



ORIGINAL ARTICLE

Effect of mother's education based on Health Belief Model (HBM) on 3-6 years old children's dental plaque index

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ABSTRACT

Childhood caries remains a serious problem in several developing and developed countries. The education of mothers to promote healthy dietary habits in children has been the main strategy used for the prevention of childhood caries. So, in this study the effect of oral health education based on HBM for decreasing dental plaque index has been studied in mothers who had 3-6 years old children. In this quasi- experimental study 56 mothers have been chosen who were divided in to experimental and control randomly. Baseline questionnaire was completed by two groups. Then, educational programs were done in three sessions for experimental group. After the educational programs, the questionnaire was completed again by two groups. Finally, gathered data were analyzed by SPSS software and statistical tests (Independent- sample T test and Chi-square test). After implementing educational programs, mean score of all aspects of health belief model (mother's knowledge, perceived benefits and barriers, perceived susceptibility and perceived severity) in the experimental group had significant difference in comparison with the control group ($P < 0.001$). The result of this study has confirmed the efficiency of using health belief model in adopting preventive behaviors regarding children dental plaque in mothers who had 3-6 years old children.

Keywords: Child, Dental plaque, Education, Preschool

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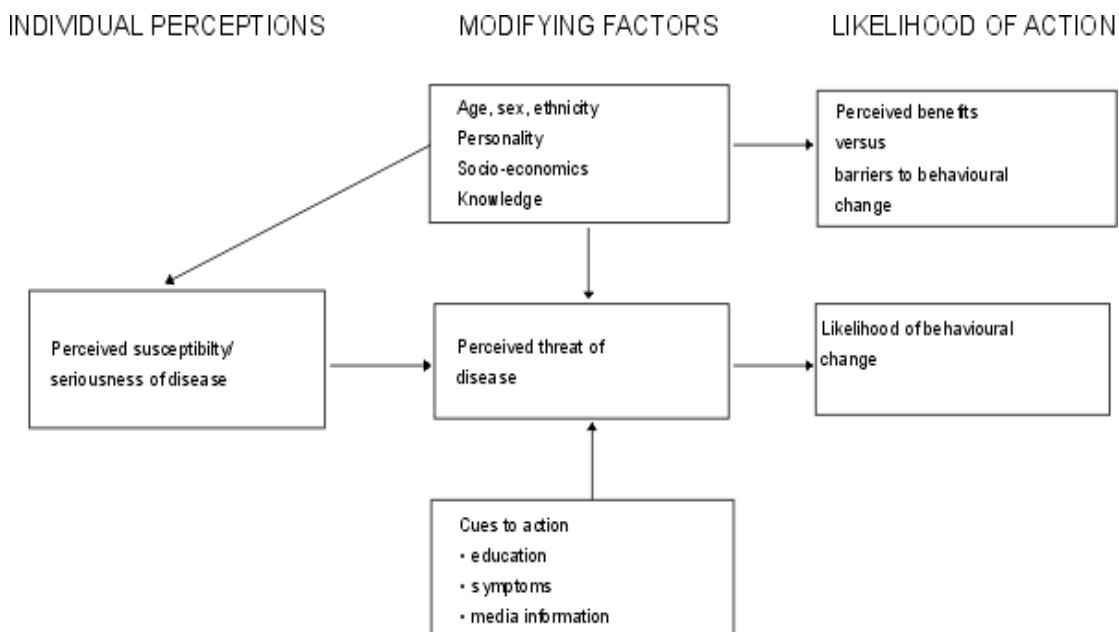
INTRODUCTION

Oral health is an important aspect of general health in infants and children and impacts the quality of life and health outcomes [1]. Although dental caries' levels have declined and stabilized the world over, the problem of early childhood caries (ECC) has remained persistent in many areas of the world affecting certain segments of society, especially the socially deprived, who remain at high-risk to this disease [2,3]. The disease is also a serious threat to the health of other primary teeth and subsequently to the health of the permanent dentition [4]. The factors associated with ECC include low income families [5], cultural differences [6,7], child temperament [8], fewer dental visits [9], lower educational level of the mother [10], low levels of oral health knowledge among mothers [10,11], inadequate oral hygiene [5,12,13], and a highly cariogenic diet in these children [5,13,14,15]. Severe early childhood caries is more common among lower socioeconomic groups and deprived ethnic minorities [16]. Many behavioral theories such as the Health Belief Model and Theory of Reasoned Action have confirmed the major role of knowledge and attitudes in explaining behavioral changes [17]. These aspects are especially emphasized when the

