

Relationship between Psychological Functioning and Pain in Pediatrics Referring for Dental Services

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ARTICLE INFO

Article history:

Received 05 February 2026

Revised 26 February 2026

Accepted 10 March 2026

Keywords:

Local anesthesia;

Dental services;

Psychological functioning

ABSTRACT

Background: Local anesthetic solutions are routinely prescribed in dental procedures to mitigate pain. The aim of this study was to investigate the relationship between psychological functioning in pediatric patients referred for dental services during the administration of local anesthesia.

Methods: The study population comprised pediatric patients referred for dental services who required general anesthesia. Following previous studies, a total of 110 children attending private dental offices were recruited for this investigation. The instruments used included the CFSS-DS questionnaire, MCDAS questionnaire, PASS-20, and VAS tool. Ethical considerations for this research included obtaining the Ethics Code Number [IR.MEDILAM.REC.1404.203], and data analysis was performed using SPSS software, version 18, utilizing appropriate statistical analyses.

Results: Of the sample under investigation, 23.6% were in the 10-year-old age group, and the gender distribution leaned towards males with a frequency of 51.8%. The mean scores (standard deviation) obtained were 41.93 ± 12.37 for the CFSS-DS, 24.18 ± 6.34 for the MCDAS, and 53.6 ± 13.4 for the PASS. Regression analysis indicated that gender had a significant relationship with CFSS-DS and MCDAS scores ($p < 0.05$), but no association was observed with the PASS score ($p = 0.76$). Furthermore, the Chi-square (χ^2) test confirmed a statistically significant relationship between all assessment tools (CFSS-DS, MCDAS, PASS) and the variables under examination, including age, history of dental treatment, and history of hospitalization ($p < 0.05$).

Conclusion: Considering the prevalence and adverse psychological consequences arising from the delivery of dental services in the pediatric population, including the manifestation of fear, anxiety, and pain anxiety symptoms, the implementation of targeted preventive interventions and supportive strategies in this domain is strongly recommended.

Introduction

General anesthesia is typically initiated either by the administration of intravenous agents or the inhalation of volatile anesthetics. Induction of intravenous anesthesia is frequently achieved through the intravenous administration of drugs such as propofol or

thiopental [1-2]. General anesthesia can result in metabolic side effects and alterations, including both hypoglycemia and hyperglycemia. For managing uncooperative behaviors or for complex dental procedures, deep sedation or general anesthesia becomes necessary. Nevertheless, the administration carries inherent risks of comorbidities such as arrhythmia,

The authors declare no conflicts of interest.

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DOI:

allergic reactions, respiratory distress, cardiac arrest, and severe hypotension [3-5].

The experience of pain can lead to the avoidance of seeking necessary therapeutic services by the patient, and consequently, by delaying consultation with the practitioner, the patient's clinical status may become exacerbated [6-7].

Local anesthetic solutions are routinely prescribed in dental procedures to mitigate pain, and their efficacy is characterized by three primary parameters: the onset time of anesthesia, the duration of the anesthetic effect, and the potency [5]. The act of administering a local anesthetic injection is a significant contributor to children's dental anxiety and fear, sometimes leading to difficulties in executing necessary care procedures. Furthermore, the anesthesia of palatal tissue is often cited as one of the most painful dental interventions, potentially creating an unpleasant experience for pediatric patients [8-9].

Various methods exist for alleviating pain during the provision of dental services, including the topical application of anesthetics such as benzocaine, warming the local anesthetic solution, utilizing distraction techniques, gently vibrating the surrounding tissue during injection, applying pressure at the injection site, modulating the needle penetration depth or slowing the injection rate, employing mechanical systems, and pre-injection cooling of the site [10-12].

The application of general anesthesia (GA) in pediatric dental treatments holds significant value for children who require special care due to the extensive nature of their needs, limited cooperative capacity, or specific underlying medical conditions. Its advantages are numerous, including the completion of treatment within a single session, relief of the child from pain, and the elimination of the requirement for patient cooperation [13-14].

Patient cooperation is paramount for the execution of dental procedures. Lack of cooperation, particularly in children, can prevent the dentist from completing the necessary work and, furthermore, significantly increases the risk of medical emergencies, such as the aspiration of a foreign body during episodes of crying [15-17]. A child's behavior during any dental appointment is influenced by several factors, including the child's age, parental anxiety and behavior, prior medical and dental history, awareness of existing dental issues, and behavioral challenges [18-19].

The most critical juncture in pediatric and adolescent dentistry occurs during the patient's initial consultation. If this relationship is not established successfully and the child develops significant anxiety or fear, remediation becomes challenging and may result in long-lasting negative sequelae [20-21].

