

## Anxiety in Mothers and Children with Sensory Impairments After Dental Treatment

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### Abstract

Children with sensory impairment are at a higher risk of having oral problems because of their condition. For this reason, these children and their mothers likely experience greater anxiety in facing dental treatments. In particular, stress and anxiety in mothers can influence their children's behavior, as the emotional bond between mothers and children with sensory impairment is often strong because of the child's condition. Levels of salivary alpha-amylase (sAA) have shown to be a non-invasive indicator of anxiety levels in individuals. This study aimed to assess the relationship between sAA levels in mothers and children with sensory impairment after dental treatment. Sixty pairs of children with sensory impairment and their mothers were enrolled in this experiment. Dental prophylaxis was performed on children and followed by measurement of sAA without the presence of their mothers. After children were done with treatment, the mothers' sAA levels were separately recorded in the waiting room. A significant positive correlation was found between sAA level of mothers and children with sensory impairment ( $r=0.309$ ;  $p<0.05$ ). This positive correlation demonstrates that controlling maternal anxiety would also be beneficial for reducing anxiety in children with sensory impairment during dental treatment.

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### Introduction

Dental treatment, with all of its instruments and noises, causes anxiety in many people who therefore avoid treatment. For children with sensory impairment, this anxiety is potentially worse, as they may be unable to fully assess the treatment scenario via their sense organs. Those who are visually impaired, for example, may have higher anxiety to physical threats like having a tooth drilled because they cannot see the bur or hand piece but can hear the loud and noisy sound of the drill.<sup>1</sup> Anxiety in this group of children is highly affected by people in their surrounding because of their dependency on others.<sup>2</sup> As mothers are the most likely to be a primary caregiver, their stress and anxiety can

also influence the behavior of their children because of their strong emotional connection to them.<sup>3,4</sup>

Methods available for evaluating anxiety varies from behavioral, emotional, hormonal, and cognitive analysis, and can include the evaluation of vital signs. Saliva sampling is widely used because of it is a non-invasive technique, unlike the use of biomarkers originating from blood samples, which can possibly cause distress to the subjects.<sup>5</sup> Salivary alpha-amylase (sAA) is linked to sympathetic activation during physically and psychologically stressful situations.<sup>6</sup> The reliability of sAA as a stress response biomarker has been investigated in different research fields.<sup>7</sup>

The assessment of sAA levels could be used to inform dentists on the importance of evaluating behavioral changes in parents during treatment and thus give them clearer understanding of anxiety toward dental care in patients.<sup>8</sup> Moreover, children with special needs may have higher sensitivity or susceptibility to

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anxiety in comparison to other groups; therefore, the determination of anxiety in this group would be beneficial for supporting comprehensive and continuous dental care in patients at high risk of oral problems. This study aimed to assess the relationship between sAA level in mothers and children with sensory impairment after these children received their first dental treatment.

### Methods

Measurement of sAA was performed in 60 pairs of children with sensory impairment and their mothers. All children were students at the School for the Sensory Impaired in Jakarta, Indonesia. Children who participated in this study had never had dental treatment. Exclusion criteria were mothers or children with asthma, diabetes, kidney failure, congenital heart disease, salivary gland disorder, and pancreatitis. Mothers and children who were on beta blockers, anti-depressants, parasympathomimetic medications, or long-term steroids were also excluded. Children who did not cooperate during the study or who had exams or sport activities at school on the day of sampling were not included.

Dental prophylaxis in children with sensory impairment was performed in a separate room without the company of mothers. sAA was measured in both children and mothers following prophylaxis with a handheld sAA monitor (Nipro, Osaka, Japan) as instructed by manufacturer. Measurements were carried out at the same time in children and mothers, but they were located in separate rooms. Spearman's correlations were used to assess the relationship between sAA levels in children and their mothers after children received dental treatment.

### Results

Table 1 shows the average sAA levels in mothers and their children after children's dental treatment. The values found in mothers were significantly differed from those of their children. Meanwhile, Table 2 shows the correlation between sAA levels in mothers and their children with sensory impairment after dental treatment, which were found to have a positively significant correlation.

