

Impact of theory-based educational intervention on promotion of caries-prevention behaviors in Iranian mothers with 3-6-year-old children.

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Abstract

Background and objective: Early childhood caries as one of the dental diseases is highly prevalent among Iranian children. Therefore, this study aimed to investigate the impact of theory-based educational intervention on promotion of caries-prevention behaviors in mothers with children of three to six years of age in Fooman city.

Materials and methods: This was an interventional quasi-experimental study and the population consisted of mothers with children of 3 to 6 years of age who referred to health care centers of Fooman city. A simple random sampling was conducted to select the intervention and control groups. The data collection tool was a questionnaire which has developed based on the theory of planned behavior. The data analysis was done using SPSS software version 20.

Results: Descriptive analysis showed that among 80 participants, 57.5% had referred for their children's routine dental visits while 42.5% had not referred for their children's routine dental visits. Correlation Matrix illustrated a significant and direct correlation between the participants' knowledge, attitude, subjective norm and perceived behavioural control have with their intention to perform behavior. The results showed a statistically significant difference in mean scores of knowledge, attitude, subjective norms, intention, perceived behavioural control and tooth brushing behavior among mothers with 3-6-year-old Children in the experimental group after the educational intervention compared to the control group (P<0.001).

Conclusion: The use of educational methods based on the theory of planned behavior in mothers of 3-6-year-old children can be effective in prevention of oral diseases and improvement of children's oral health behaviors.

Keywords: Education; Dental caries, Prevention, Children.

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Introduction

Nowadays, people are susceptible to dental caries due to their lifestyle and food habits so that 99% of people will have tooth decay during their lifetime [1]. As a dental problem in children, tooth decay may lead to pain and infection. DMF (Decay-Missing-Filled) index is the most common epidemiological index to assess dental caries [1]. In fact, Early Childhood Caries (ECC) is one of the highly prevalent dental diseases in this period [2]. The prevalence of ECC among the children under 6 years of age has been reported to be 6-90% in the world and the lowest rate is seen in the developed countries while the middle or the highest rates are observed in the developing countries [3]. Primary teeth are the basis of permanent teeth in children and more susceptible to caries compared to permanent teeth [4]. On the other hand, dental caries is a chronic infectious disease that, unlike other infectious diseases, is not inhibited by antibiotics. Hence, the

World Health Organization (WHO) has recommended all countries to focus their efforts on oral health education programs [5]. Every year, more than 50 million hours are wasted due to the complications of oral diseases [5]. Oral diseases are one of the most common and predominant human diseases, particularly among children in the world. Although dental caries is highly preventable, it is still one of the most common chronic childhood diseases. Implementing the oral health educational programs as well as improving the quality of oral health systems by 2020 has become an objective of all countries. Systematic organizing of dental care caused increasing dental care among children and adolescents and this progress has led to a change in the pattern of dental decay and thus improved children's dental health. Efforts of public health agencies and the WHO in nine industrialized countries decreased the prevalence of caries by 30% to 50% while it is increasing in developing countries. In Iran, the growth of tooth decay has had a rising trend because there is no or very little

general knowledge about the role and importance of oral health in preserving dental health [6]. In their study, Mohebi et al. [7] showed that parental awareness of the importance of primary teeth in preschool children was very low. Furthermore, mother had negative attitude towards it [7]. In Iran, the Office of Oral Health assessed the status of oral health among Iranian children aged 3 and 6 in 1998 and their DMF was found to be 1.8 and 4.8, respectively. Soltani [3] indicated that the average number of decayed primary teeth among 6-year-old children was 5.7, while the mean permanent tooth DMF was 15% among 6-year-old children.

The WHO's goal for children is to reduce the oral health index to less than one by 2015, and the new goals of this organization in terms of oral health by 2020 is to focus on the use of experiences, evaluate previous objectives and emphasize the importance of oral health as an inevitable component of public health [8]. Due to the importance of this issue, the oral health education program and the improvement of oral health systems' quality by 2020 have become a goal for all countries [6].

Techniques such as brushing and flossing are the easiest and most effective ways to reduce the incidence of plaque and tooth decay. Enabling people to properly brush and floss their teeth and reducing physical and psychological barriers and problems are the best strategies to encourage people to observe their oral health. Recent studies in America have shown that teaching preventive behaviors such as brushing and flossing and regular dental visits in the past few decades in the American society have increased the percentage of people who had managed to retain their natural teeth in older ages [3].

