Predicting Child Cooperation Based on Child Anxiety and Maternal Stress in Children with Autism During Dental Interventions

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A r t i c l e   I n f o

Article type:
Original Article

How to cite this article:
Ebrahimi, A., Mousavi, S. M., Dehghanzadeh, S., Asadi Majareh, S., & Sirousjahed, Z. (IN PRESS). Predicting Child Cooperation Based on Child Anxiety and Maternal Stress in Children with Autism During Dental Interventions. *Applied Family Therapy Journal*. http://dx.doi.org/10.61838/kman.aftj.1803

A B S T R A C T

Objective: This study aimed to predict the level of cooperation in children with Autism Spectrum Disorder (ASD) during dental interventions based on their anxiety levels and maternal stress.

Methods and Materials: A cross-sectional, descriptive-analytical study was conducted on 32 children aged 3–6 years with a clinical diagnosis of ASD in Rasht, Iran. Participants were recruited through autism support organizations and underwent dental examinations at a private clinic. Data collection involved the Spence Children's Anxiety Scale, the Frankl Behavioral Rating Scale, and the Parental Stress Scale. Children's demographic and behavioral data were recorded, and statistical analyses including Spearman correlation and multiple regression were performed using SPSS version 26 at a significance level of 0.05.

Findings: Results showed that both child anxiety and maternal stress were significantly associated with the level of child cooperation during dental procedures. Spearman's correlation revealed strong, positive relationships between child cooperation and specific anxiety subscales, while maternal stress was negatively correlated with cooperation. The multiple regression model demonstrated that these two predictors jointly explained 52.4% of the variance in cooperation levels ($R^2 = 0.524$, $p < 0.001$). Standardized beta coefficients indicated that child anxiety positively predicted cooperation ($\beta = 0.244$, $p < 0.001$), whereas maternal stress had a significant negative effect ($\beta = -0.225$, $p < 0.001$).

Conclusion: The findings suggest that both child-related emotional factors and maternal psychological states significantly influence cooperation during dental interventions in children with ASD. Screening for maternal stress and child anxiety before dental visits may enable more effective behavioral management strategies and reduce the need for invasive procedures.

Keywords: Autism Spectrum Disorder, child cooperation, maternal stress, dental anxiety, pediatric dentistry.

1. Introduction

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by persistent deficits in social communication, restricted interests, and repetitive behaviors that manifest in early childhood (Okkenhaug, 2025; Xing & Wu, 2025). Children with ASD often face unique challenges in coping with routine medical and dental procedures, largely due to sensory sensitivities, communication difficulties, and heightened levels of anxiety (Georgoula et al., 2025; Kosić et al., 2025). One of the most problematic aspects of health care for this population is dental treatment, which frequently elicits severe anxiety and behavioral resistance, resulting in inadequate dental care or the need for sedation or general anesthesia (Bartolomé-Villar et al., 2016; Widyagarini & Suharsini, 2017). These challenges highlight the need for targeted research exploring psychological and behavioral predictors of cooperation in dental contexts, particularly those related to the internal emotional state of children and their caregivers.

Dental anxiety in children with ASD is significantly influenced by multiple sensory, cognitive, and emotional factors. Children with ASD often exhibit an over-responsiveness to sensory stimuli, such as bright lights, loud noises, and physical contact, which are common in dental settings (Nematollahi & Nasehi, 2019). These sensory sensitivities are frequently accompanied by anticipatory anxiety, making routine dental check-ups overwhelmingly distressing (Zarebidoki et al., 2022). Such fear responses may be further reinforced by prior negative experiences or learned avoidance behaviors. Research has shown that specific forms of anxiety, including needle phobia, fear of embarrassment, and fear of medical authority figures, are particularly salient in children with ASD and directly reduce their level of cooperation during dental procedures (Bahrololoomi et al., 2023). These anxiety components not only impact the immediate clinical outcomes but may also contribute to long-term neglect of oral health care.

The emotional state and psychological well-being of parents—especially mothers—play a critical role in shaping children's responses to stressful medical environments. Parenting a child with autism is associated with increased levels of chronic stress, emotional exhaustion, and psychological burden (Khusaifan & El Keshky, 2022; Neijs et al., 2024). Mothers, who are often the primary caregivers, experience significant stress in managing the everyday behavioral challenges of their children, including issues related to healthcare access and compliance. Maternal stress, in particular, has been shown to be a significant predictor of children's behavioral dysregulation in novel or anxiety-provoking environments (Masoudi et al., 2022). Within the dental context, this stress may be transmitted to the child both behaviorally and physiologically, exacerbating anxiety and reducing the child's capacity to remain calm or cooperative. High parental stress levels have also been linked to lower thresholds for tolerance and less effective behavioral management strategies during medical encounters (Mello et al., 2022).

