

Assessment of the Relationship Between Dental Anxiety and Patient's Gender in Children Aged 4–6 Years Attending the Faculty of Dentistry, Damascus University

Alaa Mohmad Snobar^{*1}, Chaza Nader kouchaji²

1* Master Student in Department of pediatric dentistry, Faculty of Dentistry, Damascus University . alaa.snobar@damascusuniversity.edu.sy

2 Professor in Department of pediatric dentistry, Faculty of Dentistry, Damascus University. Chaza.kouchaji@damascusuniversity.edu.sy

Abstract:

Objective: This study aimed to evaluate the relationship between dental anxiety and patient's gender, in addition to examining the association between the physiological response to anxiety and pain perception among children aged 4–6 years attending the Faculty of Dentistry.

Materials and Methods: A clinical study was conducted on a sample of 100 children of both genders. The assessment tools included measuring dental anxiety through oxygen saturation using a pulse oximeter (as an objective, non-subjective measure), alongside pain evaluation using the Wong-Baker Faces Pain Rating Scale (as a subjective measure). Data were analyzed using Mann-Whitney and Spearman tests.

Results: The findings revealed that females recorded slightly lower oxygen saturation levels compared to males during the dental session (97.59 vs. 97.95 at T0; 96.77 vs. 97.29 at T1), and reported higher pain scores according to the Wong-Baker Scale (2.48 vs. 2.18). Although the differences did not reach statistical significance, they indicate a tendency for higher anxiety and pain among females. Moreover, Spearman's test showed a weak but statistically significant inverse correlation between oxygen saturation and pain scores ($r = -0.211$, $P = 0.035$), suggesting that children with higher anxiety may be more prone to experiencing greater pain.

Conclusions: The study concluded that patient gender may represent a contributing factor in the psychological and physiological responses associated with dental anxiety. Combining objective measures such as oxygen saturation with self-report tools like the Wong-Baker Scale provides a more accurate approach to monitoring anxiety and pain. The findings also recommend considering patient gender when planning behavioral interventions to improve children's experiences in the dental clinic.

Key Words: Dental anxiety, Pain, Gender, Pediatric dentistry.

Received: 25/12/2025

Accepted: 9/3/2026



Copyright: Damascus University- Syria, The authors retain the copyright under a CC BY- NC-SA

تقييم العلاقة بين القلق السني وجنس المريض عند الأطفال المراجعين لكلية طب الأسنان في جامعة دمشق بأعمار (4_6 سنوات)

آلاء محمد سنوبر^{1*}، شذى نادر قوشجي²

^{1*} طالبة ماجستير، قسم طب أسنان الأطفال، كلية طب الأسنان، جامعة دمشق.

alaa.snobar@damascusuniversity.edu.sy

² أستاذة دكتورة، قسم طب أسنان الأطفال، كلية طب الأسنان، جامعة دمشق.

Chaza.kouchaji@damascusuniversity.edu.sy

الملخص:

الهدف من البحث: تهدف هذه الدراسة إلى تقييم العلاقة بين القلق السني وجنس المريض، إضافة إلى دراسة الارتباط بين الاستجابة الفيزيولوجية للقلق وإدراك الألم لدى الأطفال بعمر 4-6 سنوات المراجعين لكلية طب الأسنان.

المواد والطرائق: أجريت دراسة سريرية على عينة مؤلفة من 100 طفل من كلا الجنسين، شملت أدوات التقييم قياس القلق السني عبر تشبع الأكسجين باستخدام مقياس الأكسجة النبضي (كمقياس موضوعي غير ذاتي)، إلى جانب تقييم الألم باستخدام مقياس Wong-Baker للجوه (كمقياس ذاتي). وتم تحليل البيانات باستخدام اختبارات Mann-Whitney و Spearman.

