



# The Role of Repetition and Reinforcement (by Peer Group) in Oral Health Education Program as a Base for Health Belief Model (HBM) among Iranian Primary Schools Students (Cluster Randomized Controlled Trial)

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## ABSTRACT

**Aims** Repetition and reinforcement have been shown to play a key role in the sustainability of the effect of oral health education (OHE) programs.

**Participants & Methods** The present study was based on a cluster randomized controlled trial. The population was selected from fifth-grade female students in Tehran in 2017. Three schools in district 14 were randomly selected as the sample. The students were randomly divided into two intervention groups and one control group. The first group received OHE by the school-nurse and reinforcement by peer group (SNP). The second group received OHE only by the school-nurse (SN) without any reinforcement. The intervention groups received four OHE sessions. All of the groups were received the pre- and post-test. Then, they were exposed to post-intervention after 3 and 6 months. The data were collected by using the researcher-made questionnaire based on the two constructs of the HBM. In addition, Plaque Disclosing Tablets (PDTs) were used for determining dental plaque (DP). Finally, ANOVA was used for data analysis.

**Findings** The oral health behavior (OHB) in the two groups were significantly different after four-time OHE ( $p \leq 0.02$ ). OHB was increased significantly 6 months after the intervention, compared to the control group ( $p < 0.01$ ). Moreover, DP was increased significantly in the control group, compared to the baseline in the intervention ( $p < 0.01$ ).

**Conclusion** The repetition and reinforcement play a crucial role in school-based OHE irrespective of educators.

**Keywords** Repeated and Reinforced Oral Health Education; Dental Health Education; Peer Group; School-Nurse; Dental Plaque

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## Introduction

Oral health plays a critical role in maintaining health and preventing disease [1]. The health of the body begins with the oral cavity since all daily nutrition, whether useful or not passes through this cavity [2]. Globally, dental caries (tooth decay) is regarded as the most common oral disease of childhood [3]. Approximately, 60-90% of schoolchildren worldwide are suffering from dental caries (DC) [4]. Dental caries is regarded as a major public health problem globally [5]. WHO aimed to consider an average decay, missing, and filling tooth (DMFT) of not more than 3 in 2000 and not more than 1.0 in 2010 at the age of 12 [6]. The mean value of DMFT among 12-year-old children in the world is 1.61. These indexes were 2.57, 1.3, 2.76, and 1.48 in Europe, Africa, America, and West Pacific, respectively [7]. Based on WHO (2005), the best index of DMFT is 1 among 12-year-old children all over the world [6]. In the eastern Mediterranean region, including Iran, the mean number of decay missing teeth (DMT) is the highest in the Mediterranean region [8]. Based on the reported statistics, a considerable reduction occurred in DC from DMFT of 4 to 1.8 among 12-years-old Iranian students during the past two decades. However, oral health situation of the students in this age is unsatisfactory yet [9]. The results indicate the need for a major intervention to reduce the burden of oral diseases and improve oral health, especially among schoolchildren in Iran. Schools are regarded as the best place for promoting oral health because they can provide an important place for health promotion. In addition, among the school staff, families, and community as a whole, more than one billion children worldwide may be accessed to oral health promotion in schools [10-12]. However, based on a systematic review of 143 studies during 1982-1994, dental health education had a short term effect on oral health. Thus, the quality of oral health education needs to be improved [13]. Additionally, there is some evidence indicating that those interventions are consistent in nature, involve the parents, peer group and the school personnel, use behavior change models, a combination of several training methods, and practical experiences, and provide preventive services, which are more effective in promoting oral health and reducing DC among the students in primary schools [14]. In fact, intervention studies should be conducted based on the theory. The theories derived from behavioral or social science help practice health education and promotion in several ways [15]. Besides, a theory plays a role in develop program objectives, specify the methods for changing behavior, identify the timing for intervention, choose the right combination of strategies, enhance communication between professionals, improve replication, and develop program efficiency and effectiveness [15, 16]. Based on

