

## The Behavior Change on Brushing Teeth of Children by Mothers Using a Periodic Dental Health Evaluation Card

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### Abstract

The Indonesian Health Survey reported that only 7.3% of children brushed teeth on the right time. This study aims to analyse the role of Periodic Dental Health Evaluation Card (KMGS) to increase mother-child toothbrushing behaviour and child's oral hygiene, by empowering health cadre in Integrated Health Post (Posyandu). The 54 mother-child aged 24-60 month who visited Posyandu, were divided into two groups. The intervention group consisted of 31 mothers who was given dental health education (DHE). Child's caries risk were monitored weekly in. This intervened group was compared to 23 mother-child pairs as the control group. Dental behaviour was assessed by questionnaire, and child's oral hygiene assessed by plaque index dan plaque maturity index.

The result shown there was an increase of mother's behaviour of toothbrushing ( $p=0.001$ ) and decrease on child plaque index ( $p<0.001$ ), but no significant change ( $p>0.05$ ) in child's plaque maturity.

The conclusion is DHE wick used "KMGS" may improve mother's behaviour to brush their child's teeth. Dental plaque index of children decreased, and therefor improved oral hygiene of children. The KMGS was able to be a good media to inform risk factors of early childhood caries to the mothers through DHE by health cadre in Posyandu.

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### Introduction

The prevalence of dental caries in some countries is quite high.<sup>1</sup> In Thailand, the prevalence of dental caries in children age three-year-old was 65.7%, with the mean of def-t of 3.6, and the incidence of dental caries in children age 3-5-year-old was 81.2% in 2001.<sup>2</sup> An effort that can be done to prevent dental caries is to brush the teeth to maintain good oral hygiene. Tooth brushing is one of the easiest and cheapest method to prevent dental caries. Knowledge, attitude, and practice of parents and caregivers will affect the risk for early childhood caries in children.<sup>2-4</sup> Dental Health Education (DHE) can be conducted to increase dental health status,

primarily to increase oral hygiene index.<sup>3,5</sup> Oral health education is providing a variety of learning experiences which aimed at share new health information in which in turn is intended to improve dental health behaviour.<sup>6</sup> Mothers play a significant role in increasing their children's oral health.<sup>6</sup> However, it is still reported in some areas that the knowledge of mothers are still limited.<sup>5</sup>

Non-dental health personnel, such as health cadre, may be empowered to give DHE to the community aiming to help increase the communities dental health behaviour.<sup>8-9</sup> Posyandu is the Integrated Health Post in Indonesia, which is supervised by doctors and midwives from the Community Health Centres, and are located in villages. Posyandu is visited by mothers with children aged under five-years-old and expecting mothers. Posyandu's Health Cadres receives dental health promotion training programme by doctors, dentists, and midwives. Posyandu and health cadres should be included in health promotion efforts, including the

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promotion of dental health of children. The health cadre has a unique role in the community, because they are selected voluntarily as health cadres by the community, and they are assigned to improve the public health. Because of its position very close to the people, the health cadres in Posyandu are an ideal moderator to increase awareness and knowledge of the health of low social economy people, which have a high risk of early dental caries.

Health education can be generic or tailored adapting to particular population subgroups. A tailored approach is reported to be more efficient in changing personal behaviour.<sup>10,11</sup> Health education using media campaign may help change communities health behaviour. Various kinds of media campaign can be used to change individual health behaviour, one of them is card as a printed media.<sup>10-12</sup> Periodic Dental Health Evaluation Card (KMGS) is a card which is designed to measure the risk of dental caries in children under five-year-old by health cadre in Posyandu, one of the risks of dental caries is characterised by the present of dental plaque, baby bottle feeding behaviour, and sweet eating food habit routine. Health cadres fill out the KMGS every month until the children are age 60 months old. They assist the scoring of dental caries risk of the children from the total number of risk factors which is written in KMGS. Further, the health cadres give DHE to the mothers who have children with a high score of dental caries risk detected by the KMGS. Routine KMGS filling is expected to help the establishment of the awareness and healthy dental care habits of mothers to her children. KMGS could motivate health cadres to explained the importance of taking care of children's teeth to the mother. A health program in England requires health cadres to give leaflets and packages of dental health care of children during they regularly visit from house to house, and explain how to do proper dental care for children.<sup>10</sup> The purpose of this study is to analyse the role of KMGS to increase the mother's child-toothbrushing behaviour and child's oral hygiene, by health cadres in Posyandu.

