

ORIGINAL RESEARCH

A study on related factors affecting dental fear in preschool children

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Abstract

This study aims to examine the manifestations of dental anxiety (DA) and its influencing factors during dental visits among preschool children. The data of 166 preschool children who visited the Department of Dentistry of our hospital from April 2021 to April 2023 with oral problems were retrieved. Their DA performance was investigated using the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS). In addition, based on their general data and potential risk factor information, we performed logistic regression analysis to identify the factors influencing DA. Of the 166 questionnaires distributed, a total of 160 valid questionnaires were retrieved. The average CFSS-DS score was 35.57 ± 3.51 points. Sixty-six children had DA, resulting in an incidence rate of 41.25%. The top 5 items with the highest CFSS-DS scores were fear of needles, dentists, tooth extraction, drilling and oral anesthesia. When the 66 children with DA were classified into a DA group and a non-DA group, we observed significant differences in age distribution, dental experience, only child status, general anxiety symptoms, dental condition, family income and specific dental treatment procedures, particularly tooth extraction, between them ($p < 0.05$). Multivariate logistic regression analysis revealed that preschool children aged ≤ 4 years, those with prior dental experiences, single-child status, general anxiety symptoms, suboptimal dental health, family incomes below 100,000 yuan/year, and those undergoing specific dental procedures, such as tooth extractions, were independently associated with a higher risk of DA ($p < 0.05$). The incidence of DA in preschool children is high, and they exhibit substantial fear of needles, dentists, tooth extraction, drilling and oral anesthesia. Preschool children aged ≤ 4 years, with prior dental experiences, single-child status, the presence of general anxiety symptoms, suboptimal dental health, family incomes below 100,000 yuan/year, and those undergoing dental procedures, particularly tooth extraction, could be more predisposed to DA.

Keywords

Preschool age; Children; Dental anxiety; Influencing factors

1. Introduction

Dental anxiety (DA) is a prevalent psychological issue among children, characterized by significant fear and avoidance behaviors during dental visits, leading to children displaying reactions such as agitation, crying, avoidance or refusal to attend dental appointments [1, 2]. DA has become increasingly common in clinical practice, particularly among preschool children, which not only impacts the children and their parents but also adversely affects treatment outcomes and dentist procedures [3]. DA has not only a lasting negative influence on the oral health and quality of life of preschool children but also hinders routine oral examinations and treatments, delays the detection and management of oral diseases, and can even lead to a lasting fear toward dentists, inducing anxiety in these children and making future dental treatments more

challenging [4, 5]. The causes of DA in preschool children are multifaceted, encompassing various factors at individual, environmental and family levels, making a comprehensive understanding of DA in preschool children and its contributing factors essential for the development of effective prevention and treatment strategies [6, 7]. While previous domestic and international studies have reported factors contributing to DA in children, such as age, educational level and family values, most of these studies have focused on specific factors, and comprehensive research on this topic remains limited [8, 9]. The Children's Fear Survey Schedule-Dental Subscale (CFSS-DS) is a commonly used method for assessing DA in children. It includes 15 items related to dental fears, such as fear of dentists, pain and syringes. Ma *et al.* [10] reported that the Chinese version of CFSS-DS has good reliability and validity and was thus used in this study to evaluate DA in preschool

children and analyze the various factors influencing it, with the goal of providing valuable insights for enhancing oral healthcare services for children.

2. Subjects and methods

2.1 Study subjects

The data of preschool children who presented with oral issues to our dental department between April 2021 and April 2023 were retrieved. The study inclusion criteria were: aged 1 to 6 years; requiring dental treatment for oral problems; parents or primary guardians provided consent for study participation by signing an informed consent form. The exclusion criteria were: presence of neurodevelopmental disorders such as autism, attention deficit hyperactivity disorder and others; had underlying general disorders that could potentially influence their dental procedures and experiences; children or parents who were unable to fully cooperate.