experimental evidence, psychological approaches can improve oral hygiene related behaviors [16]. Health Belief Model (HBM) is a belief-based theory of health-related behaviors which is used to predict and provide suitable dental health interventions [17]. Health Belief Model includes several constructs predicting why people use prevention, why apply screening, and how control their disease. This model includes some constructs such as perceived susceptibility, severity, benefits, and barriers, along with self-efficacy which predict why people insist on prevention, follow screening, and how they control their disease conditions [18]. Based on a cross-sectional study conducted among 416 students in this age, the results indicated that perceived benefits and self-efficacy are the most important constructs which can predict oral health behavior [19]. Most researchers indicated that perceived benefits and self-efficacy beliefs are the most important constructs which can predict Oral Health Behaviors (OHB) [20-23]. By considering the above-mentioned issues, the present study aimed to design an intervention by using these constructs on oral health among the students. Perceived benefits mean the belief in the advantages of the methods suggested for reducing the risk of the seriousness of the disease or harmful state resulting from a particular behavior [15]. Self-efficacy refers to the confidence in one's ability to acquire a new behavior [15]. Oral health education (OHE) in schools has been largely considered by dentists or school-nurse. However, the cost-effectiveness and sustainability of such an approach are questionable [24]. During recent decades, some major changes have been observed in oral health education programs, especially among the primary schools [25]. On the other hand, a trained peer of school children is regarded as another school-based resource person whose potential was used in programs [26, 27]. A peer trainer is a teenager who has the features necessary to be considered as a partner in implementing the curriculum [28]. Peer groups can provide oral health information to help their peers to understand important things about staying promotion oral health. However, telling your parents or a teacher is important if students feel dental caries [28], which is called "Health Ambassador Students (HAS)" according to the Ministry of Education of Iran [29]. A large body of research depicted that repetition and reinforcement can play an essential role in maintaining oral health education [30, 31]. Therefore, oral health education programs should be a continuous project [30]. The present study aimed to determine the effectiveness of reinforcement and repetition by peer group educators, compared to school nursing trainer alone and those without any training. In fact, the present study evaluated the repetition and reinforcement by the peer group in an OHE program based on HBM for primary students.

**Participants and Methods**

The present study was a cluster randomized controlled trial that within 3 and 6 month follow-up, was conducted in public elementary schools in Tehran, Iran in 2017. Participants were 10-12-years-old female students (the fifth grade) in district 14, located in south-east from this city with 37 public elementary schools (19 schools for girls). Then, three schools for girls were selected randomly from an official list of public elementary schools provided by the Tehran Education Area, Tehran, Iran. Such schools have approximately 30 children in each class which resulted in selecting two classes randomly for

each selected school. The first intervention group was trained by a school nurse, which was strengthened by peer group (SNP; n= 60). The second intervention group was trained by the school nurse alone (SN; n= 60). The control group (n= 60) had no treatment in OHE. The inclusion criteria included fifth-grade female student (aged 10-12 years), studying in governmental schools, and having a signed consent from the student’s parent or legal guardian. Fortunately, all parents accepted the invitation and their children participated in the study. Figure 1 displays the flow of students through the trial.