According to the statistics in Iran only 44% of 6-year-old children had brushed their teeth at least once a day [9]. Children's parents are considered as the main caregivers in terms of oral health actions. Parents should be educated based on the needs of themselves and their children and according to their culture. When educating them, listening to the parents as well as getting their consent and motivating them can make the prevention programs more successful [9]. In this regard, an important factor in maintaining the health of children is to increase the knowledge of mothers and families about the importance of childhood care. Therefore, it is necessary that educational and health promotion programs be implemented with regard to the importance of oral health. Due to having behavioural change models, health education has been able to be successful in terms of changing and improving behavior. In this regard, the theory of planned behavior has been effective in its interventions to change behavior [10]. The theory of planned behavior has been used in different studies to predict the behaviors of using toothbrushes and dental floss, and the efficiency of this model for such behavioural changes has been proven [11].

The theory of planned behavior proposed by Ajzen is based on the theory of reasoned action. This theory predicts a special behavior on the condition that the person intends to do it. According to this model, the intention to perform a behavior is predicted by three factors: attitude towards the behavior,

subjective norms, and perceived behavioural control. Behavior refers to the way a person acts. Behavioural intention is the individual's decision to adopt a behavior. Attitude towards the behavior means how desirable, pleasant, helpful and enjoyable the intended behavior is for the person and it depends on the person's judgment on the effects and consequences of the behavior. Subjective norm refers to the social pressure perceived by an individual to perform a behavior (for example parents, teachers, doctors, religious leaders). Perceived behavioural control is a degree of one's feeling on how much control s/he has over performing or not performing a behavior [10].

Considering the importance of oral health in self-care issues, and since very few studies have been done in this regard, besides considering that the results of this study may pave the way for educational interventions in order to increase the level of children's dental health, this study aimed to investigate the impact of theory-based educational intervention on promotion of caries-prevention behaviors in Iranian mothers with 3-6-year-old children.

Materials and Methods

The present research was a case-control interventional study and the population included all mothers with children of 3 to 6 years of age who referred to health centers in Fooman city. The subjects were selected through simple random sampling. To do this, in the first step, two centers were randomly selected among the health-care centers of Fooman city. Then, the centers were matched in terms of cultural, social, economic, etc. conditions of the people who refer to. Finally, one center was randomly selected as the control group and the other one as the experimental group.

Sample size

The sample size was calculated based on the results of the study by Peyman and Samiee [9], considering 0.05 and 0.1 as type I and type II errors, respectively and with respect to the fact that the means \pm SD of the perceived behavioural control score in the intervention group and the control group were 10.83 ± 2.29 and 9.13 ± 2.16 , respectively. Alternatively, the sample size in each group was determined to be 40 according to the formula for estimation of the two means and based on 10% decrease.

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 (\sigma_1^2 + \sigma_2^2)}{d^2}$$

Questionnaire

The data collection tool in this study was a researcher-developed questionnaire consisted of three parts including 12 demographic questions, 10 questions about knowledge of oral health (the scores ranged from zero to 10), and the third part consisted of some questions concerning the constructs of the theory of planned behavior as follow: attitudes (5 questions with a score range of 5 to 25), subjective norms (7 questions

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with the score range of 7 to 35), perceived behavioural control (3 questions with a score range of 3 to 15), intention (1 question with the score range of 1 to 5), and one question to assess behavior.

The questions on knowledge were scored based on a two-option scoring system (the score zero for "I do not know" and wrong answers, and the score 1 for correct answers) while the five-option Likert scale was used to score the questions concerning the constructs of the theory of planned behavior (from 5 for "strongly agree" to 1 for "strongly disagree"). Finally, the options of the five-option Likert scale for behavior question included always, often, sometimes, rarely and never, which were scored from 4 to 0, respectively.

To evaluate the validity of the questionnaire in this study, face validity as well as content validity was used. The content validity method was used with CVR (Content Validity Ratio) and CVI (Content Validity Index). In this regard, for qualitative evaluation of the content validity, the questionnaire was given to a panel of related experts in order to be evaluated in terms of grammar and the use of harmonious and appropriate words. They have also applied some modifications if necessary.

Next, to determine the content validity, the tool along with a checklist was provided to 7 experts in the fields of health education, nursing, psychology, sociology and dentistry. They were asked to specify if each item was necessary, useful, unnecessary or useless.

In addition, to determine the reliability of the questionnaire, the Cronbach's alpha internal consistency was applied and a total score of 0.78 was obtained for the Cronbach's alpha.

