

## Effect of Education on Knowledge, Attitude and Performance of Mothers Regarding Oral Hygiene of their 6-12 Year Old Children

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### Abstract

**Background and Objectives:** Mothers play an important role in oral health of their children. However, evidence shows that most mothers have inadequate knowledge, incorrect attitude and poor performance in this regard. This study sought to assess the effect of education and training on the knowledge, attitude and performance of mothers regarding oral hygiene of their 6 - 12 year old children.

**Materials and Methods:** The study was conducted on 120 mothers with 6 - 12 year old children presenting to Shemiranat Health Center. Mothers filled out a questionnaire, and oral hygiene parameters of their children were recorded. Half of the mothers were randomly selected and received oral hygiene instructions. After two months, the questionnaire was filled out again by the mothers and changes in knowledge, attitude and performance after the intervention as well as changes in oral hygiene parameters of their children were assessed.

**Results:** At baseline, 36.7% of mothers in the test group had good level of knowledge; this value significantly changed to 61.4% after the intervention ( $P < 0.0001$ ). 52.3% of mothers in the test group had good attitude before instruction; this value was 73.5% after the intervention ( $P < 0.01$ ). Plaque index (PI) values were 53.54% in the test and 71.34% in the control group after the intervention, which were significantly different ( $P = 0.00$ ). The DMFT score was not significantly different between the two groups at baseline or after the intervention. However, the ratio of filled (F) to decayed (D) teeth increased after the intervention in the test group. In addition, the frequency of fluoride therapy, fissure sealant therapy and pulpotomy in the test group was significantly higher than that in the control group after the intervention.

**Conclusion:** The results showed that instruction and training of mothers enhanced their knowledge, attitude and performance with regard to oral hygiene of their children.

**Keywords:** Oral Hygiene Instruction; Knowledge; Attitude; Performance; DMFT

### Introduction

Mothers are the first behavioral role models for their children. Oral hygiene habits and attitude of mothers directly affect their children's performance in this respect. Public information centers are scarce in Iran and there is a shortage of knowledgeable instructors in

schools to implement caries prevention strategies. Thus, family as the smallest unit of a society can play a pivotal role in enhancing the knowledge of children about oral and dental health and oral hygiene habits since children have the greatest level of communication with their family members [1]. Mothers are the first source of transmission of cariogenic bacteria to their children; thus, their inadequate level of knowledge in this respect can result in development of dental caries in their children. Level of knowledge is particularly important since it affects their attitude and oral health behaviors [2]. Oral health behaviors should be established at an early age in order to be regularly practiced in older ages and passed on to the next generation [3]. Oral hygiene instruction is the first of eight principle measures of primary health care and plays a fundamental role in promoting oral health. Evidence shows that provision of health services is not beneficial for prevention if not supported by health instruction [4,5]. Educational messages must be affordable, simple, scientifically correct and applicable for all individuals in a community. They should be influential enough to affect the beliefs and attitudes of parents. Moreover, educational preventive programs must be continuous and the resultant outcome i.e. behavioral change must be constantly monitored [6].

A systematic review on the effect of general health promotion on oral health showed that health promotion enhanced the level of knowledge; however, it was not known whether this change in attitude and knowledge resulted in behavioral change or not. Also, it was reported that chair-side health promotion was more effective and the quality of educational programs should be improved [7]. Young-Sook, *et al.* demonstrated that 17- and 34-hour educational programs enhanced the knowledge and improved the attitude of middle-school students compared to the no-intervention control group; however, in terms of performance, the two groups were not significantly different. They concluded that such educational courses are necessary for elementary, middle school and high school students to acquire correct oral health habits [8]. Al-Omiri, *et al.* evaluated the knowledge, attitude and performance of school children and showed that children had irregular oral health habits and the role of parents in this regard was limited. Knowledge, attitude and performance of parents regarding oral health and their fear of dental visits significantly affect the oral health of their children [9].

Studies conducted in developing and developed countries have shown the positive effect of education on oral health promotion [10,11]. Abhishek, *et al.* in their study on 12 year olds in India reported that they had poor knowledge, attitude and performance with regard to oral health and called for a regular educational program for children, teachers and parents [12]. However, Brukiene and Aleksejunien in a systematic review on oral health promotion of adolescents stated that the level of knowledge increased in most studies using knowledge, attitude and performance models but the long-term results of such interventions were variable mainly due to the absence of reinforcement programs [13].