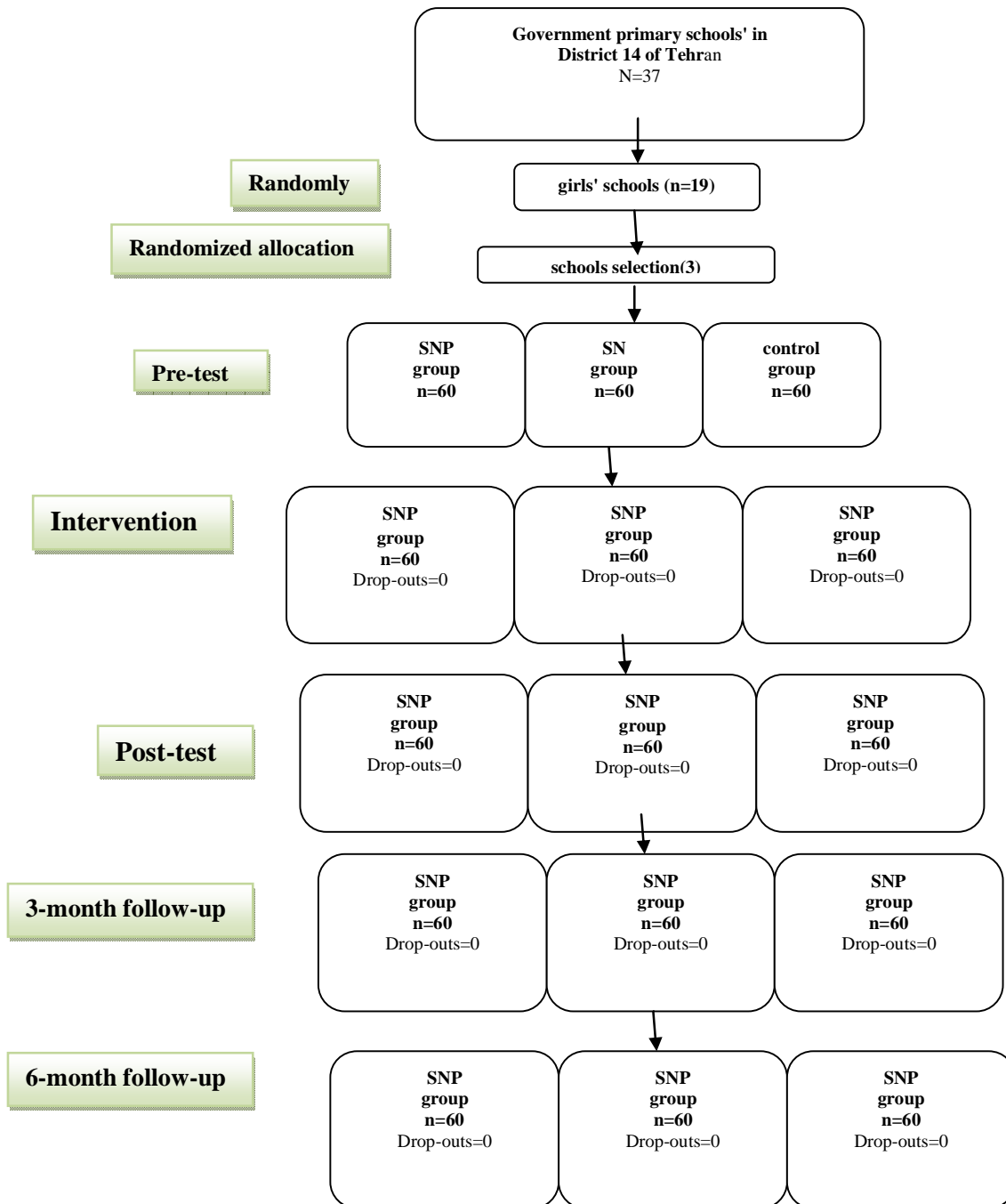


Figure 1) Flow chart of clusters and study subjects through different phases of the trial

In order to collect the related data, a questionnaire including four items related to the demographic variables such as age, parental education, and family income were selected. In addition, eight items related to the HBM constructs. The perceived benefits of oral health behaviors were assessed using four items such as “brushing my teeth at least twice a day will prevent DC and DP”. Self-efficacy was measured using the four items “I am confident I can brush my teeth at least twice a day”. The responses ranged from 1 (strongly disagree) to 5 (completely agree) based on a Likert scale. Two components of the HBM constructs were measured using a self-reported questionnaire. The items were derived from the previous study on the topic [18]. OHB was evaluated using a self-report measure. For example, “how often did you brush your teeth in the past one month?”. The responses for the item were 1 (not at all), 2 (once or twice a week), 3 (once a day), and 4 (twice a day or more). The answers of desirable and undesirable behavior were scored 1 and zero, respectively. The content validity was performed via the expert panel of 14 specialists, 4 health education experts, 5 school nurses and 5 dentists working on administered oral health in the Ministry of Health. The mean Content Validity Ratio (CVR) and Content Validity Index (CVI) were calculated as 0.66 and 0.83, respectively, based on Lawsche table [32]. Finally, the internal consistency of the constructs was evaluated by calculating Cronbach' alpha. In this study, Cronbach's alpha reliability coefficients for various constructs such as perceived benefits and self-efficacy) were 0.73 and 0.75, respectively, which indicated an acceptable internal consistency. Dental plaque in the students was assessed by a dentist. In order to control reliability, the clinical examiners were trained and calibrated by an experienced examiner at the Faculty of Dentistry of Shahid Beheshti University of Medical Sciences (SUMS) one week before starting the study. Moreover, the inter-rater agreement between two dentists was conducted by duplicate examinations on 20 students. Weighted kappa value was 92%. A number of 20 students were absent in the study. Thus, dental plaque was examined according to O'Leary index [33]. One dentist equipped with masks, gloves, and mirror presented in an empty room with sufficient light before, three months, and six months after the intervention at a certain time (8:00 a.m.) for three days and every day at one school during three research steps. The students brushed their teeth with the coordination made by a nurse and were ready to receive dental plaque disclosing tablets from the dentist. The dentist being unaware of the intervention and control groups only explained to the students that the tablets were not edible but chewable. After brushing the teeth, the students chewed the pink tablets to dissolve them in their saliva. Then, they applied the dissolved tablets on the whole surface of their teeth and took out the extra tablets from their mouth. In this way, any surface

