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Effects of Parents' Education on Dental Fissure Sealant Rate of Preschool Children Based on the Theory of Planned Behavior in Iran

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Abstract

Background

Fissure sealant therapy is one of the most effective methods for preventing dental caries. This study aimed to investigate the effect of parental education on fissure sealant in the sample of Iranian preschool children.

Materials and Methods: This experimental study was conducted in Sanandaj, West of Iran, in 2019. A total of 120 parents of preschool children were randomly selected and divided into control (n = 60), and intervention (n = 60) groups. The required data were collected by a questionnaire based on the theory of planned behavior. It consisted of two sections: demographic information and theoretical constructs. The intervention group received four sessions of 45-60 minutes. Education was conducted through lectures and question and answer using pamphlets, brochures, and dental manikins. Data were analyzed using SPSS software version 20.

Results: The intervention and control groups were homogeneous before education. They were similar in terms of mean scores of the planned model. However, after an educational intervention, all the scores increased, including the mean attitude score (from 3.09±0.47 to 4.07±0.64), subjective norm score (from 3.2±0.45 to 3.90±0.52), perceived behavioral control score (from 3.172±0.31 to 3.73±0.40), behavioral intention score (from 3.33±0.58 to 4.40±0.62(, practice score (from 0 to 19.41±0.6), and knowledge score (from 1.85±2.23 to 7.17 ±1.31). Besides, the difference was statistically significant ($p<0.05$). Also, changes in model constructs and knowledge were statistically significant in two groups ($p<0.05$).

Conclusion

According to the results with implementing four educational intervention sessions based on the theory of planned behavior on fissure sealant can help increase the fissure sealant rate.

Key Words: Children, Education, Fissure Sealant, Parents, Theory of Planned Behavior.

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1- INTRODUCTION

Nowadays, it is common knowledge that people must protect their teeth, and no one is willing to lose their teeth (1). Unfortunately, due to lifestyle and increased risk factors, such as foods high in sugar, smoking, environmental pollution and shortage of fluoride in drinking water, dental caries is nowadays considered one of the most common diseases (2, 3). Undoubtedly, prevention is the best cure for all diseases, and dental caries is no exception (4). Different strategies such as brushing, dental floss, fluoride-containing materials, and fissure sealants are recommended to prevent dental caries. The primary goal of all of these methods is to prevent the formation and persistence of bacterial plaque, leading to the secretion of acidic materials and demineralization, and ultimately, dental caries (5, 6). Due to the specific tooth morphology, plaque accumulation in some areas is higher than others, such as fissures and pits, which are more susceptible to caries than other parts.

Thus, caries in the posterior teeth is often higher than the anterior teeth (7). A fissure sealant is one of the best preventive treatments for dental caries. In this method, bonding materials and sealants are used to fill the pits in the occlusal surface of the posterior teeth, thereby preventing the accumulation of food particles and bacterial plaques, and ultimately, dental caries (8). Several studies have shown that fissure sealant at younger ages significantly reduces dental caries (9, 10). The fissure sealant rate is high in developed countries (above 50%) but unfortunately low in developing countries like Iran. In Sanandaj, it was reported to be 19% in 2017, which is lower than the standard rate. Prevention of diseases such as dental caries is also one of the most important principles of the oral hygiene development plan (11, 12). Almost all children are unable to observe oral hygiene principles and care for themselves. Family plays the most important role in children's mental, physical and social health; thus, parents play a major role in children's oral hygiene, for example, preventing dental caries. Furthermore, mothers play the leading role here and should be provided with the necessary education (1). In this context, the theory of planned behavior as one of the theoretical frameworks to show behavior with four constructs of attitudes, subjective norms, perceived behavioral control and behavioral intention is one of the most widely used health education models. According to this model, abstract attitudes, norms, and behavioral control predict behavioral intention and behavior (13), (**Figure.1**). Evidence suggests that education and interventions based on the theory of planned behavior have been effective in promoting health behaviors (14). A study by Azad et al. (X) entitled "Primary School Parents' Knowledge and Attitudes toward Fissure Sealant and Fluoride Therapy and Preventive Measures in Shiraz" indicated that parents' knowledge and attitudes toward preventive treatments were insufficient. They were required to enhance their knowledge and attitudes through educational programs (15). In a study by Jafari et al. (X) entitled "Examining the Knowledge, Attitude, and Behavior of Parents of Third-Grade Primary School Students in Tehran" showed that health education and regular referrals to dentistry positively affected parents' knowledge, attitudes, and practices (16). The relevant studies suggest that parents' knowledge and attitudes toward fissure sealant therapy as a preventive measure of dental caries in children are extremely low. They underline fissure sealant education (15). This study aimed to investigate the effect of education based on the theory of planned behavior on fissure sealant in Sanandaj, where the prevalence of dental caries is high. It should be noted that such a study has not been conducted in Iran.