Given the bi-directional emotional influence between children with ASD and their parents, a number of recent studies have emphasized the need for holistic approaches that consider both child and caregiver variables when assessing treatment outcomes in pediatric dentistry (Sartor et al., 2023; Wahdan et al., 2023). While various behavioral techniques and sedation methods are commonly used to manage uncooperative behavior in dental clinics, these interventions are costly, risk-laden, and do not address the root psychological determinants of behavioral resistance. Consequently, exploring psychological predictors such as child anxiety and maternal stress can contribute to the development of non-invasive, preventive strategies for improving cooperation in children with ASD (Selles & Storch, 2013). Furthermore, understanding the degree to which maternal stress and specific anxiety subtypes (e.g., obsessive-compulsive tendencies, agoraphobia, depression) predict child cooperation may provide actionable insights for clinicians and behavioral specialists involved in autism care (Bahrami et al., 2013).

Despite the significance of this issue, relatively few empirical studies have examined the combined effects of child anxiety and maternal stress on children's cooperation in dental settings. Much of the existing literature either focuses on general behavioral challenges in ASD or isolates one psychological variable without accounting for the systemic and familial context in which these children develop (Masoudi et al., 2022; Rojas-Torres et al., 2023). Yet, autism care research has increasingly emphasized the importance of parent–child interactional dynamics in the manifestation and regulation of behavioral symptoms, especially in stressful situations (Sartor et al., 2023). Parental attitudes and affective states have been demonstrated to influence not only children's behavioral responses but also the success of therapeutic interventions and clinical procedures (Mello et al., 2022). For instance, interventions aimed at reducing parenting stress have been

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found to enhance treatment responsiveness in children with ASD, particularly when parents are engaged in the therapeutic process (Wahdan et al., 2023).

Dental professionals are increasingly called upon to deliver care to children with ASD, yet most lack specialized training in managing the behavioral challenges associated with this population. The need for accurate, evidence-based assessment tools to predict child cooperation and identify high-risk cases has never been more pressing. Studies like those by (Amrollahi & Amouchi, 2021) and (Albehbahani et al., 2021) have highlighted the clinical importance of understanding behavioral responses in autistic children undergoing dental treatment, particularly by using indices such as the PUFA (Pulpal involvement, Ulceration, Fistula, and Abscess) to document the severity of untreated dental caries. However, while such indices are valuable in assessing clinical outcomes, they do not account for the underlying psychological factors that influence whether treatment can proceed in the first place. Thus, expanding the focus to include psychological assessments may offer a more comprehensive understanding of dental care accessibility for children with autism.

This growing concern is also reflected in public health and disability literature, where researchers stress the importance of integrating psychological screening into routine pediatric dental care, especially for children with neurodevelopmental disorders (Bartolomé-Villar et al., 2016). As (Maserat et al., 2021) has suggested, applying digital or IT-based screening tools for behavioral readiness may enhance pre-visit planning and reduce the need for emergency interventions. Moreover, child temperament—another critical psychological variable—is increasingly recognized for its predictive value in dental anxiety and cooperation, as highlighted by (Bahrololoomi et al., 2023). Children with more difficult or reactive temperaments are more likely to exhibit non-cooperative behaviors during dental appointments, a trend that is exacerbated in populations with ASD.

Given this background, the present study aims to examine how child anxiety and maternal stress jointly predict the degree of cooperation exhibited by children with autism during dental interventions.