with the remained dental plaque was pink. Then, medial, distal, lingual, and buccal surfaces were examined by the dental mirror and stained areas recorded on the record form by the dentist as shown in Figure 2 [34].



**Figure 2)** The plaque stained with the plaque test disclosing agent in the children's mouth

After collecting the baseline data in all three groups of research, an educational program was developed based on two constructs of the HBM including the instruction on the importance of oral health maintenance, the benefits of oral health, and the demonstration of tooth brushing and dental floss. The intervention included four sessions for four weeks based on two prediction constructs of HBM including perceived benefits and self-efficacy. Each session lasted for 50 min and they were delivered by a trained school nurse. The school nurse already received the same content, being taught to the students, from the researcher as pamphlets, posters, and graphs in PowerPoint in two sessions. An independent supervisor was present in every four sessions at two schools to ensure that the training was conducted equally in the intervention groups. Then, the report of each session was delivered to the researcher in form of a checklist. Both intervention groups including the training reinforcement group by oral health ambassador in addition to the training group of school nurse, and the training group by the school nurse alone received the following training. Thus, the nurse provided some contents during the first session by presenting lectures, photographs, and charts in PowerPoint about the oral form and the benefits of observing the oral health. For example, the school nurse mentioned that we can have a beautiful smile and more friends by observing the oral health. During the second session, the nurse divided the students into groups of five and a group discussion was held on oral health in each group. After that, the perceived benefits of oral health in each group were written on a paper. At the end of the discussion, the representative of each group attached the paper of his group on the classroom board so that the groups could exchange their views and the best paper be selected by the nurse's questions and answers. Then, the selected paper was attached to the classroom board. According to Glanz, group discussion is effective in understanding the perceived benefits [35]. During the third session, one top student having no decayed tooth was introduced to the students in the classroom using the pattern role method. In addition, the training films were shown to teach the behaviors

promoting the oral health including the appropriate tooth brushing twice a day for two minutes, the correct method of dental floss once or twice a day, and a six-month checkup by dentist. Then, the school nurse taught the appropriate method of tooth brushing and dental floss step by step by showing them a model. According to Glanz, showing films increases self-efficacy in the audience [35]. In the fourth session, the table of oral health behaviors record was given to the students to record the daily tooth brushing and dental floss. At the end of each day, the students' parents confirmed the table in the case of appropriate behavior and the students gave the completed tables to the school nurse at the end of the week. The school teachers and personnel were asked to have a good feedback if they observed any good behavior in students in terms of oral health (appropriate nutrition, tooth brushing, and using dental floss). The students' parents were asked to play music at home while their children were brushing their teeth to reduce stress in oral health behaviors of if a student failed at performing a behavior based on the table, and the parents would relate his failure to external factors such as the type of toothbrush. The school nurse selected 10% of students, i.e. six students among 60 students, showing interest in the field of oral health and having the ability of teaching as the ambassadors of oral health. Almost every ambassador was in charge of nine students. In this plan, the students accepting this title received a health ambassador card and proclamation. The tasks assigned to the health ambassadors were in the scope of each class including the student's snack monitoring, student's tooth brushing and using dental floss, follow-up notes in the report notebooks, and written reports to the school nurse at the end of each week. The school nurse trained the ambassadors how to use the dental floss and brush their teeth appropriately at two sessions of 50 minutes based on two predicting constructs of HBM model during the sport or art class (the time of these pieces of training was after the end of the nurse training in the intervention groups). The ambassadors were asked to provide the students with the health message specified by the nurse every two days in form of a worksheet (nine students for each oral ambassador) before the arrival of their teacher to the classroom and each student was assigned to complete the worksheet at home (two days based on the self-efficacy construct, two days based on perceived benefits). On the fifth day, the ambassadors collected the worksheet signed by the student's parents to reinforce the commitment to practice as the classroom was finished (worksheets are attached). In addition, each ambassador asked a student every week to show the practical method of tooth brushing and using dental floss at the break time. With the coordination of the school nurse, the ambassador held a competition on painting, diary-writing, etc. to strengthen the school nurse training.