**Table 1.** Average ( $\pm$  SD) sAA levels in mothers and children with sensory impairment after dental treatment

sAA level after dental treatment	Average (Minimum–maximum)
Mothers	27.5* (1–155)
Children with sensory impairment	18* (1–73)

sAA, salivary alpha amylase

\*  $p < 0.05$  (Wilcoxon signed-rank test,  $p = 0.007$ )

**Table 2.** Correlation coefficients between sAA levels in mothers and children with sensory impairment after dental treatment

	sAA level in children with sensory impairment
sAA level in mothers	$r = 0.309$ $p = 0.016^*$ $n = 60$

sAA, salivary alpha amylase

\*  $p < 0.05$  (Spearman's correlation test)

### Discussion

In this research, although mothers and children were separated, a strong positive correlation was found between the anxiety levels of mothers and their children with sensory impairment after children had received their first dental treatment. This result confirmed that emotional connection between mothers and children with sensory impairment affected children's ability to cope with their first dental visit. Dental treatment may not be easy for this group in particular and can even be challenging or cause anxiety in individuals with normal sensory organs.

Over the years, opinion has diverged as to whether or not parents should be included in dental treatment rooms, although parents tend to be interested in observing doctors and participating in the decision process to which techniques or treatments will be used on their children.<sup>9</sup> This trend is in line with Wright's Pediatric Treatment Triangle that obliges dentists and their team to communicate well with children's caregivers while treating children, as

this effort is not necessary while handling adult patients.<sup>10</sup> In this study, although mothers were not present in the treatment rooms where children had their first dental treatment, a correlation in the anxiety levels between mothers and children was still found. This showed that the emotional connection between mothers and children is not disrupted, regardless of their lack of physical presence. The high frequency of maternal directives to children with special needs might be one of the causes of this phenomenon.<sup>11</sup> Dentists should consider the strong influence of mothers over children with sensory impairment and should communicate well with mothers in advance to lessen any feelings of anxiety that could be transmitted to their children. In fact, sensory impaired individuals are known to experience higher anxiety, especially towards physical threats.<sup>1</sup> As suggested by the American Academy of Pediatric Dentistry in its behavior guidelines for pediatric dentists, educating parent before their child's first dental visit is very important.<sup>9</sup>

Children with sensory impairment are known to have a high risk of caries experience because of the difficulty they experience in maintaining an independent oral health routine.<sup>12</sup> Educating parents, or mothers in this case, is one major means of enhancing oral health in sensory impaired children. Mothers are the main helpers in daily hygiene activities of children with sensory impairments and often hold a special connection with and love for their children. Therefore, encouraging mothers' understanding and proper behaviour toward dental care is essential for developing the same attitudes in children. The assessment of mothers' anxiety levels using sAA handheld monitor is practical and easy to use in daily clinical settings; when applied regularly, this could aid dentists in deciding which behaviour management technique to use when delivering comprehensive dental care.

Anxiety following dental prophylaxis was considered in this research; prophylaxis is a basic dental treatment that is usually done with a low speed rotary hand piece and brush or rubber cup for removing plaque from teeth surfaces. Compared to other treatments, it is relatively simple and easy. Previous studies in medical settings found that most parents want to be with their children when they are undergoing invasive procedures.<sup>13</sup> Parents' reasons for attendance were wanting to know what happened, wishing to

actively support the dentist if their child has behavioral problem, and feeling like their child benefited from their presence.<sup>14,15</sup>

## Conclusion

In this study, a significant positive correlation was found between sAA scores in mothers and children with sensory impairment after children's first dental treatments. Despite mothers and children being separated during treatment, this group of children still demonstrated a strong emotional connection with their mothers when facing this challenge. This result shows that children with sensory impairment are capable of being independent during dental visits, wherein controlling their mothers' anxiety is a key way of achieving this and lowering anxiety in children.

Further research is necessary in order to examine other group of children with specific conditions or special needs, as distinct groups of children might face different challenges during dental treatment. The successful management of anxiety during dental treatment could encourage children and their parents to maintain their oral health and could therefore enhance their quality of life.

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