

Effect of various educational methods on increasing parents' awareness of their children's preventive orthodontic treatments

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Aim: Like other fields of health, the main focus in dentistry has shifted from treatment to prevention of diseases. Parents have a vital role in deciding about their children's oral health issues. This study aims to investigate the effectiveness of four educational methods (including printed pamphlets, digital pamphlets, face-to-face education, and educational films) in increasing the awareness of parents about preventive orthodontic treatments.

Methods: The study samples were selected from patients who were referred to the Pediatric Dentistry Department. 150 parents of children between 4-12 years old participated in the study. They filled out a questionnaire including demographic data and knowledge about orthodontic problems and their early treatments. Then they were divided into five groups (control, printed pamphlet, digital pamphlet, face-to-face, educational films) and after one month they repeated the test. **Results:** A total of 102 fathers and 48 mothers were evaluated. There was no statistical difference between different ages, sex, or income in terms of their awareness, but the awareness score between educational groups was different. There has been observed a significant increase in the awareness level of all four groups (except the control group) ($P < 0.05$). The highest score was seen in the video group. The difference between printed pamphlets and digital pamphlets was not significant. **Conclusions:** The results indicate that educational films are the most effective way of increasing awareness about preventive orthodontic treatments.

Keywords: Orthodontics. Awareness. Parents. Education, dental.



Introduction

A malocclusion is defined as deviating of teeth or jaws from their normal relation which can be seen in different ranges from mild to severe forms¹. Occlusal abnormalities apart from dental caries are one of the most common dental problems². Malocclusion, according to different studies, can cause oral health problems like increasing the risk of caries and temporomandibular joint disorders³. Psychological issues have been reported to be high in children with malocclusion, as they are more prone to bullying or other forms of social rejection by others⁴.

Like other fields of health, the main focus in dentistry has shifted from treatment to prevention of diseases. As well as this, parents' or guardians' role has changed from passive individuals to active participants^{5,6}. Early diagnosis of the malocclusion and appropriate intervention could have a preventive or ameliorating effect on the problems that have been induced by malocclusion. In some cases, we could guide abnormality toward normal occlusion with timely management of orthodontic problems⁷. Early orthodontic treatments are done during primary or early mixed dentition when the early signs of deviation from normal occlusion can be seen⁸.

Apart from dentists as persons who choose the best treatment plan, parents have a vital role in deciding about their children's oral health issues, and their awareness in these cases would have a major influence on deciding to take their sons/daughters to the orthodontist for treatment of their occlusal discrepancies⁹. Parents and caregivers who have no knowledge and awareness concerning orthodontic problems may not seek the right time of treatment for their children¹⁰.

Increasing parental knowledge can be attained in different ways, and finding the most effective route would be beneficial. This study aimed to compare the effects of four different methods on parental awareness about preventive orthodontic treatments including printed pamphlets, digital pamphlets, face-to-face education, and educational films.

Material and methods

Study population and sampling procedure

Parents of 150 children (102 males and 48 females) aged between 4-12 years, coming to the Department of Pediatric Dentistry, Tabriz Azad University of Medical Sciences were assessed for this study. This descriptive cross-sectional Study was conducted between September 2021 and April 2022. The parents of children younger than 4, older than 12 years old, and unwilling parents to participate in the study were excluded from the project.

Methods

Parents of children aged 4-12 years old who agreed to participate were given a questionnaire to complete. The questionnaire had two sections consisting of demographic data and knowledge of parents (13 questions of knowledge about malocclusion and

orthodontic problems). All questions were in simple sentences which could easily be understood by laypeople.

Background characteristics of parents in the first part of the questionnaire included age, gender, family income, and education. Family monthly income was measured in Euro and classified into four categories. Level of education was categorized as 'equal or less than higher school education or diploma', 'between diploma and master', and 'equal or higher than master degree'.

In the second part of the questionnaire, each question had 5 response options from "completely agree" to "completely disagree". The maximum score for each question (highest level of awareness) was 5 and the minimum score was 1. The overall score is computed by adding up all questions' scores ranging from 13 to 65 (Table 1).

