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ORIGINAL ARTICLE

Needle Threat and Acquired Dental Phobia in Pediatric Dental Patients

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ABSTRACT

Objective: To identify the relationship between injection needle threat as a mode of disciplining children and acquired dental phobia in pediatric patients.

Methods: This cross-sectional study was conducted at University College of Dentistry, Lahore, Pakistan between December 2021 and November 2022. The study included individuals under the age of 18 years who were presented during the survey and scheduled for pulpotomy or pulpectomy treatment. The study assessed two primary outcomes: dental anxiety and childhood needle threat. Dental anxiety was evaluated using the Modified Children's Dental Anxiety Scale, while childhood needle threat was measured by observing the child's responses to scenarios involving needles.

Results: Of total 200 pediatric patients, the mean age was 12.04 ±2.34 years. Mild dental anxiety level was observed in 56 (28.0%) patients, moderate in 122 (61.0%) patients and severe in 22 (11.0%) patients. Childhood needle threat was observed in 94 (47.0%) patients. Patients with mild dental anxiety were 0.86 times significantly less likely to have needle threat as compared to patients with severe dental anxiety (cOR 0.14, 95% CI 0.04 to 0.48, p-value 0.002). Similarly, patients with moderate dental anxiety were 0.83 times significantly less likely to have needle threat as compared to patients with severe dental anxiety (cOR 0.17, 95% CI 0.05 to 0.55, p-value 0.003).

Conclusion: The study revealed that most children exhibited moderate dental anxiety, with a notable incidence of dental phobia. Those with higher anxiety levels felt more threatened by needles, underscoring the need to avoid using needles as a mode of discipline.

Keywords: Dental Anxiety, Dental Phobia, Fear, Needle Threat, Pediatric.

INTRODUCTION

Fear of injection needles is one of the biggest challenges in pediatric dentistry, which can lead to dental anxiety and phobia. Globally, approximately one out of every ten children suffer from extreme levels of dental anxiety, often termed dental phobia.[1] Dental anxiety and phobia are responsible for avoidance and delay in seeking dental care amongst 13-30% of the pediatric population, which leads to deterioration of their oral health.[2-4]

When handling stressful situations like dental procedures, a child's age is vital. Various cross-sectional investigations have reported an age-related decline in dental phobia. However, some longitudinal studies reported that dental anxiety and phobia in pediatric patients rise with age.[5-7]

Parental attitudes towards dental anxiety and phobia affect the behavior of children. More than half of youngsters are terrified of needles.[8] Researchers from York University discovered a striking link between anxiety before a shot and how their parents behave during infant vaccines.[8] There are three basic parenting philosophies: permissive, authoritarian, and authoritative. Parenting practices mold children's actions and provide a foundation for their psychological development.[9]

Parents often use the threat of a needle or injection to

discipline their young children and get them to stop acting in a certain way. On the other hand, many adults believe that threatening young children with a needle or injection is an effective way to discipline them and prevent inappropriate behavior. This constitutes dental phobia in youngsters, leading to fear of needles (belonephobia). Parents often lie to children about the pain from the injection, which results in a loss of trust and the development of a fear of needles. Such children are challenging to examine in dental clinics.[10,11]

Dental phobia is a significant issue affecting many individuals, leading to avoidance of dental care and subsequent negative impacts on oral health.[12,13] By focusing on the specific context of injection needle threat as a mode of discipline, this study aims to shed light on a potentially overlooked contributor to dental phobia development in children. This study addresses an important gap in literature regarding the psychological implications of disciplinary practices in pediatric dentistry. While needle threat may be perceived as a disciplinary strategy by parents or guardians, its potential adverse effects on children's emotional well-being and attitudes towards dental care remain largely unexplored. This study aimed to identify the relationship between injection needle threat as a mode of discipline and dental phobia in pediatric patients.

METHODS

This cross-sectional study was conducted in the pediatric department of a private dental hospital i.e., University College of Dentistry, Punjab, Pakistan between December 2021 and November 2022. Ethical approval was obtained from the Institutional Review Board of the University College of Medicine and Dentistry (UCD/ERCA/21/11gq).

