

# Positive correlation between maternal self-efficacy with the children's oral hygiene behavior

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## ABSTRACT

**Introduction:** Maternal self-efficacy is known to be a strong predictor of child's oral hygiene. Several studies have shown that the majority of children do not have good dental hygiene with OHI-S index, this is related to parents' concern for their children's oral hygiene. Mother's self-efficacy in knowing children's dental hygiene needs is related to children's tooth brushing habits. The aim of the study was to find out the correlation between mother's self-efficacy and children's dental hygiene in Aceh.

**Methods:** This type of research was a quasi-experimental study with 124 participants divided into 62 people in the intervention group and 62 in the control group, with inclusion criteria for mothers who have children aged 4-6 years. Maternal self-efficacy was assessed using a modified Self-Efficacy Scale for Maternal Oral care (SESMO) questionnaire. Children's dental hygiene was calculated by the Patient Hygiene Performance plaque index. Data analysis used Spearman correlation test ( $p < 0.05$ ). **Results:** This study showed that high maternal self-efficacy is mostly high school and college education. Mothers in the majority intervention group have good and moderate child dental hygiene compared to the control group. It was found that there is a significant correlation between mother's self-efficacy and child's dental hygiene ( $r = 0.352$ ,  $p = 0.001$ ). Mothers with low self-efficacy had children with 3.10 times the odds of risk their dental hygiene was poor ( $OR = 3.10$ ;  $CI = 95\%$ ;  $1.07-8.98$ ). **Conclusion:** The children's oral hygiene behavior was positively correlated with maternal self-efficacy. The findings of this study suggest that mothers with low self-efficacy are at risk of having children 4-6 years with poor dental hygiene.

**Keywords:** Maternal self-efficacy, children's oral hygiene, plaque index

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## INTRODUCTION

Nowadays, detecting plaque has a positive effect on the oral hygiene status. The mouth has a

surface which is covered by a bacterial biofilm and it has sufficient temperature, humidity, and food for the growth of bacteria.<sup>1</sup> Oral hygiene is influenced by actions to keep the mouth clean

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and healthy, namely the tooth surface is free of plaque and calculus.<sup>2</sup> It is important in improving oral health, general health and quality of life.<sup>3</sup> The habit of maintaining dental hygiene is closely related to oral health problems.<sup>4</sup>

Data from The Global Burden of Disease Study shows that there are 3.5 million oral dental diseases which are experienced by people worldwide in 2017.<sup>5</sup> Furthermore, the population in Indonesia according to the National Basic Health Research (RISKESDAS) data in 2018 showed that 57.6% had dental health problems.<sup>6</sup> An important factor in the causality of various oral diseases is dental plaque.<sup>7</sup>

Dental plaque is a deposit which adheres to the tooth surface and consists of a community of acid-producing bacterial cells which result in demineralization of the enamel.<sup>8</sup> Moreover, the source of dental disease in children is caused by poor oral hygiene habits which result in plaque accumulation.<sup>9</sup> Plaque which accumulates on the teeth can be detected by disclosing agent material in the form of a solution or tablet which colors the bacteria on the plaque on the tooth surface.<sup>10</sup> Furthermore, the use of disclosing agents in detecting plaque has a positive effect on the oral hygiene status.<sup>11</sup> The result of study which had conducted by Andriani<sup>12</sup> in Aceh Besar shows that dental hygiene status in terms of a plaque index of 53.8% of children's teeth is included in the bad category. In addition, study which had conducted by Abdat<sup>13</sup> in Banda Aceh concluded that only 55% of children brush their teeth twice a day, it is presumably due to the role of mothers in children's oral hygiene.