After completing pre-education questionnaires by parents, they were randomly divided into 5 groups: 1) control group 2) printed pamphlet group 3) digital pamphlet group 4) educational film group 5) face-to-face group. The control group was not involved in any form of the education packages. The printed pamphlet group received an educational pamphlet that consisted of basic information about some orthodontic problems and their treatments. The digital pamphlet group received the same content via email or WhatsApp messenger (according to parents' preference). The educational film group was sent a 5-minute video with the same information as pamphlets via email or WhatsApp messenger. A face-to-face group received this information from a dentistry student at the Pediatric Dentistry Department of Tabriz Azad University. The content of these educational methods was derived from one textbook of Orthodontics (Proffit W, Fields H, Larson B, et al. Contemporary Orthodontics, 6th ed. St. Louis, Mo: Elsevier Saunders; 2018) and Pediatric Dentistry (Nowak A, Christensen J, Mabry T, et al. Pediatric Dentistry Infancy through Adolescence, 6th ed. St. Louis, Mo: Elsevier Saunders; 2018) by one assistant professor in each field and written in fluent Farsi language that was simple to lay people. After 4 weeks parents in all groups repeated the questionnaire as a post-education test.

Table 1. Questions of knowledge part of the questionnaire with scores given to each answer

	Completely agree	Agree	No idea	Disagree	Completely disagree
1. I would take my child to the orthodontist Before age 12.	5	4	3	2	1
2. Despite the transient nature of primary teeth, if they have decayed or pain I would seek treatment.	5	4	3	2	1
3. If my child has thumb sucking, I will take her/him to the dentist	5	4	3	2	1
4. If my child has primary tooth loss, I will seek treatment to avoid space loss until erupting permanent teeth	1	2	3	4	5
5. Early referring to an orthodontist may prevent Complex treatments in the future	5	4	3	2	1

Continue

Continuation					
6. With early orthodontic treatment, oral health status and self-esteem of my child would be better	5	4	3	2	1
7. I agree with early treatment of irregular anterior teeth to prevent dental trauma	5	4	3	2	1
8. Missing or supernumerary primary teeth does not affect permanent teeth relation	1	2	3	4	5
9. I will agree with early orthodontic treatment even if its costs would be high	5	4	3	2	1
10. I will wait until erupting permanent teeth for orthodontic treatment	1	2	3	4	5
11. If my child has a jaw deformity, I will wait for her/him to get older to visit a dentist	1	2	3	4	5
12. Irregularity in primary teeth's relations does not affect permanent teeth	1	2	3	4	5
13. My awareness of orthodontic treatment has a certain effect on my child's treatment acceptance	5	4	3	2	1

Reliability and validity of the questionnaire

To evaluate the validity of the questionnaire, 10 assistant professors (including an orthodontist, pedodontist, statistician, and social science expert) of Tabriz Azad University of Medical Sciences were asked about the clarity of questions. To evaluate the reliability of the questions, 30 parents were randomly selected and completed the questionnaire two times at two-weeks intervals. Cronbach alpha ($\alpha=0.75$) was used to measure the reliability¹¹.

Ethical considerations

Ethical approval was taken from the Research Ethics Committees of Islamic Azad University- Tabriz Branch (Approved ID: IR.IAU.TABRIZ.REC.1400.191). Parents of children were given informed consent including the objective and methods of the study.

Data analysis

Data were analyzed using the statistical package for the social science version 26 (SPSS Inc., Chicago, Illinois, USA), and significance levels were set at 0.05. To evaluate the effectiveness of each method in increasing awareness of preventive orthodontic treatments, we used a quantitative comparison of each group's mean and ranking of groups using Kruskal-Wallis analysis¹². An Independent two-sample t-test was used to explore the effectiveness of each method on awareness before and after education and significance levels were set at 0.05¹³.

Results

Results were obtained from 150 parents (102 fathers and 48 mothers) of children 4-12 years old in the pre-education test and 148 (102 fathers and 46 mothers) in the post-education test. The demographic characteristic of parents who filled out the first questionnaire is presented in Table 2.