By using OpenEpi sample size calculator taking prevelance of dental phobia 16.0%,[12] level of confidence 95%, 5% margin of error. The estimated sample size was 207. However, 7 samples were removed due to a considerable amount of missing information. Therefore, 200 patients' data were finally included in the study. Pediatric patients under 18 years of age who were presented during the survey and were booked for pulpotomy or pulpectomy treatment involving the drilling of teeth with local anesthesia were included in the study using a non-probability consecutive sampling technique. The patients who did not fall into the age range, mentally compromised patents, and whose parent/guardian did not give consent were excluded. After the treatment, the Modified Children's Dental Anxiety Scale (MCDAS) questionnaire was administered, and different self-reported factors that triggered dental anxiety were documented.[12]

Outcome of the study was Dental anxiety and Childhood needle threat. Dental anxiety referes to the fear, stress, or anxiety associated with thinking about or undergoing dental procedures. Dental anxiety was quantified through the child's response to the MCDAS. Childhood needle threat was measured by assessing the child's reaction to scenarios involving needles, such as vaccinations or dental procedures. Questionnaire was divided into two sections; the first section included the faces version of the MCDAS, while the second section was developed by the authors, based on a review of the prior literature and consisted of demographic information and items related to the injection needle threat as a mode of discipline by parents/guardians, as well as the other factors i.e., sight of anesthetic needle, sharp Instruments, blood, dentist, and dental drill, that cause dental anxiety.

The MCDAS is comprised of eight questions, each designed to evaluate a child's level of nervousness about specific dental procedures. Responses were captured using a five-point Likert scale with cartoon faces, which ranged from a 'very happy' face indicating a relaxed or unworried child to a 'very sad' face denoting extreme worry. The scores ranged from 8 to 40: a score from 8 to 19 suggested low dental anxiety, 20 to 30 indicated moderate anxiety, and 31 to 40 signified high dental anxiety.

The survey was conducted by filling out the questionnaires through in-person interviews with the same interviewer, i.e., a trained house officer. The ambiguities were discussed, and responses were noted.

Statistical Package for Social Sciences (SPSS) version 24 was used for the purpose of statistical analysis. Mean and standard deviation was calculated for quantitative variables such as age and MCDAS score. Frequency and percentages were calculated for qualitative variables such as gender, dental anxiety level, past traumatic experience, childhood needle threat, and visit to the dentist. Inferential statistics was explored using Independent t-test to compare MCDAS score with different factors that caused dental anxiety in pediatric patients. Chi-square test was applied to identify the association of childhood needle threat with different characteristics of pediatric patients. The p-value of ≤ 0.05 was considered statistically significant. Moreover, binary logistic regression was applied to all those variables found significant in the Chi-square contingency table. Both univariable and multivariable logistic regression were applied.

RESULTS

Of total 200 pediatric patients, the mean age was 12.04 ± 2.34 years. There were 84 (42.0%) girls and 116 (58.0%) boys. The mean MCDAS score of pediatric patients was 13.21 ±3.91. Mild dental anxiety level was observed in 56 (28.0%) patients, moderate in 122 (61.0%) patients and severe in 22 (11.0%) patients. Most of the patients had no past traumatic experience and had visited the dentist before i.e., 136 (68.0%) and 162 (81.0%) respectively. A significant mean difference of MCDAS score was found with age (p-value 0.029), gender (p-value <0.001), past traumatic experience (p-value <0.001), childhood needle threat (p-value <0.001), and dental anxiety levels (p-value <0.001) (Table 1).

The majority of the patients did not experience anxiety upon seeing the anesthetic needle 122 (61.0%), sharp instruments 136 (68.0%), blood 136 (68.0%), dental drilling 178 (89.0%), and the doctor 170 (85.0%). Childhood needle threat was observed in 94 (47.0%) patients. A significant association of childhood needle threat was found with gender (p-value <0.001), dental anxiety levels (p-value 0.002), seeing the anesthetic needle (p-value <0.001) and seeing the blood (p-value 0.004) (Table 2).

