Journal of
Research in Psychopathology
https://doi.org/10.22098/jrp.2024.14266.1216

2024; Vol. 5, No. 17
Pages: 1 - 8

Original Article

Maternal influences on pediatric dental anxiety: Exploring the link between mothers' mental health, self-esteem, and children's fear and anxiety during dental treatments

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Abstract

Children's fear and anxiety associated with dental treatment have been identified as important factors impacting their oral health and compliance with treatment. Although many studies have focused on individual factors influencing a child's experience, the role of parental well-being, particularly maternal, is under-explored. The mental health and self-esteem of mothers can influence their child's emotional and behavioral response to dental treatment, given the close emotional interaction between children and their primary caregivers. This study aimed at investigating mothers' mental health and self-esteem and children's fear and anxiety during dental treatment. This is descriptive/correlational research. The population included all mothers who took their children to dentistry centers in districts 4,12, and 14 in Tehran in 2022. The current study was conducted on 120 mothers and children who visited medical centers for dental treatment using a random cluster sampling. GHO questionnaire, Eysenck's Personality Questionnaire, and Children's Dental Fear Test were used. To answer the research hypotheses, multiple regression and Pearson correlation coefficient were used. The results from multiple regression and Pearson correlation coefficient indicated that the relationship between mothers' anxiety, depression, and self-esteem and the criterion variable (dental fear) was 0.41. The findings showed that a mother's mental health and self-esteem play an effective role in children's anxiety and fear during dental treatment. Therefore, by using the necessary mechanisms to improve mothers' mental health and self-esteem, we can hope for improving children's oral health.

Keywords

Mental health
Mothers
Self-esteem
Fear
Anxiety
Dental treatment

Received: 2023/12/20
Accepted: 2024/04/27
Available Online: 2024/08/15

Introduction

Visiting health care centers, especially dentistry centers makes some individuals anxious, which can result in not following up on dental treatment. Anxiety associated with referring to dentistry centers has been stated as the fifth most prevalent reason for anxiety. Dental anxiety is defined as an emotional reaction to a perceived threat or danger in a dental situation (Janković et al., 2014). The prevalence of dental anxiety varies from %10 to %20 among children and adolescents (Safari et al., 2018). It seems that dental anxiety starts during childhood and becomes severe with age. This is a challenging issue because it affects both patient's family and the dentist (Shim et al., 2015). When children with dental fear visit a dentistry center, it causes behavioral challenges for the dentist and they may ask the dentist to change his/her therapeutic methods (Tollili et al., 2020). In recent years, there has been a growing interest in underpinning the psychological barriers involved in oral preventive health care. Studies demonstrate that lower dental fear in children and adolescents is associated with improved oral health states (Wong et al., 2020). Since it usually happens during childhood and adolescence, recognizing the reasons for such negative reactions in children is of high importance because cooperation during dental treatment is a determinant of successful treatment (Cote & Wilson, 2016; Hagqvist et al., 2015; Porritt et al., 2012). Children's fear is affected by adults' behavior (Yousefi & Piri, 2017).

Based on recent studies, parents' dental anxiety affects children's dental anxiety. Dental anxiety is higher in

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women than men (Humphris et al., 2013). Accordingly, mothers' mental health and other related psychological factors have been paid attention more by researchers. For instance, mothers' negative attitudes toward dental health are associated with untreated dental therapeutic needs (Khalid et al., 2022). Mothers' psychological attachment has been investigated, too. When dental care services are available for parents but they fail to use such services, it can be said the attachment styles affect parents' behavior during the therapeutic procedure (Beaven et al., 2022). Studies show that parents' anxiety and depression increase children's fear of dental care (Esa et al., 2020). In another research, it is said there was a strong positive association between maternal dental anxiety and children's dental experiences (Khawja et al., 2015).