Children's dental hygiene can be influenced by several factors that are individual, family, and community factors.<sup>14</sup> Moreover, family factors; such as, maternal self-efficacy, knowledge of children's oral hygiene, and mother's habit of brushing her teeth before bed are related to the habit of keeping children's teeth clean.<sup>15</sup> maternal self-efficacy refers to beliefs a mother's ability to be more efficient which is influenced by the level of self-confidence, perception of her abilities, and feelings of motherhood.<sup>16</sup> Maternal self-efficacy can be measured by the Self-Efficacy Scale for Maternal Oral Care (SESMO). This study was developed by Matsuda et al. Who concluded

that the SESMO scale can be used to assess specific maternal self-efficacy on dental health.<sup>17</sup>

Research on the topic of self-efficacy had been conducted in western countries, but it is still rare in Indonesia. Previous study which had conducted by Finlayson et al.<sup>15</sup> concluded that maternal self-efficacy in knowing children's dental hygiene needs is related to children's tooth brushing habits.<sup>15</sup> Moreover, research which had conducted by Soltani et al. showed that children's oral hygiene behavior is significantly related to maternal self-efficacy.<sup>18</sup> In addition, Morales et al.<sup>19</sup> concluded that a high level of maternal self-efficacy correlates with better dental health status in primary teeth. These three studies show that maternal self-efficacy has an important role in children's quality of life, one of which affects dental hygiene and health. The purpose of the research was to analyzed the correlation between maternal self-efficacy and children's dental hygiene in Aceh.

## **METHODS**

A quasi-experimental study with the number of research subjects was 124 people which were divided into two groups that were 62 people in the intervention group and control group. The study was conducted from November 4th-18th December 2021 in the working area of the Darussalam Public Health Center Aceh Besar. The inclusion criteria in this study were; mothers who came to the Integrated Healthcare Center (Posyandu) in the working area of the Darussalam Public Health Center who had children aged 4-6 years; they were willing to be participants with the approval of an informed consent letter. Exclusion criteria in this study were; mothers who were not cooperative; mothers who came to the Integrated Healthcare Center (Posyandu) in the working area of the Darussalam Public Health Center who had children with special needs. The collection of participants was conducted by collecting initial data from Integrated Healthcare Center (Posyandu) cadres in the working area of the Darussalam Public Health Center in the form of names, addresses, and telephone numbers of Integrated Healthcare Center (Posyandu) participants. Mothers as participants were divided

into intervention groups and control groups. The intervention group was given an educational video about how to brush their teeth properly and how to maintain oral health. Meanwhile, the control group was not given educational videos. The researcher explained about how to apply a disclosing agent solution to the children's teeth, apply cheek retractor and how to take photos of their teeth to the participants. Disclosing agent solution materials and a cheek retractor were also distributed to each participant to take home. After three weeks later, the researcher then gave a questionnaire to all participants in both the intervention group and the control group for maternal self-efficacy data. The results of the questionnaire validity test showed a correlation probability value with a total score of  $\alpha < 0.05$  for all question items. The results of the reliability test showed the value of Cronbach Alpha = 0.913 > 0.361 (r table) with a significance level of 5%. Maternal self-efficacy data for each research subject would be categorized based on the answer score to be low if the score is 15-45 and high if the score is 46-75.

In addition, the study continued by assessing the dental health of the children of the participants and was measured by the Patient Hygiene Performance plaque index. Before applying the disclosing agent, the child is paired with a cheek retractor first. Then, the disclosing agent material is applied to the child's teeth to identify dental plaque, then take a photo and then sent by whatsapp to the researcher. If there were participant who had difficulty or complain about applying the disclosing agent and taking the correct photos, the posyandu staff will help because the officer's house is close to the participating women. The measurement results were input into the measurement sheet with a very good category if the score is 0; good if the score is 0.1-1.7; moderate if the score is 1.8-3.4; and bad if the score is 3.5-5.0. The analysis was conducted with the help of the IBM Statistical Product and the application of Social Science (SPSS) version 25. In this study, analysis of the data used was the Spearman correlation test in order to see the correlation between maternal self-efficacy and child's dental hygiene. This study passed the Ethics Commission by the Faculty of Dentistry, Syiah Kuala University No. 316/KE/FKG/2021.