Inclusion and exclusion criteria

The inclusion criteria for this study were mothers with children of 3-6 years of age referring to the health-care centers in Fooman city who had medical records in those centers, interest and willingness to participate in the educational intervention, the ability to read and write, and regular participations in educational sessions. On the other hand, the exclusion criteria included the mothers' unwillingness to continue their participation in the study, being absent in more than one educational session, and change of dwelling place during the study. It is noteworthy; all these mothers were the primary care givers of their 3-6-year-old children.

Ethical consideration

In order to prevent any ethical problem, the subjects were assured that the information would be kept confidential by the researcher. Furthermore, the times of educational classes were determined based on the participants' suggestions so that they would all have the chance to attend the classes.

Data gathering and educational intervention

After obtaining and recording the informed consent of the subjects, the pre-test questionnaire was completed as self-report. Taking advantage of the preliminary data analysis, we

designed the educational content based on the general purpose of the study and in cognitive, emotional and behavioural areas, on the basis of the theory of planned behavior.

The educational classes were held in three sessions managed by the researcher for the experimental group according to the pre-test results and based on determining the people influencing the participants.

A lesson plan was prepared for each educational session, and each class lasted for 20 minutes in the form of oral presentations with questions and answers. Following that, there were group discussions proportionate to the class for 40-60 minutes. The interval between each educational session was one week and total study duration lasted for three weeks.

The control group received no educational session except the routine educations of the health-care center, which included other health issues and rarely focused on oral hygiene. Although, for the sake of ethical principles, they were given the same pamphlets and booklets that were given to the intervention group. After the last educational session and a month after educational sessions, the questionnaire was completed again by the participants in both groups.

The data were analysed using SPSS software version 20.0 applying descriptive and analytical tests.

Results

Descriptive findings showed that the participants were consisted of 80 mothers aged 18-49 who had referred to the health-care centers in Fooman city. Most of them were older than 30 years old (85% of the case vs. 75% of the control group). In the case group, 80% and in the control group 62.5% of women were educated higher than primary school. 55% of women in the case group had more than one child, versus 52.5% of the control group. In both groups, 90% of women had insurance. Before intervention, 46 mothers (57.5%) had referred to dentists for tooth restoration or tooth extraction of their children, among which 55% (22 mothers) were of the case and 60% (24 mothers) were of the control group. By contrast, 34 mothers (42.5%) had not referred to dentists for tooth restoration or tooth extraction of their children, among which 45% (18 mothers) and 40% were of the case and control group, respectively.

Table 1 shows that knowledge, attitude, subjective norm and perceived behavioural control have a significant and direct correlation with intention to perform behavior.

Table 2 shows that the mean scores of knowledge, behavior, and constructs of the theory of planned behavior (attitude, subjective norms, perceived behavioural control, intention) in the experiment group significantly increased after the intervention compared to pre-intervention scores, but no statistically significant difference was observed in mean scores of these constructs in the control group in the two phases of the experiment (pre- and post-intervention).

The results also indicate a statistically significant difference between the intervention and control groups in terms of

knowledge, behavior, and constructs of the theory of planned behavior.

Table 1. Correlation matrix between knowledge and constructs of the theory of planned behavior.

	Knowledge	Attitude	Subjective norm	Perceived control	behavioural	Intention
Knowledge	1					
Attitude	0.298**	1				
Subjective norm	0.237*	0.429**	1			
Perceived behavioural control	0.242*	0.189	0.272*	1		
Intention	0.381**	0.451**	0.386**	0.551**		1

*Correlation is significant at the 0.05 level.

**Correlation is significant at the 0.01 level.

Table 2. The mean and standard deviation of knowledge, behavior, and the constructs of the theory of planned behavior in pre-test, post-test in both intervention and control groups.

	Group	Pre-test	post-test	Paired T-test	T-test	
		Mean (SD)	Mean (SD)		Before	After
Knowledge	Experiment	5.57 (2.63)	8.92 (1.91)	<0.001	0.23	<0.001
	Control	6.22 (2.25)	5.90 (1.90)			
Attitude	Experiment	12.25 (2.89)	16.55	<0.001	0.78	<0.001
	Control	12.05 (3.69)	11.60 (3.22)			
Subjective norm	Experiment	17.27 (4.76)	19.97 (3.45)	<0.001	0.23	<0.001
	Control	15.72 (6.64)	15.17 (5.70)			
Perceived behavioural control	Experiment	5.57 (1.50)	1.77 (1.18)	<0.001	0.81	<0.001
	Control	5.67 (2.28)	1.77 (1.18)			
Intention	Experiment	1.77 (1.18)	3.20 (0.64)	<0.001	0.44	<0.001
	Control	2.02 (1.65)	1.87 (1.41)			
Behavior	Experiment	2 (1.21)	3.32 (0.69)	<0.001	0.87	<0.001
	Control	1.95 (1.60)	1.92 (1.11)			