النتائج: أظهرت النتائج أن الإناث سجلن معدلات أكسجة أقل بشكل طفيف من الذكور خلال الجلسة السنوية (97.59 مقابل 97.95 عند T0؛ 96.77 مقابل 97.29 عند T1)، كما سجلن درجات أعلى للألم وفق مقياس Wong-Baker (2.48 مقابل 2.18). وعلى الرغم من أن الفروق لم تصل إلى دلالة إحصائية، فإنها تعكس ميلاً أعلى للقلق والألم لدى الإناث. كما كشفت نتائج اختبار Spearman عن وجود علاقة عكسية ضعيفة لكنها دالة إحصائياً بين تشبع الأكسجين ودرجات الألم ($r = -0.211$ ، $P = 0.035$)، ما يشير إلى أن الأطفال الأكثر قلقاً قد يكونون أكثر عرضة لتجربة الألم بشكل أكبر.

الاستنتاجات: خلصت الدراسة إلى أن جنس المريض قد يشكل عاملاً مؤثراً في الاستجابات النفسية والفيزيولوجية المرتبطة بالقلق السني، وأن الجمع بين مقياس موضوعية مثل تشبع الأكسجين وأدوات التقييم الذاتي مثل Wong-Baker يوفر وسيلة أكثر دقة لرصد القلق والألم. كما توصي النتائج بضرورة أخذ جنس المريض بعين الاعتبار عند التخطيط لإجراء التدخلات السلوكية لتحسين تجربة الطفل في العيادة السنوية.

الكلمات المفتاحية: القلق السني، الألم، الجنس، طب أسنان الأطفال.

تاريخ الابداع: 2025/12/25

تاريخ القبول: 2026/3/9



حقوق النشر: جامعة دمشق -

سورية، يحتفظ المؤلفون بحقوق

النشر بموجب

CC BY-NC-SA

Introduction:

Dental anxiety represents one of the main challenges in pediatric dentistry. It is defined as an excessive fear of an ambiguous or unknown threat, resulting in negative psychological and physiological responses during dental visits, which directly affects oral health and quality of life (del Carmen, 2023). Prevalence ranges from 4% to 20% among preschool children and varies by age (Almarzouq, 2024).

Severity of dental anxiety is influenced by personal factors such as age and gender, social factors such as socioeconomic status, and dental-related factors including previous experiences in the clinic (Shindova 2021). Females tend to show higher levels of anxiety than males (Singh, 2024). Children with dental anxiety often avoid regular dental visits and seek care only in cases of acute pain, which delays diagnosis and may lead to more invasive procedures. Negative experiences further exacerbate anxiety and increase the likelihood of general anesthesia interventions, which are costly and carry higher risks (Almarzouq, 2024).

This study aims to evaluate the relationship between perceived dental anxiety and pain severity, as well as the influence of patient gender among children aged 4–6 years attending the Faculty of Dentistry, Damascus University.

Materials and Methods:

Study Design:

A clinical study was conducted on 100 children aged 4–6 years, equally distributed by sex into 50 females and 50 males. The sample size was calculated using G*Power 3.1.9.7 and based on similar previous study (Mahale, 2023; Cristea et al., 2025). The participants visited the department of pediatric dentistry at Damascus University between April and May 2025. The study aimed to evaluate the relationship among dental anxiety, pain severity, and patient gender.

Ethical Approval:

The study was approved by the Department of Pediatric Dentistry and the Ethics Committee of the Faculty of Dentistry. Written informed consent was obtained from parents.

Inclusion Criteria:

Children aged 4–6 years.

Patients with definitely positive (++) or positive (+) ranking according to the Frankle Behavior Rating Scale.

Patients visiting the Faculty of Dentistry for therapeutic reasons.

Ability to cooperate during assessment.

Exclusion Criteria:

Presence of psychological or neurological disorders affecting response.

Pre-treatment with anxiolytics or analgesics.

Chronic medical conditions affecting pain or anxiety.

Assessment tools:

Pulse oximeter (SpO₂) for objective anxiety measurement.

Wong-Baker Faces Pain Rating Scale for subjective pain assessment.

The initial study session included an explanation of the study objectives and procedures to the parents and informed consent was obtained.

Baseline SpO₂ was measured before any dental procedure.

Topical anesthesia (Benzocaine 20%) was applied, followed by inferior alveolar nerve block using Lidocaine 2% with Epinephrine 1:200,000.

Pain during anesthesia was assessed using Wong-Baker Scale.