## RESULTS

Based on table 1, most of the subjects in this study were the young adult age group (26-35 years) as many as 69 people (55.6%). Mother's age and health are important factors in influencing the mother's ability to care for children. The majority of the research subjects with the latest high school education are 54 people (43.5%). Mother's education has an important role in the development and upbringing of children as well as a

Table 1. Background sample characteristic for mother by age group and education level

Age Group (years)	Number (n=124)	%
17-25 years	7	5.6
26-35 years	69	55.6
36-45 years	42	33.9
46-55 years	6	4.8
<b>Level of education</b>		
Elementary school	10	8.1
Middle school	29	23.4
High school	54	43.5
College	31	25.0

Table 2. Distribution of the Maternal self-efficacy based on Education level

Level of Education	Maternal Self-Efficacy		Total (n=124)
	High (n=74)	Low (n=50)	
Elementary school	7	3	10
Middle school	16	13	29
High school	31	23	54
College	20	11	31

Table 3. Distribution of the dental hygiene level based on children's age

Child Age (n=124)	Children's Dental Hygiene		
	Good (n=25)	Moderate (n=55)	Poor (n=44)
4 years (n=50)	8 (6.4%)	23 (18.6%)	19 (15.3%)
5 years (n=50)	13 (10.5%)	20 (16.1%)	17 (13.7%)
6 years (n=24)	4 (3.2%)	12 (9.7%)	8 (6.5%)

Table 4. Distribution of Maternal self-efficacy in the intervention group and the control group

Maternal self efficacy	Group		Total (n=124)
	Intervention (n=62)	Control (n=62)	
High	49 (39.5%)	25 (20.2%)	74 (59.7%)
Low	13 (10.5%)	37 (29.8%)	50 (40.3%)

Table 5. Correlation between maternal self-efficacy level with children's dental hygiene level

Children's dental hygiene	High maternal self efficacy (N=74)		Low maternal self efficacy (N=50)		Spearman's rho	p value
	Intervention (N=49)	Control (N=25)	Intervention (N=13)	Control (N=37)		
Good	13 (10,5%)	7 (5,6%)	2 (1,6%)	3 (2,4%)	0.352*	0.001**
Moderate	25 (20,3%)	13 (10,5%)	2 (1,6%)	15 (12,1%)		
Poor	11 (8,9%)	5 (4,1%)	9 (7,3%)	19 (15,3%)		

greater level of knowledge about parenting. Based on table 2, most mothers are educated high school and college have high self-efficacy. Shown that Mother's self-efficacy is related to education level.

Based on Table 3, it can be seen that most children's dental hygiene has moderate and good categories at the age of 4 years, 5 years, and 6 years. This research still found a large number of children with poor oral hygiene at the age of 4 and 5 years.

Based on Table 4, it can be seen that the self-efficacy of mothers in the high category was found more in the intervention group than the control group at 39.5%. While the control group was dominated by mothers' self-efficacy with a low category of 29.8%.

Based on the result of the Spearman correlation test in Table 5, the correlation value is 0.352 with a positive correlation direction. The direction of positive correlation shows unidirectional. It means that the greater the value of a variable, the greater the value of other variables. Moreover, it is indicated by the value of  $p = 0.000$  ( $p < 0.05$ ) which means that there is a significant relationship between the maternal self-efficacy and the child's dental hygiene. It is also found that the Spearman correlation value for each group was  $r = 0.325$  in the intervention group and  $r = 0.356$  in the control group. There is a significant correlation ( $p < 0.05$ ) between the maternal self-efficacy with the child's dental hygiene, in both the intervention and control groups. Spearman correlation value ( $r = 0.352$ ) shows that correlation strength is sufficient. Based on the Odds Ratio value, it is stated that mothers with low self-efficacy are at risk with child poor dental hygiene (OR = 3.10; CI = 95%; 1.07-8.98)

## DISCUSSION

The findings of this study were that the majority of mothers' self-efficacy had good and moderate

categories of child dental hygiene, on the contrary, mothers with low self-efficacy found the majority had poor child dental hygiene (shown in Table 5). In accordance with other studies which stated that self-efficacy in the intervention group increased the plaque index score and duration of brushing teeth compared to the control group. Mothers have an important role in influencing the habits and health status of their children since children depend on their mothers to fulfill their oral health.<sup>14</sup>

Most of the subjects in this study were the young adult age group (26-35 years) as many as 69 people (55.6%). It is in line with research conducted by Asta (2017) which stated that mothers mostly at the age of 26-35 years.<sup>20</sup> Mother's age and health are important factors in influencing the mother's ability to care for children. The majority of the research subjects with the latest high school education are 54 people (43.5%). Furthermore, research conducted by Gustina (2015) showed that most of the Integrated Healthcare Center (Posyandu) participants have a high school education/equivalent.<sup>21</sup> Mother's education has an important role in the development and upbringing of children as well as a greater level of knowledge about parenting.

