

Health Education Promotes Knowledge and Practices of Oral Health among Schoolchildren

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Abstract: Background: During the past decades many industrialized countries have experienced a dramatic decline in dental caries prevalence among children. The reasons behind the improved oral conditions include but not limited to improved oral hygiene practices, fluoridated toothpastes, and effective oral health programs beside establishment of school-based health education programs. Consequently the oral and dental health knowledge increased and the attitude of children and their parent was changed. Health education is defined as the principles that people follow and behave in a manner that promotes, maintains and/or restores health.

Objective: The present study was carried out among school age children in Najran Saudi Arabia to assess the impact of health education program on promoting knowledge and practices among those students towards dental caries.

Material & Methods: This is school-based interventional study that has been undertaken in Najran city during the period of October 2013 to May 2014. A multistage random sample technique was used to obtain a total sample of 288 students from 3 different public primary schools for girls in Najran. Subjects were grouped into three groups according to their schools. The principal method of data collection was a semi structured, open-ended questionnaire. The questionnaire was composed of two parts that were personal data and some questions to be answered by the students. Also a clinical examination guided by the DMFT index (Decayed, Missing and Filled Teeth index) was carried by a dentist. Thereafter a medical specialist gave the students an education health program about the importance of oral health and its role in maintaining the integrity of the teeth. The questionnaire was offered to the students once more to evaluate the effects of the health education program.

Results: Two hundred nine students out of 288 students examined had unhealthy teeth (prevalence rate of 72.57%) and DMFT mean of the surveyed subjects was 0.73. Sixteen percent of the examined students didn't know the causes of dental caries. Seventy percent of the respondents have no idea about fluoridated toothpaste. The study also revealed that 37% of the students get their knowledge about oral issues from their parents. The parents' education did not influence ($p>0.05$) the incidence of dental caries. Ninety percent of students with dental problems have positive family history of dental caries. After conducting the health education program all students become aware of the causes of dental caries and their knowledge was significantly ($p<0.01$) improved. Also the students' knowledge about fluorinated toothpastes and their importance in combating dental caries was significantly ($p<0.01$) increased. Furthermore DMF index declined to 0.7.

Conclusion & Recommendation: Dental caries prevails among school age students and hereditary is a major predisposing factor that aggravates the situation. The Saudi students' knowledge about the oral health is very poor and they only get it from illiterate parents. Thus this study places extra emphasis on dental education programs implementation in primary schools to reduce dental caries among students. Since most of students' parents are illiterates dental caries preventive strategies; like offering teeth brushing classes before starting the regular classes as well as endorsement of sustainable health education programs in cooperation between education and medical authorities; must be thought-out and implemented in Najran area.

Keywords: Dental caries, health education, school children, DMFT index

I. Introduction

Health is a common theme in most cultures and is a fundamental human right without distinction of race, religion, and political belief, economic and social condition (Park, 2009). Oral health is a standard of health of the oral and related tissues that enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and contributes to the general well being. It is concerned with maintaining the health of craniofacial complex, the teeth and gums, as well as the tissue of the face and head that surrounds the mouth (Yewe-Dyer 1993). Oral diseases are major health problem, especially in children, owing to their high prevalence and incidence in all the regions of the world. At the global level, prevalence rates and pattern of oral disease have changed considerably over the past two decades (Tanni, 2009; Elfaki et al. 2014). Increasing levels

of dental caries among children are observed in some developing countries, especially for those countries where community and school based preventive oral care programs are not established (Rao et al.1999). Health education is an important tool of public health and an effective primary preventive method. Efficient dental health education should incorporate oral health instructions and methods to eliminate plaque. Many studies have revealed the efficacy of health education in controlling plaque and thereby dental diseases (Wang et al. 1998). Tooth brushing frequency and adoption of appropriate tooth-brushing technique after oral health education is known to reduce tooth plaque and gingival sores and the female subjects showed better understanding of oral health education program (Ajith Krishnan et al. 2010). A significant reduction in the mean plaque scores after performing an oral health education programs is also reported (Rayner et al. 1992; Ivanovic M, Lekic, 1996). These studies reflected that dental caries is a serious health problem that cannot be managed with any prevention measures other than health education to increase the awareness of the societies about the impacts of this problem. In Najran Saudi Arabia the impact of oral health education program on children's oral health is not reported before.