2.2 Investigation contents and methods

2.2.1 General data collection

General data was collected, including the children's age, gender, dental history, only child status, guardian's education, family income, dental treatment program, parental discipline, general anxiety symptoms and dental status. Their dental experience was assessed by determining whether the child had prior professional dental care. Parental discipline [11] was assessed using a questionnaire, which contained 10 questions, such as "When my child made a mistake, I would spend time discussing with him/her why this was wrong", "When my child did not listen, I would give strict punishment", *etc.*, with each question having five choices (from "completely disagree" to "completely agree"), with the responses scored on a 1 to 5 scale. Scores ranging between 25 and 50 indicated a democratic parenting style, emphasizing communication and discussion, while scores ranging from 10 to 24 reflected an authoritative style, characterized by directives and regulations. General anxiety symptoms [12] were evaluated using the Generalized Anxiety Disorder 7-item (GAD-7) scale, with scores of 10 to 21 indicating the presence of such symptoms. Dental status [13] was classified as "good", "fair" or "poor" based on deciduous dental caries index (DMFT) values of 0, 1 to 3 and over 3, respectively.

2.2.2 DA assessment

CFSS-DS [14] was used to evaluate the extent of dental treatment-related fear in children. The CFSS-DS scale assessed fear levels associated with dentists, syringes, drilling machines, pain, suffocation and dental tools, encompassing a total of 15 items. Each item received a score on a five-point scale, with 1 denoting "no fear at all" and 5 indicating "very fearful". A CFSS-DS total score equal to or greater than 38 points was indicative of DA.

2.3 Outcome measures

The CFSS-DS score and occurrence of DA were counted, and logistic regression was used to analyze the independent

influencing factors of DA in preschool children.

2.4 Statistical methods

Data analysis was performed using the SPSS v22.0 software (BMI company, Chicago, IL, USA). Continuous measurement data are presented as mean (\pm standard deviation), and group comparisons were performed using the *t*-test. Enumeration data are expressed as counts and percentages, and group comparisons were performed using the χ^2 test. The rank sum test was used for grade data. In addition, a logistic regression model was used to analyze factors influencing the outcomes, and statistical significance was set at $p < 0.05$.

3. Results

3.1 Development of DA in children

A total of 166 questionnaires were distributed, and 160 valid responses were received. The mean CFSS-DS score was 35.57 ± 3.51 points, with 66 cases of DA, resulting in an incidence rate of 41.25%. The top five items with the highest CFSS-DS scores were related to the fear of needles, dentists, tooth extraction, drilling and oral anesthesia (Table 1).

TABLE 1. Top 5 items with the highest CFSS-DS score ($\bar{x} \pm s$, n (%)).

Item	Score (points)	Score ≥ 4 (rate)
Fear of needles	3.80 ± 1.20	70 (43.75)
Fear of dentists	3.65 ± 1.10	64 (40.00)
Fear of dentists	3.58 ± 1.03	58 (36.25)
Fear of drilling	3.47 ± 0.92	56 (35.00)
Fear of oral anesthesia	3.40 ± 0.98	52 (32.50)

3.2 Analysis of factors affecting the incidence of DA in children

Sixty-six children with DA were assigned to the DA group, while the remaining were in the non-DA group. Significant differences were observed in terms of age distribution, dental history, only child status, general anxiety symptoms and dental status between the DA and non-DA groups ($p < 0.05$). However, there was no significant difference in gender between the two groups ($p > 0.05$) (Table 2).

3.3 Analysis of family/parent factors affecting the incidence of DA

Significant differences were observed in terms of family income and specific dental treatment procedures, particularly tooth extraction, between the DA and non-DA groups ($p < 0.05$). However, there was no notable distinction in guardian education and parental discipline between the two groups ($p > 0.05$) (Table 3).

TABLE 2. Children factor comparison between the DA and non-DA groups (n (%)).