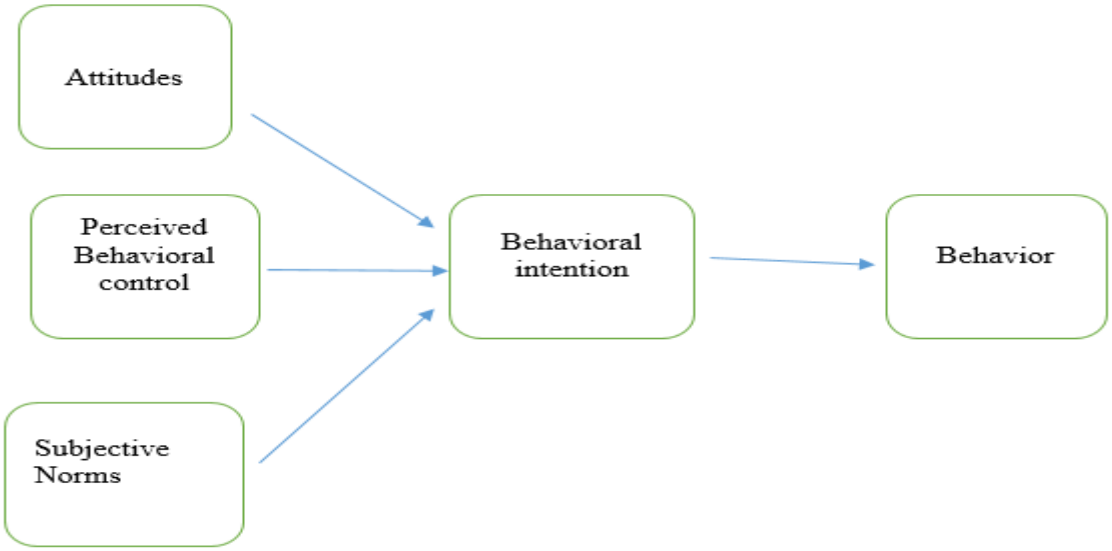

Fig.1: Theory of Planed Behavior (TPB) (13).

MATERIALS AND METHODS

2-1. Study design and population

This experimental study was conducted in Sanandaj, West of Iran, in 2019. Samples were selected by random cluster sampling from two districts of Sanandaj, in such a way that four pre-schools were selected from each district. After examining the children's teeth, the children's parents were assigned to two groups: the control group (n = 60) and the intervention group (n = 60).

2-2. Method

Inclusion criteria included children inhabiting in the area with six healthy teeth and no fissure sealant. After obtaining the necessary permissions from the Kurdistan Education Department, the study was carried out in four primary schools. Education was performed based on the theory of perceived behavioral control. It included four constructs, including attitude that examines one's positive or negative evaluation of the fissure sealant, subjective norms that examine the effect of social pressure on the incidence of certain behaviors, perceived behavioral control that examines the hardness or easiness of one's perception of the fissure sealant, and behavioral intention construct that evaluates parents' tendency to perform fissure sealant on their children.