Therefore the objective of the current study was to evaluate the impact of oral health education on the status of plaque, dental caries and oral health among 10-13 years old female children attending government school in Najran city, KSA.

II. Oral Health Education

Biesbrock et al. (2004) defined health education as comprising of consciously constructed opportunities for learning involving some form of communication designed to improve health literacy through improving health knowledge and developing certain life skills that will increase the awareness of individual and/or the community of the importance of health. People's health education aims to develop a sense of responsibility for their health conditions (Biesbrock et al. 2004). Oral health education is provided in numerous ways. Wide range of oral health related topics such as but not limited to techniques, oral hygiene, diet, oral structures as well as the benefits of oral health are addressed in oral health programs. Diet and oral hygiene and its impact on oral health are likely to be the topics covered most broadly. If the oral health education is given on principles of active learning, combined with additional activities and provided on a regular basis; health education is likely to have a positive impact on oral health behavior as well as oral health status (Amin and Al-Abad, 2008).

School health education involves all strategies designed as well as activities and services offered by schools alone and/or in association with health authorities to promote students' physical, emotional, and social development. Fortunately, a number of prevention and health promotion interventions exist (Amin and Al-Abad et al.2005). In 1995, the World Health Organization (WHO), launched the "Global School Health Initiative" which is designed to improve the health of students, school personnel, families and other members of the community through schools (Wyne, 2004).

III. Justification Of The Problem

1. Dental caries is the most common chronic disease of childhood and it exceeds the incidences of both asthma and environmental allergies. Although the prevalence of dental caries declined over the last decades; the caries of the primary dentition and the mean caries rates among children of 2-11 years old have increased markedly over the past 12 years.
2. Since dental caries is a serious health problem that cannot be prevented with vaccine, raising the awareness of the society through health education programs remains the cornerstone of combating this serious problem.
3. Students are a force for change among the community and are receptive to learning and education. Thus if they were provided with enough health knowledge they can disseminate it to the entire society. Consequently they will contribute significantly in combating dental caries.
4. Raising students' awareness about dental check-up may assist in early diagnosis of dental caries and help in avoiding the bad consequences of the dental problems.
5. Increasing the knowledge of using fluoride toothpaste among students and increasing their awareness of proper tooth-brushing practices will help in reducing oral health problems.

IV. Material & Methods

This is school-based interventional study that was undertaken in Najran city during the period of October 2013 to May 2014. A multistage random sample technique was used to obtain a total sample of 288 students from 3 different public primary schools for girls in Najran. Subjects were grouped into three groups according to their schools and within schools students were selected from the 3 upper classes (grade 4 with age 10-11 years – grade 5 with age 11-12 years- and finally grade 6 with age 12 -13 years old). The principal method of data collection was a semi structured open-ended questionnaire and interview, beside a clinical examination. The questionnaire was composed of two parts that were personal data and some questions that

answered by students before conducting the education program and the same questionnaire distributed and been answered as well after conducting the health education program. A pilot study on 10 children was conducted before beginning the program to ensure the accuracy of diagnosis and to standardize the procedures, on the other hand the interview guides were pre-tested for appropriateness of wording and responses. To assess dental caries by clinical examination, DMFT (Decayed, Missing and Filled Teeth) index was used, the clinical examination was performed by female dentist who did it pre and post the program. Data was analyzed using Chi- square test and analysis of variance. The study was conducted in three phases that were:

1- Phase one (baseline data phase) 2- Phase two (intervention phase) by performing health education lectures, pamphlets that include basic information and facts about oral health and dental caries, beside demonstration sessions. And 3- Phase three (evaluation phase) the same students had been questioned and examined 6 months later after the intervention program.