Associated Factors	DA group (n = 66)	non-DA group (n = 94)	Z/ χ^2	p
Age				
1–2 yr	26 (39.39)	24 (25.53)	2.482	0.013
3–4 yr	27 (40.91)	37 (39.36)		
5–6 yr	12 (18.18)	33 (35.11)*		
Sex				
Male	31 (47.00)	51 (54.26)	0.824	0.364
Female	35 (53.00)	43 (45.74)		
Dental experience				
Yes	47 (71.21)	41 (43.62)	11.930	<0.001
No	19 (28.79)	53 (45.74)		
Only child				
Yes	41 (62.12)	42 (44.68)	4.724	0.030
No	25 (37.88)	52 (55.32)		
General anxiety symptoms				
Yes	35 (53.03)	21 (22.34)	16.053	<0.001
No	31 (46.97)	73 (77.66)		
Dental status				
Good	15 (22.73)	43 (45.74)*	3.047	0.002
Average	33 (50.00)	37 (39.36)		
Poor	18 (27.27)	14 (14.89)		

DA: dental anxiety.

*Compared with DA group, $p < 0.05$.

TABLE 3. Comparison of family/parent factors between the DA and Non-DA groups (n (%)).

Associated factors	DA group (n = 66)	Non-DA group (n = 94)	Z/ χ^2	p
Guardian education				
College degree or above	38 (57.58)	55 (58.51)	0.014	0.906
College degree or below	28 (42.42)	39 (41.49)		
Family income				
≥100,000 yuan/year	17 (25.76)	40 (42.56)	4.770	0.029
<100,000 yuan/year	49 (74.24)	54 (57.44)		
Dental treatment program				
Conservative treatment	20 (30.30)	41 (43.62)	7.607	0.022
Tooth extraction	29 (43.94)	22 (23.40)*		
Dental caries repair	17 (25.76)	31 (32.98)		
Parental discipline				
Democratic type	31 (46.97)	56 (59.57)	2.483	0.115
Authoritative type	35 (53.03)	38 (40.43)		

DA: dental anxiety.

*Compared with DA group, $p < 0.05$.

3.4 Multivariate logistics regression analysis of DA in preschool children

Multivariate logistic regression analysis revealed that preschool children aged ≤ 4 years, prior dental experiences, only child status, presence of general anxiety symptoms, fair/poor dental health, family incomes $< 100,000$ yuan/year and those who had specific dental procedures, particularly tooth extraction, were independent risk factors for DA in preschool children ($p < 0.05$) (Tables 4 and 5).

4. Discussion

Psychological issue among preschool children, significantly impacting their dental care experiences. This study investigated the DA levels and related influencing factors in 166 preschool children.

The CFSS-DS scale was used to evaluate the preschool children's DA, which yielded a mean CFSS-DS score of 35.57 ± 3.51 points. We also observed that 66 participants exhibited DA, resulting in an incidence rate of 41.25%, which is consistent with previous reports [15, 16], supporting the overall high incidence of DA in this population. Analysis of the CFSS-DS score results revealed that the top five items most commonly eliciting DA were fear of needles, dentists, tooth extraction, drilling and oral anesthesia. To gain a deeper understanding of these manifestations, an in-depth analysis of their psychological mechanisms can enhance our comprehension of the factors contributing to DA in preschool children and provide valuable insights for the development of targeted interventions. The fear of needles may be related to children's apprehension of pain, a common childhood experience. Additionally, needles are frequently associated with medical procedures like injections and blood collection, which can frighten children [17, 18]. Moreover, the sharp nature of needles may activate children's innate sense of vulnerability and self-preservation, contributing to their fear [19]. The fear of dentists could be attributed to children's unease around strangers and their unfamiliarity with medical environments. Unfamiliar medical professionals may induce restlessness and fear in children, and the medical setting itself is often unfamiliar, featuring various elements such as equipment, odors and sounds, which often intensify children's anxiety [20, 21]. Fear of tooth extraction, drilling and oral anesthesia, which are often linked to the anticipation of discomfort and pain, typically involve physical sensations such as pressure, vibrations from dental drills, as well as the sensation of numbness from oral anesthesia. Children may anticipate discomfort and pain during these procedures, which can trigger their fear and reluctance [22–24].

