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Improving Student's Self-Efficacy and Perceived Susceptibility Toward Oral and Dental Health: A Randomized Controlled Trial

Behnam Ghorbani[1], Hossein Shahnazi[2]* and Akbar Hassanzadeh[3]

[1]Student Research Committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran
[2]Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran
[3]Department of Epidemiology and Biostatistics, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

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ABSTRACT

Objectives: We sought to assess the impact of educational intervention on female junior high school students' perceived susceptibility and self-efficacy regarding oral and dental health. ***Methods***: We recruited 100 female junior high school students (50 in intervention and 50 in control group) from Falavarjan city using multistage random sampling. A self-administered questionnaire was used to gather data about study variables. Students in the intervention group attended five 90-minute sessions designed to teach the students about dental hygiene. ***Results:*** We found no significant difference between the two groups with respect to the preintervention mean scores of knowledge, perceived susceptibility, and self-efficacy ($p > 0.050$). The postintervention mean scores in the intervention group were significantly higher than those in the control group ($p < 0.050$). ***Conclusions:*** Training plans with particular behavioral goals and good instructional strategies can be useful in empowering students toward dental health.

Oral and dental health is viewed as an important aspect of a healthy lifestyle. The application of efficient educational methods for increasing individuals' knowledge of oral and dental health, fostering their attitudes to it, and boosting their relevant performance will result in the improvement of this important domain of public health.[1] Oral and dental health play a key role in general physical health.[2] The prevalence of early dental caries in Southern Asia is reported to be high. Moreover, approximately 60–90% of students in developed countries suffer from oral and dental diseases.[3] Over the past two decades, a large number of developed countries had a significant reduction in the prevalence of oral and dental diseases among children and adolescents.[4] Nevertheless, the rate in developing, as well as developed, countries remain high despite technological and scientific advances.[5] The prevalence of caries among 12-year-old students in Iran is above the standards set by the World Health Organization (WHO) in 2010. In 2004, the mean decayed, missing, and filled teeth index was 1.9 among 12-year-old Iranian students. This index was 2 among girls and 1.7 among boys.[6] The result of a study in Saudi Arabia shows that, females used brushing and flossing more than males.[7]

Statistics indicate that a large number of Iranian school girls, who will be the future mothers of the society, suffer from caries.[8] Physiological conditions will be changed during pregnancy and nutrient deficiency affects the growth and strength of dental tissues. This problem endangers oral and dental health. Hence, it is essential to consider oral and dental health seriously.[9]

Empowering individuals to floss and brush at recommended levels and removing physical and psychological barriers to these behaviors are the best strategies for maintaining oral and dental health.[10] The result of research in Saudi Arabia revealed that only 33.1% of students knew that using dental floss helps prevent periodontal disease.[7] However, only 44% of 12-year-old adolescents in Iran brush at least once a day.[10]

Different studies demonstrate that most school students do not consider themselves susceptible to

*Corresponding author: ✉h_shahnazi@yahoo.com

caries, which means that they have a low perceived susceptibility.[7] In fact, adolescents have the idea that people develop such diseases only when they are older. Moreover, they assume that their teeth are very strong at this age and nothing can endanger their health.[11,12]

Lack of necessary skills in performing health behaviors, such as brushing and flossing effectively, is related to low intention to do these activities. Some others perform the behaviors; however, they do them poorly, which fails to protect their teeth against caries and tooth loss.[8,13] Hence, improving school students' self-efficacy in following oral and dental hygiene practices may effectively prevent caries and enhance dental health.

The oral and dental health integration plan in Iran's health networks emphasizes the implementation of preventive measures and the provision of health care services at all oral and dental health levels. Nevertheless, the rate of caries in the population is higher than the WHO standards although several years have passed since its implementation.[14] One of the other procedures for maintaining and promoting oral and dental health in the community is education. When individuals receive training, their knowledge of factors causing diseases and ways to prevent their development increases. Moreover, necessary preparations are made for changing attitudes and adopting preventive behaviors. They can undergo this training either individually or collectively. Attending schools to train students in oral and dental hygiene and holding relevant conferences are two examples of community-level health education.[8,12,15]

The majority of articles published from Iran have focused only on knowledge of students regarding oral health and neglected to assess and improve other prerequisite items.

We tried to promote student's oral health using subjective (perceived susceptibility) and objective (self-efficacy) factors, which are essential to create behavior change and empower adolescents.