role of parents' knowledge of and attitudes towards health behavior and status of their offspring is assessed [18]. Parents play a central role in giving children the information and encouragement needed for healthy lives [19]. Parental oral health-related knowledge, belief, and attitudes influence the tooth-brushing behavior of their children [20]. Furthermore, parents' attitudes have a significant positive influence on the children's dental caries and gingival health [24]. Within the family, the role of mother has been emphasized in relation to a child's oral health habits and status [22]. Despite changing roles and areas of responsibility within the family, in the child's oral health-related lifestyle, the mother still seems to play the key role [19, 20]. To find factors promoting children's oral health behavior, more research on family characteristics and parent-child relations has been suggested [23]. While a wealth of research has been performed to determine the importance of parents' oral health-related knowledge and attitudes for oral health among preschoolers few studies have been carried out on school-aged children [24]. This information is important, especially in societies where mothers play a significant role in rearing their children. Health education, a widely accepted approach in prevention of oral diseases, is a process of transmission of knowledge and skills necessary for improvement in quality of life. The goal of planned health education program is not only to bring about new behaviors but also to reinforce and maintain healthy behaviors that will promote and improve individual, group or community health [25].

Health Belief Model

The Health Belief Model (HBM) is a psychological model that attempts to explain and predict health behaviors. This is done by focusing on the attitudes and beliefs of individuals. The HBM was spelled out in terms of four constructs representing the perceived threat and net benefits: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. These concepts were proposed as accounting for people's "readiness to act" [26].



Source: Glanz et al, 2002, p. 52

The present study evaluates the influence of educational intervention based on HBM on mothers' oral health-related knowledge and attitudes toward dental health of their children and Decreasing Dental Plaque Index in 3-6 Years old Children, Zanjan, Iran.

MATERIALS AND METHODS

Subjects:

This quasi-experimental study involved 56 randomly selected mother and child pairs who referred to Zanjan health center, Iran. Inclusion criteria were: 1) living with child, 2) don't use fluoride in children and 3) completing consent form. Those mothers who had missed one or more educational sessions were excluded. Participants allocated to experimental and control groups randomly (28 in each group)

Instrument:

A self-administered questionnaire which was designed on the basis of HBM constructs was applied. It had 44 questions, among which 22 were about knowledge and 22 about attitude components (perceived susceptibility, perceived severity, perceived benefits and barriers). This questionnaire was reviewed by a

panel of professionals in health education. It's content and construct validity was examined. Suggestions were obtained with respect to necessary addition, deletions and changes in wording to clarify any ambiguity and to fit the understanding level of the participants. Reliability analysis was conducted for testing the reliability of knowledge and attitude scales. Internal consistency of these sections of questionnaire was calculated by using Cronbach alpha techniques which, was 0.71 in knowledge and 0.72 in attitude sections.

Intervention:

At first, the questionnaire was completed by two groups (experimental and control) and dental plaque of children determined by dentist with the use of Navy Plaque Index (NPI). Then, mothers in the experimental group participated in 3 educational sessions (each of them one hour). In these sessions, aspects of oral health in children by using different methods such as: lecture, focus group discussion, pamphlet and film were presented for mothers. One month after educational sessions, the questionnaire was completed by two groups again and also dental plaque index determined by dentist.

Data analysis:

The scoring for attitude was based on 5 point Likert scale, while the scoring for knowledge included yes/no responses. In the case of knowledge questions, true responses gained one and false responses gained zero scores. But, in terms of attitude questions, spectrum of scores was between 0 (strongly disagree) to 4 (strongly agree). Behavior also was assessed with considering frequency of tooth-brushing behavior in children and mothers help in this regard as the correct behavior gained one and incorrect behavior gained zero score. Finally, gathered data were analyzed by using the Statistical Package for Social Sciences (SPSS) software (version 15.0) and appropriate statistical tests (Independent- sample T test and Chi-square test). Statistical significance was defined as $P < 0.05$.

RESULTS

This study was carried out on 56 mother and child pairs. Mean score of mother's age was 31 ± 4.75 in the experimental and 30.25 ± 3.51 in the control group. In terms of education, there wasn't significant difference between two groups ($P = 0.88$). Independent sample T test showed that, after educational intervention mean scores of knowledge and attitude components (perceived susceptibility, perceived severity, perceived benefits and barriers) are significantly different between experimental and control groups [Table 1]. According to Chi-square test, frequency of tooth-brushing behavior in children was different between two groups after educational sessions [Table 2]. Also this same statistical test showed significant difference between two groups in terms of mothers help in tooth-brushing behavior of children after intervention [Table 3]. Mean score of dental plaque index had decrease in two groups one month after education [Table 4] while, comparison of mean score difference of dental plaque index before and after educational intervention between two groups indicated that decreasing dental plaque index in the experimental was significantly higher than control group [Table 5].