It should be noted that dental anxiety during childhood is a dynamic phenomenon. It does not have a specific reason (Murad et al., 2020). Some reasons can be a parent-child relationship, parents' anxiety, parents' previous dental experience, parental presence or absence in the dental office, parents' perception, child's age, gender, mental growth, previous experience, and parents' personality (Kyritsi et al., 2009). When mothers are not mentally healthy, it causes negative emotions toward dental treatment. Mothers' behavior and their psychological states have a considerable effect on manifesting emotional states in children and their ability to be compatible with different situations (Wu & Gao, 2018). However, the results of studies on the effect of parents' behavior on children's dental anxiety are different. Some studies confirm the effect of maternal fear on children's dental anxiety (Wong et al., 2020). But there is not a direct relationship between other features such as mothers' emotional maturation and children's dental anxiety (Maljaei et al., 2019). Also among university students self-esteem is inversely related to cyberchondria and illness anxiety (Ahmadi & Babaei Aqje Kohl, 2024).

Mothers' self-esteem is another significant factor that should be considered because it seems it causes fear and anxiety in children. Recent studies show that mothers' self-esteem and self-worth can be effective factors in children's psychological features (Koparkar et al., 2022). Studies done in developed countries show that parents' self-efficacy and self-confidence are important factors in children's mental health. High self-esteem and social competence result in appropriate parenting (Fathi et al., 2018). A mother's self-esteem has a significant role in the way a child's anxiety is managed. When mothers believe in their abilities to manage stressful situations, it increases their function in critical and specific situations (Reyhani et al., 2017).

Since fear and anxiety have some consequences for the patient and the dentist, they can influence dental attendance and cause problems such as pain, abscess, losing primary teeth, and other similar problems (Klingberg & Broberg, 2007; Stein Duker et al., 2022). Maternal and child fear and anxiety during the therapeutic procedure can lead to an irregular referral for treatment or not visiting the dentist, consequently, therapeutic costs increase (THEMESSL-HUBER et al., 2010). Poor oral hygiene in children affects their physical growth, weight, self-esteem, social life, and academic achievement negatively (Moore et al., 2004; THEMESSL-HUBER et al., 2010).

Children's dental problems have wider consequences for parents and other family members. For instance, mothers' anxiety increases by increasing children's dental problems thus due to obsessive thoughts mothers are not able to make a decision properly (Esa et al., 2020). Also in other areas, research shows mothers of hyperactive children showed significantly higher levels of interpersonal sensitivity, depression, and anxiety compared to mothers of normal children (Narimani et al., 2023). This can have a reverse effect on mothers' and child's mental health and overshadow other aspects of their life.

By reviewing studies on the association between a mother's psychological feature and a child's dental fear, different results were found. For instance, in a study done in Hong Kong in 2018 on children aged 9-13 years old, it was found that parental dental anxiety and parenting style do not affect children's dental anxiety (Wu & Gao, 2018). In a study on the effect of different psychological factors on child dental anxiety, it was found that family distress factors did not correlate with child dental anxiety (Kroniņa et al., 2017). In a study done in Saudi Arabia (Alhareky et al., 2021), it was found that there is a significant correlation between maternal dental anxiety and untreated decay in the primary teeth.

Considering the above-mentioned findings, anxiety is a fundamental and pervasive human emotion, more so when individuals face stressful situations that are associated with pain or discomfort, such as dental treatments. For children, such experiences can be deeply intimidating and, in many cases, can cause long-term fear or anxiety about dental procedures. It is estimated that 9-20% of children have pronounced dental anxiety, which can occur through avoidance of dental care, which can lead to an increase in oral health problems.

Furthermore, children's emotions and reactions to these procedures are not isolated. The psychological well-being of parents, particularly mothers, can have a significant impact on the child's emotional and behavioural response to stress factors. Maternal mental health and self-esteem, then, play a crucial role in the child's perception of potentially stressful events, such as dental treatment. This reciprocal relationship underscores the importance of considering not only the individual factors of the child, but also the family and psychosocial context in which the child is integrated.

Research indicates that mothers with better self-esteem and mental health are better able to provide emotional support and insurance to their children in potentially difficult situations. Conversely, mothers who have mental health problems or reduced self-esteem can inadvertently contribute to their child's increased anxiety. Because children often reflect their parents' attitudes and emotional reactions.

Despite its plausibility, the literature exploring the direct relationship between the mental health and self-esteem of mothers and the fear and anxiety of children during dental treatment remains sparse. A deeper understanding of this relationship is essential for implementing more comprehensive intervention strategies, considering not only the child but also the family environment. Such strategies could potentially ameliorate children's anxiety towards dental treatments, enhance their oral health, and improve overall family well-being.