Several studies have assessed the effect of health instruction on oral health knowledge and attitude. However, no previous study has used a standard questionnaire to assess the effect of oral health instruction on knowledge and attitude of mothers or evaluate the resultant change in oral health parameters of Iranian children. Thus, the current study aimed to assess the effect of instruction on knowledge, attitude and performance of mothers with regard to oral health of their 6 - 12 year-old children in Tehran.

### Materials and Methods

The present study was conducted on 120 mothers presenting to Shemiranat Health Center in Tehran along with their 6 - 12 year-old children in 2012. They all signed written informed consent forms, and were randomly divided into two groups of test and control. By reviewing the relevant articles and textbooks, a questionnaire was designed, which included important oral and dental health factors. For assessment of validity, aside from using the information available in textbooks, the questionnaire was assessed by four instructors working in Shahid Beheshti School of Dentistry in terms of the accuracy and appropriateness of questions. Also, a few of the mothers were randomly selected and asked to fill out the questionnaire and rate it in terms of level of difficulty, appropriateness and clarity of questions (qualitative content validity and face validity). Reliability was assessed by test-retest method. The questionnaire was filled out by 20 randomly selected mothers and the same persons were requested to fill out the questionnaire again after two weeks. They did not receive any instruction during the two-week period regarding oral health. The obtained knowledge and attitude scores at two different time points were assessed using intra-class correlation coefficient (ICC). Kappa coefficient was also calculated for assessment of the agreement be-

tween the two phases and weighted kappa was calculated for each question (to take into account disagreements between the two phases similar to the frequency of agreements in calculations). The final questionnaire included 11 knowledge questions, 8 attitude questions and 7 function questions. After selection of samples, all children were examined by a senior dental student using a dental mirror and an explorer under daylight. Demographic information (including age, level of education, occupation, order of child in the family, number of children and family income), number of filled, decayed and extracted teeth and PI (using Fuchsin) were all recorded. The mothers were then requested to fill out the questionnaire.

Sixty mothers, randomly assigned to the test group, received instructions by a trained individual face-to-face on a phantom by use of a toothbrush for 30 minutes. The instruction covered the topics asked in the questionnaire. At the end of each session, the instructor answered questions of the mothers. At the end of two months, both test and control mothers and their children were recalled and the DMFT and PI of children were recorded. The frequency of their visits for dental care services such as fissure sealant therapy, pulpotomy and stainless steel crown was also recorded to assess the performance of mothers. The mothers were then asked to fill out the questionnaire again and their score (based on their correct responses to questions) was recorded. Change in the score of each mother was calculated. Also, the effect of confounding factors (level of education of parents, family income, occupational status) on the score change was evaluated.

For statistical analysis, first the ICC and weighted kappa were applied to assess the reliability of the questionnaire. Then, age, level of education, occupation, order of child in the family, number of children, family income, performance, knowledge score and attitude score in the two groups of test and control (frequency and mean) were compared. Independent t-test and kappa 2 were applied to assess equality of variances in the two groups. ANOVA was used to assess the correlation of baseline knowledge and attitude with the study variables at  $P = 0.05$  level of significance. Non-parametric Friedman test and Kruskal Wallis test were used to assess the effect of intervention on change in oral health parameters and performance, knowledge and attitude scores. A total of 28 subjects in both groups did not show up for the assessment of oral health parameters at two months; however, this amount of loss to follow up did not affect the results. These subjects were excluded from the study (this is the reason for variable number of samples in different analyses).

## Results

The teeth of 120 children aged 6 - 12 years (with a mean age of 8.6 years) were examined. A total of 120 mothers aged 21 - 50 years with a mean age of 32.5 years (each had 1 to 5 children (mean of 2.6)) were evaluated. 18% of children were caries-free (22.4% of boys and 14.5% of girls) and this rate did not change after two months. Although the frequency of caries-free boys was higher than girls, this difference did not reach statistical significance ( $P = 0.331$ ).

### Oral and dental health of children before and after instruction

Statistical analysis showed no significant difference in DMFT scores after the intervention compared to baseline in the two groups ( $P = 0.843$ ) (Table 1). Table 2 illustrates that after intervention, the F parameter (filling) increased ( $P = 0.002$ ) and the D parameter (decay) decreased ( $P = 0.001$ ) significantly in the test group. As it has been shown in table 3, the frequency of fluoride therapy, fissure sealant therapy and pulpotomy was significantly higher in the test group after the intervention compared to controls. The PI before the intervention was not different between the test (68.23%) and control (65.86%) groups ( $P = 0.843$ ). After the intervention, the mean PI reached 53.54% in the test and 71.34% in the control group; this difference was statistically significant ( $P = 0.00$ ).