### Materials and methods

The study was conducted in two Posyandu in a suburb near the capital city of Indonesia. The analysis was performed before

and after the intervention, comparing between control and intervention group. The research protocol was approved by the Faculty of Dentistry University of Indonesia Ethical Committee (Approval No. 76 / Ethical Clearance / FKGUI / XI / 2013). Purposive sampling was used. Samples were 54 pairs of mother and children age 2-5-year-old, who visited Posyandu in Tugu District, Depok, West Java. Further, 31 pairs were given intervention such as tooth brushing and DHE, while the 23 other pairs were the control group, who were not provided with DHE. All children were examined for risk factors of early childhood caries using KMGS by the health cadres in Posyandu at baseline and followed-up after one, two, and three weeks. KMGS is a card that assesses the risk factors of early childhood caries, including to dietary habit of children, bottle feeding, oral hygiene, and tooth brushing behaviour. Written informed consent was obtained from each participating mother.

Dental examinations, consisting of dmft and Loe-Sillness Plaque Index, were performed to all children using standard hands instruments. Dmft is an estimation of children's dental status calculating the total number of decayed, missed, and filled teeth (dmft). Oral hygiene status of children was examined using the Loe-Sillness Plaque Index. The disclosing solution was used, and the dental plaque was scored using maturity plaque indicator score from GC.Corp. The questionnaire, with Cronbach alpha 0.76, was used to analyse the behaviour of mothers towards their children's oral health. Subjects were examined at baseline and followed-up after one, two, and three weeks. The questionnaire was directly asked to mothers related to demographic variables, educational level, marital status, children dental health care behaviour including knowledge, attitude, practice, awareness and motivation of mother's about dental health behaviour which relates to early childhood caries risk factors. The questions in the questionnaire were objective and close-ended. All data for reported oral health behavior of mother was categorized as moderate and good. The moderate categorize was assigned had a score lower than 70, while a goodcategorize was assigned had a score higher than 70.

The training of trainer for health cadres was conducted in Posyandu to complete the KMGS monthly. A guidance book was written for the health cadres and mothers as DHE materials,

which includes definition of KMGS, purpose and utility of KMGS, how to fill in the KMGS, how to define groups of children based on dental caries, how to refer the children who have dental caries to the health center, how to give explanations to mothers about dental health and dental caries risk of children, children's caries risk of level evaluation, and how to motivate mother-child to take care of their oral health. They were also trained to do dental plaque examination. The empowerment of health cadre aimed for the sustainability of the program. Health cadre was taught about oral health, the function of deciduous teeth, causes of dental caries, and dental caries risk factors. Further, DHE was provided to mothers. The score in KMGS showed green for no dental caries risk factor, yellow for moderate caries risk factor, and red for high caries risk factor. All mothers received DHE on the first, second, and third visit, by health cadres.

## Results

The prevalence of dmft of this studies sample was 72%, while 54% children in this study were boys. Most of the mothers in this study are senior high school educated, and most of them as housewives, and lived in the same area. Table 1 describes the comparison of dmft score between intervention and control group at baseline.

Group	Intervention		Control	
	Number	%	Number	%
0	7	22.6	8	34.8
0.1 – 4	12	38.7	11	47.8
>4	12	38.7	4	17.4
Total	31	100.0	23	100.0

**Table 1.** Frequency distribution of dmft of children age 2-5 year old between intervention and control group.

The questionnaire score of oral health behaviour is obtained by adding mother's knowledge, attitudes, and practice scores. After three weeks, mother's behaviour in the intervention group increased significantly, compared with control group (Table 2). 54.8% of children have good oral hygiene with dental plaque index between 0.00–1.00. Dental plaque index comparison between before and after the

intervention was analysed using paired T-test. The result showed a significant decrease in dental plaque index in the intervention group. On the third week, a significant difference occurred on the dental plaque index between intervention and control group using the independent T-test (Table 3).

Group	Intervention				Control				p-value <sup>b</sup>
	Before		After		Before		After		
	N	%	N	%	N	%	N	%	
Moderate	14	45.2	2	6.5	12	52.2	11	47.8	.001*
Good	17	54.8	29	93.5	11	47.8	12	52.2	
Total	31	100.0	31	100.0	23	100.0	23	100.0	

**Table 2.** Frequency distribution of oral health behaviour of mothers between intervention and control group at baseline and after three weeks.

