

Analyzing non-pharmacological behavior management in children with dental anxiety: A systematic review and meta-analysis

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ADMINISTRATIVE INFORMATION**Support** - King Khalid University.**Review Stage at time of this submission** - Completed but not published.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202440064**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 April 2024 and was last updated on 16 April 2024.**INTRODUCTION**

Review question / Objective This systematic review and meta-analysis aimed to evaluate the effectiveness of NPBIs in reducing dental anxiety and improving behavioral outcomes during dental visits in pediatric patients.

Rationale This work addresses a significant gap in the literature by systematically synthesizing available research on non-pharmacological interventions for pediatric dental anxiety. It also offers insights into methodological strengths and weaknesses within the existing body of evidence, highlighting areas for future research. Ultimately, the findings of this review have the potential to guide dental practitioners towards more informed, patient-centered approaches to managing dental anxiety, enhancing the quality of pediatric dental care, and improving long-term oral health for children.

Condition being studied Dental anxiety, a prevalent concern among pediatric patients, significantly hinders the ability to deliver effective dental care. It's characterized by a spectrum of fearful responses to dental stimuli that not only affects children's immediate emotional well-being but also poses long-term implications for their oral health. Dental anxiety manifests across various age groups, impacting individuals differently as they grow. For example, studies have shown that the prevalence of dental anxiety in preschool-aged children varies between 4% and 20%, while in school-aged children from 6 to 12 years, it fluctuates between 8% and 23%. Among adolescents, the range is slightly narrower, from 7% to 18%, whereas in adults, dental anxiety prevalence is notably higher, ranging from 14% to 30%.

Studies indicate that early experiences of dental anxiety can lead to avoidance of dental care, resulting in poor oral hygiene, increased incidence of dental caries, and a higher likelihood of requiring extensive dental interventions later in life. The traditional approach to managing dental anxiety in

children has predominantly relied on pharmacological interventions. However, the concerns about the possible side effects, the potential for sedation-related complications, and the growing preference for non-pharmacological alternatives have shifted the focus towards behavioral management techniques.

METHODS

Search strategy A comprehensive internet search of electronic databases including PubMed, Scopus, Cochrane, and Web of Science has been performed until April 2024. We used specific keywords to identify potentially relevant studies. Further records were extracted through manual searches.

Participant or population Children undergoing dental procedures.

Intervention All types of non-pharmacological behavioral interventions (NPBIs) aimed at reducing dental anxiety.

Comparator No intervention, no distraction, standard care, or another type of NPBI.

Study designs to be included Randomized controlled trials (RCTs).

Eligibility criteria Studies published in English.

Information sources A comprehensive internet search of electronic databases including PubMed, Scopus, Cochrane, and Web of Science has been performed until April 2024. We used specific keywords to identify potentially relevant studies. Further records were extracted through manual searches.

Main outcome(s) Out of 2957 records identified, 76 RCTs met the inclusion criteria, encompassing 6723 participants. The review revealed that distraction techniques did not significantly reduce dental anxiety compared to Tell-Show-Do (TSD) (SMD -0.34, 95% CI -0.71 to 0.04), though they were effective in reducing pain (SMD -0.43, 95% CI -0.76 to -0.10). Virtual Reality (VR) distraction did not show a significant reduction in dental anxiety or pain when compared to traditional distraction techniques.

The evidence on the effectiveness of NPBIs in managing dental anxiety in pediatric patients is mixed. While certain distraction techniques may alleviate pain, their impact on anxiety is comparable to that of traditional methods like TSD.

Data management Two authors independently applied the selection criteria. Eligibility screening was performed in two steps: the first step was to screen abstracts for eligibility and in the second step, full text articles of eligible abstracts were retrieved and screened for eligibility. We then created an online data extraction sheet that was accessible to the two authors who conducted the data extraction. The extracted data included: (1) study ID, (2) study publication year, (3) country, (4) study design, (5) number of participants, (6) age range, (7) intervention and control, (8) methods of assessment, (9) evaluation time, (10) changes in fear and anxiety, (11) changes in pain, and (12) completion of treatment.

Quality assessment / Risk of bias analysis In accordance with the guidelines of the Cochrane Handbook of Systematic Review and Meta-analysis [16], we employed the Cochrane risk of bias assessment tool 2 (RoB-II) to assess the risk of bias in RCTs. This tool examines the following seven critical domains for potential bias: (1) sequence generation, (2) allocation concealment, (3) blinding of participants and personnel, (4) blinding of outcome assessment, (5) incomplete outcome data, (6) selective reporting, and (7) other potential sources of bias. Two authors independently assessed each of the mentioned domains across the studies, assigning ratings of unclear, low, or high risk of bias. The Risk of Bias in Non-Randomized Studies of Intervention (ROBINS-I) tool was also used to assess bias in non-randomized studies.

Strategy of data synthesis We measured the changes in dental fear and anxiety using several measures including Dental Subscale of Children's Fear Survey Schedule (CFSS-DS), Facial Image Scale (FIS), Raghavendra Mahuriu Sujata Pictorial Scale (RMS-PS), Frankl's behavior rating scale (FBRS), Venham Picture Test (VPT). We also assessed the change in pain using the self-rated pain scales (WBFS), Face, Legs, Activity, Cry, Consolability (FLACC) scale. All the scaled were pooled as a standardized mean difference (SMD) and its accompanying 95% confidence interval (CI) into pairwise meta-analysis models. The statistical analysis was conducted using STATA software version 18. A statistical significance level of < 0.05 was considered.

Subgroup analysis The data was compiled from a variety of articles:

- Author(s), year of publication, country, study design.
- Total number of patients/datasets.
- Training/validation datasets.

Sensitivity analysis Not Applicable.

Language restriction Only articles in English.

Country(ies) involved Saudi Arabia.

Keywords Dental anxiety, pediatric dentistry, non-pharmacological interventions, systematic review, meta-analysis, distraction techniques, Virtual Reality.

Dissemination plans All the Data will be shared after the publication of the article.

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