

CORRELATION BETWEEN ANXIETY IN MOTHERS AND CHILDREN WITH SENSORY IMPAIRMENTS BEFORE DENTAL TREATMENT

MARGARETHA SOVARIA¹, EKA S SHOFIYAH¹, MOCHAMAD F RIZAL^{2*}, SARWORINI B BUDIARDJO²

¹Department of Pediatric Dentistry Residency Program, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia. ²Department of Pediatric Dentistry, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia. Email: Levipedo@gmail.com

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ABSTRACT

Objective: Mothers have very important roles in their children's development. Their instinctive love develops strong emotional connections with their children, especially when their children have sensory impairments (SI). Feelings experienced by mothers, such as anxiety toward dental treatment, can affect their children's emotions. Salivary alpha amylase (sAA) has been proposed as a biomarker of stress due to its sensitivity to changes in the body, such as dental anxiety. This study aimed to analyze the relationship between sAA levels in mothers and children with SI before dental treatment.

Methods: Measurement of sAA from sixty pairs of children with SI and their mothers was taken together in the waiting room before the children's dental treatment. Spearman's analysis was used to find the correlation between their sAA levels.

Results: In this study, sAA levels in mothers accompanying their children with SI correlated significantly with their children's sAA levels ($r=0.533$; $p<0.002$).

Conclusions: The correlation between dental anxiety in mothers and children with SI before dental treatment was found to be significant.

Practical Implications: Anxiety toward dental care is a phenomenon that frequently arises in children. Mothers, the main influencers of their children's development, are thought to be one cause of high anxiety in children. Children with special needs are at a higher risk for developing dental problems. Therefore, an understanding of these children's levels of anxiety can be used by pediatric dentists to improve dental care.

Keywords: Salivary alpha amylase, Anxiety, Children, Sensory impairment, Before dental treatment.

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INTRODUCTION

Dental anxiety is a common phenomenon which affects the process of delivering proper dental care to society in almost all age ranges [1,2]. The causes of this problem vary from lack of knowledge to environmental perception. The pediatric treatment triangle theory by Wright explains that, in treating children, communication is a 1:2 relationship between the dentist and the children and their parents, whereas in treating adults, it is only a 1:1 communication [3]. Successful communication regarding dental treatment can overcome feelings of anxiety. In children with sensory impairment (SI), this communication challenge expands because their special condition requires a different approach [4]. These children tend to have a stronger dependency on their caregivers, in most cases their mothers, and their physical and emotional relationships are more intense compared to children without SI [5].

A mother's care for her children is considered a natural instinct which leads to a strong emotional relationship between them [6]. This strong connection, however, also works for negative feelings like anxiety. Dentists need to fully understand anxiety and its effects on children's behavior as a foundation for building trust both in children and parents [1].

Salivary alpha amylase (sAA) is one of the major proteins in saliva and accounts for 40-50% of the protein produced by the salivary glands. Activation of the autonomic nervous system has a strong influence over the salivary glands and controls the secretion of sAA [7]. It is considered a reliable biomarker of stress and is preferred as a non-invasive procedure among several other methods because it does not cause distress to the subject [2,7-9]. The activity of sAA is reported to increase during distress and decrease during comfort [10].

Research about anxiety in mothers and their children during dental treatments and the effects on their dental health has been conducted in many countries. However, not much research focusing on children with SI and their dental health has been done even though these children are at higher risk for dental problems.

The objective of this research is to analyze the relationship between sAA levels in mothers and their children with SI before dental treatment.

METHODS

Sixty pairs of children with SI age 5 and above who registered as students in a school for the sensory impaired in Jakarta, Indonesia, and their mothers participated in this study. The exclusion criteria were mothers and children with asthma, diabetes, kidney failure, congenital heart disease, salivary gland disorder, and pancreatitis. Mothers and children were also excluded if they were on beta blockers, antidepressants, parasympathetic medications, or long-term steroids. Further, children who had experience with dental treatment did not cooperate or had tests or sporting activities at school on the day of sampling were excluded from the study.