V. Base Data

Initially a questionnaire was distributed for collecting the base data that includes personal characteristics of the surveyed samples, questions regarding knowledge about the causes of dental caries and how to prevent it, beside the way, and frequency of brushing their teeth. In addition to the family history (genetic factor) had been assessed too. Another approach was the clinical examination. The examination was carried out by female dentist. A pilot study on 10 children was conducted before beginning the program to ensure the accuracy of diagnosis and to standardize the procedures. The school children were examined by a clinical observation without radiograms in the medical rooms of the three schools. The oral conditions were assessed by using latex gloves, probe, mouth mirrors and cotton rolls. The examination lasted 25 minutes per child, following the WHO guidelines. To assess dental caries DMFT (Decayed, Missing and Filled Teeth) index was used. The systematic examination includes the crown and exposed root of every primary and permanent tooth, each crown and root are assigned a number based on the result of that exam. The names of children who needed dental treatment were given to the classes' teachers who informed the parents to be referred to the dental clinics. Data were collected as she simply counted each affected surface, yielding a Decayed, Missing (due to caries only), and Filled Teeth surfaces.

5.1 Interventional phase

A health education program had been implemented in the three targeted schools in Najran with the same health team (The dentist and nurses). The health education program offered included:

- Classes about the risk factors and causes of dental caries.
- Some dietary advices about reducing frequent intake of sugar-containing food and drink and they can substitute them by having fresh fruits.
- Classes about the benefits of brushing the teeth carefully at least twice a day with fluoridated toothpaste and flossing.
- Classes about the importance of regular visiting of dentists for early identification of teeth problems and their proper treatment.
- Practical classes and cartoon films besides using manikin to demonstrate the proper ways of using tooth brushes to clean the teeth and how to clean the tongue.

5.2. Oral health education activities

Oral health education sessions (One hour each) took place at approximately 3-month intervals; students were grouped into groups of 32 individuals for oral health education activities held in each selected school. The attendance at the oral health education activities was voluntary, and all selected students participated in all sections. Oral health education activities were performed by a dentist, and other 2 nurses. The content of sessions was similar for all groups. Initially, a session of 30 min of oral health education was conducted by a dentist, in which information was provided on the importance of adequate oral hygiene and nutrition, general health-related behaviors and their relationship with systemic health. The process of tooth decay was explained to them, placing emphasis on the potential caries-preventive benefits of health-related practices. Fluoride toothpaste and toothbrushes were provided free of charge. After that, a dental examination was conducted by the dentist, and a referral was made for those with treatment needs. Moreover a supervised tooth brushing practice was demonstrated with toothbrush and topical gel fluoride 1, 23% applied by the dental nurse. Finally, hand-outs and flyers emphasizing the importance of oral-health care and how it can be achieved were distributed to children and their families.

5.3. Evaluation phase

The same students had been questioned and examined 6 months later after the intervention (health education program) by adopting the same way and by the same personnel who were on data base phase for comparing the findings pre and post the educational program.

VI. Ethical Approval

The protocol was approved by the research ethics committee of the Nursing College, Alneelain University, Najran University, and the Ministry of Education - KSA before field work was started. Schools under the sampling were officially informed and assured about the privacy and confidentiality of the research findings. In addition to that informed verbal consent was obtained from students and their guardians before conducting the study.

VII. Statistical Methods

Data were registered in Microsoft Excel 2007 and elaborated by Statistical Package for the Social Sciences Windows, version 20 (IBM, SPSS, Chicago, Illinois, USA). Descriptive statistics were calculated for every measured variable, in order to evaluate the studied sample. The P value for statistical significance was set at (0.05), so any value less than ($P < 0.05$) was interpreted as statistically significant.

VIII. Results

As shown in table 1 only 27.43% were healthy, the prevalence rate of dental caries was 72.57%. DMFT mean (Decayed, Missing and Filled Teeth) for the examined group was 0.73 before conducting the program. This DMFT value declined to 0.71 after conducting the health education program (Fig. 1). Moreover table 1 reflects that the 10th primary school has the highest dental caries prevalence than the other two schools, while the 25th primary school showed the lowest prevalence rate.

