



Effect of Oral Hygiene Instruction by an Educational Film versus Practical Face-to-Face Instruction on Simplified Oral Hygiene Index of Third Graders: A Clinical Trial

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Article Info	ABSTRACT
Article type: Original Article	Objectives: Oral hygiene instruction is an important step to promote oral health. Educational health promoting interventions focus on knowledge enhancement and adoption of optimal oral health behaviors. The visual media can greatly help in this respect. This study aimed to compare the effect of an educational film versus practical face-to-face instruction on Oral Hygiene Index-Simplified (OHI-S).
Article History: Received: 15 Jul 2024 Accepted: 18 Feb 2025 Published: 13 Aug 2025	Materials and Methods: This parallel-design single-blind clinical trial was conducted on 120 third-graders (9-year-olds) in Hamadan city in 2020 who were selected by convenience sampling from 4 random schools. They were randomly assigned to two groups of educational film and practical face-to-face instruction. An educational film was sent to all students through Shaad mobile application. The second group received practical face-to-face oral hygiene instructions. Next, all students were requested to use their own toothbrush for one month. The OHI-S was calculated for students at the onset of the study and at one month after the intervention. Data were analyzed by ANOVA using SPSS version 24.
* Corresponding author: Department of Pediatric Dentistry, Tehran University of Medical Sciences, Tehran, Iran Email: salehipegah7@gmail.com	Results: In the practical instruction group, the OHI-S was 1.55 ± 0.45 at one month after the intervention, showing a reduction by 0.25 ± 0.11 units. In the educational film group, the OHI-S was 1.48 ± 0.39 at one month after the intervention, showing a reduction by 0.29 ± 0.19 units. The two groups had no significant difference regarding the reduction of OHI-S ($P=0.10$).
	Conclusion: Both practical instruction and educational film effectively decreased the OHI-S of students. Considering the ongoing COVID-19 pandemic, educational film can serve as a suitable alternative to practical face-to-face oral hygiene instruction.
	Keywords: Students; Oral Hygiene Index; Health Education, Dental; Dental Care for Children
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INTRODUCTION

Oral health has a prominent effect on general health, and can positively influence many aspects of life such as the performance of children at school and their future position because evidence shows that over 50 million school hours are lost annually due to oral and dental problems [1,2].

Oral hygiene in dentistry refers to regular practice of oral and dental care and preventive measures. Preventive dentistry is a basis for all oral health-related measures [3]. Despite the attempts made in developed countries, dental caries is still a common condition, and its prevalence has increased in some developing countries due to changed diet

[4,5]. According to Morrison et al, [6] oral hygiene instruction is an important aspect of health promotion and refers to knowledge enhancement of the public and instruction of hygienic skills and practices to them in order to empower them to have a greater control over their health status. Thus, educational strategy planning is an important part of health instruction. Correct educational strategy planning requires selection of an efficient method of instruction [7].

Several programs may be used for health instruction. Selection of an efficient oral hygiene instruction tool to attract the audience and transfer oral hygiene knowledge and skills is a fundamental step in such programs. In this process, the media and educational films can be of great help and can efficiently encourage the target population to adhere to hygienic measures [8]. Lecture, group discussions, role modeling, demonstrations, educational films, publications, etc. can all be used for this purpose. Lecture-based instruction is a traditional method of health education, which has been practiced for a long period of time, and is routinely used for educational purposes [9]. Technique of oral hygiene instruction to patients is of great significance. It should be noted that instruction in children is different from that in adults. Involving the children and parents in the process of instruction is also highly important because many researchers believe in self-instruction and self-education as the keys to efficient education [10]. It has been documented that if children are acquainted with the hygienic principles at a young age, they would adhere to such principles in adulthood as well [11,12]. The technique of oral hygiene instruction and continuation of education are among other important topics. The instruction technique should be simple and easy to learn with minimal adverse effects [13].

Considering the fact that prevention is prioritized to treatment, and the cultural gap regarding the significance of oral health as well as the high cost of dental procedures and the priority given to preventive measures by the World Health Organization, further studies on preventive interventions are required [14].

Considering all the above, this study aimed to assess the effect of practical face-to-face oral hygiene instruction and an educational film on the Oral Hygiene Index-Simplified (OHI-S) of third graders in Hamadan city in 2020.