2-3. Measuring

The required data were collected using a researcher-made questionnaire whose validity and reliability were assessed by the relevant experts and whose content and face validities were confirmed using five health professionals' views. The content validity index (CVI) and content validity ratio (CVR) were calculated. To determine the CVR, with the range (Necessary, not necessary but useful, not necessary) were reviewed according to Lawshe table, to determine the minimum index of relative content validity coefficient items whose CVR numerical value was higher than 0.99 were retained. To determine the CVI, according to the CVI of Waltz and Bausell, questions with a CVI higher than 0.7 were retained. The general validity and reliability of the questionnaire based on Cronbach's alpha were reported to be

0.84% and 0.86%, respectively. One of the questions in the perceived behavior control whose CVR was reported negative was excluded and recognized as unnecessary by experts. This questionnaire included demographic information with 13 items and knowledge about dental fissure sealant with eight three-option questions (yes, no, and I do not know), and four constructs of planned theory, including attitude (7 questions), subjective norms (8 questions), perceived behavioral control (9 questions), and behavioral intention (6 questions). They are scored on a five-point Likert scale (strongly agree, agree, disagree, disagree, strongly disagree). Finally, the practice was measured quantitatively.

2-4. Intervention

Educational content was prepared based on valid sources, model structure and pre-test results, including brochures, leaflets, and dental manikins. After designing the educational program and based on general and specific goals, group education was held in each preschool once a week for one month (four sessions), and for approximately an hour, including 15 minutes for preparation before education, 30 minutes for lecture using dental images and manikins, and 15 minutes for question and answer session. After obtaining informed consent from the parents to participate in the study and explaining its implementation stages and emphasizing confidentiality of information, the questionnaires were distributed among the parents in both intervention and control groups. They were completed in a self-reported manner and collected (pre-intervention). Three months after the last educational session, the questionnaires were re-distributed among the intervention and control groups.

2-5. Data analysis

The data were analyzed using SPSS software version 20 and descriptive statistics (absolute and relative frequency, mean and standard deviation), as well as analytical tests of Chi-square and independent t-test. A p-value of less than 0.05 was statistically significant.

3- RESULTS

The study participants included 120 parents with a mean age of 30.63±6.19 years in the intervention group and 31.2±5.90 years in the control group. Mothers constituted 93.3% of the parents who participated in the educational intervention. Only 6.7% of fathers participated in education. Housewives constituted 90% of the parents in the intervention group and 93.3% of those in the control group. Besides, 6.7% of the parents in the intervention group and 8.3% of those in the control group had an academic degree (**Table.1**).

No significant difference was found between demographic characteristics of the intervention and control groups. The required information about the study participants (intervention group, 75%, control group, 58.3%) was mostly obtained from mass media (television, radio, and newspapers). The majority of the parents referred to the dentist only when their children had dental problems (intervention group, 60%, control group, 40%). They also referred to public health centers when they needed to see a dentist. Most of them stated that they did not receive the necessary education to prevent dental caries when they referred to the dentist and treatment centers (intervention group,70%, control group, 56.7%) (**Table.1**).

Table-1: Demographic characteristics of the participants in the intervention and control groups.