Such training was only conducted in one intervention group (the reinforcement training group). The activities of the oral health began at the end of the nurse training and continued by six months. The school nurse was in charge of supervising such training. The students in the control group did not receive any intervention. The questionnaires were completed by the students in the intervention and control groups immediately, three months, and six months after the interventions to evaluate the programs. The dental plaque was assessed by a dentist in all three groups immediately, three months, and six months after the intervention.

The medical ethics committee of Tarbiat Modares University confirmed this study (IR.TMU.REC.1394.242). The parents provided written consent to their elementary school-age children's participation in the study. Also, the Health and Education's Ministry confirmed the study in Iran under the number 316/2880 on October 11, 2017. SPSS 22 software was used for data analysis. Descriptive statistics included means and standard deviations among the main variables of the study, in order to find the differences between perceived benefits, self-efficacy, OHB, and plaque scores before and after the education program administrated. Repeated measures analysis of variance was used to evaluate the changes in the perceived benefits, self-efficacy, OHB, and dental plaque scores at pre-test, post-test, three and six months after the intervention. Analysis of variance (ANOVA) and Least Significant Difference Bonferroni correction were used for measuring the difference in mean variables between groups.

## Findings

All 180 female students (10-12 years old, primary school, and grade 5) participated in the study. Figure 1 displays the flow of students through the trial. The mean age of participants was  $10.99 \pm 0.461$  years. Table 1 demonstrates the distributions of the three groups of students in terms of their age, parental education, and family income. In addition, no significant difference was found between the groups in baseline characteristics. The present study was a repeated evaluating study and had a between-subjects factor (experimental and control groups) and several within-subjects factors (perceived benefits, self-efficacy, behavior, and plaque scores). In addition, the participants in each group measured independent variables at four-time point (pre-test, post-test, three and six months after the intervention) separately, so, the present study is a complex variate type study.

The first intervention group was trained by a school nurse, which was strengthened by the peer group. The second intervention group was trained by the school nurse alone and the third group was the control group.

As shown in Table 2, by considering the main effect, stage and interacting effect of the stage with the group was significant on the oral health dependent variables. The main effects of stages were meaningful in perceived benefit (F= 8.22; p<0.001), perceived self-efficacy (F= 61.06; p<0.001), behavior (F= 12.02; p<0.001), and plaque scores (F= 4.06; p<0.05). In other words, there is a significant difference between the mean of two stages in dependent variables. The main interaction effect of the stage with the group were significant in perceived benefit (F= 4.84; p<0.001), perceived self-efficacy (F= 16.36; p<0.001), behavior (F= 3.86; p<0.001), and plaque scores (F= 8.49; p<0.001).

Table 3 indicates the results. Due to the interaction effect of the stage with the group, two simple effects of the group and stage were investigated separately at the later step. Initially, an ANOVA with repeated measures of a factor with three levels was used to compare the means of three groups. Then, the effect of simple stage investigated which occurred in this study when the average changes to an intervention were measured four times. Finally, a Bonferroni correction was used for Paired-comparison.

Table 3 shows the mean and standard deviation of between- and within-subject factors including perceived benefit, perceived self-efficacy, behavior, and plaque scores during pre-test, post-test, three and six months after the intervention. Table 3 indicates no significant differences among three groups in the pre-test (One of pre-conditions for ANOVA was set).

**The effects of between-group factors**

Table 3 compares the values of perceived benefits in the intervention and control groups. Six months after

the intervention, the mean perceived benefits in SNP group was 19.55 (SD= 0.92). In fact, there was a significant difference among the three groups, and SNP group had a higher mean of perceived benefits than two other groups (p<0.05). The self-efficacy was significantly improved after the program in both experimental groups. Table 3 depicts that perceived self-efficacy was improved significantly in both intervention groups compared with the control group (p<0.001). Self-efficacy in the intervention group was significantly improved by using HAS education, compared with the SN group at six months after the intervention (p<0.05; Table 3). During the 6-month time-point, OHB was significantly improved in SNP and SN intervention group, compared to the control group (p<0.01). The mean score of the participants' behavior in the SNP intervention group was 0.98±1.17 in pre-test, but the score was gradually increased as the program proceeded, reaching 2.36±1.37 after 6 months (Diagram 1).