MATERIALS AND METHODS

This parallel-design single-blind clinical trial was conducted on third graders in Hamadan city in 2020. The study protocol was approved by the ethics committee of Tehran University of Medical Sciences (IR.TUMS.DENTISTRY.REC.1398.171). The study was conducted on 120 nine-year-old students (equal number of girls and boys) selected from four schools (2 girls and 2 boys schools) by convenience sampling. After obtaining the list of students from the schools, the students were randomly assigned to two groups of educational film and practical face-to-face instruction.

Sampling method and calculation of sample size:

The sample size was calculated as pilot. The OHI-S of 10 nine-year-old children (5 girls and 5 boys) presenting to the dental clinic of Tehran University of Medical Sciences was measured. Considering the mean and standard deviation of OHI-S that were calculated to be 1.65 and 0.44, respectively, the mean comparison formula was used to calculate the sample size for the comparison of two means. Assuming the homogeneity of the variances for OHI-S in the two study groups, the minimum sample size in each group was calculated to be 60 children to find 0.24 difference (15% of the mean pilot sample) considering $\alpha=0.05$, $\beta=10\%$, and statistical power of 90% using the following formula:

$$n = \frac{[Z(1 - \alpha/2) + Z(1 - \beta)]^2 (SD_1^2 + SD_2^2)}{d^2}$$

$\alpha=5\%$; $\beta=10\%$; $SD_1=0.44$; $SD_2=0.44$; $n_1/n_2=1$; $n_1=n_2=60$

Inclusion criteria:

1. Third graders (9 years of age)
2. Written informed consent of the parents for clinical dental examination of their children and oral health instruction to them

3. Willingness of students for participation in the study

Exclusion criteria:

1. Poor general health and presence of a systemic disease
2. History of medication intake (in the past 6 months) such as anticonvulsants
3. Presence of restorations in buccal or lingual (palatal) surfaces of teeth #11, 16, 26, 31, 36, and 46
4. Presence of crowding, severe malocclusion, or developmental disorders
5. Use of fixed or removable orthodontic appliances.

Written informed consent was first obtained from the parents, and then a 6-minute educational film regarding oral hygiene instruction was given to the school management team and they were requested to send it to the students in the educational film group through Shaad mobile application. The second group received practical face-to-face oral hygiene instruction by a calibrated dental student who did not have access to the educational film in the system. All students were asked to brush their teeth using their own toothbrush for one month after the intervention. A questionnaire regarding the educational level of the parents, hygienic habits, consumption of sweets, dental procedures, and gender was filled out at the study onset and one month after the intervention for all students, and their OHI-S was calculated and recorded. The scenario of the educational tooth brushing film was prepared by two pediatric dentists. The film instructed correct toothbrushing first on a model, and then on a child for more in-depth learning. To ensure that all children in the educational film group have watched the film, they were asked to briefly describe the film and practice what they learned on a model prior to measuring their baseline OHI-S. Both groups were asked to brush the teeth of a model after the training.

To record the OHI-S, the students were examined in an adequately lit room using a mirror and a disposable explorer. All examinations were performed by a calibrated

dental student during school hours and at least one hour after the children had breakfast with no prior notice. The side of the explorer was used to quantify the amount of dental plaque accumulated on the tooth surface while the sharp tip of the explorer was used to detect dental calculus. The Green-Vermillion OHI-S was used in this study [15-17]. First, the debris index (DI) and then the calculus index (CI) scores were separately calculated and summed to calculate the OHI-S score. The OHI-S score and the questionnaire data of each student were coded. The length of the research period (collection of questionnaires) was 6 weeks.

Blinding:

In this study, the analyzer was blinded to the group allocations, and therefore, the study had a single-blind design.

Statistical analysis:

Qualitative variables were reported as number and percentage, and quantitative variables were reported as mean and standard deviation. The difference between the baseline OHI-S score and the OHI-S score at one month after the intervention was reported as absolute and relative values (percentage of change). Since the data were normally distributed, ANCOVA (general linear model) was applied to compare the two intervention groups regarding OHI-S. ANOVA was also used to compare the OHI-S scores of the two groups at one month after the intervention after controlling for the baseline values. Statistical analyses were carried out using SPSS version 24 (IBM CO., Chicago, IL, USA) at 0.05 level of significance.

RESULTS

This study was conducted on 120 third graders including 30 boys and 31 girls (a total of 61) in the educational film group, and 30 boys and 29 girls (a total of 59) in the practical instruction group. The students in the two groups were standardized in terms of level of education of the parents, number of restored and extracted teeth, frequency of dental visits, frequency of consumption of sweets, frequency of toothbrushing and dental flossing, fissure sealant or preventive resin restoration treatments, and baseline OHI-S (Table 1).