Variables	Intervention group, n=60	Control group, n=60	P-value
Education			
Less than diploma	41(68.3)	31(51.7)	
Diploma	15(25%)	24(40%)	0.167
Academic	4(6.7%)	5(8.3)	
Job			
Housewives	54(90%)	56(93.3%)	
Self-employed	5(8.3%)	4(6.7)	0.223
Employer	1(1.7)	0	
Income(Adequacy from their own point of view)			
Adequate	30(50%)	31(51.7)	0.50
Inadequate	30(50%)	29(48.3%)	
Source of information			
Media and newspaper	45(75%)	35(58.3%)	
Dentist	6(10%)	10(16.7%)	0.153
Friends and relatives	9(15%)	15(25%)	
Ability to pay costs			
Yes	13(21.7)	13(21.7)	
Hardly	30(50%)	25(41.7%)	0.547
No	21(35%)	22(36.7)	
Place to refer dentistry			
Public clinic	29(49.3%)	27(45%)	
Private clinic	5(8.5%)	8(13.6%)	
Specialist pediatric dentist	18(30.6%)	19(31.7%)	0.783
dentistry faculty	8(13.6%)	6(10%)	
Referral time			
Once per 6 month	6(10%)	7(11.6%)	
Once per year	2(3.3%)	7(11.6%)	
When feeling toothache	36(60%)	24(40%)	0.050
Not referred ye	16(26.7%)	22(36.7%)	
Number of children in family			
1	25(41.7%)	21(35%)	
2	21(35%)	26(43.3%)	0.208
3	14(23.3%)	10(16.7%)	
4	3(5%)	0	
Distance to the nearest clinic			
Low (<1000 Meters)	4(6.7%)	3(5%)	
Moderate(1000-2000 Meters)	15(25%)	15(25%	
High(>2000 Meters)	41(68.3)	42(70%)	0.925

Additionally, the control and intervention groups did not show a significant difference in the areas of knowledge, attitudes, subjective norms, perceived control, and behavioral intention (**Table.2**). However, comparing the post-intervention results for the two groups ($p<0.005$) showed a significant difference in all areas. The practice was zero in the control group, but children of 19 participants (31.6%) in the intervention group had fissure sealant (**Table.2**).

Table-2: Comparison of mean scores of constructs measured before and after the intervention in the two groups of control and intervention.

Variables	Knowledge, Ranged:0 to 8		Attitude, Ranged: 1to 5		Subjective norms, Ranged:1 to 5		Perceived behavioral control, Ranged: 1 to 5		behavioral intention, Ranged: 1 to 5		Practice, Ranged 0 to 1	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Intervention group, n=60	1.85±2.23	7.17 ±1.3	3.09±0.47	4.07± 0.64	3.2±045	3.90±0.52	3.172±0.31	0.40 3.73±	3.33±0.5	4.40±0.62	-	19.41± 0.6
Control group, n=60	1.60±2.00	1.22±1.6	3.11±0.38	2.97± 0.28	3.13±٠.31	3.09±032	3.04±040	3.06±0.31	3.15±0.40	3.06±062	-	-
P-value	0.52	0.001	0.744	0.001	0.27	0.001	0.27	0.001	0.119	0.001	_	0.001

4- DISCUSSION

The present study investigated the effect of educational intervention based on the theory of planned behaviour on the dental fissure sealant rate for the first time in Iran. The results showed that educational intervention positively impacted parents' knowledge about fissure sealant. The study by Goranathan et al. (2018) in India on mothers' oral hygiene (17), and the study by Haque et al. (2016) on the effect of oral hygiene education in preventing dental caries in adolescents in Bangladesh (18) demonstrated that education positively affected knowledge. However, the study by Shaikh (2018) in South Africa on those referred to dental clinics to prevent dental diseases (19) did not confirm the above-mentioned result. Based on the transtheoretical model principles, knowledge is a prerequisite to the preparation stage in changing behavior (20). Gaining knowledge and information are likely to be part of the behavior change process. The provision of information, including scientific recommendations appropriate to the needs of participants, enhanced knowledge. Introducing books and educational videos are appropriate to increase knowledge. The results of the current study showed that the educational program could enhance parents' attitudes toward fissure sealant. The study by Ramroop et al. (X) in Tobago on children regarding dental caries preventive behaviors (21), and the studies by Shirzad et al. (2015) in Tehran on changes in parents' attitude, using the oral hygiene education (22), suggested that educational intervention had a positive effect on attitudes. However, the study by Shaikh (2018) in South Africa on those who referred to dental clinics (19) indicated that educational intervention did not positively affect attitudes. Based on the theories of rational choice and planned behavior, in which attitude is a prerequisite for behavior change, one's attitude and preparedness and his/her special perspective are psychologically influential in dealing with phenomena, issues, and reactions (23). The use of materials showing the risk of consequence in the present educational program and an educational program that can indicate perceived risk in different dimensions probably enhance people's attitudes toward fissure sealants. Using educational methods that can avoid memorizing materials and scattered learning and create deep learning is recommended. The results of our study indicated that educational program enhanced parents' subjective norms about fissure sealants. The study by Patel et al. (2019) in India on patients with periodontitis to investigate the factors affecting oral hygiene behavior based on