Therefore, adolescence is the best period for training individuals to develop health-promotion behaviors and improve their perceived susceptibility to and self-efficacy in healthy behaviors.[15] The present study was conducted to consider the effect of an educational intervention on female junior high school students' perceived susceptibility (their risk) and self-efficacy (belief in their ability to succeed) regarding oral and dental health.

METHODS

One hundred female junior high school students from Falavarjan were selected as the study population using multistage random sampling. Two schools were randomly chosen from among eight all-girls junior high schools in this city, located in the Iranian province of Isfahan. Students in these schools were culturally and socially matched. One school was randomly selected as the control group and the other school as the intervention group. Fifty students were selected from the rolls in each school using systematic random sampling. The sample size was calculated to compare the average scores of perceived susceptibility and self-efficacy between two groups, and for that the following was considered: confidence interval of 95%, power of 80%, expected difference in the primary outcome score (perceived susceptibility) between the two groups of 10, and a standard deviation ≤ 16.7.[10]

The inclusion criteria were attending a junior high school and providing written informed consent. Those who failed to fill out the questionnaire or attend the training sessions were excluded from the study.

A self-administered questionnaire about the research was designed. Its validity was confirmed by a panel of experts including six health education professors and professionals. The reliability of the questionnaire was assessed using the test-retest method. Results of the reliability demonstrated that the internal consistency of all the constructs in the study was at the required level so that a was 0.90 for knowledge, 0.78 for perceived susceptibility, and 0.82 for self-efficacy, showing that the reliability of the questionnaire was at an acceptable level.

The questionnaire had two parts. The first part concerned demographics and comprised of questions concerning educational status, age, and the occupation of the students' parents and their household income. The second part was composed of questions about the three variables, namely knowledge (11 multiple-choice questions, in the 0–11 score range), perceived susceptibility (six questions, 6–30 score range), and self-efficacy (eight questions, 8–40 score range). As an example, the students were asked to give their opinion about these sentences: "I am very young to get tooth decay" (perceived susceptibility) and "I can learn the correct way to use dental floss" (self-efficacy). The questions concerning perceived susceptibility and self-efficacy were based on the five-point Likert scale ('Totally

Table 1: An outline of what was involved in the training sessions to improve the students' knowledge, perceived susceptibility, and self-efficacy.

Variables	Training goals	Training techniques
Knowledge	Getting familiar with the oral and dental anatomy.	Lecture and role-play.
	Getting familiar with some causes of caries.	Lecture and group discussion.
	Getting familiar with the role of fluoride in dental health.	Lecture.
Perceived susceptibility	Discussing the issue of caries considering different genders and age groups.	Group discussion and question-and-answer.
	Discussing the significance of oral and dental health care during adolescence.	Group discussion and question-and-answer.
	Discussing some factors predisposing one to caries.	Lecture and group discussion.
Self-efficacy	Conversing with model students who had adhered to oral and dental health principles and, therefore, had healthy teeth.	Model.
	Getting familiar with oral and dental health principles and performing proper health practices.	Group discussion and role-play.
	Brushing the teeth using intraoral mock-ups, illustrations, pamphlets, and posters.	Role-play.
	Flossing the teeth using intraoral mock-ups, illustrations, pamphlets, and posters.	Role-play.

agree', 'Agree', 'Don't know', 'Disagree', and 'Totally disagree'). The questionnaire was filled out by both the groups before the intervention.

Students in the intervention group attended five 90-minute sessions and received necessary oral and dental health training both theoretical and practical through lectures, role-play, and the question-and-answer technique. In these sessions, the students learned about the role of the mouth and teeth in the body, the tooth set, tooth surfaces, dental plaque, signs and symptoms of caries, ways to prevent caries, and proper brushing and flossing techniques.

In the first session, in order to broaden the students' knowledge of oral and dental health care, they were familiarized with the oral and dental anatomy and the surrounding tissues (periodontium), characteristics of healthy and unhealthy gums (gingiva), signs and symptoms of oral and dental diseases, certain causes of caries, and the role of fluoride in maintaining dental health. In the second session, to enhance their perceived susceptibility to factors causing caries, the students were provided with statistics on adolescent caries. The students were also invited to discuss some factors predisposing one to caries and effects of hormonal changes on caries. Furthermore, they met students who had lost their teeth because of ignoring oral and dental health advice and talked to them about their problems. In the third session, to improve the students' self-efficacy and skills in oral and dental health care, they were acquainted with pertinent principles. In addition, they flossed and brushed their teeth using intraoral mock-ups, illustrations, pamphlets, and posters. Furthermore, they conversed with model students who had followed oral and dental health principles and had healthy teeth [Table 1]. Two months later, the two groups completed the questionnaire once more.

