The effect of educational intervention based on BASNEF model on the students' oral health

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Abstract

Prevention and hygiene has been always preferred to treatment. In this regard, one of the most effective strategies would be investing and paying attention to the health education and knowledge in the schools. Poor oral health may have a bad effect on the children's performance in the school as well as their success during the life. So the present study was aimed to evaluate the effect of training intervention based on BASNEF modelon the prevention and control of oral health among secondary male students. This research was a semi-experimental study including 80 students who were divided randomly in to experimental and control groups (each 40 people) in 2013 through multistage sampling method in Bandar Abbas. Data collection tool was a questionnaire based on BASNEF model. Training intervention was done based on BASNEF structures within 6 training sessions. Then the obtained data from the questionnaire were analyzed by independent t-test, paired t-test, McNemar and Chi-square tests and described through descriptive statistics. The research findings showed that the mean score of knowledge and related structures of BASNEF model is significantly different between the experimental and control groups in the area of doing health behavior after intervention (p<0.001). According to the findings of this research, the educational intervention based on BASNEF model can cause health behavior among the students with a coordinated and proper structure in addition to promotingtheir knowledge and attitude.

Keywords: BASNEF Model, Oral Health, Student

Introduction

Prevention and hygiene has been always preferred to treatment. In this regard, one the most effective strategies may be the investment on health education and knowledge in the schools and paying attention to them [1]. Since negligence to oral health, not only affect oral health but also lets lots of micro-organisms enter from mouth to the body which consequently endangers public health [2]. Besides,poor oral health may also have a bad effect on children's' performance in school as well as their success throughout the life. Children with poor oral health are 12 times more likely to have limitation such as absence of school compared to the children with good oral health [3]. Lack of hygiene and prevention

from oral diseases at the right time, lead to teeth lost at early ages which result in more difficult and costly consequences [4]. Poor oral health is a contributing factor in the incidence of some infectious diseases, digestive disorders and speech disorders. It makes a lot of side effectsand financial losses. For this reason, the prevention of tooth decay and maintenance of gum health is important.WHO has stated that the cost of prevention and maintenance of healthy teeth in lifetime is equal to the treatment of an advanced dental complication [5]. The available statistics show that approximately 5 to 10 percent of public health expenses in the industrialized countries is related to the treatment of oral diseases which imposes major financial burden to the government [6]. On the other hand, more than 50 million hours are wasted annually due to the complications of oral diseases which affects the performance and activities of the people [7]. Food and health poverty as well as cigarettes cause dental problems. A study showed that health behavior which includes the acceptance of all individual and group actions with the purpose of preventing diseases is destroyed by doing unhealthy behaviors [8].

The results of a study in oral health area based on pander- model on the students of Marivan city showed that there is a positive and significant correlation between oral health and other variables of health improvement pattern [3]. Another study on oral and dental care based on Health Belief Model (HBM) in children revealed that the increase of individuals' understanding trough group training and self-training is effective in the incidence and improvement of preventing behavior from oral diseases (7). An study which was conducted in the field of oral health and based on HBM in Hamedan city showed that the relationship between oral health behaviors and the structures of understood sensitivity, understood obstacles, guidance action self-effectiveness was significant but its relationship with the structure of understood severity and understood benefits was not significant [9].

The results of a study on physical health of high-school male students in Tehran city showed that the most common physical disorder was tooth decay (with the frequency of 69%) [10]. The results of a research showed that tooth decay as a multifactorial infectious disease is greatly influenced by several factors such as parents' education, family economy, family population and the observance amount of oral health [11]. Results of another study with the aim of assessing the oral health of high-school students in Mashhad city showed a significant statistical difference between two variables of health type and different geographical areas. Also there was a meaningful difference between areas with higher socio-economic situation and the areas with lower socio-economic situation [12]. Prior researches indicate a difference in the health behavior of children who had received health education in their schools and those who were deprived of it [13]. So it is necessary that peoples' health behaviors be shaped in a suitable time like childhood, to build healthy lifestyle and habits. Most scientists believe that the student age is the most amendable and suitable age to achieve this goal [14]. In this regard, there are some patterns in health education for designing the proper training interventions to change the behavior of oral self-care and build health habits and prevent from disease development. One of the most comprehensive models in this field is BANSEF model which is used to study and identify the behaviors and create the new behaviors in the society. Prior studies have confirmed the effectiveness of this model [15-19]. This model is a combination of two models PRECEDE and BIM(Behavioral Intention Model) and is consisted of different structures including beliefs (attitude toward behavior assessment), attitude toward behavior, subjective norms and enabling factors [15]. Also, it should be mentioned that the value of educational programs depend on the effectiveness of these programs and the later also depends largely on the proper use of the theories and models. Considering the stated issues,the huge population in the student age and high DMFT index of this group which is equal to 4.5 [20], and lack of assessing health behaviors based on the structures of BASNEF

model, authors decided to conduct this study with the aim of assessing the effectiveness of educational intervention based on BASNEF model on the prevention and oral health of students.

