

## Oral Health Education (OHE) Program on Adolescents before and after Teacher's Training in Diyala City: A Comparative Clinical Study

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### ABSTRACT

**Background:** Application and development of oral health education (OHE) program is critical to recognize and to improve the risk of oral and dental health factors among adolescents.

**Aim:** The purpose of the study was to evaluate the developments in the adolescents' oral health behavior and skills, in comparison with the pupils' situation before the teachers' training.

**Materials and Methods:** Seven schools in the city of Diyala-Baquba participated in a randomized controlled experiment for this research. Eighty males and females aged 12 with good general health participated in this study over the course of 16 weeks to evaluate the effects of a school-based OHE program on their oral hygiene, gum health, and halitosis. From the selected schools, one subjected to the intervention of OHE program and one of them was a control. A questionnaire was used to measure both general and oral health. In order to better prepare the teachers, a course lasting three days planned. To evaluate levels of oral hygiene, we used plaque indices, gingival indices, and halitosis scores to evaluate their breath.

**Results:** Results showed that intervention school showed statistically significant improvements in student oral health indicators such plaque, gingivitis, and halitosis scores. Comparing teacher-led group to the controls and the baseline assessment, the former was found significantly lower scores for the plaque index, gingival index, and halitosis. There were significant differences discovered statistically ( $P < 0.01$ ).

**Conclusions:** School's children in the teacher-led OHE group showed significant improvements in their oral health, hygiene, gingival health, and oral malodor.

**Keywords:** Adolescents, Halitosis, Oral health education, Teacher-led

### INTRODUCTION

The mouth's separation from the entire of the body must be stopped<sup>(1)</sup>. Intractable toothache, low quality of life, and tooth loss affect millions of people because of the neglect of oral health in the context of broader health promotion<sup>(2)</sup>.

Every year, millions of hours of school and work are lost around the world due to oral disorders that impede activity in school, at work, and at home<sup>(3)</sup>.

The state of one's oral health has far-reaching implications for one's physical and mental health, including one's ability to learn and develop normally, to look and feel attractive, to eat and speak normally, to chew and enjoy one's food, to smile and socialize, and to experience overall psychological and social<sup>(4)</sup>.

Children's dental health has been linked to their overall health, educational achievement, and quality of life<sup>(5)</sup>. Pre-adolescents accounted for 90% of the total respondents who indicated an oral health-related impact<sup>(6)</sup>. Time trends in both society and dental illnesses require attention to be paid to the adolescent years, when many habits that persist into adulthood are initiated<sup>(7)</sup>.

In developing countries, the prevalence of chronic disorders including obesity, diabetes, and caries suggests that the quality of life in regards to dental health, and possibly the overall quality of life, may decline<sup>(2)</sup>. Health education is an essential component of the process of acquiring health-promoting and health-maintaining behaviors<sup>(3)</sup>.

Over a billion children and their teachers, parents,

and extended communities can all be reached through schools as a means of promoting health and wellness<sup>(5)</sup>.

There is some evidence that the oral health education (OHE) can improve short-term knowledge and, to a lesser extent, healthy behaviors like tooth brushing and diet<sup>(8)</sup>. All of these reasons, including the desire to learn more about dental hygiene, inspired us to conduct this study.

**Aim: To evaluate the developments in the adolescents' oral health behavior and skills, in comparison with the pupils' situation before the teachers' training.**

### MATERIALS AND METHODS

#### • Study population

This study was designed to be a longitudinal with 16-weeks intervention trial involving a representative sample of 12 years old adolescents of seven primary schools in Diyala-Baquba city. The sample involved was forty adolescents as a teacher-led group and forty as a control of both genders.

#### • Ethical aspects

**Diyala Educational Directorate approved the study, and parental permission and written agreement were collected from participating teenagers.**

#### • Theoretical model of the study

The data includes self-administered questionnaires

from the adolescents and objective clinical dental examinations for the children. A self-designed format was designed to get general information regarding their general and oral health. The parents filled out the questionnaires in their own homes.

The students were tested while they were in class and were seated on a portable chair. Portable lamp source for artificial illumination was used. Clinical data were documented by a researcher on prefabricated data sheets. Eight clinical oral examinations were carried out by the researcher to evaluate the OHE program including: -Baseline examination was carried out before conduction of the OHE program, and seven examinations were carried out each two weeks after the implementation of the program. Baseline plaque index<sup>(9)</sup>, calculus component of periodontal disease Index was scored utilizing the criteria of Ramfjord<sup>(10)</sup>, and gingival index<sup>(11)</sup> were recorded on Ramfjord teeth to aid in the diagnosis of the oral health, and gingival health using a mouth mirror and a probe. Assessment of halitosis by a halimeter according to the manufacturer's instructions was done.