2.   Methods and Materials

2.1.   Study Design and Participants

This study employed a cross-sectional, descriptive-analytical design and was conducted on 32 children diagnosed with Autism Spectrum Disorder (ASD) in the city of Rasht. The primary aim was to examine the relationship between child anxiety, maternal stress, and the level of cooperation of children with autism during dental interventions. The study population included children between the ages of 3 and 6 who were formally diagnosed with autism and were residing in Rasht. The inclusion criteria required that children be within the specified age range, possess a confirmed diagnosis of ASD, and have parents who provided informed written consent to participate in the study. Exclusion criteria involved children who were excessively uncooperative to the extent that examination was not feasible, parental or child distress that interfered with participation, and any history of underlying medical or syndromic conditions unrelated to autism. Additionally, children with severe dental anomalies, structural enamel or dentin defects, or significant dental misalignments were excluded from the sample. Due to the limited availability of eligible participants, a convenience sampling method was utilized. Following the approval of the research proposal, the researcher contacted autism support centers in Rasht to recruit participants. Consent forms were distributed and collected from parents. A checklist was completed for each child, including demographic information such as age and gender. Dental examinations were performed using a dental mirror, probe, and flashlight, and were conducted by the same examiner (the researcher) to ensure consistency. The pufa/PUFA index was recorded for each child as part of the dental health evaluation. Furthermore, the severity level of autism (Levels 1, 2, or 3) was documented for each participant.

2.2.   Measures

The first tool used in this study to assess child anxiety was the Spence Children's Anxiety Scale (SCAS), developed by Spence in 1999. This self-report instrument, which can also be completed by parents for younger children, is designed to evaluate anxiety symptoms across multiple dimensions such as generalized anxiety, separation anxiety, social phobia, and obsessive-compulsive behaviors. The scale contains 38 items, with responses given on a 4-point Likert scale ranging from "never" to "always." The SCAS has been widely validated and exhibits strong psychometric properties in both clinical and non-clinical populations. For this study, the

parental-report version of the SCAS was used to assess the presence and intensity of anxiety symptoms in children with ASD, as direct self-report from these children may not yield reliable results due to communication limitations. The Persian version of the SCAS used in this study has shown acceptable reliability and validity in previous studies conducted with Iranian populations.

The second instrument employed was the Frankl Behavioral Rating Scale, introduced by Frankl et al. in 1962, which was used to assess the level of cooperation during dental examinations. This observational tool categorizes children's behavior into four levels: definitely negative, negative, positive, and definitely positive. The rating is determined based on the child's verbal and non-verbal responses during dental procedures, and it serves as an efficient way for clinicians to classify the level of cooperation in real-time. The Frankl scale has been extensively used in pediatric dentistry research and practice for its simplicity and applicability in clinical settings, particularly with children who may have developmental disorders. In this study, the examiner (researcher) observed and rated each child's behavior during the dental visit using this scale, ensuring uniform scoring conditions for all participants.

To measure maternal stress levels, the study utilized the Parental Stress Scale (PSS), which evaluates the stress parents experience in the caregiving role. This scale includes 18 items that cover both positive aspects of parenting (e.g., emotional rewards and personal development) and stress-related aspects (e.g., feeling overwhelmed or exhausted). Each item is rated on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree." The total score reflects the overall stress level, with higher scores indicating greater parental stress. The PSS is particularly suitable for capturing the emotional experiences of parents of children with special needs, and its Persian translation has demonstrated good reliability in prior research conducted with Iranian parents. In the context of this study, mothers of children with ASD completed the PSS, providing insight into how their stress levels may influence their children's behavioral responses during dental treatment.

2.3. Data Analysis

All data collected were analyzed using SPSS software, version 26. Descriptive statistics, including frequencies, means, and standard deviations, were first used to summarize the demographic and clinical characteristics of the sample. Inferential statistical methods were then employed to test the study hypotheses. Spearman's correlation coefficient was used to examine the relationship between child anxiety, maternal stress, and child cooperation levels. This non-parametric test was selected due to the small sample size and potential deviations from normality. Furthermore, regression analysis was conducted to identify the predictive power of child anxiety and maternal stress on the level of cooperation during dental visits. All statistical analyses were conducted at a significance level of .05, and the assumptions for each test were carefully checked to ensure the validity of the results.

3. Findings and Results

Before proceeding with inferential statistics, descriptive analyses were performed to examine the general distribution of variables. A crucial assumption in regression analysis is the normal distribution of residuals, as it validates the results of regression-based statistical tests. To evaluate this assumption, the Kolmogorov–Smirnov test was applied to the dependent variables to determine their distributional properties. If this assumption had not been met, appropriate transformations would have been applied.