Demographic and clinical data were recorded in a standardized form.

Statistical Analysis:

Data were recorded in Excel and analyzed using SPSS v.25. Differences in anxiety and pain by gender were evaluated using Mann–Whitney and Spearman Tests.

Results:

Females showed slightly lower oxygen saturation than males at T0 (97.59 vs. 97.95) and T1 (96.77 vs. 97.29), indicating higher physiological anxiety, though differences were not statistically significant (Table 1).

Table .1 Mann–Whitney test for SPO2 by gender.

Mann-Whitney				
P-value	Test value	Mean SPO2	Gender	Scale
.424	1118.00	97.95	Male	(SPO2) T0
		97.59	Female	
.698	1177.50	97.29	Male	SPO2) T1
		96.77	Female	

Females reported slightly higher pain scores (2.48 ±3.13) than males (2.18 ±3.19) at T1, without statistical significance (Table 2).

Table 2. Mann–Whitney test for Wong-Baker by gender.

Mann-Whitney				
P-value	Test value	Mean	Gender	Scale
.543	1150.00	2.18	Male	Wong-Baker
		2.48	Female	

Spearman correlation showed a weak but significant inverse relationship between SpO₂ and pain scores (r = -0.211, P = 0.035), suggesting children with higher anxiety experience greater pain (Table 3).

Table 3. Spearman correlation between SpO₂ and Wong-Baker at T1.

Spearman Rank Test				
P-value	Measure correlation(r)	Scale of pain	Scale of anxiety	Time
.035	-.211	Wong-Baker	SPO2	T1

Discussion:

Dental anxiety in children is one of the most common challenges faced by pediatric dentists, as it directly affects a child’s cooperation during treatment, the quality of care delivered, and the likelihood of completing follow-up visits, (Menni 2020). Although several studies have compared anxiety levels between males and females, the evidence concerning children aged 4–6 years remains inconsistent, partly because expressions of fear and behavioral responses vary among genders in this early developmental stage. This specific age range was chosen because it represents the pre-school period, a particularly sensitive stage in which dental anxiety is more prevalent, as reported by (Fux-Noy, 2023). Combining physiological indicators such as oxygen saturation (SpO₂) with evaluative tools like the Wong-Baker Scale enhances the reliability of assessment, especially since physiological measures have been shown to be

dependable in estimating anxiety in children, as demonstrated by (Dixit, 2020). Integrating these complementary methods provides a clearer understanding of the factors influencing dental anxiety, including potential gender differences, and supports the development of more targeted behavioral and clinical interventions for this vulnerable age group.

The results of the study indicate the presence of differences between genders in the physiological response to anxiety during the dental session. Females recorded lower oxygen saturation (SpO₂) values compared to males across all evaluation stages, with an additional decrease observed after the administration of local anesthesia. Although these differences were not statistically significant, the decline can be interpreted as a physiological reaction to anxiety associated with the anticipation of pain. This is consistent with Singh (2024), who reported that females tend to report higher levels of dental fear and anxiety in stressful situations such as dental visits. The study attributed this to

physiological factors as well as a greater emotional expression ability among females (Singh, 2024).

Regarding pain assessment using the Wong-Baker Scale, females scored relatively higher than males, which may indicate a tendency to amplify or express pain more clearly. These differences are often attributed to psychological and social factors, as females are believed to be more inclined to express their emotions, including pain and anxiety, due to educational and cultural influences that encourage greater emotional expression compared to males (Sivarajan, 2021; Dadalti, 2021).

The study also shows an inverse relationship between oxygen saturation (SpO₂) and the recorded pain scores. This can be interpreted by the fact that the physiological response to anxiety may influence pain perception in children. This finding is supported by Saed (2024), who confirmed that anxiety increases a child's sensitivity to pain (Saed, 2024).

Limitations:

This study has some limitations. The sample was relatively small and drawn from a single university clinic, which may limit the generalizability of the findings. The narrow age range (4–6 years) represents a developmental stage with variable emotional expression, which may influence anxiety and pain reporting. Pain assessment relied on a subjective self-report scale that may be affected by individual expressiveness. Although SpO₂ was used as an objective measure, it can also be influenced by factors such as breathing or movement. Future studies should include larger, more diverse samples and consider additional physiological anxiety markers (such as heart rate variability or salivary cortisol).