This study examines the relationship between the mental health and self-esteem of mothers and the fear and anxiety of their children during dental treatment. By shedding light on this connection, we aim to contribute to a holistic approach to pediatric dental care that addresses both the child's and their mother's psychological wellbeing.

Method

Participants

This is a correlational research using regression analysis. The population includes all children less than 7 years old and their mothers who visited dentistry and health care centers in East Tehran. There are not certain statistics for the research population, but based on the researcher's estimation there are more than 40 dentistry and health care centers in districts 4, 12, and 14 in Tehran. The number of sample was considered based on Stevenson's rule. Based on James Stevenson's suggestion, considering 15 items in multiple regression analysis using the least standard squares for each variable is a good approximate. There are 6 variables in the study (4 subscales in mental health, 1 variable for self-esteem, and 1 variable for children fear), thus at least 120 samples are necessary for the research. The sample was selected using random cluster sampling. First, different regions in districts 4, 12, and 14 were identified, one region in each district was selected, then among dentistry and health care centers 2-4 centers were selected The clinics involved were Dr. Majid Mehran Clinic and Dr. Fahimi Clinic, Hazrat Rasool Clinic and Shahed Dental Clinic.

After that, the questionnaires were distributed among mothers. It should be noted that the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS) was completed with the help of mothers. The inclusion criteria of the study were the consent of mothers who visited a dental center, their cooperation to complete the questionnaires, and children who needed several therapeutic sessions for dental treatment. Furthermore, several demographic and social traits were considered crucial for the inclusion criterion. The study specifically targeted children between the age range of 4 to 12 years. The mothers had a minimum educational attainment of a diploma. All participants possessed a high level of fluency in the Persian language, which guaranteed effective communication and comprehension of the questionnaires and consent forms. The exclusion criteria were all children who cannot be treated as outpatients due to their underlying diseases (severe intellectual disability and refractory diseases. Licensed healthcare professionals provided medical records to confirm these conditions, ensuring that all participants were suitable for the dental treatments planned in this study.).

To ensure the dignity, rights, and welfare of all participants were protected, we strictly followed ethical guidelines during this study. All participants provided informed consent, with the study's objectives, methods, potential dangers, and advantages explicitly explained and recorded. Confidentiality and privacy of participants were rigorously upheld by employing anonymization techniques and implementing secure protocols for data management. Transparency, accountability, cultural sensitivity, and inclusivity were key ethical considerations integrated throughout the study, from design to dissemination.

Instrument

The Children's Fear Survey Schedule-Dental Subscale (CFSS-DS):

The most frequently used measuring instrument for the determination of dental fear and anxiety in children is CFSS-DS. For the first time, it was designed in 1968. Then it was revised by Cuthbert and Melamed in 1982. It was translated into different languages such as Japanese, Latin, and Chinese (Beena, 2013). This questionnaire has high accuracy to measure children's dental fear because most dental situations have been stated in it. It also has high reliability, it can be used for children of different ages. The Persian version of this instrument has been produced by Safari et al. (2018). This questionnaire contains 15 items that measure fear of environmental and psychological elements in a dental office. Items were ranged by the Likert scale from 1 to 5 (1 not afraid, 5 very afraid). Its content validity was confirmed by interviewing some dentists and psychologists. Accordingly, CVR was calculated that was higher than 0.60. The Cronbach's alpha coefficient was 0.80 which was desirable. The Kappa coefficient was high for all items.

Furthermore, in the current study, the difference between dental fear in different groups was investigated that confirmed the construct validity of the instrument (Beena, 2013).

The General Health Questionnaire-28 (GHQ-28):

GHQ-28 is a multiple test that measures mental disorders in different situations. It was developed by Goldberg using a clinical interview with 200 patients in surgical wards in England. He concluded that more than %90 of the sample was categorized as patient and healthy subjects. The main questionnaire consists of 60 items. In the studies, short forms including 30-item, 28-item, and 12-item are used. 28-item version was used in the current study. This questionnaire includes 4 subtests including somatic symptoms (questions 1-7), anxiety

and insomnia (questions 8-14), social dysfunction (questions 15-21), severe depression (questions 22-28). Questions of the general questionnaire include 4 options. There are two scoring systems: the first method is (1,1,0,0), and the minimum score and the maximum score are between 0 and 28, respectively. In the second method, the Likert scale (0,1,2,3) was used, the minimum score is 0 and the maximum score is 84. In both methods, lower GHQ-28 scores indicate a lower level of distress (Gibbons et al., 2004). The validity of this questionnaire had been desirable in several studies. The Cronbach's alpha coefficient is 87% (Montazeri et al., 2003).