Table 2. Demographic characteristics of the participants before grouping (n=150)

		Number (%)
Age	< 29	15 (10)
	29-34	71 (47.3)
	34-39	45 (30)
	>39	19 (12.6)
Gender	Female	48 (32)
	Male	102 (68)
Family monthly Income (Euro)	< 200	20 (13.3)
	200-350	75 (50)
	350-500	51 (34)
	> 500	4 (2.6)
Education	≤ Higher school education or Diploma	96 (64)
	Between diploma and master	41 (27.3)
	≥ Master or higher	13 (8.6)

According to Table 3, our results did not show any significant correlation between the age and awareness score of parents from preventive orthodontic treatments, probably because of the relatively young population composition of participants. This was unavoidable since the parents of children up to 12 years old must be included in this study.

There was not a significant relationship between sex and the awareness of parents in the pre- and post-education scores. As well as this, Family income did not affect their awareness level.

The results of the analysis of variance also show that in both the pre and post-test stages there is a significant difference between the awareness of different educational groups. (pre-test: $F=5.78$, $\text{sig} \leq 0.05$. post-test: $F=3.6$, $\text{sig} \leq 0.04$).

Table 3. Test results to investigate the relationship between demographic characteristics and awareness

	test	Awareness in the pre-test stage	Awareness in the post-test phase
Age	Correlation coefficient (r)	-0.07	0.06
	Meaningful	0.34	0.47
	Number	150	148

Continue

Continuation			
	T test	-1.6	-0.1
Gender	Meaningful	0.09	0.9
	Number	150	148
Family monthly Income (Euro)	Variance (f)	2.6	1.1
	Meaningful	0.07	0.34
	Number	150	148
Education	Variance (f)	5.78	3.6
	Meaningful	0.05	0.04
	Number	150	148

In both the pre-education and post-education stages, there is a significant difference between the awareness of different educational groups about preventive orthodontic treatments.

As it is shown in Figure 1, the range of mean scores is between 38.6 to 43.8 which is not considered high. After the education phase, concerning questionnaires that parents filled out, there was a significant increase in the awareness of all groups except the control one. Among four groups (printed pamphlets, digital pamphlets, educational film, and face-to-face), the most effective way to increase awareness was through educational films. The second score was for the face-to-face group. There was not any noticeable difference between printed pamphlets and digital pamphlets. (Table 4)

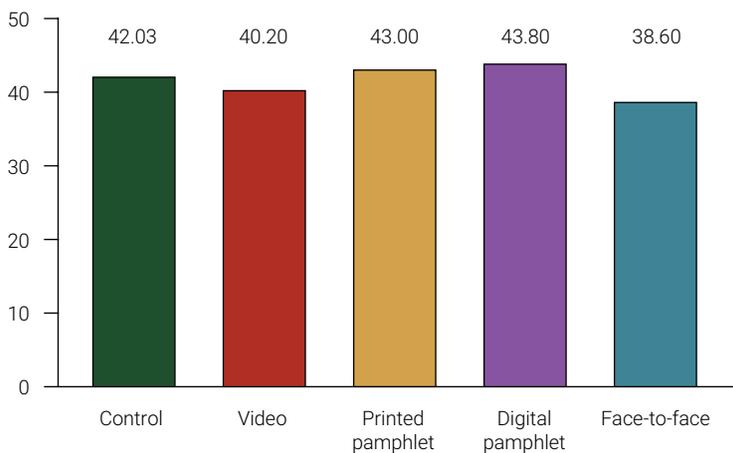


Figure 1. Awareness mean score of participants before education

Table 4. Parents' awareness of preventive orthodontic treatment in all groups before and after intervention using the Kruskal Wallis test

	Group	No.	Mean	Kruskal Wallis test
	Control	30	42	80.53
Awareness of preventive orthodontic treatments in pre-education stage	Printed pamphlet	30	43	87.75
	Digital pamphlet	30	43.8	90.73
	Educational film	30	40.2	65.72
	Face-to-face interaction	30	38.6	52.77
	Total	150	41.5	
Awareness of preventive orthodontic treatments in post-education stage	Control	30	42.6	29.27
	Printed pamphlet	29	46	49
	Digital pamphlet	29	45.8	48.7
	Educational film	30	59	127.25
	Face-to-face interaction	30	52.6	88.20
	Total	148	50.4	

Discussion

The purpose of this study was to evaluate the effect of various educational methods on increasing the awareness of parents toward their children's orthodontic problems and preventive treatment of them. The main findings were that educational video was the most efficient method and face-to-face education took second place. In addition, there was no difference between printed pamphlets and digital pamphlets.