DMFT	Before the intervention		After the intervention	
	Test	Control	Test	Control
0	20	16	20	16
1	12	13	12	13
2	14	17	14	17
3	21	14	19	14
4	11	14	12	13
5 and more	22	26	23	27

**Table 1:** Children distribution (%) according to their DMFT scores before and after intervention in the test and control groups.

Scores	Before intervention		After intervention	
	Test	Control	Test	Control
D	345	365	258	336
M	245	180	273	205
F	54	40	138	44

**Table 2:** Percentages of each parameter of DMFT score before and after intervention in test and control groups (number of each parameter in each group/number of all samples in each group \* 100)  
 D: Decayed Teeth ; M: Missing Teeth; F: Filled Teeth

Treatment	Test	Control
Tooth Filling	20	12
Pulpotomy	12	3
Fissure sealant	47	4
Fluoride therapy	18	2

**Table 3:** Number of new treatments performed on each group during two months follow up period (only the treatments performed in this health center were calculated).

**Mothers’ knowledge of oral health of their children before and after intervention**

The results of independent t-test regarding the knowledge of mothers showed that the knowledge scores of the two groups before the intervention was not significantly different (P = 0.442). Also, the results showed that baseline knowledge of mothers was correlated with level of education, occupation and economical status of mothers (P < 0.05) (Table 4). However, it did not have a significant correlation with the number of children (P = 0.43). Also, it was found that knowledge of mothers improved with age (P = 0.01). Table 5 presents the knowledge status of mothers in each group before and after intervention. According to the Friedman test, the mean knowledge score at baseline and after the intervention was significantly different in the test group (P < 0.0001); however, no such a difference was noted in the control group (P = 0.440).

Knowledge					
Confounding factors		Good	Moderate	Poor	P value
Level of education	Illiterate	12	19	69	0.003
	High school diploma	21	26	53	
	Bachelor’s degree or higher	58	7	35	
Level of income	Less than 500,000T	17	25	58	0.031
	500,000-1,000,000T	29	18	53	
	>1,000,000T	37	22	41	
Occupational status	Full-time job	49	24	27	0.007
	Part-time job	31	36	33	
	Housewife	22	29	49	

**Table 4:** Confounding factors related to mothers’ knowledge (%).

Knowledge	Before intervention		After intervention	
	Test	Control	Test	Control
Good	36.7	43.6	61.4	46.6
Moderate	53.5	46.5	36.5	50.8
Poor	9.2	9.9	2.1	2.6

**Table 5:** Knowledge status (%) of mothers in each group before and after oral hygiene instruction.

Regression analysis of the effect of education in presence of other variables (mother’s age, level of education, number of children, occupation, order of child in the family and family income) showed that only the instruction variable had a significant effect on the knowledge score ( $P < 0.05$ ).

**Mothers’ attitude regarding oral health of children before and after intervention**

No significant difference was found before the intervention regarding the attitude of mothers in the two groups of test and control ( $P = 0.327$ ). As table 6 shows, baseline attitude of mothers was significantly correlated with level of education, income and occupation of mothers ( $P < 0.05$ ); however, no such a correlation was noted between the baseline attitude and number of children or mother’s age ( $P = 0.12$  and  $P = 0.07$ , respectively). Table 7 illustrates the attitude status of mothers in each group before and after intervention. Two months after the intervention, attitude of mothers in the test group significantly improved compared to that in the control group and this difference was statistically significant ( $P < 0.01$ ). The Friedman test showed a significant  $P$  change in the mean attitude score after the intervention in the test group ( $P < 0.01$ ); however, the difference in this respect in the control group was not significant ( $P = 0.347$ ). Regarding the effect of other variables, regression analysis showed that only the instruction variable significantly affected the attitude of mothers ( $P < 0.01$ ) and the effect of other variables was not significant.