SPSS Statistics (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) was used for data analysis. The chi-square and independent *t*-tests were run to compare the demographic variables in the two groups. To compare the groups' pre- and postintervention mean scores of knowledge, perceived susceptibility, and self-efficacy, the independent *t*-test were applied.

Subjects were briefed about the research project and were assured that their data would be kept confidential. Moreover, before they entered the study, their parents provided written informed consent.

RESULTS

We sought to explore the effect of an educational intervention on female Falavarjanian junior high school students' knowledge, perceived susceptibility, and self-efficacy with respect to oral and dental health. There was no attrition in this study. The mean age of the mothers of the students in the intervention group and the control group was 39.1±5.2 and 39.6±4.7 years, respectively. Furthermore, the mean age of the fathers of the students in the intervention group and control group was 46.6±9.3 and 45.6±5.3

Table 2: Parents' occupation, educational status and household income in the two groups.

Variable	Intervention group	Control group	*p*-value
	n (%)	n (%)	
Paternal occupation			
White-collar	3 (6.0)	6 (12.0)	
Blue-collar	16 (32.0)	13 (26.0)	0.770 *
Self-employed	20 (40.0)	22 (44.0)	
Unemployed	6 (12.0)	4 (8.0)	
Other	5 (10.0)	5 (10.0)	
Maternal occupation			
Homemaker	47 (94.0)	45 (90.0)	
Employee	3 (6.0)	5 (10.0)	0.350 *
Maternal education			
Elementary school	21 (42.0)	16 (32.0)	
Junior high school	7 (14.0)	9 (18.0)	
High school	20 (40.0)	19 (38.0)	0.320 *
University	2 (4.0)	6 (12.0)	
Paternal education			
Elementary school	18 (36.0)	11 (22.0)	
Junior high school	13 (26.0)	15 (30.0)	
High school	12 (24.0)	15 (30.0)	0.270 *
University	7 (14.0)	9 (18.0)	
Household income			
Low	8 (16.0)	4 (8.0)	
Median	14 (28.0)	13 (26.0)	
Sufficient	26 (52.0)	32 (64.0)	0.540 *
High	2 (4.0)	1 (2.0)	
	Mean ± SD	Mean ± SD	
Maternal age	2.5 ± 1.3	7.4 ± 6.3	0.590 **
Paternal age	3.9 ± 6.4	3.5 ± 6.4	0.520 **

**Chi-square.*
***Independent t-test; SD:standard deviation.*

years, respectively. The independent *t*-test showed that there was no significant difference between the two groups with respect to the mean age of the mothers ($p = 0.590$) and fathers ($p = 0.520$). The likelihood-ratio chi-square test demonstrated that there was no significant difference between the groups with respect to the frequency distribution of the fathers' occupation ($p = 0.770$). There was no significant difference between the groups with respect to the frequency distribution of the mothers' occupation ($p = 0.350$). The chi-square test showed no significant difference between the two groups with respect to the parents' educational status and their household income ($p > 0.050$) [Table 2].

No significant difference existed between the two groups with respect to the preintervention mean scores of knowledge, perceived susceptibility, and self-efficacy ($p > 0.050$). Postintervention mean scores in the intervention group were statistically significant in comparison with the control group ($p < 0.050$) [Table 3].

DISCUSSION

This study aimed to increase school students' perceived susceptibility to oral and dental health and improve their self-efficacy. The study showed that there was no significant difference between the intervention and control groups demographic data. According to the results of the study, the mean score of knowledge increased significantly in the intervention group after the training sessions. Other studies have also demonstrated that training improves knowledge of oral and dental health.[8,15] The reason why the students' knowledge was limited before the sessions was that they had not received adequate training in oral and dental hygiene in schools. Training extends

Table 3: A comparison of the mean scores of knowledge, perceived susceptibility, and self-efficacy between the two groups before and after the intervention.