Malocclusion, in some societies, is not considered an oral health problem. This causes not seeking treatment or delay in treatment at the appropriate time which stems from a lack of information and knowledge of patients and parents about occlusion problems¹⁴. A delay in orthodontic treatment will make it difficult for the face to adapt to it, whereas earlier treatment would be beneficial in terms of the face adapting to it¹⁵. Some advantages of early treatment of orthodontic problems are the elimination of the need for the second phase of orthodontic treatments, tooth extractions, or orthodontic surgeries¹⁶.

For the reasons mentioned above, increasing awareness of malocclusion and orthodontic problems should be a priority for dentists and other health sector workers. Parents of children were targeted in our study, as most occlusal discrepancies occur during childhood, and parents' knowledge about preventive treatment of orthodontic problems is very important¹⁷. We did not find any relation between parents' awareness level and age, sex, and income, but the educational level had a significant effect on awareness level. Similar findings were found in the study of Finnish¹⁸ except for educational level. Patel et al.¹⁹ and Rude and Kisling²⁰ have found a relationship between parents' awareness and their educational level.

According to our results, the initial awareness of all groups regarding the preventive treatment of orthodontic problems was low. 68% of the respondents disagreed or completely disagreed that problems of primary teeth could have a permanent effect, which is following Chhabra and Chhabra²¹ study (2012) that showed most of the parents (84.2%) did not agree with the detrimental effect of primary teeth problems on permanent teeth. In another study²², it was observed that 58.8% of parents agreed with the repercussions that problems of primary teeth would have on the permanent successors and their occlusal relations.

Previous studies have evaluated the effect of paper pamphlets as a tool to increase knowledge about orthodontic problems²³. However, the present study is the first one to investigate the effectiveness of four educational methods (printed pamphlets, digital pamphlets, face-to-face education, and educational films) in increasing the awareness of parents about preventive orthodontic problems.

The results of this study showed that all educational methods have a significant effect on increasing the knowledge of parents. The educational film was the most effective way. Capan²⁴ (2021) in a study evaluated YouTube videos as an information source for parents about space maintainers and concluded that these videos may have misleading information and should not be used as a trusted information source. We used textbooks in Orthodontics and Pediatric dentistry with the guidance of two professor assistants to make videos, so they could be used as a reliable source for parents and patients. The effectiveness of the film might have resulted from its attractive format.

Face-to-face education was in second place as an information source for parents. Compared to pamphlets (printed or digital) it has more interactions between parents and educators which causes more efficacy than pamphlets. Pamphlets (digital or printed) are also effective in increasing the knowledge level in our study. A study by Al-Jobair and Al-Emran²⁵ (2004) showed that 75% of patients prefer written format and 80% of them read leaflets. The leaflets should be comprehensive for lay people to be effective in educating²⁶.

The strengths of our study are the simple language in the pamphlets and questionnaire, and the attractiveness of educational films. The limitations of our study are that a large sample size of parents should be included and the long-term holding of information acquired from sources should be evaluated.

Conclusion

Based on this study educational film is the most efficient way of increasing knowledge about the early treatment of orthodontic problems and their advantages. Printed and digital pamphlets are the less effective method. In addition, the demographic characteristics of parents (except the educational level) do not affect the awareness of preventive orthodontic treatments.

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Data availability

Datasets related to this article will be available upon request to the corresponding author.

Conflicts of Interest

None

Author's Contribution

All authors actively participated at the manuscript's findings and have revised and approved the final version of the manuscript.

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