Eysenck's Personality Questionnaire:

Eysenck's Personality Questionnaire which is used widely and has been conceptualized as a single-factor scale that measures two dimensions of personality: Introversion and Extroversion (Rosenberg, 1965). It consists of 5 positive and 5 negative sentences. In this questionnaire, the participants are asked to read sentences carefully and choose the best option that is true about them. The Likert scale was used for scoring. In positive sentences strongly agree has a score of 3, agree score of 2, disagree score of 1, and strongly disagree score of 0. In negative sentences, the scores are the opposite. A total score of 10-19 shows low self-esteem, 20-29 shows medium self-esteem, and 31-40 shows high self-esteem. The Cronbach's alpha coefficient is 0.88 which shows its high reliability (Rosenberg, 1965). Using the Split-Half method, its reliability is 0.87 (Hormozi Nezhad et al., 2000).

Procedure

Descriptive statistics such as mean and standard deviation of scores were used for data analysis. Inferential statistics, including Pearson correlation and multiple regression analysis, were employed to test the hypotheses. The statistical analyses were conducted using SPSS software version 25.

Results

To ensure a thorough analysis, the sample population's demographic composition was meticulously recorded. There were 120 participants in the sample, with 54.2% being females (n=65) and 45.8% being males (n=55), creating a balanced gender representation. Regarding educational attainment among the participants, 17.5% (n=21) possessed a high school diploma, 55.0% (n=66) had completed tertiary education at the associate or bachelor level, and 27.5% (n=33) held advanced degrees, at the master's level or higher. This diverse educational background enabled a nuanced examination of the impacts of maternal education on pediatric dental anxiety within various educational contexts.

The Kolmogorov-Smirnov test was utilized to examine the normality of the distribution of the variables. As depicted in Table 1, the K-S values were found to be insignificant ($p > 0.05$) for all variables, indicating that the distribution of the sample group does not significantly differ from a normal distribution. Thus, it was appropriate to use parametric statistics for the analysis of the variables.

Table 1. K-S test (the normality of the distribution of the variables)

Variables	K-S value	Significance level	Mean	Standard Deviation
Dental fear	0.54	0.36	3.2	0.5
Somatic symptoms	0.84	0.21	2.8	0.6
Anxiety	0.95	0.17	3.5	0.4
Social dysfunction	0.81	0.23	2.9	0.7
Depression	0.19	0.55	3.1	0.5
Self-esteem	0.71	0.29	3.4	0.6

Table 2. Correlation Between Maternal Mental Health and Pediatric Dental Anxiety

Component	Physical Symptoms	Anxiety	Social Functioning Impairment	Depression
Physical Symptoms	-0.12	0.42	0.07	0.25
Anxiety		0.18	0.58	0.001
Social Functioning Impairment			-	0.06
Depression				0.25

Table 2 shows that the correlation between maternal anxiety and depression and pediatric dental fear is statistically significant at the P<unk>0.01 level. However, the relationship between maternal physical symptoms and social functioning impairment and child fear is not significant. The correlation coefficient for anxiety is 0.42, with a coefficient of determination of 0.18, which indicates that 18% of the variance in child fear scores can be predicted from maternal anxiety. The correlation for depression is 0.25, with a determination coefficient of 0.06, suggesting that 6% of the variance in child fear scores is predictable from maternal depression. These statistical results demonstrate a direct relationship between maternal mental health and children's fear:

Table 3. Correlation Between Maternal Self-Esteem and Pediatric Dental Anxiety

Correlation Coefficient (R)	Significance Level (Sig)	Coefficient of Determination (R^2)
-0.32	0.001	0.10

As shown in Table 3, the correlation between maternal self-esteem and pediatric dental anxiety is -0.32, which is significant at the P≤0.01 level. This inverse and significant relationship indicates that an increase in maternal self-esteem is associated with a decrease in child's fear of dental care. The coefficient of determination is 0.10, which means that 10% of the variance in the child's fear scores can be predicted by maternal self-esteem. According to the statistical findings, there is a direct correlation between increased maternal self-esteem and reduced fear and anxiety in children during dental treatments.