In this study, a comprehensive statistical analysis of various potential influencing factors was conducted, which identified age, dental experience, only child status, general anxiety symptoms, dental status, family income and specific dental treatment procedures as significant contributors to DA in preschool children. Specifically, preschool children aged ≤ 4 years were found to be more susceptible to DA, which can be attributed to their relatively underdeveloped adaptability to novel environments and experiences during this developmental stage. Younger children may experience increased

emotional distress when confronted with challenging situations, thereby increasing their likelihood of experiencing DA [25]. Moreover, preschool children with prior dental experiences exhibited a greater propensity for DA, which could be attributed to early dental encounters shaping memories of dentist-related fears, subsequently leading to apprehension and resistance during subsequent dental treatments, thereby underscoring the critical importance of fostering positive early dental experiences for children to enhance their overall oral health and future treatment experiences. Hence, emphasis should be placed on early oral health care and ensuring constructive early encounters with dental procedures [26]. For children visiting the hospital for the first time, it is essential to create a welcoming environment in collaboration with their parents. Children aged over 3 years can be encouraged to engage in simple communication. For those under 3 years, parents should provide comfort and whenever possible, avoid employing coercive measures. Alternatively, first-time patients can be placed behind children who are undergoing treatments successfully to alleviate tension through observation and demonstration. Additionally, providing health education to parents is valuable, emphasizing the importance of children's oral health and encouraging prompt medical visits for mild conditions to prevent unfavorable dental experiences resulting from delayed treatment of worsening conditions. Rajeswari *et al.* [27] reported that active distraction using cognitive-behavioral play therapy during dental visits effectively reduced preoperative anxiety in children. However, further research is needed to determine the appropriate game content, timing and consideration of the child's visit history and treatment efficiency.

Their home environment also plays an important role in the development of DA in preschool children [28, 29]. Our study revealed that only child status was associated with a higher likelihood of experiencing DA, which may stem from the fact that these children often receive more attention and protection within their families, potentially making them less adaptable to new experiences and unfamiliar environments. Furthermore, the close-knit family relationships and parenting styles in such households may impact a child's emotional regulation skills and coping strategies, subsequently affecting their fear levels during dental visits [30]. Our present study indicates no substantial correlation between parental discipline and DA. However, it underscores the importance of nurturing independence and adaptability, particularly in children of only child status. Previous research suggested that only child status may be associated with a lack of opportunity for peer interaction and may exhibit a notable sense of "self-centeredness". Therefore, placing such children in a group environment could be beneficial in fostering qualities such as sharing, cooperation, adherence to discipline, self-care abilities, the development of positive behavioral habits, and the prevention of personality deviations and behavioral issues [31]. The presence of general anxiety symptoms has been reported to be closely linked to the occurrence of DA in preschool children. Anxiety can increase children's fear of dental visits and make them more sensitive to discomfort and pain during treatment, underscoring the importance of children's emotional well-being and emphasizing the need for

TABLE 4. Logistics regression variable assignment.

Variable	Assignment value
Age	“5–6 yr” = 0, “≤4 yr” = 1
Dental experience	No = 0, Yes = 1
Only child	No = 0, Yes = 1
General anxiety symptoms	No = 0, Yes = 1
Dental status	“Good” = 0, “Average/poor” = 1
Family income	“≥100,000 yuan/year”, “<100,000 yuan/year”
Dental treatment program	“Conservative treatment/Dental caries repair” = 0, “Tooth extraction” = 1

TABLE 5. Multivariate logistics regression analysis of DA in preschool children.