Method

It was a semi-experimental study which was conducted on secondary school male students in Bandar Abbas, Iran, in 2013-2014. According to the power of 80%, $\alpha=0.05$ and $d=0.5$ which as the effect size was obtained from the last studies[21], the sample size for each group was calculated 30. Considering the loss probability and for more confidence, 10 participants were added to each group. Finally, 40 people were selected for each group and totally 80 people (40 people in experimental group and 40 people in control group) were arrived to the study. We used multi-stage sampling method. At first, the secondaryschools of Bandar Abbas were divided into two zones of rich (good economic situation) and half-rich (lower-middle economic situation) from the perspective of socio-economic situation.Then two schools were selected from each zone randomly (one school was assigned to the experimental group and another one to the control group). Totally, four schools were selected randomly. On the next step, 20 students from each school were entered the study by simple random sampling. The including criteria to enter the study for both groups were as follows: studying in secondary school and being masculine. Exclusion criteria for the experimental group were: failure in completing the questionnaire, lack of parental consent and the absence of even a single session of training sessions.Data collection tool was a researcher-made questionnaire based on the framework of BASNEF model. It was a 59-items questionnaire consisted of two parts. First part: demographic data such as age, family size, level of education, the occupation and education of the parents. Second part: the structures questions of BASNEF model: knowledge (12 four-choice questions) for each, score 1 was belonged to the correct answer and score 0 to the wrong answer, attitude (10 five-choice questions based

on Likert scale), subjective norms (12 four-choice questions and based on Likert scale), enabling factors (5 four-choice questions and based on Likert scale), behavior (9 multi-choice questions) and behavioral intention (3 five-choice questions and based on Likert scale). Also, the mean score in each structures of BASNEF model was calculated from 0 to 100. The questionnaire was evaluated by some experts in this area (experts' panel) to assess the face and content validity. To assess the reliability, the questionnaire was given twice to 15 people of the studypopulation with the interval of 10 days (re-test) (r=0.82). After the questionnaire completion,reliability was 64 percent using Cronbach's alpha. Researcher began to work after receiving the accreditation from the research deputy of Hormozgan University of Medical Sciences, Department of Education and related schools and ethical approvals including the information confidentiality and the consent of the students and their parents. The researcher referred to the respective schools,coordinated with the principle, provided essential explanation regarding the questionnaire, the reason of the project, the confidentiality of information, the purpose of the study in the intended classes and received the consent from the students and their parents (with previous coordination) . Then based on sampling method, the students were entered the study to complete the sample size. Before the educational intervention, the questionnaire was given to both intervention and control groups.

To avoid bias, questionnaires were given to students by anyone other than the researchers. Besides, essential information regarding to the intended questionnaire was given to this person to respond the possible questions of the students to complete the questionnaire more accurately. It should be noted that the questionnaires were encoded in both stages and were given to the students with the same code. It was used to assess the process of educational effect on the experimental group. After completing the questionnaire, the educational content for the experimental training was formulated based

on the structures of BASNEF model and the results of primary need assessment by pre-test. After pre-test, people were classified based on their weaknesses and were trained based on their needs. The control group only received the current and routine trainings without any training by the researcher. At the end of training for experimental group, the questionnaires were given to both groups again based on the assigned codes to each person in the first stage in order to assess the effect of education. After gathering data and codingin software, descriptive statistics such as mean, standard deviation and variance were used. Besides, two-sample t-test, paired t-test and Mc Nemar and chi-square tests

were used to analyze data. In the current study p<0.05 was considered as statistically significant.