The result showed that high maternal self-efficacy is mostly high school and college education. Research which had conducted by Fatimah (2020) concluded that maternal self-efficacy is related to external variables; such as, education level.<sup>22</sup> It is in line with research which had conducted by Soltani et al.<sup>18</sup> who found that higher maternal self-efficacy is found in mothers with higher levels of education.<sup>18</sup> In addition, research which had conducted by Morales<sup>19</sup> showed that children with mothers with low education have worse oral hygiene than children from mothers with higher education.<sup>19</sup>

The result of the study shows that most of the mothers have high self-efficacy as many as

74 people (59.7%). It is supported by the results which shows that the groups of mothers who are given the intervention have higher self-efficacy than the control group. Moreover, Suyami<sup>23</sup> concluded that the intervention in the form of providing education affects maternal self-efficacy level Breastfeeding Self-Efficacy Scale Short Form (BSES-SF).<sup>23</sup> Maternal self-efficacy is the main prerequisite for improving children's oral hygiene. Moreover, an increase in maternal self-efficacy can lead to the promotion of dental hygiene habits among children.<sup>15</sup> Therefore, interventions in the form of education based on increased self-efficacy can help to improve preventive behavior towards oral hygiene in children. In addition, Jamieson<sup>24</sup> stated that in the intervention group there is an increase in plaque index scores and duration of brushing compared to the control group. Based on the findings of this study shows that mothers in the majority intervention group have good and moderate child dental hygiene compared to the control group.

Most children aged 4-5 years have dental hygiene in the moderate category. It is in line with research which had conducted by Worang's<sup>25</sup> which found that the oral hygiene status of preschool children is in the moderate category. Moreover, the results of the study which had conducted by Busman<sup>26</sup> showed that the majority of children have moderate OHI-S dental hygiene, it is related to parental concern for their children's oral hygiene.<sup>26</sup> In accordance with this study shows that mothers with high self-efficacy mostly have their children's dental hygiene in the moderate category.

Supported by the results of the Spearman correlation statistical test between maternal self-efficacy and child's dental hygiene,  $p=0.000$  ( $\text{sig}<0.005$ ) means that both variables show a significant correlation with  $r=0.352$  in a positive direction. The findings in this study are consistent with previous research which had conducted by Soltani<sup>18</sup> which found that children's oral hygiene is significantly and positively related to maternal self-efficacy. It is in line with research which had conducted by Kakudate<sup>17</sup> which resulted in the Spearman rank correlation value between maternal self-efficacy with children's dental caries and tooth brushing frequency. The result of this study shows that mothers with low self-

efficacy have 3 times risk of to having children with poor dental hygiene ( $\text{OR}=3.10$ ;  $\text{CI}=95\%$ ;  $1.07-8.98$ ). In addition, research which had conducted by Jamieson<sup>24</sup> showed that mothers who have low self-efficacy have a 2.4 times risk of assessing poor dental health ( $\text{OR} = 2.40$ ;  $\text{CI} = 95\%$ ;  $1.54-3.74$ ). Therefore, interventions in the form of education based on increasing mothers' self-efficacy can help to increase preventive behavior towards oral hygiene in children. This is considered appropriate if it is carried out by the health center through routine Posyandu activities. The children's oral hygiene behavior was positively correlated with maternal self-efficacy. The findings of this study suggest that mothers with low self-efficacy are at risk of having children 4-6 years with poor dental hygiene.

The limitations of this study are due to the Covid-19 pandemic causing intervention via video to be less effective because it is not given directly and assessment of children's dental hygiene is carried out through photos sent by the mother to researchers via WhatsApp so that the accuracy of taking photos affects the results of the photos sent.

## CONCLUSION

The children's oral hygiene behavior was positively correlated with maternal self-efficacy. The findings of this study suggest that mothers with low self-efficacy are at risk of having poor child dental hygiene.

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