A multiple regression analysis was conducted to predict a child's dental fear based on the mother's mental health (anxiety and depression) and self-esteem. Social dysfunction and somatic symptoms were found to lack a significant relationship with dental fear and were thus not incorporated into the regression model. Table 4 presents the regression coefficients of the predictors for dental fear.

Table 4. The regression coefficient of predictors of dental fear

Independent variable	B value	Beta	t value	Significance level
Anxiety	0.81	0.38	6.18	0.0001
Depression	0.51	0.18	4.11	0.0001
Self-esteem	-0.98	-0.27	-5.74	0.0001
R2= 0.17	R=0.41	F=12.81	Significance level F= 0.0001	

The correlation coefficient (R=0.41) indicates a moderate correlation between a mother's anxiety, depression, and self-esteem, and the dependent variable, children's dental fear. The F-value is significant ($p < 0.01$), suggesting that changes in the dependent variable scores can be predicted by these independent variables.

Moreover, the coefficient of determination (R2 = 0.17) suggests that these three independent variables (anxiety, depression, and self-esteem) account for 17% of the variance in dental fear.

Analysis of individual beta values revealed that the mothers' anxiety had the most substantial effect on children's dental fear (Beta = 0.38), indicating that a one-standard deviation increase in the mother's anxiety level is associated with a proportional increase in the child's dental fear. Similarly, an increase in the mother's depression was associated with a rise in the child's dental fear (Beta = 0.18).

Contrarily, an increase in the mother's self-esteem was associated with a decrease in the child's dental fear (Beta = -0.27). In essence, for every standard score increase in a mother's self-esteem, the child's dental fear reduces by 0.27 standard score.

In summary, the study found a direct correlation between mothers' anxiety, depression, and self-esteem, and children's dental fear and anxiety during dental treatment. These findings suggest that a mother's mental health and self-esteem play a role in influencing a child's dental fear, with potential implications for children's oral health.

Discussion

This study focused on the relationship between the mental health and self-esteem of mothers and the fear and anxiety of their children during dental treatment. The findings are in addition to the growing body of literature that suggests that the psychological well-being of mothers can significantly influence children's emotional response to potentially stressful events, such as dental procedures. The results of the study should be interpreted in the wider context of previous research showing a strong correlation between parent and child dental anxiety. Our findings further expand this area by specifically examining the role of maternal mental health and self-esteem, offering a more nuanced understanding of the complex dynamics involved.

A key observation from our study is the significant correlation between poorer maternal mental health and higher levels of dental fear and anxiety in children. This echoes previous research that suggests children of parents with mental health disorders are at an increased risk of anxiety disorders, and extends it to the specific context of dental treatment. As well, low self-esteem among mothers was associated with increased fear and anxiety among children during dental procedures.

The findings of the current study are in line with the findings of (Esa et al., 2020; Kroniņa et al., 2017; Murali & Shanmugam, 2017; Wong et al., 2020). Esa et al. (2020) investigated a large sample of preschool children to determine the association between maternal and child dental anxiety during dental treatment. The results showed mothers who are more anxious cause their children to be anxious during dental treatment. It leads to dental caries and oral problems in children.

Different factors including family-related factors are effective on children's emotional states. There is a significant difference between a child who is brought up in a favorable condition than a child in a stressful condition. Family behaviors can increase or decrease undesirable traits in children (Nasimi et al., 2022). As one of the important family factors, parents' behaviors can affect children's emotional states. Different researchers believe that in the first five years of children's lives, parents' behavior is of high importance and it has been proved that children's first relationships are significant in creating their emotional, social, and cognitive abilities (Mahmoodi & Jafari, 2020).

Esa et al. (2020) believe that the relationship between

maternal dental anxiety and a child's dental fear is of high importance because it affects a child's daily activities, social-mental health, and family function. In their study, there was a significant association between mothers' anxiety and their children's oral health. Mothers who have low mental health and suffer from problems such as anxiety and depression usually have obsessive thoughts about dental treatment, they evaluate the possibility of problems in dental treatment at a high level that causes emotional tension (for instance, anxiety and fear). Furthermore, it can lead to do annoying activities (Bresler, 2020).