Table 1. Demographic information of children, frequency of restored and extracted teeth, frequency of dental visits, frequency of toothbrushing and dental flossing, frequency of consumption of sweets, and baseline Oral Hygiene Index-Simplified in the two study groups.

Variable		Practical instruction(%)	Educational film (%)
Gender	Male	30 (50.8)	30 (49.2)
	Female	29 (49.2)	31 (50.8)
Mother's level of education	Below high school diploma	22 (37.3)	11 (18.1)
	High school diploma	25 (42.4)	31 (50.8)
	University education	12 (20.3)	19 (31.1)
Father's level of education	Below high school diploma	15 (25.4)	9 (14.8)
	High school diploma	25 (42.4)	31 (50.8)
	University education	19 (32.2)	21 (34.4)
Treatment	Restorative	Yes 26 (44.1)	35 (57.4)
		No 33 (55.9)	26 (44.6)
	Extraction	Yes 34 (57.6)	37 (60.7)
		No 25 (42.4)	24 (39.9)
Dental visits	At least every 6 months	8 (13.6)	12 (19.7)
	Yearly or longer	49 (86.4)	51 (80.3)
Consumption of sweets	Once a day	44 (74.6)	49(80.3)
	Twice a day or more	15 (25.4)	12 (19.7)
Toothbrushing	Yes	48 (81.4)	55 (90.2)
	No	11 (18.6)	6 (9.8)
Flossing	Yes	11 (18.6)	15 (24.6)
	No	48 (81.4)	46 (75.4)
Fissure sealant or PRR	Yes	7 (11.9)	12 (19.7)
	No	52 (88.1)	49 (80.3)
OHI-S Baseline		0.05±1.66	0.38±1.67

PRR: Preventive resin restoration

Figure 1 shows the flow diagram of the study, which indicates the number of participants in each phase of the study and mentions the reasons for exclusion of the participants in each group as well as follow-up and analysis (Fig. 1).

The mean OHI-S of the students in the practical instruction group was 1.66 ± 0.50 before and 1.55 ± 0.45 after the intervention. These values were 1.67 ± 0.38 before and 1.48 ± 0.39 after the intervention in the educational film group. As shown in Table 2, the mean reduction in OHI-S at one month after the intervention was 0.25 ± 0.11 in the practical instruction and 0.29 ± 0.19 in the educational film group. The difference in this

regard was not significant between the two groups ($P > 0.05$).

Table 3 presents the changes in OHI-S (qualitative score) analyzed by the Fisher's exact test. The changes in the OHI-S score were not significantly affected by the gender or level of education of the parents ($P = 0.84$, $P = 0.57$, and $P = 0.85$ for the interaction effects of intervention with gender, level of education of mother, and level of education of father, respectively).

In the practical instruction group, the OHI-S score decreased by 0.11 units ($P = 0.002$; 95% CI: 0.04-0.17). This reduction was 0.19 units in the educational film group ($P < 0.001$, 95% CI: 0.11-0.26) (Fig. 2).