Conclusions:

Patient gender may influence psychological and physiological responses to dental procedure.

Females showed slightly higher anxiety and pain, though not statistically significant.

Using both objective (SpO₂) and subjective (Wong-Baker) measures provides a more accurate assessment of dental anxiety.

Gender should be considered when planning behavioral interventions in pediatric dentistry.

Funding: this research is funded by Damascus university – funder No. (501100020595).

References:

1. Alamoudi N, Farsi N, AlSaid S (2021). Behavioral management strategies in pediatric dentistry: Current trends and challenges. *Saudi Dental Journal*, 33(7), 384–391.
2. Almarzouq S (2024). Effectiveness of nonpharmacological behavioural interventions in managing dental fear and anxiety among children: A systematic review and meta-analysis. *Healthcare*, 12, 537.
3. Alrubaik A, Alzahrani S (2023). Sensory distraction techniques for dental anxiety management in preschool children. *Journal of Clinical Pediatric Dentistry*, 47(3), 156–162.
4. Aminabadi NA, Najafpour E, Ghoreishizadeh A (2020). Effects of cognitive distraction on children's pain and anxiety during local anesthesia. *Pediatric Dentistry*, 42(5), 319–325.
5. Cristea R, Ganea M,(2025). Dentophobia and the Interaction Between Child Patients and Dentists: Anxiety Triggers in the Dental Office. *Healthcare*, 13(9):1021. doi:10.3390/healthcare13091021.
6. Dadalti GT, et al. (2021). Gender differences in dental anxiety expression in children. *International Journal of Pediatric Dentistry*, 31(2), 215–222.
7. del Carmen M (2023). Magic-based distraction techniques for pediatric anxiety management: A clinical perspective. *Journal of Pediatric Behavioral Dentistry*, 15(2), 74–81.
8. Dixit, U., & Jasani, R. (2020). 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*, 38(1), 71–78.
9. Eren H, Atabek D (2020). Physiological responses to stress during dental treatment in anxious children. *European Archives of Paediatric Dentistry*, 21(4), 497–504.
10. Fux-Noy, A. (2023). Anxiety during the dental care of children aged 4 to 6 years over three consecutive visits. *Journal of Clinical Pediatric Dentistry*, 47(6), 100–105. <https://doi.org/10.22514/jocpd.2023.084>.
11. Khandelwal M, Rathore A, Sharma M (2021). Comparative evaluation of pop-it toys and music therapy for anxiety reduction during pediatric dental treatment. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 39(4), 310–316.
12. Mahale, A. (2023). Correlation of dental anxiety measured by children drawing: Hospital scale and SEM scale with the intelligence quotient levels measured by Binet Kamat Test among children aged 6–9 years. *Journal of Pediatric Dentistry*, 11(1), 16–22.
13. Menni, A. (2020). DentalVibe® versus lignocaine hydrochloride 2% gel in pain reduction during inferior alveolar nerve block in children. *Journal of Dental Anesthesia and Pain Medicine*, 20(6), 397–402.
14. Saeed T (2024). Impact of preoperative dental anxiety on intraoperative pain perception during tooth extraction: A cross-sectional study. *Journal of University Medical & Dental College*, 15(4), 1009–1013.
15. Shindova MP, Belcheva AB (2021). Dental fear and anxiety in children: A review of the environmental factors. *Folia Medica*, 63(2), 177–182.
16. Singh R (2024). Visual and multisensory distraction in pediatric dentistry: Comparative effectiveness study. *International Journal of Pediatric Dental Research*, 12(1), 15–23.
17. Sivarajan M, Lakkoji D, Ezhilarasan D (2021). A review on gender differences in dental anxiety. *The Journal of Contemporary Issues in Business and Government*, 27, 2378–2384.
18. Wu H, Lin C (2023). Effectiveness of LED-based visual distraction on dental pain perception in children. *Clinical Oral Investigations*, 27(2), 763–770.