Table 3 demonstrates the OHB among the students in the SNP intervention improved significantly at the end of the study compared to the participants in the SN group (p<0.01). The participants in the intervention groups showed no change in dental plaque during the post-test, compared to the students in the control group (p>0.05), while dental plaque was increased at six months after the intervention in the control group. Regarding the dental plaque results, the participants in the intervention groups significantly reduced plaque, compared to the children in the control group at 6-month follow-up (p<0.01; Table 3). Six months after the intervention, the participants in the SNP group had a significant reduction in the mean score of DP, compared with the SN group (p≤0.01; Diagram 2).

**Table 1** Frequency and percentage of demographic characteristics of participants (N= 180)

Demographic characteristics	Group 1	Group 2	Group 3	Total	p-Value
<b>Age</b>					
10	9(15.0)	5(8.3)	6(10)	20(11.1)	0.14
11	46(76.7)	45(75)	51(85)	142(78.9)	
12	5(8.3)	10(16.7)	3(5)	18(10)	
Total	60(100)	60(100)	60(100)	180(100)	
<b>Father's education level</b>					
Illiterate/Primary school	3(5.0)	7(11.6)	7(11.7)	17(9.4)	0.52
Secondary school/High school/Diploma	32(53.3)	38(63.3)	30(50.0)	100(55.6)	
Higher than diploma	25(41.7)	15(25.0)	23(38.3)	63(35.0)	
Total	60(100)	60(100)	60(100)	180(100)	
<b>Mother's education level</b>					
Illiterate/Primary school	7(11.7)	6(10.0)	5(8.3)	18(10.0)	0.31
Secondary school/High school/Diploma	32(53.3)	36(60.0)	28(46.7)	96(53.3)	
Higher than diploma	21(35.0)	18(30.0)	27(45.0)	66(36.7)	
Total	60(100)	60(100)	60(100)	180(100)	
<b>Family income</b>					
Low	2(3.3)	4(6.7)	1(1.7)	7(3.9)	0.38
Appropriate	25(41.7)	23(38.3)	20(33.3)	78(43.3)	
Well	20(33.3)	20(33.3)	23(38.3)	53(29.5)	
Excellent	13(21.7)	13(21.7)	16(26.7)	42(23.3)	
Total	60(100)	60(100)	60(100)	180(100)	

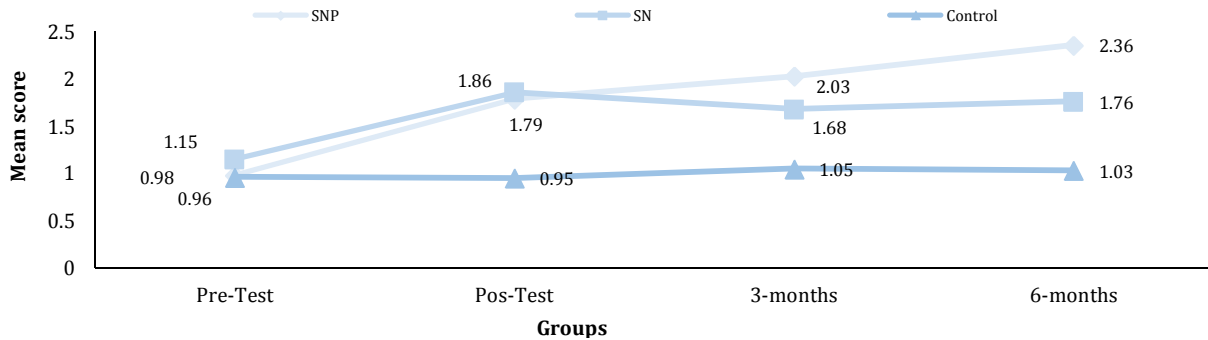
**Table 2)** Analysis of variance for repeated measures within-group and between-group effects of stages with scores of oral health variables based on the HBM