Table 1. Clinical examination results before conducting the health education program

School & groups by age		Healthy	Unhealthy teeth			Sample size	Prevalence of caries (%)
			Decayed	Missing	Filled		
6th primary school	Group I (10 - 11years)	9	11	7	5	32	72.92%
	Group II (11-12 years)	5	17	8	2	32	
	Group III (12-13 years)	12	6	10	4	32	
10th primary school	Group I (10 - 11years)	8	14	8	2	32	76%
	Group II (11-12 years)	9	10	6	7	32	
	Group III (12-13 years)	6	12	5	9	32	
25th primary school	Group I (10 - 11years)	6	14	10	2	32	68.75%
	Group II (11-12 years)	10	13	1	8	32	
	Group III (12-13 years)	14	7	0	11	32	
Total		79	104	55	50	288	
%		27.43%	36.11%	19.1%	17.36%		

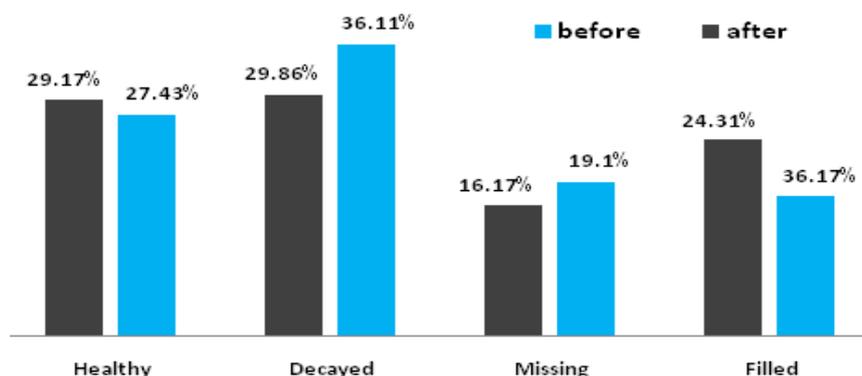


Fig. 1. Comparison of the clinical examination results before & after the education program.

Table 2 shows that the genetic factor has a powerful impact on dental caries occurrence. More than 90% of the affected students have a positive family history of dental caries. Fig. (2) displays the major causes of dental caries, it shows that almost 16% of the studied sample don't have an idea about the causes of dental caries, while 15% believe that the cause of dental caries is just a matter of luck but fortunately these percentages declined significantly ($p < 0.01$) to zero percent after the education program. Although the surveyed groups come from a population whose parents' education differs; there was no difference ($p > 0.05$) in the incidence of dental caries between students whose parents have higher education and those whose parents are illiterate.

Table 2: The association between hereditary and occurrence of dental caries

Family history	Healthy	Unhealthy	Total	%
Yes	73	187	260	90.28%
No	6	22	28	9.72%
Total	79	209	288	

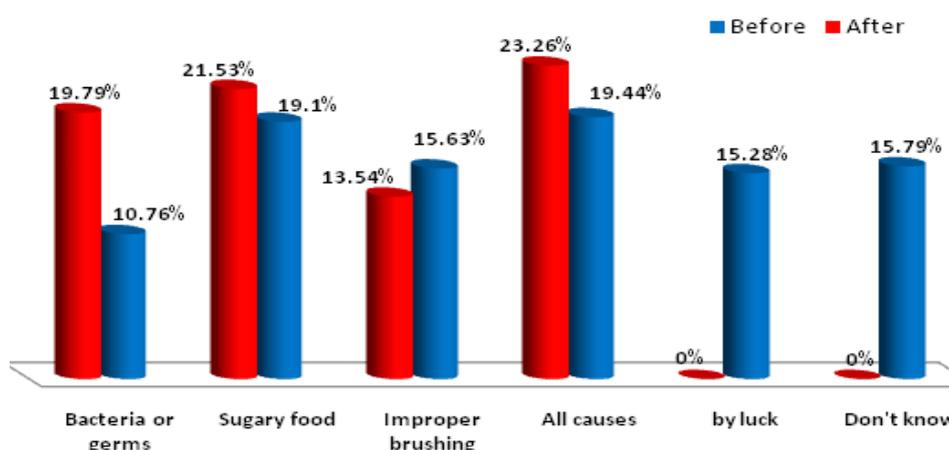


Fig. 2. Comparison of the respondents' knowledge about the causes of dental caries before & after the health education program