The findings of the current study are not in line with the findings of the study done by Goettems et al (2011). They reported that dental anxiety makes mothers distressed. This difference can be a result of cultural and geographical diversity between the two samples in these two studies. In their study, Goettems et al. Evaluated mothers' dental anxiety and anxiety in children aged 2-5. Based on a study, there is a relationship between parents' dental anxiety and the quality of oral health in preschool children (Goettems et al., 2011; Murali & Shanmugam, 2017).

On one side, mothers with high levels of self-esteem believe in their abilities and capacities in a special situation. Based on Bandura, self-efficacy refers to an individual's belief in his/her capacity to execute behaviors necessary to produce specific performance and the ability to control activities. Self-esteem and perceived self-efficacy not only cause individuals to take more effective measures, but it improves individuals' trust in their abilities to do next activities in similar and dissimilar conditions. Self-esteem causes individuals experience a higher degree of self-regulation in thoughts, emotions, and behaviour. Consequently, resiliency is increased in tough situations (Ayyash-Abdo et al., 2016). Mothers with high self-esteem have a desirable attitude toward their abilities, this positive attitude can reduce stress in new and critical situations (Wong et al., 2020). Self-worthiness based on self-evaluation and self-efficacy are two fundamental components of self-esteem that can lead to a desirable function in different situations (Mohammadzadeh et al., 2018). Mothers with low self-esteem do not believe in their abilities to manage challenges during treatment, which causes them to be stressed in critical conditions (Reyhani et al., 2017). Perhaps, due to this stress, they avoid facing challenging situations.

To explain the results obtained, it is important to note that the relationship between mother and child is very important. It is obvious that this relationship can affect a child's personality and behavioural features directly and indirectly. Thus, different studies show that any positive and negative feature can affect family members, especially children. The relationship between maternal anxiety and children's dental fear is important because its direct effects on children can be observed. Due to the mother's growing anxiety, the child's oral health decreases. In addition, mothers with poor mental health (anxiety and depression) usually have obsessive thoughts, and their negative predictions about possible dangers during treatment affect their children negatively.

In this study, the findings suggest that this influence may help predict a child's fear during dental treatment. Since dentistry environments are usually accompanied by fear and anxiety, the current study confirms a direct relationship between mothers' and children's features.

Conclusion

In conclusion, this research supports the notion that mothers' mental health and self-esteem significantly influence their children's fear and anxiety during dental treatment. The findings highlight the substantial impact of the mother's psychological landscape on children's emotional reactions to potentially stressful situations.

This study's results suggest that to effectively address and manage children's dental fear and anxiety, a more holistic approach is needed, one that extends beyond the child to encompass the broader familial and psychosocial context. Therefore, interventions should not only target the child, but also provide adequate psychological support to parents, in particular the mother, as an integral part of comprehensive paediatric dental care.

The potential implications of these findings are important as they can inform the development of new intervention strategies to improve children's oral health outcomes and their relationship with dentistry. It can lead to a shift from a primarily child-centered approach to an approach that considers the entire family unit's psychological wellbeing. Future research should explore the mechanisms underlying the impact of maternal mental health and self-esteem on children's dental fear and anxiety. Furthermore, exploring the role of other caregivers and their families may provide a better understanding of this dynamic. By shedding light on this complex relationship, our study contributes to the growing body of research advocating for a comprehensive, family-inclusive approach to pediatric dental care.

Author contribution

Marzie Hashemi: Idea & Conceptualization, Project Administration, Supervision, Original Draft Preparation, Writing, Revise & Editing.

Susan AliBabaei -Khamene : Data Curation, Analysis.

Acknowledgment

The researchers would like to express their deep gratitude to all the people who took part in this research.

Informed Consent

Written informed consent was obtained from all individual participants included in the study. The protocol was approved by the local Ethical Committee in Khatam University (Khatam University, Tehran, Iran).

Conflict of Interest

The authors confirm the absence of any conflict related to financial interests, relation with organizations or person in any way involved in the research, and interrelations of the co-authors.

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