Variable	F	p-Value
Perceived benefits	8.22	0.001
	4.840	0.001
Self-efficacy	61.061	0.001
	16.368	0.001
behavior	12.025	0.001
	3.868	0.001
Dental plaque	4.063	0.011
	8.493	0.001

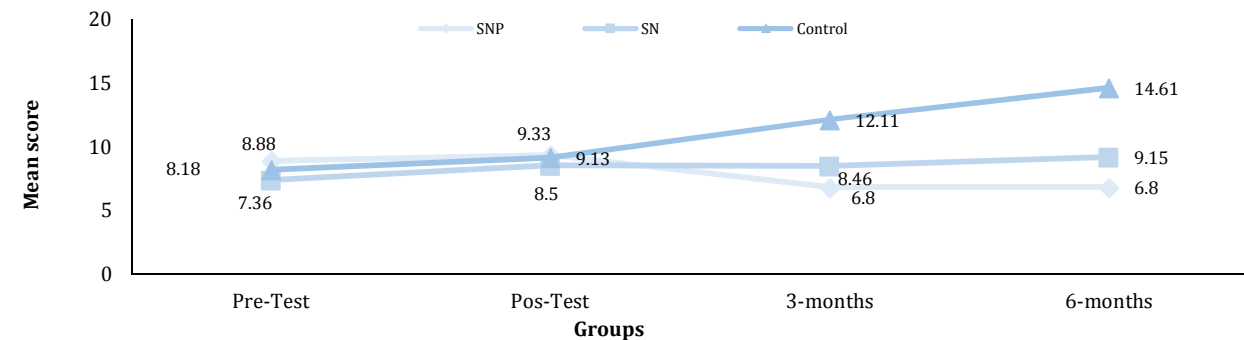
**Table 3)** Comparison of within-subject and between-subject effects factors in four stages of the implementation of dependent variables in three groups based on the HBM

Variable	SNP	SN	Control	p-Value
<b>Perceived benefits</b>				
Pre-test	16.92±2.80	17.22±2.63	16.78±3.48	p>0.05
Post-test	18.15±2.38**	18.45±1.57****	16.45±3.27	p<0.001
Three-month follow-up	18.95±1.46***	18.73±1.67****	16.61±2.35	p<0.001
Six-month follow-up	*19.55±0.92****	18.30±2.00****	16.31±3.45	p<0.05
p-Value	p≤0.01	p≤0.01	p>0.05	-
<b>Self-efficacy</b>				
Pre-test	12.13±2.61	11.92±2.47	11.57±2.65	p>0.05
Post-test	16.50±0.48**	16.46±2.82***	11.31±4.27	p<0.001
Three-month follow-up	18.43±0.35***	17.41±2.58****	11.51(3.84)	p<0.001
Six-month follow-up	*17.95±0.40****	16.45±3.25****	11.65±3.56	p≤0.01
p-Value	p<0.001	p<0.001	p>0.05	-
<b>Oral health behavior</b>				
Pre-test	0.98±1.17	1.15±1.25	0.96±1.07	p>0.05
Post-test	1.79±1.41**	1.86±1.38****	0.95±1.12	p<0.05
Three-month follow-up	2.03±1.61***	1.68±1.37****	1.05±1.14	p≤0.01
Six-month follow-up	*2.36±1.37****	1.76±1.26****	1.03±1.08	p<0.01
p-Value	p<0.001	p≤0.01	p>0.05	-
<b>Dental plaque</b>				
Pre-test	8.88±5.92	7.36±8.58	8.18±8.51	p>0.05
Post-test	9.33±5.22	8.50±5.23	9.13±4.47	p>0.05
Three-month follow-up	*6.80±3.85****	8.46±4.08***	12.11±4.61**	p<0.05
Six-month follow-up	*6.80±4.28****	9.15±4.80***	14.61±6.13***	p≤0.01
p-Value	p<0.05	p>0.05	p<0.01	-

\*: p<0.05 vs. SNP and SN groups (Bonferroni comparison between groups); \*\*: p<0.05 vs. SNP and control groups (Bonferroni comparison between groups); \*\*\*: p<0.05 vs. SN and control groups (Bonferroni comparison between groups); \*: p<0.05 vs. comparison of between pre-test and post-test in a group; \*\*: p<0.05 vs. comparison of between pre-test and three-month follow-up in a group; \*\*\*\*: p<0.05 vs. comparison of between pre-test and six-month follow-up in a group