Group	Time	Baseline(the 1 <sup>st</sup> week)	2 <sup>nd</sup> week	the 3 <sup>rd</sup> week	p-value <sup>b</sup>
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Intervention (n=31)		1.07± 0.50	0.75± 0.37	0.68± 0.35	.001**
Control (n=23)		0.99± 0.53	No Evaluation	1.06± 0.54	.211
p-value <sup>a</sup>		.576	-	.007*	

**Table 3.** The comparison of dental plaque index in children from the first to the third week between the Intervention and Control group.

Note: \*\* p<0.01, \* p<0.05

<sup>a</sup>Comparison of dental plaque index between Intervention and Control group.

<sup>b</sup>Comparison of dental plaque index in Intervention group from baseline (the 1<sup>st</sup> week), 2<sup>nd</sup> week and the 3<sup>rd</sup> week.

## Discussion

Dental caries of children under five years old in the Depok city, a suburban of Jakarta, has high level of dental caries. There was an increased level of mothers, who have good dental health behaviour on brushing teeth her children. Based on the Transtheoretical Model, mothers who are ready to change their dental health behaviour, are indicated in the "stage of action".<sup>3,4</sup> In this case is brushing their children's teeth for good oral health.<sup>7</sup> Although behavioural change research is usually done in the medium or long term period, but based on some studies of changes in behaviour can also be seen in the short term period.<sup>2</sup> A study shows that one community of mother after intervention with health campaign in two weeks they changed in a good health behaviour level, this behavioural change can be maintained until the following month.<sup>3-5</sup> The result of another study about healthy lifestyle education indicated that there

has been increasing behaviour in one week and three months later.<sup>3</sup>

The Increasing in tooth brushing behaviour can lead to a reduction in dental caries prevalence in children. In a long-term study, the mothers were given DHE periodically after three months, six months and one year. The result after three years indicated that the children in intervention group have the prevalence of dental caries and gingivitis significantly lower than those of children in the control group. Also, the mother in the intervention group has lower level of gingivitis, debris and calculus than those in the control group.<sup>5</sup> The improvement of oral health in children through KMGS is consistent, indicating that DHE could change dental health behaviour level. This study showed that empowering non-professional dental health manpower is potential to provide DHE to community.<sup>4</sup>

The mother's knowledge level after the intervention has reached the stage of "applying", based on Bloom theory modified Anderson and Krathwohl. Rothe (2010) also elaborated that interventions for the provision of dental health information can improve dental health knowledge.<sup>5</sup> While the attitude of mother in this study, after the KMGS intervention, showed that it could reach the level of acceptance of values and characterization from Krathwohl, Bloom, and Marsia theory regarding attitude levels. However, from the behavior change theory, the changes in level of practice because of health education have to began from knowledge level change and then attitude level change. The study results describes that before intervention the degree of attitude of mother was weak, this step is called "valuing", which means the mother still assessing the information related to her attitude. Strippel (2010), describes his study result that a good programme in dental health will increase level of attitude.<sup>4</sup> While another reseacher describes that DHE programme intervention in routinely will provide to improve practicing in oral health.<sup>7</sup>

This study confirmed that mothers have substantial influence in increasing child's toothbrushing frequency. Nonetheless, the success of the DHE in the community depend on their respond and whether they are ready to receive the information for changing their behaviour or not. The decrease of plaque index after one and two weeks did not show any differences. These might be caused due to the different level of readiness. Transtheoretical

Model is explaining that the effectiveness of DHE depends on the willingness level of each person. Varying levels of readiness need a different kind of approach. The plaque decrease might happen due to the increase of tooth brushing frequency, duration, and proper technique.<sup>12,13</sup> The results of this study should be generalised with caution. One of the limitations of this study was that potential bias might occur from the plaque index measurements. The measures were scheduled, and there were no instructions before the examinations. Despite these limitation, this study showed that KMGS is supporting the improvement of mother-child's oral health.

## Conclusions

After 3 weeks intervention a significant decrease occurred on the dental plaque index of children inthe intervention group compared to control group, because after three weeks intervention the 93.5% of mother have significant good oral health behavior. Therefore, the role of Periodic Dental Health Evaluation Card (KMGS) in routinely could change the oral health behavior of mother to increase the mother's child-toothbrushing behaviour and oral hygiene children.

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## Declaration of Interest

The authors report no conflict of interest.

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