Table 1- Mean total scores of HBM constructs before and one month after educational intervention in experimental and control groups

HBM Constructs	Experimental N=28		Control N=28		Independent Sample-T test
	Mean (SD) before education	Mean (SD) after education	Mean (SD) before education	Mean (SD) after education	
Knowledge	50.97 (9.28)	82.95 (22.52)	48.37 (9.28)	46.75 (12.92)	P<0.001
Perceived susceptibility	59.28 (8.29)	94.57 (3.47)	58.42 (8.75)	61 (8.87)	
Perceived Severity	64.14 (7.88)	92.14 (4.80)	62.28 (10.09)	64.14 (10.40)	
Perceived benefits	75 (5.61)	90.85 (5.42)	75.71 (6.43)	76.72 (7.72)	
Perceived barriers	37.85 (9.18)	78.36 (7.94)	38.16 (10.61)	39.69 (11.35)	

Table 2- Patterns of tooth-brushing behavior in children before and one month after educational intervention in experimental and control groups

Frequency of tooth-brushing	Experimental N=28		Control N=28		chi-square test
	Number (%) before education	N (%) after education	N (%) before education	N (%) after education	
Desirable ^a	3 (10.7)	17 (60.7)	5 (17.8)	5 (17.8)	P = 0.005
Undesirable ^b	25 (89.3)	11 (39.3)	23 (82.2)	23 (82.2)	

a- ≥ 2 daily tooth-brushingb- < 2 daily tooth-brushing**Table 3- Patterns of mother's help in child tooth-brushing behavior before and one Month after educational intervention in experimental and control groups**

Frequency of Mother's help	Experimental N=28		Control N=28		chi-square test
	Number (%) before education	Number (%) after education	Number (%) before education	Number (%) after education	
Never	1 (3.6)	0	4 (8.9)	3 (10.7)	P = 0.005
Seldom	13 (46.4)	3 (10.7)	10 (35.7)	10 (35.7)	
Often	8 (28.6)	8 (28.6)	5 (17.9)	6 (21.5)	
Always	6 (21.4)	17 (60.7)	9 (32.1)	9 (32.1)	

Table 4- Mean total scores of dental plaque index before and one month after educational intervention in experimental and control groups

Dental plaque	Experimental N=28		Control N=28		Independent-Sample T test
	Mean (SD) before education	Mean (SD) after education	Mean (SD) before education	Mean (SD) after education	
		2.81 (1.29)	1.34 (0.659)	2.74 (1.32)	2.33 (1.17)

Table 5- Mean difference scores of dental plaque index before and one month after educational intervention in experimental and control groups

Group	Mean	SD	Independent-sample T test
Experimental	-1.46	-1.21	P<0.001
Control	-0.41	-0.65	

DISCUSSION

Dental plaque has been considered as the main cause of dental diseases, which is well preventable with sound tooth-brushing [27]. In our study, increasing the mean score of knowledge in the experimental group following educational sessions result in improving desirable behavior of mothers regarding children dental health. In Kahzadi's study also it is showed that increasing knowledge by using subjective norms such as: family members especially mothers causes dental health preventive behaviors in children 28. Results of this study indicated that, after educational intervention, mean scores of HBM constructs [Table1] have been increased significantly in the experimental group. This finding is in line with earlier research showing an association between increased perceived susceptibility with education and promoting desirable behavior [29]. This study has demonstrated that mother's positive attitudes towards

oral health had a significant influence on their children's twice-daily tooth-brushing behavior. Therefore educational intervention on the basis of HBM constructs had significant influence on mothers helping behavior in children tooth-brushing. This finding is accordance with earlier findings in this regard [30, 31, 32]. In our study, the mean of dental plaque index was similar in two groups before education. But after that, there was significant difference between experimental and control group. It is notable that, decreasing dental plaque index is the best indicator of improving behavior of mothers. Other previous studies also showed that, after educational intervention mean score of dental plaque has been decrease 33, 34. Health educational programs have been traditionally based upon the theory that acquiring new knowledge will alter attitudes and lead to a change in behavior. However, a linear relationship between knowledge, attitude, and behavior seems simplistic because external factors such as environmental, social, and family circumstances have an influence on human behavior, as suggested in behavioral theories such as the PRECEDE-PROCEED model [35]. Based on the Theory of Reason Action, 'important others' such as family members and friends are important in changing and maintaining oral health behavior in adults 36. Bearing in mind the important role of parents, and especially mothers, in developing positive values and behaviors in their children 37, the influence of mothers in this study as 'important others' on children's health behavior is logical. In the context of a family, children should not be considered merely as passive recipients of care in everyday routines of health action, because they play an active role in making healthful choices 38. In their role as health-promoters, they can contribute to healthy activities in the family. Thus, the family should promote children's health as well as their children's ability in developing a healthy lifestyle. The significant influence of mothers' attitudes on children's oral health found here may be attributed to the impact of their attitudes on their parental caring behaviors for their children [25]. Additionally, this points to the deep interaction between mother and child, and supports the mother's role as an important resource for the child's perception and acceptance of attitudes, values, and behaviors especially during the critical period for establishing attitudes and beliefs and shaping each individual's health behavior [38].

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