Table 1

Descriptive Statistics and Kolmogorov–Smirnov Test Results for Variable Normality Assessment

Variable	Mean	Standard Deviation	Kolmogorov–Smirnov Z	p-value
Child Cooperation	85.2799	9.86839	0.532	0.940
Maternal Stress	49.3891	6.02907	1.239	0.093
Fear of Embarrassment	20.0519	2.86113	0.506	0.960
Fear of Needles/Injection	20.0182	3.34318	0.662	0.773
Obsessive Thoughts	19.4403	3.08688	0.525	0.946
Depression	21.6597	3.16892	0.872	0.433
Agoraphobia	20.3481	3.58577	0.490	0.970
Fear of Doctors	134.6690	13.40286	0.642	0.804
Child Temperament	101.5182	12.10706	1.053	0.218

As shown in Table 1, the p-values for all variables, including maternal stress and child cooperation (ranging from 0.093 to 0.960), exceed the threshold of 0.05. Therefore, the null hypothesis of normality cannot be rejected, and the distributions of all variables are considered normal. The skewness and kurtosis values were also acceptable, supporting the normality assumption. Given that all variables met this assumption, parametric and non-parametric tests could be applied as appropriate.

To evaluate the existence and strength of the relationships between the main variables, correlation analysis was conducted. Due to the potential non-normal distribution in some cases, Spearman's rank-order correlation coefficient was used. This coefficient ranges between -1 and +1, where a negative sign indicates an inverse relationship and a positive sign signifies a direct relationship. The closer the absolute value of the coefficient is to 1, the stronger the relationship; values near 0 indicate a weak correlation. Along with the strength of the relationship, the significance of the correlation was tested using a null hypothesis of no correlation in the population.

Table 2

Spearman Correlation Matrix Among Predictor and Criterion Variables

Variable	1	2	3	4	5	6	7	8	9
Child Cooperation	1	0.386	0.412	0.541	0.585	0.482	0.329	0.911	0.619
Maternal Stress		1	0.629	0.476	0.387	0.417	0.323	0.733	0.583
Fear of Embarrassment			1	0.473	0.464	0.334	0.291	0.586	0.658
Fear of Injection				1	0.575	0.562	0.318	0.612	0.775
Obsessive Thoughts					1	0.610	0.448	0.614	0.815
Depression						1	0.544	0.543	0.814
Agoraphobia							1	0.387	0.709
Fear of Doctors								1	0.717
Child Temperament									1

All correlations were statistically significant at $p < .01$. As shown, child cooperation was positively correlated with all components of child anxiety and maternal stress. The strongest relationship was observed between child cooperation and fear of doctors ($r = 0.911$, $p < .01$), followed by temperament ($r = 0.619$, $p < .01$). These findings demonstrate a significant and direct association between maternal stress, child anxiety dimensions, and the level of cooperation in children during dental procedures.

Following the correlation analysis, a multiple regression analysis was conducted to evaluate the predictive value of child anxiety and maternal stress on child cooperation.

Table 3

Multiple Regression Model Summary

Step	R	R²	Adjusted R²	Std. Error of the Estimate	F	df	Sig.	Durbin-Watson
1	0.620	0.384	0.385	9.51876	134.235	31	0.000	1.902
2	0.725	0.524	0.521	8.38622	109.989	31	0.000	1.902

As presented in Table 3, the final model achieved a multiple correlation coefficient (R) of 0.725, indicating a moderate relationship. The coefficient of determination (R²) was 0.524, suggesting that approximately 52.4% of the variance in child cooperation was explained by the combined predictors—maternal stress and child anxiety. The adjusted R² remained stable at 0.521, and the Durbin–Watson statistic was 1.902, confirming that the residuals were independent. Overall, these results affirm that the model has satisfactory explanatory power.

Table 4

Multiple Regression Coefficients for Predicting Child Cooperation

Model	Predictor	B	Std. Error	Beta	t	p	VIF
1	Constant	10.141	1.515	-	6.694	0.000	-

2	Child Cooperation	0.120	0.018	0.328	6.783	0.000	1.000
	Constant	15.812	1.962	-	8.058	0.000	-
	Child Anxiety	0.088	0.018	0.244	4.794	0.000	1.163
	Maternal Stress	-0.133	0.031	-0.225	-4.399	0.000	1.163

Based on the standardized beta coefficients from Model 2 in Table 4, the regression equation for predicting child cooperation from child anxiety and maternal stress can be expressed as:

$$\text{Child Cooperation} = 15.812 + (0.244 \times \text{Child Anxiety}) - (0.225 \times \text{Maternal Stress})$$

The beta values indicate that child anxiety positively predicts cooperation ($\beta = 0.244$, $p < .001$), whereas maternal stress negatively predicts cooperation ($\beta = -0.225$, $p < .001$). Both predictors are statistically significant, confirming that higher anxiety in children corresponds to more cooperation, while elevated maternal stress is associated with lower child cooperation. This dual dynamic suggests that while a certain level of child anxiety may be manageable or expected during dental interventions, parental stress plays a crucial role in shaping the child's behavioral response. These results support the conceptual model where both child-related emotional factors and parental psychological states jointly influence cooperative behavior in clinical settings.