Table 3 represents the sources of information from which students get their knowledge about dental hygiene issues, this table also shows that a recognized number of students (37%) get their knowledge regarding dental disease prevention and oral hygiene behavior from their parents. The students' level of knowledge was significantly ($p < 0.01$) improved after conducting the program. Around 76 percent of the participating respondents identified that they didn't have an idea about fluoridated toothpaste before conducting the program, this percentage decreased significantly ($p < 0.01$) to 7% (Fig. 3) after the program.

Table 3: Sources of information about dental issues

Sources of information	Healthy teeth	Unhealthy teeth (DMFT)	Total	%
1. Schools	8	29	37	12.85%
2. Parents	23	84	107	37.15%
3. News-papers	0	12	12	4.17%
4. TV / Internet	37	52	89	30.9%
5. Posters / others	11	32	43	14.93%
Total	79	209	288	100%

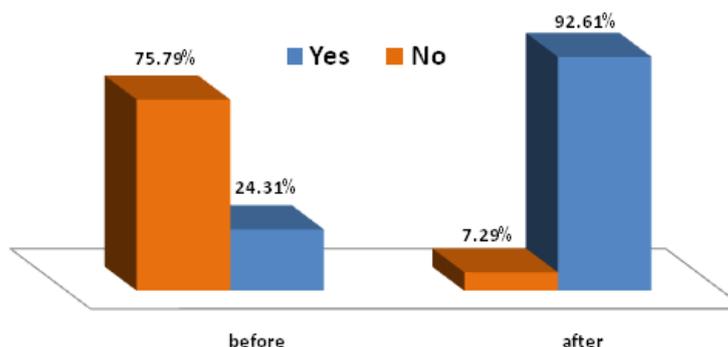


Fig. 3. Knowledge about fluoridated toothpaste before & after the program.

Table 4 shows that the majority of the surveyed sample (85%) used to take sweets more than two times a day. This percentage declined to 73.6% after conducting the health educational program. Fig. 4 shows that 90% of the students have negative attitude towards brushing their teeth in the evenings but this percentage decreased 10 times (9%) after conducting the program. Ninety nine percent of the studied sample claimed that they don't use to visit dentists unless they feel pain, but this percentage decreased to 1.4% after conducting the health educational program (Fig. 5).

Table 4: Frequency of consuming sugary drinks and foods

Frequency of taking sugary food	Healthy	Unhealthy	Total	%
Once or less a day	19	23	42	14.58%
More than two times a day	60	186	246	85.42%
Total	79	209	288	100.00

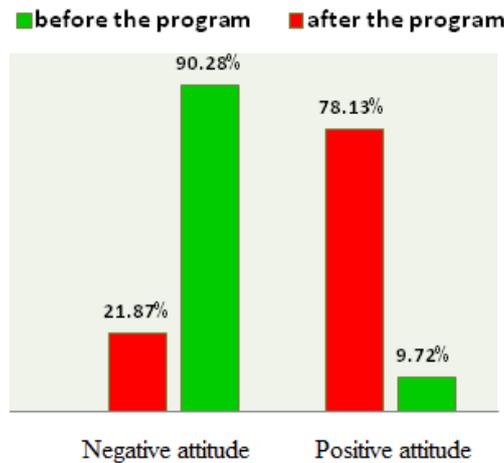


Fig. 4. Comparison of students' attitude towards brushing teeth at bed time before & after the program.

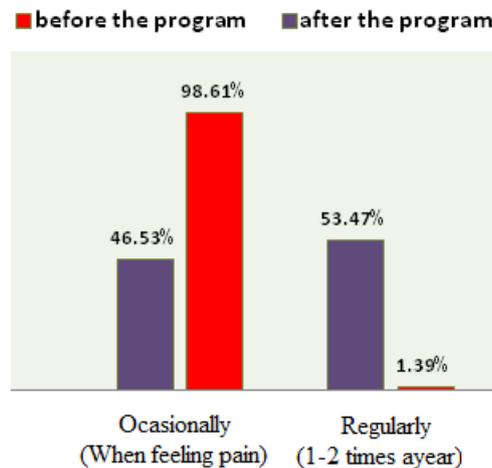


Fig. 5. Comparison of students' attitude towards visiting dentists before & after the program.