Results
The mean age in experimental and control groups were respectively 13.95±0.814 and 14±0.816 (p=0.785). Chi-square test showed that there was not a significant relationship among the variables of educational level, father's occupation, mother's occupation, father's education, mother's education, between the experimental and control groups (p>0.05)(Table 1).
Paired t-test did not show any significant difference between the knowledge mean of

Table 1 *The comparison of underlying data between control and experimental groups*

		Experimental group		Control group		p-value*
		N	%	N	%	
Father's education	illiterate	1	2.5	1	2.5	0.835
	primary	4	10	3	7.5	
	cycle	11	27.5	16	40	
	diploma	13	32.5	8	20	
	collegiate	11	27.5	12	30	
Mother's education	illiterate	3	7.5	3	7.5	0.644
	primary	8	20	6	15	
	cycle	11	27.5	12	30	
	diploma	11	27.5	10	25	
	collegiate	7	17.5	9	22.5	
Mother's occupation	housekeeper	36	90	34	85	0.505
	practitioner	4	10	6	15	
Father's occupation	employee	12	30	13	32.5	0.848
	Free job	25	62.5	24	60	
	other	3	7.5	3	7.5	
Educational level	First	20	50	20	50	1.000
	Third	20	50	20	50	

*Chi-square test

control group in both pre-test and post-test stages (p=0.102) while there was a significant difference between the knowledge mean of experimental group before and after the educational intervention (p<0.001) (Table 2).
Mc-nemar test showed a significant difference in oral health situation between experimental and control groups before and after the educational intervention (p<0.001) (Table 3).

Discussion
The results of the present study showed that the mean score of knowledge after training intervention in the experimental group was significantly increased while this difference was not significant in the control group. The role of education in promoting the study individuals' knowledge seemed partly natural and many interventional studies have referred to it [22, 23].

Table 2 *The comparison of mean scores of BASNEF model structures between control and experimental groups before and after intervention*

	Group	Before intervention	After intervention	Mean scores before and after intervention	p-value*
		Mean ± SD (score from 100)	Mean ± SD (score from 100)		
Knowledge	experimental	38.75±15.73	59.79±17.07	21.04	<0.001
	control	42.08±13.06	44.79±17.16	2.70	<0.102
Independent t- test		T=0.306	p<0.001		
Attitude	experimental	43.06±13.22	61±14.26	17.93	<0.001
	control	42.25±11.26	42.93±12.49	0.687	<0.327
Independent t- test		T=0.768	p<0.001		
Subjective norms	experimental	44.27±10.01	58.07±10.86	13.79	<0.001
	control	46.15±10.62	47.06±12.26	0.913	<0.168
Independent t- test		T=0.419	p<0.001		
Enabling factors	experimental	58.24±16.32	73.05±15.64	14.81	<0.001
	control	59.35±15.70	60.55±15.59	1.20	<0.250
Independent t - test		T=0.757	p<0.001		
Behavioral intention	experimental	48.33±21.45	69.16±24.83	20.83	<0.001
	control	45.83±18.39	47.91±18.36	2.08	<0.096
Independent t - test		T=0.577	p<0.001		

*Paired t-test

However the rate of knowledge improvement and increase in training interventions is a significant point. Also, the prior studies indicated that theory-based studies in knowledge improvement of individuals were more efficient than classical interventions. For instance, Hezavei et al study reported a significant difference in knowledge improvement of two educational groups based on BASNEF model and classical education [19]. It seems that BASNEF model-based training has an important role in promoting the knowledge of the study individuals due to the involvement of subjective norms in the education [24, 25]. The findings of the present study were consistent with the studies of Taghdisi et al [26], Najimi et al [27], Hezavei et al [19] and Baghiani Moghadam [24] whoindicated that education was effective on increasing the knowledge of the test group.

On the other hand, the mean score of knowledge in control group was also increased. It can be due to the students' curious to respond pre-test questions through asking their parents and teachers.

According to the results of the present study, the mean scores of attitude among the students in the experimental group was increased after training intervention. It is shown that the intervention based on BASNEF model is effective on improving the students' attitudes in doing health behaviors. However it should be noted that knowledge is the first step in behavior changing, but in the case of attitude change, the effectiveness of training would be double. The results of this study were in line with the findings of Hezavei et al [15], Kahzadi et al [28]and Nicklas [29], but inconsistent with the studies of Yaghubi and Mohammadpour. Since they reported that training intervention could not be effective. which may be due to several environmental and social factors. Therefore, change of individuals' attitude is not possible only through education. One of the proper methods to change the attitude is talking about the beliefs. In fact, the process of ideas rainfall in words and watching the reactions of the other people is one of the strong methods for attitude changing [32]. In this study, the method of question and answer was used. In this method, the educational materials were not injected as a one-way or teacher-based method