4. Discussion and Conclusion

The findings of the present study revealed significant relationships between child anxiety, maternal stress, and the level of cooperation exhibited by children with Autism Spectrum Disorder (ASD) during dental interventions. The results indicated that both higher levels of child anxiety and maternal stress were associated with lower levels of cooperation, and when included in a predictive model, these two variables jointly explained over 52% of the variance in child cooperation. The standardized regression coefficients demonstrated that child anxiety had a positive predictive relationship with cooperation, whereas maternal stress had a negative predictive influence. These findings underscore the dual role that individual and familial psychological factors play in influencing behavioral outcomes in dental settings for children with ASD.

The strong negative correlation between maternal stress and child cooperation in dental contexts aligns with a growing body of literature emphasizing the critical role of parental emotional states in shaping child behavior,

particularly in high-stimulation environments such as dental clinics. Elevated levels of maternal stress are known to compromise a parent's ability to regulate their own affect and provide consistent behavioral support to their children, especially during challenging moments like dental visits (Mello et al., 2022; Neijs et al., 2024). As mothers experience greater emotional fatigue, their capacity to buffer their children against anxiety-provoking stimuli diminishes, thereby amplifying the child's behavioral distress and resistance to treatment. This relationship was previously documented in the study by (Khusaifan & El Keshky, 2022), which found that increased parental stress—particularly among mothers of children with autism—was a significant predictor of behavioral and emotional difficulties in children. Similarly, (Sartor et al., 2023) demonstrated that perceived quality of the parental relationship and parental well-being had a direct impact on the emotional regulation capacity of children with ASD.

In tandem, the findings also revealed that specific dimensions of child anxiety—such as fear of embarrassment, needle phobia, obsessive thoughts, depression, and agoraphobia—had statistically significant and positive correlations with cooperation levels. Interestingly, while anxiety is often associated with avoidance behaviors, in this study, certain anxiety subcomponents appeared to predict higher levels of cooperation. This may reflect a subset of children for whom anxiety, particularly anticipatory anxiety, leads to increased compliance as a coping strategy rather than behavioral resistance. Prior studies have indicated that some children with ASD display hyper-compliance or perfectionism in response to anxiety, especially in structured environments like clinical settings (Selles & Storch, 2013). Moreover, (Bahrololoomi et al., 2023) reported that child temperament and specific anxiety traits were significantly associated with dental behavior ratings, further supporting the notion that different facets of anxiety may have varying behavioral consequences in medical environments.

The significant predictive role of child anxiety in this study is further reinforced by the literature on emotional and behavioral regulation in autism. For example, (Zarebidoki et al., 2022) observed that children's exposure to media content linked to fear or medical themes significantly increased their dental anxiety and reduced cooperation. This supports the hypothesis that internalized fear responses, shaped by

environmental cues and cognitive schemas, can manifest differently across anxiety dimensions. Likewise, (Nematollahi & Nasehi, 2019) established a correlation between sensory processing issues and behavioral non-cooperation in dental settings among preschool children, suggesting that emotional dysregulation in ASD is often intertwined with sensory sensitivities and anxiety responses.

The regression results of this study confirmed that maternal stress and child anxiety are not only correlated with child cooperation but are also significant predictors. The finding that these two variables could jointly account for more than half of the variance in cooperation levels is consistent with the systemic view of autism, which posits that child behaviors are best understood within the family context (Masoudi et al., 2022; Mello et al., 2022). For instance, (Rojas-Torres et al., 2023) emphasized the importance of parental involvement and stress management in any therapeutic approach for children with autism, arguing that parental mental health is a core determinant of intervention efficacy. Similarly, (Wahdan et al., 2023) demonstrated that behavioral training programs targeting parents significantly improved child behavior outcomes by reducing parenting stress and enhancing emotional responsiveness.