Attitude					
Confounding factors		Good	Moderate	Poor	P value
Level of education	Illiterate	38	48	14	0.001
	High school diploma	57	38	5	
	Bachelor’s degree or higher	74	26	0	
Level of income	Less than 500,000T	34	49	17	0.021
	500,000 - 1,000,000T	62	34	4	
	> 1,000,000T	79	19	2	
Occupational status	Full-time job	67	29	4	0.010
	Part-time job	52	40	8	
	Housewife	42	47	11	

**Table 6:** Confounding factors related to mothers’ attitude (%).

Attitude	Before intervention		After intervention	
	Test	Control	Test	Control
Good	52.3	55.7	73.5	56.3
Moderate	39.7	36.5	26.4	40.1
Poor	8	7.8	1.1	3.6

**Table 7:** Attitude status (%) of mothers in each group before and after oral hygiene instruction.

**Performance of mothers regarding oral health of children before and after intervention**

There was a significant difference in the performance of mothers between the test and control groups after the intervention ( $P < 0.05$ ) except for the question “What are you doing to maintain dental health of your child?”. The results showed that in the test group, after the intervention, number of mothers who reported tooth brushing twice or three times a day increased ( $P = 0.01$ ) and the brushing technique was changed to Bass method in many of them ( $P = 0.00$ ). In addition, number of mothers who brush the teeth before bed-time increased significantly after intervention in the test group ( $P = 0.03$ ). These measures were not changed significantly in the control group when before and after intervention values were compared.

**Discussion**

Prevention is better than cure. It has been well documented that efficient health instruction can be the most effective and easiest strategy to promote public health and prevent diseases [8,10]. However, successful instruction and education has never been easy and requires time and effort.

Mothers play a fundamental role in health of their children, and their poor performance is often secondary to their poor knowledge. Evidence shows that oral and dental conditions are relatively common in Iran and dental care services in highly populated areas are not enough to obviate the treatment needs of patients. Thus, educating mothers seems to be a priority to decrease the burden of oral and dental diseases in children. The current results showed that 36.7% and 43.6% of mothers in the test and control groups, respectively, had good level of knowledge. These values were 52.3% and 55.7%, respectively, for good attitude. Wong., *et al.* assessed the knowledge and attitude of sitters of preschool children regarding oral hygiene and showed that 12.6% had poor knowledge in this regard and 87.5% of

mothers stated that they were willing to know more in this respect [14]. The current study showed that 52.6% of mothers of 6 - 12 year-olds had poor and moderate knowledge about oral and dental health of their children. Future studies are required to find reasons behind low level of knowledge of mothers. Also, our findings revealed relatively poor performance of mothers in terms of oral hygiene. Incorrect tooth brushing techniques and not seeking dental treatment were among the main findings with regard to poor performance of mothers. The majority of mothers (77%) reported TV programs as their main source of information about oral hygiene behaviors. Thus, it seems that TV programs can greatly help to enhance the knowledge of public and improve their performance regarding oral hygiene.

The present study showed that many of the carious teeth at baseline (D) were filled (F) after the intervention, however, educating mothers regarding plaque control did not have a significant effect on DMFT, which may be due to the short interval between the two phases of examination (a carious lesion takes approximately six months to manifest clinically). Haratono., *et al.* demonstrated that even after 1.5 years of educating children, their DMFT index did not significantly change compared to that of the control group [15]. In the current study, the patients were examined two months after the intervention, which was a limitation of the study.

Improvement in knowledge and attitude scores after the intervention in the test compared to the control group in our study was in agreement with the findings of previous studies, indicating the positive effect of oral hygiene instruction on attitude and knowledge scores [10,11]. Peker., *et al.* in 2010 reported that oral hygiene instruction program in a group of students improved their attitude and performance [16]. The current study showed that the performance of mothers improved in the test group especially with regard to the use of preventive procedures such as fissure sealant therapy and fluoride therapy, which had been emphasized in the training program. Also, the frequency of patients keeping their primary teeth with pulpotomy (instead of extracting them) increased after the intervention. The number of mothers that reported brushing their teeth twice or three times a day also increased after the intervention and a reduction was noted in the number of mothers reporting occasional tooth brushing. Moreover, 89% of mothers in the intervention group reported tooth brushing before sleeping after the intervention. One advantage of face-to-face oral hygiene instruction is correction of tooth brushing technique. Selection of Bass tooth brushing technique and increased frequency of tooth brushing by mothers in the test group after the intervention were indicative of their improved performance.

## **Conclusion**

Based on the results of the current study, a small percentage of children in the study population were caries-free, and the PI of 6 - 12 year-olds was very high. The knowledge and attitude of most mothers were poor or moderate and they mostly had a poor performance. The results revealed that health instruction to mothers significantly improved their knowledge, attitude and performance and caused a reduction in PI of their children. It also significantly affected the components of DMFT. After the intervention, the frequency of fissure sealant therapy and fluoride therapy significantly increased and according to the self-reported questionnaire, a significant improvement in performance was noted.

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