Aim

The aim of this study was to investigate the relationship between psychological functioning in pediatric patients referred for dental services during the administration of local anesthesia.

Methods

The study population comprised pediatric patients referred for dental services who required general anesthesia. Following previous studies, a total of 110 children attending private dental offices were recruited for this investigation.

Inclusion criteria: provision of informed consent for participation, the ability of the child and/or parent to read, write, and comprehend the questionnaires, the absence of any significant mental or physical impairment, and cooperation throughout the research procedures. Although the reference age for "pediatrics" typically spans from 2 to 12 years, this specific study focused on individuals aged 8 to 12 years [22]. Exclusion criteria involved any unwillingness to continue participation or incomplete completion of the questionnaires.

The instruments used included the CFSS-DS questionnaire, MCDAS questionnaire, PASS-20, and VAS tool.

CFSS-DS Questionnaire: This tool has 15 items; each question has 5 answers (from a score of 1 corresponding to feeling calm and fearless to a score of 5 corresponding to a very fearful state). The overall score of the tool includes scores ranging from 15 to 75, and if the patient obtains a score higher than 35, it indicates the presence of dental stress in the patient [23-24].

MCDAS Questionnaire: To measure patients' anxiety, the MCDAS tool was used, which had 8 questions and measured the level of anxiety in each indicator with a 5-point Likert scale. The minimum score obtained by each patient was 8, and the maximum score was 40 [25-26].

Pain Anxiety Symptoms Scale (PASS-20): This tool has 20 questions and 4 subscales of Cognitive, Escape-avoidance, Fear, and Escape-avoidance. Scoring of this tool ranges from never, with a score of zero, to always, with a score of five, with the range of scores obtained from 1 to 100 [27-28].

The research procedure involved explaining the study objectives, obtaining consent from both the children and their parents, and subsequently completing the necessary instruments. Given the young age of the subjects, if the children were capable, they completed all questionnaires themselves, with the exception of the Visual Analog Scale (VAS), which was completed by the parents otherwise. Ethical considerations for this research included obtaining the Ethics Code Number [IR.MEDILAM.REC.1404.203] from Ilam University of Medical Sciences, clearly explaining the research objectives, and adhering to all guidelines issued by the University's Ethics Committee. Data analysis was

performed using SPSS software, version 18, utilizing appropriate statistical analyses.

Results

The findings presented in (Table 1) indicate that most of the examined children were 10 years old (23.6%), and the majority were male (51.8%). In addition, 87.3% of the participants had no history of hospitalization, and 54.5% had never received any dental care services.

The results showed that the mean (SD) scores were 41.93 (12.37) for the CFSS-DS Questionnaire, 24.18 (6.34) for the MCDAS Questionnaire, and 53.6 (13.4) for the Pain Anxiety Symptoms (Table 2).

Results showed that, in patients with no history of dental services, the mean (SD) scores were 47.20 (11.51) for the CFSS-DS Questionnaire, 26.78 (6.51) for the MCDAS Questionnaire, and 58.70 (14.11) for the Pain Anxiety Symptoms (Table 3). The findings showed that there was a statistically significant relationship between gender status and scores obtained from the CFSS-DS Questionnaire and MCDAS Questionnaire ($p < 0.05$), but no relationship was observed with PASS score status ($P = 0.76$) (Table 4). Also, according to the findings shown by χ^2 statistical analysis, a significant relationship was observed between all the tools used and the variables examined, including patient age, dental treatment history, and hospitalization history ($p < 0.05$) (Table 5).

Table 1- Demographic characteristics of patients referred for dental services during the administration of local anesthesia

Variables		N	%
Age	8 years old	22	20
	9 years old	21	19.1
	10 years old	26	23.6
	11 years old	18	16.4
	12 years old	23	20.9
Gender	Boy	57	51.8
	Girl	53	48.2
Hospitalization history	Yes	14	12.7
	No	96	87.3
Dental treatment history	No experience	60	54.5
	In the past 6 months	34	30.9
	More than 6 months	16	14.5
Anesthesia drugs	Lidocaine	20	18
	Articaine	12	14.5
	Mepivacaine	17	17
	Bupivacaine	32	43.5

Table 2- Comparison of the average scores of the studied instruments by gender in patients referred for dental services during the administration of local anesthesia