The trial involved two groups the study group was imparted OHE by teachers while the control group that did not receive any form of OHE program. The teacher-led was given a single educational input to conduct OHE and explain the purpose of the study to the school adolescents. The selected teachers were trained for oral hygiene education program by organizing one-hour session for three days, and then made a calibration for them. Participants learned about the connection between oral and overall health, the functions of teeth, how teeth form, the anatomy of the mouth, the factors that lead to tooth decay, and the best ways to avoid getting dental caries and periodontal disease, oral malodor, and emergency oral care at school<sup>(12)</sup>.

, videotapes, macromodels, Puppet Theater, and coloring pictures were all used as a part of the educational materials given to adolescents in an effort to get them more interested in and involved in the lessons being presented. The videotapes contain a demonstration on the proper technique of flossing. They were shown by using the laptop. In demonstration of oral hygiene procedures macromodels (dentures, brush and floss). Puppet theatre in the school plays an

important role in transforming the educational material of dry matter to easy and more acceptable to learners<sup>(13)</sup>. It began two weeks after implementation of OHE program to assess plaque index (PLI), gingival index (GI), and oral malodor again and continue after that two weeks interval for seven times.

**Statistical analysis**

SPSS version 20.0 was used for statistical analysis after data were imported into Microsoft Excel. The central limit theorem states that for sufficiently large samples (30 or 40), the sampling distribution approximates normality<sup>(14)</sup>. To analyze the data, we first tabulated and categorized the information we received. Levene's test procedure was used to find the homogeneity among the data. Since the F-test was statistically significant, post hoc tests were conducted, and further investigation of the discrepancies between the means is required to offer particular information on which means, and Scheffe's test were employed in the event that equal variances were assumed.

For the purposes of this study, a p-value of less than 0.05 was considered statistically significant, whereas a p-value of more than 0.05 was not; a p-value of less than 0.01 was considered extremely significant.

**RESULTS**

**The sample**

The total sample consisted of 80 adolescents aged 12 years, 40 were males (50%) and 40 were females (50%) divided into two groups. The number of the males was equal to the number of the females.

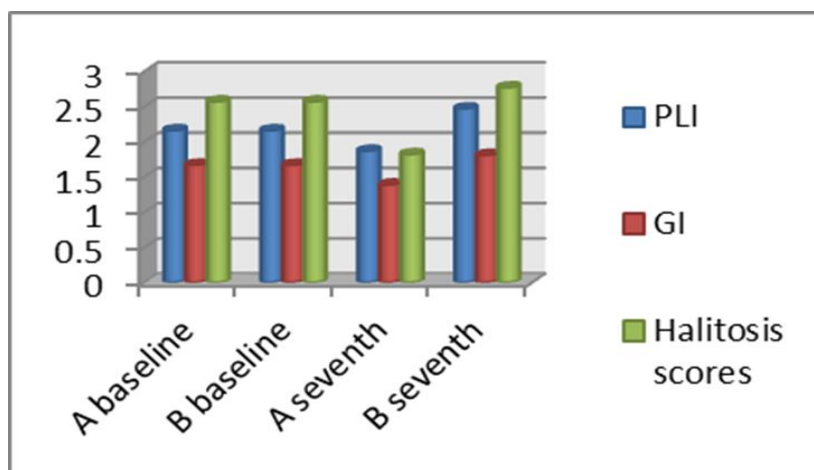
**Before giving the OHE program:**

Table 1 revealed the mean value and the standard deviation of the plaque index, gingival index and halitosis scores for the sample among the groups at baseline examination (before implementation of the OHE program). According to Levene's test, there were no significant differences between the groups statistically for each variable ( $p > 0.05$ ) (Figure 1). Scheffe repeated measure test between groups, according to mean differences showed that there were no significant differences  $P > 0.05$ .

**Table 1: The mean values of the variables of the sample among the study and control groups at baseline examination**

Variables	A		B		Levene's test	
	Mean	SD	Mean	SD	F	p-value
PLI	2.16	0.37	2.16	0.37	0.425	0.886
GI	1.67	0.53	1.67	0.53	1.762	0.099
Halitosis scores	2.57	0.67	2.57	0.67	1.112	0.358

*Degree of freedom (df) = 1, A = group supervised by the teacher, B = control group*



**Figure 1: The mean values of the variables of the sample among the study and control groups.**

For Calculus index, the study indicated no presence of calculus.

**After giving the OHE program**

Table 2 shows the means of plaque, gingival, and halitosis scores of the sample at different examinations before and after implementation of the OHE program. At baseline examination, the groups A and B have  $2.16 \pm 0.37$ ,  $1.67 \pm 0.53$ ,  $2.57 \pm 0.67$  for PLI, GI, and halitosis scores respectively. At the seventh examination after starting giving the OHE program (after 14 weeks) the group A has  $1.87 \pm 0.40$ ,  $1.39 \pm 0.42$ ,  $1.82 \pm 0.54$  for PLI, GI, and halitosis scores respectively. That means there were reduction in PLI, GI, and halitosis scores while, there were increasing in the PLI, GI, and halitosis scores for the control group as  $2.47 \pm 0.55$ ,  $1.81 \pm 0.51$ ,  $2.77 \pm 0.91$  for PLI, GI, and halitosis scores respectively. Levene's test of plaque index shown high significant differences between baseline and seventh examinations for all the scores, (Table 2).