Measurements of sAA were taken from both mothers and children in the waiting room before dental examination using a handheld sAA monitor according to the manufacturer's instructions (Nipro, Osaka, Japan). A strip to collect saliva was positioned under the tongue for 30 seconds and then directly placed in the handheld device to be analyzed. Levels of sAA were revealed in the monitor within 30 seconds [10]. Spearman's analysis was used to find the correlation between the sAA levels of mothers and their children before the children's dental treatment.

RESULTS

Table 1 summarizes that the average sAA level was higher in mothers than in their children before dental treatment, and this difference was found to be statistically significant. A positive correlation was also found to be statistically significant between sAA levels in mothers and their children with SI before dental treatment (Table 2).

DISCUSSION

Association between maternal dental anxiety and children's dental anxiety has been found in several studies, and even further, mothers' fears have been found to affect their children's dental caries experience [10,11]. In this research, focusing on children with SI, we found that their anxiety was significantly correlated with their mother's anxiety even before they experienced their first dental treatments. Children with SI were studied in our research because this specific group is at a higher risk of dental problems due to their dependency [12].

In this research, mothers and children were both measured while they sat together in a room, waiting for the children's first dental treatment. Opinions regarding the effect of parental presence in the dental operatory during a child's dental treatment vary among clinicians, educators, and researchers. The American Academy of Pediatric Dentistry includes parental presence or absence as a method to help establish effective dentist-child communication during dental treatment. A parent's desire to be present during her child's treatment does not necessarily mean she distrusts the dentist. Instead, it might mean that she is uncomfortable if she cannot verify her child's safety visually [13]. Research shows, and similar results were found in this study, that parental presence is beneficial in reducing children's psychological trauma and results in less distress during and after medical treatments [14,15].

Sensory impaired individuals are known to have higher anxiety, especially toward physical threats [16]. The significant correlation in sAA levels between mothers and children with SI found in this study is possibly the result of their strong emotional bonding. As mentioned by Ardito *et al.* (2004), mothers of children with disabilities show a high frequency of maternal directive and overprotective behaviors when interacting with their children. This manner can influence both the development and personality of their children [17].

According to the theory of attachment, continuous interactions with caregivers, which with special needs children is often their mothers, form a structure of knowledge deriving from repeated interactions between the child and the figure of attachment known as an internal

Table 1: Average (\pm SD) sAA level of mothers and their children with SI before dental treatment

	Average (minimum-maximum)
Mothers	43* (2-163)
Children with SI	29.5* (2-113)

* $p < 0.05$ (Wilcoxon signed-rank test, $p = 0.001$), sAA: Salivary alpha amylase. SI: Sensory impairment

Table 2: Correlation coefficients between sAA levels of mothers and their children with sensory impairment before dental treatment

	sAA children with SI
sAA mothers	$r = 0.533$ $p = 0.002^*$ $n = 60$

* $p < 0.05$ (Spearman's correlation test), sAA: Salivary alpha amylase. SI: Sensory impairment

working model. It begins to develop from the 1st year of life and tends to remain stable into adulthood [18].

From a pediatric dentistry point of view, the results seen in our study are highly beneficial and can be used in clinical practice. Relating our results to the pediatric treatment triangle theory by Wright, effective communication with both the caregivers, and the children as patients are key to the achievement of successful dental treatment, while failure in managing one of them might otherwise interfere with care [3].

Our findings also showed that knowing the level of a mother's anxiety can be used to predict how her child with SI will react to dental treatment.

This information is valuable because dentists can better decide which behavior management technique to apply in advance without the need for a trial-and-error method in daily practice. In reverse, as a preventative approach, early dental education can target anxious mothers detected by their sAA levels, so they can transmit positive feelings toward dental treatment to their children with SI.

CONCLUSION

Our study showed a significant correlation between dental anxiety in mothers and their children with SI before dental treatment. Basic knowledge of patients' levels of anxiety in this specific group is needed by pediatric dentists to deliver adequate dental care. Children with special needs are at a higher risk for dental problems. Therefore, more research should be done in other special need patients to study the effect that different disabilities may have on children's behavior. In this way, dentists can understand how to more effectively deliver care to their most vulnerable patients.

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