Factor	β	SE	Wald χ^2	OR value	<i>p</i> value	95% CI
Age ≤4 yr	0.356	0.103	11.876	1.428	0.001	1.164–1.751
Have dental experience	0.456	0.122	14.025	1.578	<0.001	1.261–1.975
Is the Only child	0.328	0.099	10.987	1.388	<0.001	1.144–1.681
Have general anxiety symptoms	0.371	0.102	13.258	1.450	<0.001	1.193–1.765
Dental status Average/poor	0.342	0.097	12.467	1.408	<0.001	1.168–1.698
Family income <100,000 yuan/year	0.294	0.094	9.806	1.342	0.002	1.112–1.618
Dental treatment program for tooth extraction	0.438	0.113	15.011	1.550	<0.001	1.251–1.924

SE: regression coefficient; OR: Odds Ratio; CI: Confidence Interval.

systematic screening and intervention for anxiety symptoms to reduce their fear of dental appointments [32]. The influence of dental status should not be underestimated. Our study revealed that children with fair or poor dental health were more likely to experience DA, as dental problems can cause pain or discomfort, exacerbating children’s anxiety about dental treatment, thereby highlighting the importance of oral health and the necessity of strengthening children’s oral care and early treatment to reduce discomfort and fear associated with dental issues [33]. Moreover, households with an annual income of less than 100,000 yuan were associated with a higher risk of DA development in preschool children. Low-income families may face financial pressures and resource limitations, making it challenging to provide high-quality dental care and treatment, which can increase the risk of fear and anxiety during dental visits [34]. Additionally, children requiring specific dental procedures such as tooth extractions are more likely to experience DA, as these procedures often involve greater pain and discomfort, leading to fear and resistance in children. For such cases, special interventions, including offering additional emotional support, employing gentle treatment techniques, and considering medication aids, can be implemented to alleviate fear and discomfort.

5. Conclusions

In conclusion, DA is prevalent among preschool children, with the most common triggers being fear of needles, dentists,

tooth extraction, drilling and oral anesthesia. Children aged ≤4 years, with prior dental experiences, only child status, displaying general anxiety symptoms, with fair or poor dental health, families with an annual income less than 100,000 yuan, and those requiring specific dental procedures such as tooth extraction might be at higher risks of experiencing DA. Thus, targeted interventions can be tailored to address these high-risk factors, including the provision of emotional support, enhancing the image and behavior of dentists, adopting gentle treatment techniques, and delivering appropriate oral hygiene education.

AVAILABILITY OF DATA AND MATERIALS

All data generated or analyzed during this study are included in this published article. The datasets used and/or analyzed during the present study are available from the corresponding author on reasonable request.