the planned model (24), and the study by Van den Branden (2015) in the USA on those referred to public dental clinics on predictors of oral hygiene using the planned theory (25). However, the study by Ebrahimipour et al. (2014) on pregnant women to improve oral hygiene behavior (26) showed that the educational program did not have a significant positive effect on subjective norms. According to the principles of social support theory and the theory of planned behavior, subjective norms, including social elements (friends, parents and relatives) are part of it, and behavior of elements of subjective norms play an important role in changing health behaviors (27). In the present educational intervention, using the programs that enhanced parents' views on protecting children's teeth was probably effective in enhancing subjective norms.

Providing education to a wide range of community and friends and family of the studied subjects to enhance subjective norms is suggested to affect fissure sealants. The results of the present study showed that the educational program contributed to enhancing parents' perceived behavioral control on fissure sealants. The study by Dumitrescu et al. (2011) in Norway on medical students for oral hygiene behavior (28), and the study by Stanton (2011) in Ireland on students regarding the effect of persuasive messages on dental flossing behavior (29), demonstrated that educational intervention positively affected perceived behavioral control. However, in the study by Weatherwax et al. (2015) on parents' knowledge and fluoride therapy status (30), it did not positively impact perceived behavioral control. According to Ajzen's theory of planned behavior, perceived behavioral control refers to one's perception of control over behavior, reflecting facilitators and barriers to behavior (13). Providing appropriate educational materials and using the experiences of others to better understand facilitators and barriers as well as the materials indicating the usefulness of fissure sealants were probably effective in this study. Introducing facilitators and incentives to cope with barriers in the educational program is recommended. This study showed that education had a positive impact on increasing behavioral intentions. The study by Lee et al. (2019) in Taiwan on medical students concerning practical skills of the behavioral planned model on periodontal preventive behavior in 2019 (31), demonstrated that education was effective in enhancing behavioral intention. Additionally, the study by Bramantoro (2019) on mothers' behavior in access to health information (32), showed that behavioral intention increases with increasing subjective norms and attitudes. According to the planned behavioral model, attitude and subjective norms and behavioral control predict behavioral intention (13).

The results of this study showed that the educational program effectively enhances parents' practice toward fissure sealants. The study by Freeman et al. (2013) in Ireland on students regarding the educational program in quality of life and oral hygiene (33) and the study by Afshar et al. (2016) in Tehran on the effect of oral hygiene education on reduction of dental plaque in children (34) showed that education had a positive effect on enhancing practice. Nevertheless, the study by Chaffee et al.)٢٠١٣(in Brazil on staff nutrition education for prevention of dental caries (35) implied that education had no positive effect on practice. Based on social support theory, material and tangible supports (instrumental support), and availability of essential information (informational support) have a great impact on practice (36). In the present educational program, the use of plans to reduce the fissure sealant costs and to introduce near and accessible centers have

been effective in enhancing practice. It is recommended for future studies to provide dental and medical services and free fissure sealant services for children. The shortage of facilities, including a lack of projectors, appropriate physical space for pre-school education in this are, was among the limitations of the study and education for preschool and primary school teachers, education at the community level and social support for low-income areas are recommended for future studies.

5- CONCLUSION

This study suggested that the fissure sealant rate was lower than the standard level due to the lack of knowledge and information in the study areas. Besides, implementing four educational intervention sessions based on the theory of planned behavior, levels of knowledge, attitude, and perceived behavioral control increased, leading to increased behavioral intention and performing fissure sealants. Educational intervention and psychological consequences (theory of planned behavior) play a crucial role in fissure sealants and dental care.

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7- CONFLICT OF INTEREST: None.

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