**Diagram 1)** Mean score of behavior in intervention and control groups



**Diagram 2)** Mean score of dental plaque in intervention and control

### The effect of within-group factors

For the four-time point outcomes, the differences of within-group factors from baseline to six months after the intervention were compared. The participants in both intervention groups increased mean scores in perceived benefits ( $p \leq 0.01$ ), perceived self-efficacy ( $p < 0.001$ ), and OHB ( $p \leq 0.01$ ) during the post-test, three and six months after the intervention compared with the pre-test. The effect of within-group comparison was influenced by time (baseline, pre-test, three, and six months after the intervention), which indicated a significant increase in DP and decrease in DP mean score for the SNP group ( $p < 0.05$ ). The results of data analysis indicated that the participants in the SN group had no significant change in DP score ( $p > 0.05$ ), while the control group changes in DP score were significant ( $p < 0.01$ ).

## Discussion

The theory of research and practice are in line with each other and these words are not only related to each other, but they are essential for health education and health behaviors. Designing a precise intervention based on theories requires the use of appropriate techniques [35]. The effectiveness of peer education approach is based on the theory that sensitive information is more easily transmitted among peers [36]. In this regard, the present study aimed to examine and compare the role of training reinforcement through the peer group than the training by the school nurse using the health belief model prediction constructs to improve the oral dental behaviors among female students. The findings indicated that the training reinforced by the peer group has a positive effect on two prediction constructs of health belief model including perceived benefits and perceived self-efficacy on promoting the behavior of oral health. The result was confirmed by a large number of studies [30, 31, 37]. Based on the literature review, all studies in different conditions failed to confirm the positive effects of training reinforcement by peers. Some studies showed that training by the peer group had no difference with other training methods and the lack of increase in perceived benefits in the peer group was raised due to the lack of sufficient information at the level of adult educator [38]. Regarding the above-mentioned study, it seems that selecting an appropriate educator in the peer group, being accepted by other students, and having an appropriate control on the target group are considered as the factors affecting the training of the peer group. In the present study, since the students who were interested in oral health and had higher power of speech were selected by the school nurse and the information was taught to the health ambassador by the school nurse and then the

oral health ambassador reinforced the training based on the proposed program of the educator, having a program for selecting and training as well as peer education reinforced the training in perceived benefits of oral health among the students. The results of this study indicated that the dental plaque among the students being trained by peer group was significantly reduced six months after the intervention in both groups. The finding is consistent with the study of D'Cruz and Aradhya [39]. Due to the increased perceived self-efficacy, it seems that the peer group educator had better self-confidence and was more aware of transferring the information on the behaviors of oral health and observing it under any time and place conditions in terms of appropriate tooth brushing and using dental floss because of the needs of the target group (due to the same age with the intervention group) could be more effective and successful than the other intervention group in terms of reinforcing the information.

Thus, the results of the present study indicated that a theory-based intervention with peer education approach could improve self-efficacy among students in the intervention groups. Self-efficacy is an on-target predictor of oral-health behavior [17, 40, 41]. However, strengthening the training conducted by the peer group increased the effectiveness of a theory-based intervention in this group [40, 41]. The findings suggested an immediate need for more efficacy of interventions, strengthening the training conducted by peer group, even in theory-based education. Since the peer group including young child's peer group is generally made up of school friends, peer groups were composed of friends from neighborhood or elsewhere. The members of peer groups gained valuable experience in forming health promotion on their own and developing their own health behaviors [42, 43].

Therefore, this approach aimed at empowering the students to participate in effective activities leading to an increase in information and services. In addition, this group requires such information and services for promoting the health level. This approach can play a role in developing appropriate behavior and changing behavior in the target groups. Regarding the effectiveness of peer education reinforcement in line with two prediction constructs of health belief model on oral health behaviors, it is suggested to use the capabilities of the peer group in oral promotion program in this age group. As a result, the participation of more students in the above-mentioned program will be achieved and their learning will be improved. As most of the participants were female students in Tehran, the results should be interpreted with caution when they are generalized to male students or other types of population. Finally, further studies with similar age groups are necessary for confirming the findings.



## Conclusion

HAS plays a key role in the success of theory-based intervention at schools by implementing repetition and reinforcement strategies. HAS can train peers who can act as all-time repetition and amplify OHB messages.

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