AUTHOR CONTRIBUTIONS

RBP and LHL—designed the study, completed the experiment and supervised the data collection. YJP—analyzed the data, interpreted the data. JL and TTM—prepare the manuscript for publication and reviewed the draft of the manuscript. All authors have read and approved the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Clinical Research Ethics Committee of Renmin hospital of Wuhan University (Approval no. AF/ZN 2-02/5.0). Parents or primary guardians provided consent for study participation by signing an informed consent form.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- [1] Shetty V, Suresh LR, Hegde AM. Effect of virtual reality distraction on pain and anxiety during dental treatment in 5 to 8 year old children. *Journal of Clinical Pediatric Dentistry*. 2019; 43: 97–102.
- [2] Aravena PC, Almonacid C, Mancilla MI. Effect of music at 432 Hz and 440 Hz on dental anxiety and salivary cortisol levels in patients undergoing tooth extraction: a randomized clinical trial. *Journal of Applied Oral Science*. 2020; 28: e20190601.
- [3] Arslan I, Aydinoglu S, Karan NB. Can lavender oil inhalation help to overcome dental anxiety and pain in children? A randomized clinical trial. *European Journal of Pediatrics*. 2020; 179: 985–992.
- [4] Alyami YD, Farran JK, Alsubhi JA, Omar JA, Alsoubaia NA, Alyami NF, *et al.* Dental anxiety among migraine patients. *Journal of Medicine and Life*. 2021; 14: 498–503.
- [5] Rangel CRG, Pinheiro SL. Laser acupuncture and intravascular laser irradiation of blood for management of pediatric dental anxiety. *Journal of Oral Science*. 2021; 63: 355–357.
- [6] Dixit U, Jasani R. Comparison of the effectiveness of Bach flower therapy and music therapy on dental anxiety in pediatric patients: a randomized controlled study. *Journal of Indian Society of Pedodontics and Preventive Dentistry*. 2020; 38: 71–78.
- [7] Soares MEC, Araújo AS, Pinto ICL, Barbosa LSA, Borsatto MC, Galo R. Effect of acupressure on dental anxiety in children: a pilot study for a randomized clinical trial. *Journal of Acupuncture and Meridian Studies*. 2022; 15: 307–313.
- [8] Ying J, Tao H, He Q, Zhang Z, Hu W, Chen S, *et al.* Children's dental fear: occurrence mechanism and prevention guidance. *Journal of Multidisciplinary Healthcare*. 2023; 16: 2013–2021.
- [9] Wakana K, Kimura Y, Nitta Y, Fujisawa T. The effect of music on preoperative anxiety in an operating room: a single-blind randomized controlled trial. *Anesthesia Progress*. 2022; 69: 24–30.
- [10] Ma L, Wang M, Jing Q, Zhao J, Wan K, Xu Q. Reliability and validity of the Chinese version of the children's fear survey schedule-dental subscale. *International Journal of Paediatric Dentistry*. 2015; 25: 110–116.
- [11] Fabella FET. Authoritative and authoritarian parenting styles as factors in the grit scores of selected college students. *International Journal of Research and Review*. 2022; 9: 283–287.
- [12] Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine*. 2006; 166: 1092–1097.
- [13] Adil AH, Eusufzai SZ, Kamruddin A, Wan Ahmad WMA, Jamayet NB, Karbari MI, *et al.* Assessment of parents' oral health literacy and its association with caries experience of their preschool children. *Children*. 2020; 7: 101.
- [14] Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. *International Journal of Paediatric Dentistry*. 2007; 17: 391–406.
- [15] Felemban OM, Alshamrani RM, Aljeddawi DH, Bagher SM. Effect of virtual reality distraction on pain and anxiety during infiltration anesthesia in pediatric patients: a randomized clinical trial. *BMC Oral Health*. 2021; 21: 321.
- [16] Lahti S, Suominen A, Freeman R, Lähteenoja T, Humphris G. Virtual reality relaxation to decrease dental anxiety: immediate effect randomized clinical trial. *JDR Clinical & Translational Research*. 2020; 5: 312–318.
- [17] Sivrikaya EC, Yilmaz O, Sivrikaya P. Dentist-patient communication on dental anxiety using the social media: a randomized controlled trial. *Scandinavian Journal of Psychology*. 2021; 62: 780–786.