Additionally, this study's use of the Frankl Behavior Rating Scale as a measure of cooperation provides valuable clinical insight. Previous research, such as that by (Amrollahi & Amouchi, 2021), supports the utility of combining behavioral observation tools with psychological assessment in pediatric dentistry to better understand the child's readiness and risk factors. The current study extends this line of inquiry by explicitly connecting these behavioral outcomes to psychological variables, emphasizing the value of predictive modeling in planning and individualizing dental care for children with ASD.

From a practical perspective, the findings of this study align with the conclusions of (Widyagarini & Suharsini, 2017), who advocated for the development of dental environments and care strategies tailored to the emotional and sensory profiles of children with autism. Providing sensory-friendly dental spaces, pre-visit exposure, and caregiver coaching may mitigate the adverse effects of anxiety and parental stress. The evidence provided by (Maserat et al., 2021) further suggests that integrating technology-based interventions—such as digital pre-screening or preparatory applications—could enhance behavioral predictability and cooperation during dental visits for this population.

Moreover, the findings resonate with those of (Bahrami et al., 2013), who demonstrated that structured motor activities like karate reduced stereotypical movements in children with autism, indirectly suggesting that behavioral discipline and structured environments can positively affect emotional regulation and compliance. While this study focused on physical interventions, the underlying principle—that structured interaction can foster better behavioral outcomes—remains applicable to clinical and dental contexts. Complementing this, (Albehbahani et al., 2021) compared mindfulness-based interventions with play therapy for mothers and reported significant reductions in the symptoms of children with ASD, highlighting the reciprocal nature of maternal mental health and child functioning.

In summary, the present study not only supports the growing recognition of psychological and familial variables in determining cooperation during pediatric dental interventions but also offers a robust empirical model for predicting such behaviors. The integration of child anxiety and maternal stress into predictive frameworks allows clinicians to proactively identify at-risk children and adapt their intervention strategies accordingly. This reflects a shift toward a more holistic, child–family-centered model of dental care for individuals with autism, in which emotional and psychological factors are no longer peripheral but central to the planning and execution of care.

5. Suggestions and Limitations

Despite the valuable insights provided by this study, several limitations should be acknowledged. First, the sample size was relatively small (N=32), limiting the generalizability of the findings. The participants were drawn from a specific geographic area and referred through particular autism support centers, which may not represent the broader ASD population. Additionally, all dental examinations were conducted in a single private clinic under controlled conditions, which may not reflect the variability and unpredictability of other dental care environments. The reliance on self-report questionnaires, particularly for assessing maternal stress and child anxiety, introduces the potential for reporting bias, especially given the emotional involvement of caregivers. Lastly, the cross-sectional design restricts the ability to make causal inferences about the directionality of the relationships between variables.

Future studies should aim to replicate these findings using larger and more diverse samples across multiple geographic

regions and clinical settings. A longitudinal design could provide a deeper understanding of the temporal dynamics between maternal stress, child anxiety, and cooperation over repeated dental visits. Investigating the moderating effects of other variables, such as the father's involvement, socioeconomic status, or the presence of co-occurring conditions (e.g., ADHD, sensory processing disorder), may further enhance the predictive model. Moreover, exploring intervention-based designs that include parental stress reduction programs and anxiety management training for children could provide actionable data on improving cooperation outcomes. Mixed-method approaches that incorporate qualitative interviews may also yield richer insights into caregiver perceptions and strategies.

To translate these findings into practice, dental professionals should consider routine screening of both child anxiety and caregiver stress levels prior to appointments involving children with ASD. Integrating short, validated tools into the intake process can help identify potential behavioral risks. Dental environments should be adapted to minimize sensory overload, and staff should be trained in behavioral management techniques specific to autism. Moreover, involving parents—especially mothers—in pre-treatment behavioral planning and offering stress-reduction support or coaching can significantly improve the treatment experience for both the child and caregiver. By fostering an emotionally supportive clinical setting and emphasizing the child–parent dyad, dental professionals can enhance cooperation, reduce the need for invasive management techniques, and ultimately improve oral health outcomes in this vulnerable population.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

Declaration of Interest

The authors report no conflict of interest.

Funding

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. This study was approved by the Ethics Committee of Guilan University of Medical Sciences under the ethical code IR.IAU.LIAU.REC.1401.013.

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