333.
18. Shafakhah M, Behzadi S. Impact of educational videos on dental anxiety and fear in patients undergoing root canal treatment in Shiraz, Iran. *J Clin Basic Res*. 2021;5(3):45-51.
19. AlSwayyed T, AlGazlan A, AlAjaji S, AlAbdullatif S, AlShanqeety O. The impact of educational intervention on dental anxiety in patients undergoing non-surgical endodontic procedures: a randomized experimental study. *Int J Dent Oral Health*. 2017;3(10):128-133.
20. Marcenes W, Kassebaum NJ, Bernabé E, Flaxman A, Naghavi M, Lopez A. Global burden of oral conditions in 1990-2010: a systematic analysis. *J Dent Res*. 2013;92(7):592-597. doi:10.1177/0022034513490168.
21. Dawani N, Nisar N, Khan N, Syed S, Tanweer N. Prevalence and factors related to dental caries among pre-school children of Saddar Town, Karachi, Pakistan: a cross-sectional study. *BMC Oral Health*. 2012;12:59. doi:10.1186/1472-6831-12-59.
22. Faisal S, Zehra N, Hussain M, Jaliawala HA, Faisal A. Dental anxiety among patients attending public and private dental hospitals of Karachi. *J Pak Dent Assoc*. 2015;24(1).
23. Waheed Z, Imran M, Liaqat F, Aziz M, Butt H, Khan SA. The efficacy of aroma and music therapy to reduce dental anxiety and pain intensity. *Pak J Med Health Sci*. 2022;16(4):1110-1112.
24. Hodge DR, Nadir A. Moving toward culturally competent practice with Muslims: modifying cognitive therapy with Islamic tenets. *Soc Work*. 2008;53(1):31-41. doi:10.1093/sw/53.1.31.
25. Armfield JM. Towards a better understanding of dental anxiety and fear: cognition vs. experiences. *Eur J Oral Sci*. 2010;118(3):259-264. doi:10.1111/j.1600-0722.2010.00740.x.
26. Beck AT. *Cognitive therapy and the emotional disorders*. New York: International Universities Press; 1976.
27. Clark DA, Beck AT. *Cognitive therapy of anxiety disorders: a practice manual and conceptual guide*. New York: Guilford Press; 2010.

28. Shadish WR, Cook TD, Campbell DT. *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin; 2002.
29. Palinkas LA, Horwitz SM, Green CA, Wisdom JP, Duan N, Hoagwood K. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Ment Health Ment Health Serv Res*. 2015;42:533-544. doi:10.1007/s10488-013-0528-y.
30. Choi J, Price J, Ryder S, Siskind D, Solmi M, Kisely S. Prevalence of dental disorders among people with mental illness: an umbrella review. *Aust N Z J Psychiatry*. 2022;56(8):949-963. doi:10.1177/00048674211025635.
31. Turner E, Berry K, Aggarwal VR, Quinlivan L, Villanueva T, Palmier-Claus J. Oral health self-care behaviours in serious mental illness: a systematic review and meta-analysis. *Acta Psychiatr Scand*. 2022;145(1):29-41. doi:10.1111/acps.13375.
32. Bjørkvik J, Quintero DPH, Vika ME, Nielsen GH, Virtanen JI. Barriers and facilitators for dental care among patients with severe or long-term mental illness. *Scand J Caring Sci*. 2022;36(1):27-35. doi:10.1111/scs.12935.
33. Høyvik AC, Willumsen T, Lie B, Hilden PK. The torture victim and the dentist: the social and material dynamics of trauma re-experiencing triggered by dental visits. *J Rehabil Torture Vict Prev Torture*. 2021;31(3):70-83. doi:10.7146/jrtp.v31i3.125703.
34. Fredriksen TV, Søftestad S, Kranstad V, Willumsen T. Preparing for attack and recovering from battle: understanding child sexual abuse survivors' experiences of dental treatment. *Community Dent Oral Epidemiol*. 2020;48(4):317-327. doi:10.1111/cdoe.12512.
35. Lu C, Zhang YY, Xiang B, Peng SM, Gu M, Wong HM. Management of fear and anxiety in dental treatments: a systematic review and meta-analysis of randomized controlled trials. *Odontology*. 2023;111(1):20-32. doi:10.1007/s10266-022-00711-x.
36. Wolf TG, Schläppi S, Benz CI, Campus G. Efficacy of hypnosis on dental anxiety and phobia: a systematic review and meta-analysis. *Brain Sci*. 2022;12(5):521. doi:10.3390/brainsci12050521.
37. Doering S, Ohlmeier MC, de Jongh A, Hofmann A, Bisping V. Efficacy of a trauma-focused treatment approach for dental phobia: a randomized clinical trial. *Eur J Oral Sci*. 2013;121(6):584-593. doi:10.1111/eos.12090.