Time point	Variables	Intervention group	Control group	*p*-value*
		Mean ± SD	Mean ± SD	
Preintervention	Knowledge	9.1 ± 7.5	1.1 ± 8.4	0.720
	Perceived susceptibility	1.1 ±2.6	3.1 ± 7.6	0.880
	Self-efficacy	1.1 ± 9.7	5.1 ± 3.6	0.440
Postintervention	Knowledge	9.1 ± 1.5	2.1 ± 9.5	0.020
	Perceived susceptibility	5.1 ± 8.7	6.1 ± 3.6	0.003
	Self-efficacy	3.1 ± 8.7	9.1 ± 5.7	0.005

**Independent t-test; SD: standard deviation.*

individuals' knowledge about the causes of diseases and methods for preventing them; moreover, it prepares them for adopting preventive behaviors.[16]

The first training session drew upon lectures, role-play, brainstorming, and group discussions to help the students become familiar with the oral and dental anatomy and the surrounding tissues, qualities of healthy and unhealthy gums, signs and symptoms of oral and dental diseases, some causes of caries, and the role of fluoride in protecting dental health.[10] Similar studies indicate that the utilization of viable oral and dental health care strategies can broaden students' knowledge. One study concluded that education could reinforce positive oral and dental health-related attitudes and behaviors among school students.[17] Another study asserted that there was a significant improvement in oral and dental health knowledge among subjects after the educational intervention.[18] The results of the present study demonstrated that the mean score of perceived susceptibility to oral and dental health in the intervention group increased significantly after the training sessions. Similar studies have also noted the effectiveness of education in increasing perceived susceptibility to oral and dental health issues.[11,19,20] However, one study found no significant increase in the mean score of students' perceived susceptibility to oral and dental health following an educational intervention.[8] In a study of schoolgirls aged 13–19, over half of the subjects contended that they were too young to have caries.[12] Adolescents may recognize the seriousness of health problems if they consider themselves susceptible to them. Hence, trainers and teachers should help adolescents face reality. Their direct contact with adolescents who suffer from oral and dental health problems would influence their attitudes significantly.[12] Some pre-teen children viewed poor oral and dental health as occurring only in the elderly.[21] School students' perceived susceptibility to oral hygiene and dental caries increased following educational intervention.[20] Accordingly, they came to firmly adhere to the belief that the intake of sweet foods could cause caries even during adolescence.[20] Motivational interviewing was one of the most efficient health education strategies for effecting positive changes in oral and dental health behaviors and preventing caries.[22] Educational intervention increased subjects' self-confidence in identifying the risk factors for oral and dental health problems and following health care practices.[23]

In the second training session, to increase students' perceived susceptibility to oral and dental hygiene, they were asked to take part in group discussions and use the question-and-answer technique to discuss attitudes of different age groups and genders toward caries, the significance of following oral and dental health practices during adolescence, and factors predisposing one to caries. The mean score of self-efficacy in oral and dental health behaviors increased significantly in the intervention group after the intervention. Other studies have also illustrated the effectiveness of education in increasing this self-efficacy.[8,13] According to results of some studies, students low self-efficacy in oral and dental health care behaviors is one of the main reasons they suffer from caries and lose their teeth.[8,10] A planned educational intervention based on oral and dental health behaviors was shown to improve behaviors such as brushing and flossing.[24] Another study asserted that the enhancement of self-efficacy in oral and dental health behaviors would give parents further encouragement to make more preventive dental visits for their children.[25] To encourage critical care nurses within academic centers to adhere to oral care recommendations, regularly repeated educational sessions with practical exercises, theoretical training, and direct feedback have been suggested.[26]

In the third session, to enhance the students' self-efficacy in oral and dental health care, they were familiarized with oral and dental health care principles using models, group discussions, and role-play. Furthermore, the students flossed and brushed their teeth using intraoral mock-ups, posters, illustrations, and pamphlets. In addition, they became acquainted and conversed with model students who had healthy teeth due to adherence to oral and dental health behaviors; moreover, the students became personally familiar with problems of those who had lost their teeth due to inadequate or improper health care.

The present study was not free of limitations. One major limitation is that this study did not assess the difference in the actual performance of students (i.e., students brushing and flossing habits), which should be considered for future research. Small sample size and the use of univariate statistical test without adjusted analysis may be considered another limitation in this study.

CONCLUSION

Efficient strategies and well-rounded education could enhance individuals' perceived susceptibility to caries and improve their self-efficacy in performing oral and dental health behaviors well. We recommend that training plans with particular behavioral goals and good instructional strategies are devised for schools, which invite experts to educate students about oral and dental health. Using this approach will minimize oral health problems.

Disclosure

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