Discussion

The WHO's goal for children's oral health index is to reduce it to less than one by 2015, and the new goals of this organization in terms of oral health by 2020 is to focus on the use of experiences, evaluate previous objectives and emphasize the importance of oral health as an inevitable component of public health [8].

Given the importance of this issue, the oral health education program and the improvement of oral health systems' quality by 2020 have become a goal for all countries. In this regard, the present study aimed to investigate the impact of theory-based educational intervention on promotion of caries-prevention behaviors in mothers with 3-6 year-old children.

In this study, a theory-based approach was used because studies have shown that the most effective programs use

theory-based approaches rooted from behavior change models and are able to suggest a variety of factors for educational interventions to be used in behavior change interventions [12].

Results of this study showed that attitude, subjective norms, and perceived behavioural control had a direct and significant relationship with intention. In fact, improving each of these constructs would improve the intention to perform oral health care behavior. This result is in line with the ones obtained by Peyman and Samiee [9] Norman et al. [13], Brickell et al. [14], and Besharati et al. [15]. The results of this study also showed that there was a direct and significant relationship between knowledge and subjective norms, attitude, perceived behavioural control and intention. This reflects the importance of knowledge in increasing the elements that create behavior. Knowledge might affect the development of positive attitude

and establishment of subjective norms in the societies. It could also affect the perception of the ease of preventive behavior.

Moreover, in our study, intention and behaviors associated with oral health had a positive and significant relationship with attitude, perceived behavioural control and subjective norms. That is to say, increasing each of these constructs would lead to an increase in oral health-care behaviors. This result was consistent with those of Starkel et al. [10] and Rahimi et al. [16].

In this study, the impact of educational intervention on mothers with children of 3-6 years of age showed that educational interventions have a significant effect on increasing the mean scores of knowledge, attitude, subjective norms, perceived behavioural control and intention. Besides, our results showed a significant difference between pre- and post-educational intervention in terms of the mothers' knowledge. This result is in line with the results of studies by Amin et al. [17] and Peyman and Samiee [9]. We also found a statistically significant difference between pre- and post- educational intervention in terms of the mothers' attitude. This was in line with the results of the study conducted by Astrom et al. [18]. The results on subjective norms and perceived behavioural control also showed a significant difference between pre- and post- educational intervention and were consistent with the results of the studies carried out by Amin et al. [17] and Astrom et al. [18].

Furthermore, the results on the intention of preventing dental caries behavior revealed a significant difference between preventive behavioural intention before and after the educational intervention. This was in line with the results of the studies conducted by Payman and Samiee [9] and Astrom et al. [18].

In the present study a comparison between the impacts of an educational intervention on tooth brushing behavior in both groups showed a significant difference between the means of post-intervention behavior in both groups. This result was consistent with the results of the study by Weinstein et al. [19] who compared the mothers in two groups of motivational intervention and traditional education using a pamphlet. They reported that observing preventive behavior by the motivational intervention group lead to a decrease in children's dental caries [19]. These results were also consistent with those obtained by Kowash et al. [20] on the effectiveness of oral health in a long-term health educational program for mothers with young children. Other studies also could achieve the same results as ours. Such as the studies conducted by Weinstein et al. [19], Plutzer et al. [21], and Neumann et al. [22], which showed the positive and significant impacts of educational interventions on oral health promotion.

There are some limitations in our study. One of these limitations was that the questionnaire was completed by the participants as self-reported. The other limitation was that only the mothers who had medical records and referred to the health-care centers were included in this study.

Conclusion

Health education is considered as one of the most important measures for prevention of oral diseases and promotion of public health. In this regard, an important role of health education is to prepare the public through increasing their knowledge, skills and health experiences, by means of which people can have more control over their health [23]. Hence, regarding the results of the present study and the study by Armitage et al. [11] that have proved the efficacy of an educational intervention based on the theory of planned behavior on promotion of tooth brushing behavior, it can be argued that the theory of planned behavior may be used as a convenient theoretical framework for designing and implementing interventions for oral health of 3-6-year-old children.

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