Variables	Boys (n= 57)		Girls (n= 53)		Total (n= 110)	
	Mean	SD	Mean	SD	Mean	SD
CFSS-DS Questionnaire	38.77	11.08	45.33	12.87	41.93	12.37
MCDAS Questionnaire	22.31	5.08	26.18	6.96	24.18	6.34
Pain Anxiety Symptoms	53.24	13.32	54.00	13.74	53.60	13.47

Table 3- Comparison of the average scores of the studied instruments by dental treatment history

Variables	No experience		In the past 6 months		More than 6 months	
	Mean	SD	Mean	SD	Mean	SD
CFSS-DS Questionnaire	47.20	11.51	37.35	10.19	31.93	9.85
MCDAS Questionnaire	26.78	6.51	21.88	4.69	19.31	3.53
Pain Anxiety Symptoms	58.70	14.11	49.23	10.81	43.81	5.33

Table 4- Binary linear regression of tests vs. gender in patients referred for dental services during the administration of local anesthesia

Variables	B	S.E.	P value	Exp(B)	CI 95%
CFSS-DS Questionnaire	0.04	0.017	0.007	1.04	1.01-1.08
MCDAS Questionnaire	0.15	0.034	0.002	1.1	1.03-1.18
Pain Anxiety Symptoms Scale	0.004	0.014	0.76	1.004	0.97-1.03

Table 5- Analysis of sociodemographic variables in relation to patients referred for dental services during the administration of local anesthesia

Variables	Age		Dental treatment history		Hospitalization history	
	χ^2	<i>p</i>	χ^2	<i>p</i>	χ^2	<i>p</i>
CFSS-DS Questionnaire	245.53	0.000	113.65	0.001	67.23	0.001
MCDAS Questionnaire	286.59	0.000	66.18	0.003	42.67	0.001
Pain Anxiety Symptoms Scale	154.83	0.009	80.63	0.026	45.40	0.027

Discussion

Given the role of oral health in other aspects of health, it is necessary to pay special attention to it [29-30]. Providing dental services to children can lead to pain as well as psychological challenges, including stress and anxiety. Dental anxiety in children can prevent a child from visiting the dentist regularly, thereby increasing the risk of oral health problems, including tooth decay [31]. On the other hand, it is important to pay attention to the psychological problems of patients, as previous studies have emphasized the role of stress, anxiety, and depression in patients' health status [32-34]. For this reason, this study aimed to determine the psychological status of children seeking dental services.

Based on the CFSS-DS questionnaire results, the examined children experienced dental service-related stress, with a mean (SD) score of 41.93 (12.37). In the study by Boka et al. (ages 4–12 years), the mean (SD) CFSS-DS score was 32.53 (12.01) for boys, 33.95 (11.74) for girls, and an overall mean of 33.1 (11.86). Patients with higher CFSS-DS scores were found to display more uncooperative behavior during local anesthesia administration [35]. In the study by Guney et al., the status of the Child Dental Fear and Anxiety Scale (CFSS) scores was examined in two groups of 6–12-year-old patients: sedation and general anesthesia. According to the findings, the mean (SD) CFSS score in the sedation group was 39.7 ± 11.0 at the preoperative stage, which decreased to 32.3 ± 8.6 in the postoperative stage. Meanwhile, in the general anesthesia group, the mean score was 36.5 ± 9.9 at the preoperative stage, which reduced to 27.3 ± 9.5 in the postoperative stage [36].

According to the findings of the MCDAS questionnaire, the children assessed in this study exhibited anxiety. In the study conducted by Abedi et al. in Iran, patients' anxiety scores were found to be above the normal range, and a significant correlation was observed between the level of anxiety and the intensity of perceived pain [37]. Similarly, Cantekin et al. reported that 14 out of 15 examined children showed high anxiety levels, and as the number of extracted teeth increased, their anxiety scores also rose [38].

Key factors influencing dental stress and anxiety in children in this study include being female, being younger, having a history of dental treatment, and having

a history of hospitalization. These findings align with the research by Fayad et al., who also reported that younger children, female patients, and those with prior unpleasant dental experiences exhibited higher levels of anxiety [39]. Investigations conducted by Bahrololoomi et al. in Yazd, Iran, demonstrated that female gender was significantly associated with elevated levels of dental fear in children, with girls exhibiting higher fear scores compared to their male counterparts. Furthermore, the analyses indicated that a history of previous dental treatments and younger age (under 9 years) were related variables that correlated with an increased severity of dental fear within this studied population [40].

Conclusion

Considering the prevalence and adverse psychological consequences arising from the delivery of dental services in the pediatric population, including the manifestation of fear, anxiety, and pain anxiety symptoms, the implementation of targeted preventive interventions and supportive strategies in this domain is strongly recommended.

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