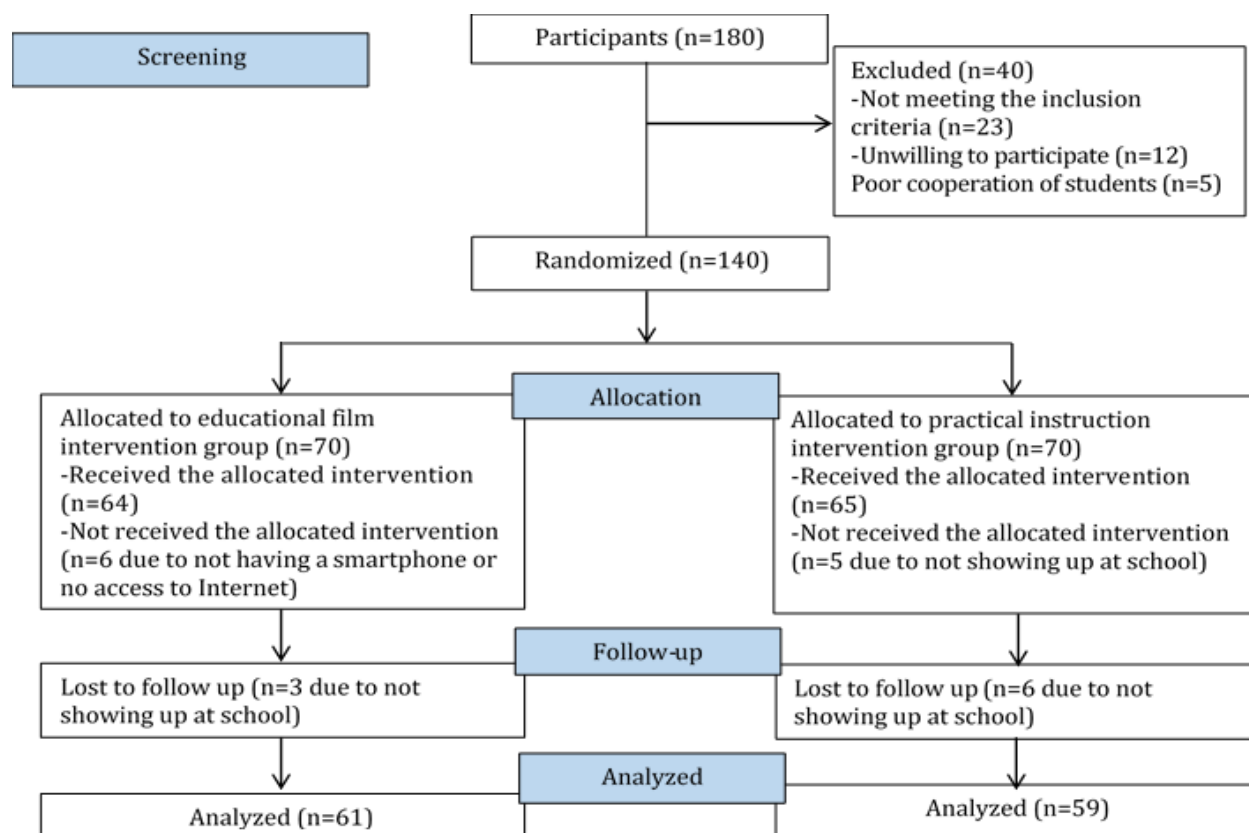


Fig 1. Flow diagram of the study

Table 2. Changes in Oral Hygiene Index-Simplified score (quantitative score) in the two groups after the intervention compared with baseline

Variable	Groups Practical instruction	Educational film	Model 1 Mean difference	95% CI	P- Value	Model 2 Mean difference	95% CI	P- Value
OHI-S at 1 month	1.55 ± 0.45	1.48 ± 0.39	0.08***	-0.02 - 0.17	0.10	0.04	- 0.05- 0.13	0.35
OHI-S difference	0.11 ± 0.25	0.19 ± 0.29	-0.08	-0.02 - 0.18	0.12	-0.07	-0.18 -0.03	0.17
Percentage of change in OHI-S	5.47 ± 15.89	10.37 ± 17.51	-4.90	- 10.95- 1.15	0.11	-4.19	-10.5 - 2.13	0.19

*Not adjusted for baseline variables; **Adjusted for level of education of mother, restorative treatment, dental visits, toothbrushing and flossing, consumption of sweets, and fissure sealant or PRR; ***Adjusted for baseline variables by ANCOVA

Table 3. Changes in Oral Hygiene Index-Simplified (qualitative score) in the two groups

	Practical instruction		Educational film	
	N	Percentage	N	Percentage
Increase (changes < -0.3)	4	6.8%	4	6.6%
No change (changes between -0.3 to +0.3)	38	64.4%	32	52.5%
Reduction (changes > +0.3)	17	28.8%	25	41.0%