IX. Discussion

The current study indicated that the health education program offered to schoolchildren improved their awareness of the importance of oral health and its role in combating dental caries. Furthermore the schoolchildren's knowledge of dental caries causes, importance of fluorinated toothpaste and necessity of counseling dentist was also improved. Health education program offered to children and encouraged them to adopted regular oral health behavior such as tooth-brushing at least twice a day, visiting dentists at least once a year, and reduction in consumption of sugary food/ drinks reduced dental decay (Rayner, 1992; Ivanovic and Lekic,1996). Also the results of this study is in agreement with the results of a similar study conducted in Chicago, USA (Biesbrock et al. 2004) where a significant reduction of incidence rate of dental caries was observed among school students. Similar findings have been reported too in other countries where school-based

preventive programs were found effective in improving oral healthy knowledge and behavior (Abdullah, 2009, Subedi et al. 2011). Similarly Flanders 1987, Hartono et al. 2002, Satyawan et al. 2014, reported that oral health education is of paramount importance in instilling the oral health ideas and altering children's behavior. The positive effects of health education offered in this study is also in accordance with that of other studies conducted in different parts of the world, where the oral health behaviors and attitudes of children were changed after conducting the oral health education programs (Frenchen, et al. 2001; Shenoy and Sequeira, 2010). This study highlighted the strong correlation between genetic factor and the occurrence of dental caries and this finding is in agreement with the results of similar study that had been conducted in China and Japan where a significant correlation was observed between genetic factor and the occurrence of dental problems (Petersen et al. 2004; Kurushima et al. 2015). In the current investigation the parents' level of education had no influences on the oral health status which disagrees with what of Castilho et al. 2013. This study did not deny the influence of parents' level of education on the oral health of their kids, however in the current study the level of education of parents is nearly of primary level and other social factors in the Saudi society might contributed to this difference. The most probable factor that might results in the high incidence of dental caries among the surveyed students is socioeconomic status of the family which is known as a powerful factor that influence dental caries occurrence among children (Ekman, 1990; Nancy et al. 2008; Borges et al.2012). The same finding is reported by Khan et al. (1998) who reported that social class has a significant role in dental health status. A significant improvement of children's attitude towards visiting dental care services was observed among the surveyed subjects after conducting the oral health education program. Similar findings were reported by Frencken et al. (2001) and Carlos et al. (2004).

X. Limitations, And Future Plans

The most significant limitations to this survey were its short-term nature, small population and its limitation to schoolgirls only. Long-term national projects should be seriously thought to meet the restorative and preventive dental needs of Saudi schoolchildren particularly in Najran area where the findings of this study have been obtained. Since this study was conducted on small population of girls students the findings of this survey cannot be used to judge the dental health status of Najran's schoolchildren unless a large number of schools of boys and girls are included. However, the results of this study indicate the seriousness of the situation as soon as the dental problems are proofed rampant among girls and boys. Furthermore, in the future investigations the parents' and teachers' attitudes towards oral health should not be ignored. The future plan intends to expand the program services during the coming academic years to include more girls as well as boys' schools from both public and private sectors to maximize the benefits of the study.

XI. Conclusion & Recommendation

Dental caries prevails among school age students and hereditary is a major predisposing factor that aggravates the situation. The Saudi students' knowledge about the oral health is very poor and they only get it from illiterate parents. Thus this study places extra emphasis on dental education programs implementation in primary schools to reduce dental caries among students. Health education is an important tool of public health and an effective primary preventive method. Since most of students' parents are illiterates, dental caries preventive strategy; like offering teeth brushing classes before starting the regular classes; must be endorsed in cooperation between education and medical authorities.

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