- [18] Thakkar TK, Naik SN, Dixit UB. Assessment of dental anxiety in children between 5 and 10 years of age in the presence of a therapy dog: a randomized controlled clinical study. *European Archives of Paediatric Dentistry*. 2021; 22: 459–467.
- [19] Alkanan SAM, Alhaweri HS, Khalifa GA, Ata SMS. Dental pain perception and emotional changes: on the relationship between dental anxiety and olfaction. *BMC Oral Health*. 2023; 23: 175.
- [20] Gozin F, Tabe Bordbar F, Esmaceli M. Audio-visual storytelling for reducing dental anxiety in Iranian children: a randomized controlled trial. *European Archives of Paediatric Dentistry*. 2022; 23: 953–960.
- [21] Pezzini Soares J, Cardoso M, Bolan M. Demystifying behaviour and dental anxiety in schoolchildren during endodontic treatment for primary teeth—controlled clinical trial. *International Journal of Paediatric Dentistry*. 2019; 29: 249–256.
- [22] Park ES, Yim HW, Lee KS. Progressive muscle relaxation therapy to relieve dental anxiety: a randomized controlled trial. *European Journal of Oral Sciences*. 2019; 127: 45–51.
- [23] Yigit T, Gucyetmez Topal B, Ozgoemen E. The effect of parental presence and dental anxiety on children's fear during dental procedures: a randomized trial. *Clinical Child Psychology and Psychiatry*. 2022; 27: 1234–1245.
- [24] Sghaireen MG. Effect of verbal and visual information on the level of anxiety among dental implant patients. *The Journal of Contemporary Dental Practice*. 2020; 21: 846–851.
- [25] Freeman R, Maguire A, Ryan V, Wilson N, Innes NPT, Clarkson JE, *et al.* The FICTION trial: child oral health-related quality of life and dental anxiety across three treatment strategies for managing caries in young children. *Community Dentistry and Oral Epidemiology*. 2020; 48: 328–337.
- [26] Dou L, Vanschaayk MM, Zhang Y, Fu X, Ji P, Yang D. The prevalence of dental anxiety and its association with pain and other variables among adult patients with irreversible pulpitis. *BMC Oral Health*. 2018; 18: 101.
- [27] Rajeswari SR, Chandrasekhar R, Vinay C, Uloopi KS, RojaRamya KS, Ramesh MV. Effectiveness of cognitive behavioral play therapy and audiovisual distraction for management of preoperative anxiety in children. *International Journal of Clinical Pediatric Dentistry*. 2019; 12: 419–422.
- [28] Kayaalti-Yüksek S, Yıldırım S. Effect of Mozart's music on the learning of toothbrushing behavior in children with high and low dental anxiety levels. *Clinical Oral Investigations*. 2022; 26: 5979–5988.
- [29] Nalci G, Alaçam T, Altunkaynak B. Evaluation of the effectiveness of a mobile application in the management of dental anxiety: a randomised controlled trial. *Journal of Oral Rehabilitation*. 2022; 49: 535–540.
- [30] Guinot F, Mercadé M, Oprysnyk L, Veloso A, Boj JR. Comparison of active versus passive audiovisual distraction tools on children's behaviour, anxiety and pain in paediatric dentistry: a randomised crossover clinical trial. *European Journal of Paediatric Dentistry*. 2021; 22: 230–236.
- [31] Dodd S, Widnall E, Russell AE, Curtin EL, Simmonds R, Limmer M, *et al.* School-based peer education interventions to improve health: a global systematic review of effectiveness. *BMC Public Health*. 2022; 22: 2247.
- [32] Padminee K, Hemalatha R, Shankar P, Senthil D, Jayakaran TG, Kabita S. Effectiveness of biofeedback relaxation and audio-visual distraction on dental anxiety among 7- to 12-year-old children while administering

- local anaesthesia: a randomized clinical trial. *International Journal of Paediatric Dentistry*. 2022; 32: 31–40.
- [33] Camacho-Alonso F, Vilaplana-Vivo J, Caballero-Guerrero PM, Pato-Mourelo J, Sánchez-Siles M. Impact of audiovisual information on anxiety and fear in patients undergoing dental implant treatment. *Clinical Implant Dentistry and Related Research*. 2019; 21: 1189–1198.
- [34] Smolarek PC, da Silva LS, Martins PRD, Hartman KDC, Bortoluzzi MC, Chibinski ACR. Evaluation of pain, disruptive behaviour and anxiety in children aging 5–8 years old undergoing different modalities of local anaesthetic injection for dental treatment: a randomised clinical trial. *Acta Odontologica Scandinavica*. 2020; 78: 445–453.

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