N: Number

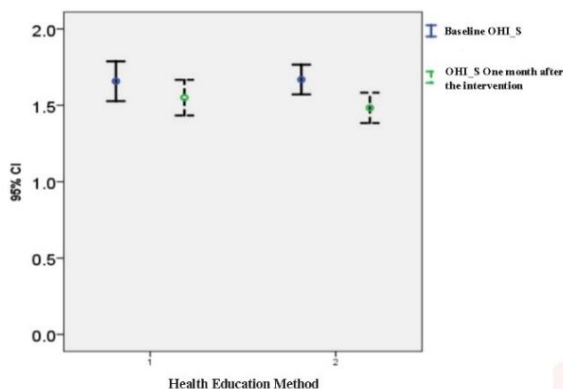


Fig 2. Reduction in Oral Hygiene Index-Simplified score in the two group

DISCUSSION

Oral hygiene instruction is a basis for prevention of oral and dental problems. Health instruction is often performed through programs or educational packages, affecting oral hygiene practice. However, implementation of such programs and technique of health data transfer have been less commonly addressed in the literature. Selection of an appropriate technique for efficient transfer of such information to the public is highly important. This study compared the effect of practical oral hygiene instruction versus an educational film on the OHI-S of third graders. Of different target groups for oral hygiene instruction, children, especially school-aged children, are highly important since their behavioral change and establishing correct hygienic behaviors at this age can result in adherence to such measures throughout their entire life. Selection of 9-year-old children for this study was because of their adequate mental development, and their higher trainability compared with younger children. Also, children at this age are expected to have adequate independence to practice personal oral hygiene measures. On the other hand, third graders have a lighter instructional program than higher-grade students and have more time for extracurricular educational programs. Furthermore, 9-year-old children have several erupted permanent teeth and thus, it would be an ideal time to establish positive hygienic behaviors in them. Birang et al. [18] showed

that instruction through an educational film not only resulted in immediate knowledge enhancement, but also led to knowledge retention for a long period of time and improved the oral hygiene practice of students as well. Accordingly, they recommended instruction through educational films to promote oral health as an effective strategy. However, they only assessed the effect of an educational film for promotion of oral health while the present study compared practical instruction and educational film on OHI-S. Evidence shows that traditional face-to-face instruction is not necessarily superior to virtual instruction, and the efficacy of traditional and virtual instruction should be further scrutinized for different topics. The present study aimed to assess whether the educational film of oral hygiene instruction is as effective as practical face-to-face instruction or not.

The present study evaluated a small population of third graders and showed that the changes in OHI-S were not affected by gender or level of education of the parents. The results showed that the OHI-S at one month after the intervention decreased by 0.25 ± 0.11 units in the educational film and 0.29 ± 0.19 units in the practical instruction group with no significant difference between them. This finding indicates comparable efficacy of the two modalities, which was different from the result of Afsari Erdchi et al, [19] who believed that the media cannot play an effective role in propagation of oral hygiene and behavioral change of the public in this respect. However, the present results agreed with the findings of Wakefield et al, [20], Vozza et al, [21] Safari et al, [22] Littlefield et al, [23] and Coles [24] regarding the role of mass media in education of new skills or life style change of the general population.

Children have a great emotional communication first with their parents, particularly mothers, and then with their school teachers and spend a lot of time with them. Thus, repeated oral hygiene instruction by them can greatly help in establishment of such behaviors in students. Thus, with respect to the cultural level of a society, a number of

educational tools, depending on the age of children, and hygienic and preventive goals, can be selected to create motivation in children and encourage them to adhere to oral hygiene measures, and establish appropriate hygienic behaviors and replace harmful behaviors with positive ones.

Although the present study found no significant difference between the two modalities in terms of efficacy, educational films can be used as an alternative to in-person instruction of oral hygiene since the former is less costly and time-consuming, and is reproducible. Within the limitations of this study, it can serve as a preliminary study to pave the way for assessment of the effect of direct and indirect instruction of health-related topics. Educational films require less human resources and can target a much larger population compared with face-to-face instruction. However, the decision regarding the method of instruction depends on a number of conditions such as time, location, financial constraints, and social and cultural conditions. Also, the efficacy of oral hygiene instruction by different methods should be assessed over longer periods of time to assess knowledge retention. The current situation of the community calls for more advanced techniques for educational purposes depending on the position and age of the target population. Accordingly, the efficacy of different educational techniques should be assessed in different positions. Further studies are required on the efficacy of different educational methods.

One limitation of this study was the fact that the obtained results are related to a specific target group. Further studies are required on different ages and ethnic groups with longer follow-ups. Also, this study was conducted during the COVID-19 pandemic with strict adherence to precautionary measures. Thus, the authors had many limitations in accessing the students and had to use Shaad mobile application to display the educational film. Further studies under normal conditions with longer follow-ups and reminders for further adherence to oral hygiene measures are required to obtain more accurate results

regarding the efficacy of different methods of oral hygiene instruction.

CONCLUSION

According to the present results, both modalities decreased the OHI-S of students at one month after the intervention compared with baseline, and were both equally effective with no significant difference between them.

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CONFLICT OF INTEREST STATEMENT

None declared.

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