**Table 2: The mean values of the variables of the sample among the study and control groups at baseline and seventh examinations**

Examination	Variables	A		B		Levene's test	
		Mean	SD	Mean	SD	F	p-value
Baseline	PLI	2.16	0.37	2.16	0.37	0.00	1.00
Seventh		1.87	0.40	2.47	0.55	5.322	0.024
Baseline	GI	1.67	0.53	1.67	0.53	0.00	1.00
Seventh		1.39	0.42	1.81	0.51	4.668	0.34
Baseline	Halitosis scores	2.57	0.67	2.57	0.67	0.00	1.00
Seventh		1.82	0.54	2.77	0.91	7.941	0.006**

*Degree of freedom (df) = 1, A= group supervised by the teacher, B= control group*

Scheffe test for compound comparison show statistically high significant differences in PLI, GI, and halitosis scores between the baseline and the seventh examination ( $p < 0.01$ ) (Table 3).

**Table 3: Multiple comparisons by Scheffe test**

Variable	Examination	Mean difference	Sig.
PLI	First	0.150	0.99
	Seventh	0.600	0.000**
GI	First	0.150	0.99
	Seventh	0.422	0.000**
Halitosis score	First	0.075	0.978
	Seventh	0.950	0.000**

*\*\* Highly significant  $p \leq 0.01$ , Mean differences = mean of group A - mean of group B*

Scheffe test was done to find the differences in favor of any of the groups, (Table 4). The mean value for the group A is the lower one for all variables. Therefore, it could be argued that the group A is effective in the full improvement.

**Table 4: Comparison of the means of groups according to Scheffe test at seventh examination**

Variables	Groups	No.	1	2
PLI	A	40	1.87	
	B	40		2.47
GI	A	40	1.39	
	B	40		1.81
Halitosis scores	A	40	1.82	
	B	40		2.77

*A = group supervised by the teacher, B = control group, No. = number, 1 = the lower mean value, 2 = the higher mean value*

## DISCUSSION

In this study, the significant in the age group 12 was found could be related to that this age group was the pubertal so that the several hormonal changes could occur. Several epidemiological studies revealed that the periodontal disease is widespread in children and may vary from community to another<sup>(15)</sup>.

Other study has been reached different result by other investigator<sup>(16)</sup>.

The effect of the program has been evaluated clinically as changes by means of indices, in oral hygiene effectiveness, gingival health, and oral malodor assessment leading to evaluate the OHE program. In the present study, despite the fact that the two groups were comparable in terms of oral hygiene at the time of the baseline assessment, both showed poor oral health because the children do not have any interest or knowledge about cleaning their teeth. It is important to say that this study found that the calculus was absent in these two group. This result does agree with other studies<sup>(17, 18)</sup>, and disagree with **Al-Azawi**<sup>(19)</sup>.

Several previous studies found that dental knowledge affected on the oral hygiene<sup>(17, 18)</sup>, and other study found that the dental knowledge and behavior does not affected the oral hygiene<sup>(20)</sup>. It can be concluded that good oral hygiene habits tend to decrease the prevalence of halitosis in accordance with Hasan<sup>(21)</sup>.

The group supervised by teacher has the lower means of PLI, GI, and halitosis scores reflecting the increase in group's leader awareness and participation, while increased markedly for the control group due to eating disorders and dental phobia during this age. Generally, the adolescents neglected their teeth as showed by **Coolidge et al.**<sup>(22)</sup>, and **Eick et al.**<sup>(23)</sup>. However, no statistically significant difference was found between all groups at baseline examination.

The dynamic interaction between the educator and a selection of students was the driving force behind the formation of the teacher-led group. The educators had an interest in OHE since they were aware of the children's poor dental health.

This research concurs with that of **Sgan-Cohen et al.**<sup>(24)</sup>, who found that educators were enthusiastic about educating parents and students on the value of good oral hygiene and preventative dentistry but less enthusiastic about actively participating in school-wide dental health initiatives.

At the level of influence of the teachers on the adolescents, the current study goes with **Ehizele et al.**<sup>(25)</sup>, and **Ramroop et al.**<sup>(26)</sup>.

According to **Kwan et al.**<sup>(3)</sup>, the vast majority of educators have a favorable outlook on oral health with respect to their own participation in dental health education in the classroom. This is because educators know firsthand how important it is to their students' health to learn about proper dental hygiene. While,

**Sofola et al.**<sup>(27)</sup> found that primary school teachers have a poor attitude to oral health; the results of this study contradict those findings. The outcomes show that students' oral health literacy and behavior were positively impacted by the OHE curriculum.

## CONCLUSION

School's children in the teacher-led OHE group showed significant improvements in their oral health, hygiene, gingival health, and oral malodor.

- **Funding: Not relevant**
- **Authors' contributions:** The final manuscript has been reviewed and approved by all authors.
- **Competing interests:** The authors declare to have no conflicts of interest.

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