Table 3 reveals binary logistic regression analysis for predicting needle threat among pediatric patients. At the univariate level, all of the variables showed significant odds ratios. The risk of needle threat was 0.69 times significantly lower in boys as compared to girls (cOR 0.31, 95% CI 0.17 to 0.76, p-value <0.001). Patients with mild dental anxiety level were 0.86 times significantly less likely to have needle threat as compared to patients with severe dental anxiety level (cOR 0.14, 95% CI 0.04 to 0.48, p-value 0.002). Similarly, patients with moderate dental anxiety level were 0.83 times significantly less likely to have needle threat as compared to patients with severe dental anxiety level (cOR 0.17, 95% CI 0.05 to 0.55, p-value 0.003).

Furthermore, the findings of the multivariable analysis were presented after adjusting the variables that were significant in the univariable analysis. At this stage variables gender, seeing the anesthetic needle, and seeing the blood showed significant odds ratios.

DISCUSSION

High dental anxiety can cause more than an unpleasant emotional reaction that makes it difficult to receive dental care; it can also cause flashbacks, nightmares, intrusive visions, trouble falling asleep, irritability, and poor focus, even if dental work is not immediately scheduled.[12,13] A key predictor of dental avoidance in childhood is dental anxiety, which may persist into adulthood. People's oral health and dental experiences can significantly improve by preventing and treating dental fear in childhood. Severe dental anxiety is termed dental phobia.[14, 10] In the present study, most

Table 1: Mean comparison of dental anxiety scores with different factors that caused dental anxiety in pediatric patients (n =200)

	Total	MCDAS Score Mean ±SD	p-value
Age (years)			
9 to 14	158	12.90 ±3.97	0.029*
15 to 20	42	14.38 ±3.48	
Gender			
Girls	84	11.38 ±3.53	<0.001*
Boys	116	14.53 ±3.68	
Past Traumatic Experience			
Yes	64	16.28 ±4.15	<0.001*
No	136	11.76 ±2.86	
Childhood Needle Threat			
Yes	94	14.53 ±4.22	<0.001*
No	106	12.04 ±3.25	
Been to the Dentist			
Yes	162	12.98 ±4.0	0.080
First Experience	38	14.21 ±3.44	

- MCDAS : Modified children dental anxiety scale
* p-value ≤ 0.05 (Independent t-test)

Table 2: Association between childhood needle threat with pediatric patients' characteristics (n =200)

Factors	Total	Childhood Needle Threat		p-value
		Yes (n =94)	No (n =106)	
Age (years)				
9 to 14	158	72 (45.6)	86 (54.4)	0.488
15 to 20	42	22 (52.4)	20 (47.6)	
Gender				
Girls	84	26 (31.0)	58 (69.0)	<0.001*
Boys	116	68 (58.6)	48 (41.4)	
Dental Anxiety Levels				
Mild	56	22 (39.3)	34 (60.7)	0.002*
Moderate	122	54 (44.3)	68 (55.7)	
Severe	22	18 (81.8)	4 (18.2)	
Seeing the Anesthetic Needle				
Yes	78	60 (76.9)	18 (23.1)	<0.001*
No	122	34 (27.9)	88 (72.1)	
Sharp Instruments				
Yes	64	36 (56.3)	28 (43.7)	0.095
No	136	58 (42.6)	78 (57.4)	
Seeing the Blood				
Yes	64	40 (62.5)	24 (37.5)	0.004*
No	136	54 (39.7)	82 (60.3)	
Seeing the Dentist				
Yes	30	18 (60.0)	12 (40.0)	0.122
No	170	76 (44.7)	94 (55.3)	
Seeing the Dental Drill				
Yes	22	8 (36.4)	14 (63.6)	0.367
No	178	86 (48.3)	92 (51.7)	

***** p-value ≤ 0.05 (Chi-Square test)

Table 3: Binary logistic regression analysis for variables predicting childhood needle threat of pediatric patients (n = 200)