Table 3 *The comparison of oral health situation between control and experimental groups before and after educational intervention*

	Group	Before intervention		After intervention		p-value***
		Inappropriate* Frequency (%)	Appropriate** Frequency (%)	Inappropriate Frequency (%)	Appropriate Frequency (%)	
The frequency of brushing	experimental	19(47.5)	21(52.5)	6(15)	34(85)	0.002
	control	17(42.5)	23(57.5)	23(57.5)	17(42.5)	0.180
Chi-square test		Chi²=0.822		p<0.001		
The frequency of dental floss use	experimental	28(70)	12(30)	18(45)	22(55)	0.021
	control	28(70)	12(30)	33(82.5)	7(17.5)	0.302
Chi-square test		Chi²=1.000		p<0.001		
		Before intervention		After intervention		
	Group	Yes Frequency (%)	No Frequency (%)	Yes Frequency (%)	No Frequency (%)	**p-value***
Using toothpaste with fluoride	experimental	21(52.5)	19(47.5)	40(100)	0	0.001
	control	(42.5)17	23(52.5)	16(40)	20(60)	0.980
Chi-square test		Chi²=0.502		p<0.001		
Use of dental floss	experimental	25(62.5)	15(37.5)	35(87.5)	5(12.5)	0.002
	control	23(57.5)	17(42.5)	21(52.5)	19(47.5)	0.625
Chi-square test		Chi²=0.820		p<0.001		

*Brushing less than twice per day
** Brushing twice or more per day
***Mc-nemar test

to the learners, but students had an active role in the process of education.

The results of the present study showed that the training intervention was effective on the increasing mean score of enabling factors in the test group. In fact, this increase may be due to: 1- the students' access to the training classes, pamphlets and booklets 2- the students' access the necessary things for health behavior including toothbrush, toothpaste, dental floss and others by the family 3- lack of students' access to the sugary,unhealthy and harmful foods for oral health in the home and school.

Several studies indicated the role of enabling factors based on BASNEF model in changing the behavior intention to health behavior [33, 34]. This finding was consistent with Alizade's findings on employee safety [35], Mahmaei's study on the prevention of cardiovascular risk factors [36] and Hezavei et al study on nutritional

practice [15].

In the present study, the mean score of subjective norms after the training intervention in the test group was significantly increased, but the difference was not significant in the control group. Subjective norms (father, mother, family members and teachers) may be effective in remembering the health behaviors such as tooth-brushing, dragging floss and so on. Increasing the mean score of the experimental group may be due to the training intervention based on BASNEF model for this group and also the involvement of family members like mothers for encouraging students to do healthy behaviors. Several studies have shown that education through the effective subjective norms such as family, friends and peers [19] teachers and family girls [37] increases the participation in the manner of behavior change among study subjects

based on BASNEF model. In the present study, a significant difference was observed between the mean scores of behavioral intention before and after the training intervention in the experimental group. The finding of the current study was consistent with Hezavei's study on eye care in diabetic patients [19], Sharifi Rad et al study on lactating behavior of mothers [16] and Hezavei's study about nutritional practice of students [15]. However, no significant difference was observed in the control group in pre-test and post-test. In fact, behavioral intention may be influenced by other BASNEF model structures including attitude towards behavioral evaluation, attitude towards the behavior and normative beliefs.

Conclusion

According to the findings of the present study, trainings based on BASNEF model with a proper and coordinated structure not only increases the students' knowledge and attitude but also causes health behaviors among the students.

Self-reporting, the absence of some busy parents in the justifying classes of intervention and the large number of questions were among the limitations of the current study which might had a negative effect on the quality of answering the questions.

1- The evaluation of training intervention effect based on other models and theories of health education in the prevention and control of oral health and its comparison with BASNEF model and choosing the best pattern in this area.

2- The evaluation of training intervention effect based on BASNEF model as a pilot and its follow-up in different periods (e.g.; one month later, three months later and even six months later)

3- The Evaluation of BASNEF model effect in the prevention and oral health on other groups of the society.

Contributions

Study design: ASM,LH
Data collection and analysis: ASM, AGh,AHM
Manuscript preparation: TAM, LH, AA, AHM

Conflict of interest

"The authors declare that they have no competing interests."

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