	Univariable analysis		Multivariable analysis	
	cOR (95% CI)	p-value	aOR (95% CI)	p-value
Gender				
Girls	0.31 (0.17 to 0.76)	<0.001*	0.45 (0.21 to 0.94)	0.036*
Boys	1		1	
Dental Anxiety Levels				
Mild	0.14 (0.04 to 0.48)	0.002*	0.61 (0.15 to 2.45)	0.487
Moderate	0.17 (0.05 to 0.55)	0.003*	0.57 (0.16 to 2.08)	0.404
Severe	1		1	
Seeing the Anesthetic Needle				
Yes	8.62 (4.46 to 16.67)	<0.001*	6.19 (3.01 to 12.74)	<0.001*
No	1		1	
Seeing the Blood				
Yes	2.53 (1.37 to 4.66)	0.003*	1.42 (0.68 to 2.95)	0.343
No	1		1	

cOR: Crude odds ratio, aOR: Adjustedodds ratio, CI: confidence interval, *p-value ≤ 0.05

respondents had moderate dental anxiety, whereas, sever dental phobia reported in eleven percent of the patients. Previous literature has reported the prevalence of moderate to severe dental anxiety between six to sixty two percent.[3,4,7,9,12]

Previous studies have shown a positive correlation between a history of unpleasant dental experiences or trauma and acquired dental phobia, especially in pediatric patients.[9, 15, 16] In our study, almost one-third of the participants had bad past dental experiences, and their mean anxiety scores were significantly higher. Moreover, individuals with mild or moderate dental anxiety were significantly less likely to experience needle threat compared to those with severe anxiety, highlighting the impact of dental anxiety levels on specific fears like needle threat.

Indirect dental fear developed due to cartoons, movies, hearing other persons' negative experiences, and watching other children undergoing dental procedures may result in acquired dental phobia. Patients with indirect fear may exhibit dental anxiety even on their first visit.[17, 18] However, in the present study, there was no difference in the anxiety levels of patients who had been to the dentist before and those on their first visit. This can be attributed to indirect fear on their first dental visit.

In order to punish kids for bad behavior and instill discipline, many families threaten them with needles or injections. This might make children more sensitive to pain and increase their fear of needles. Previous studies reported needle threat by the family to be around thirty eight percent.[10,19] In the present study, needle threat by the family to discipline their children was forty seven percent. Those threatened with the needle/injection were more significantly anxious. Moreover, they felt more intimidated seeing the anesthetic needle, dental drill, and sharp instruments.

Seeing dental instruments, particularly needles and sharp tools, has been identified as a primary trigger for dental anxiety. This visual stimulus is closely associated with fear of pain, leading to increased anxiety levels.[20, 21] The anticipation of pain is a crucial factor in dental anxiety. Individuals with higher pain sensitivity or a fear of experiencing pain during dental procedures are more likely to experience dental anxiety.[20] The logistic regression analysis in the current study underscored the influence of gender, the sight of anesthetic needles, and blood on the likelihood of experiencing needle threat. These associations suggest that interventions to reduce dental anxiety and needle fear should consider these factors, potentially offering targeted strategies to mitigate these fears.

There are certain limitation in the current study. The study's cross-sectional design limits the ability to establish causal relationships between dental anxiety levels and childhood needle threat. Moreover, the study was conducted in a single center, potentially limiting the generalizability of the findings to other populations. However, it is advised that family members, especially parents, should be counseled to avoid using needle threats to discipline their children as this might instill dental fear and phobia in their children and could be construed as child abuse. Instead, they should teach them good behavior and discipline them in the proper manner. Despite of these limitations, the study is of significance. One strength of this study is that the study utilizes validated measures to assess dental anxiety levels and childhood needle threat, enhancing the validity of the results. Furthermore, the study's comprehensive analysis of various factors contributing to needle threat provides valuable insights into pediatric dental anxiety.

CONCLUSION

The study revealed that most children exhibited moderate dental anxiety, with a notable incidence of dental phobia. A significantly higher dental anxiety was found among children with age 15-20 years, male gender, having past traumatic experience and childhood needle threat. Patients with moderate to high anxiety levels were significantly more susceptible to perceiving needle threat. Threatening children with needles to discipline them should be avoided as they might cause dental anxiety in kids and prevent them from receiving dental care. Understanding these dynamics is crucial for developing effective interventions to enhance children's dental care experiences and reduce associated anxieties.

ETHICAL APPROVAL: This study was approved by Institutional Review Board of the University College of Medicine and Dentistry (UCD/ERCA/21/11gq, dated: 21.10.2021).

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MA: Literature search, critical revision of the manuscript for important intellectual content, interpretation of the data, and proofreading. All authors reviewed the results and approved the final version of the manuscript.

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