

# EFFECTIVENESS OF AN EDUCATIONAL WEBSITE ON ORAL HEALTH FOR ADOLESCENTS

*Efetividade de website de educação em saúde bucal para adolescentes*

*La efectividad de website de educación en la salud bucal de adolescentes*

Original Article

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## ABSTRACT

**Objective:** To evaluate the effectiveness of a website developed as an educational tool on oral health for adolescents. **Methods:** Experimental study developed in the city of Belem, Para, in the period between August and November 2012, with sample consisting of 160 adolescents ranging from 11 to 15 years old, attending public or private schools. Two groups were formed, the intervention one, with participation in educational activity and access to a website with information on oral health for adolescents; and the control group, with talks on the same topic. Data was collected using two self-administered questionnaires and, after the educational intervention, were assessed using Chi-square test, Analysis of Variance and Tukey's test. **Results:** After the educational activities, students from both groups presented good knowledge about issues related to dental caries and etiology of oral cancer, having the experimental group presented a better performance on these topics. Most of the students (n=122; 76.25%) participants in this survey had never held the oral self-examination and did not have adequate knowledge about periodontal disease. **Conclusion:** Both educational method led to a change in the knowledge acquired by the adolescents, which was reflected in the number of correct answers they gave. As it can be seen, however, the intervention group attained better performance after access to the website, showing its effectiveness.

**Descriptors:** Dental Health Education; Adolescent Health; Adolescent Medicine.

## RESUMO

**Objetivo:** Avaliar a efetividade de um website desenvolvido como ferramenta de educação em saúde bucal para adolescentes. **Métodos:** Estudo experimental realizado no município de Belém-PA, no período entre agosto e novembro de 2012, com amostra composta por 160 adolescentes na faixa etária de 11 a 15 anos, de escola pública e particular. Formaram-se dois grupos, sendo um experimental com participação em atividade educativa e acesso a um website de informações sobre saúde bucal para adolescentes; e o controle com palestras contendo a mesma temática. Os dados foram coletados por meio de questionários autoadministrados e, depois da ação educativa, foram verificados a partir de Teste Qui-quadrado, Análise de Variância e Teste de Tukey. **Resultados:** Observou-se que os escolares, de ambos os grupos, após as atividades educativas, obtiveram um bom conhecimento acerca das questões sobre cárie e etiologia do câncer bucal, tendo os escolares do grupo experimental apresentado melhor desempenho sobre esses temas. A maioria (n=122; 76,25%) dos escolares participantes da pesquisa nunca havia realizado o autoexame bucal e não possuía conhecimento adequado sobre doença periodontal. **Conclusão:** Os dois métodos educativos fizeram com que houvesse uma mudança nos conhecimentos adquiridos pelos adolescentes, o que se reflete na quantidade de respostas acertadas por eles. Porém, como pode ser constatado, o grupo experimental obteve melhor desempenho após o acesso ao website, mostrando sua real efetividade.

**Descritores:** Educação em Saúde Bucal; Saúde do Adolescente; Hebiatria.

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## RESUMEN

**Objetivo:** *Evaluar la efectividad de un website desarrollado como herramienta de educación en salud bucal de adolescentes.*

**Métodos:** *Estudio experimental realizado en el municipio de Belém-PA, entre agosto y noviembre de 2012, con una muestra de 160 adolescentes entre los 11 y 15 años, de escuela pública y privada. Dos grupos, siendo uno experimental con participación en actividad educativa y acceso a un website de informaciones sobre la salud bucal de adolescentes; y el grupo control con ponencias de la misma temática. Fueron recogidos datos a través de cuestionarios auto-administrados tras la acción educativa. Los mismos fueron analizados con la prueba del Chi-cuadrado, Análisis de la Varianza y la Prueba de Tukey. Resultados:* *Se observó que los escolares de ambos los grupos tenían un buen conocimiento sobre caries y etiología del cáncer bucal tras las actividades educativas, siendo el grupo experimental el que presentó mejor desempeño sobre estos temas. La mayoría (n=122; 76,25%) de los escolares participantes de la investigación nunca habían realizado el autoexamen bucal y no tenían el conocimiento adecuado sobre enfermedad periodontal. Conclusión:* *Los dos métodos educativos generaron cambios en los conocimientos adquiridos de los adolescentes lo que se refleja en la cantidad de respuestas correctas de su parte. Sin embargo, como se pudo ver, el grupo experimental tuvo mejor desempeño tras el acceso al website, señalando su real efectividad.*

**Descriptores:** *Educación en Salud Dental; Salud del Adolescente; Medicina del Adolescente.*

## INTRODUCTION

Adolescence, from Latin ‘*adolescō*’, which means growing, developing<sup>(1)</sup>, is a specific phase of the human development, characterized by a period of changes and multiple, profound and essential transformations for the human being to reach maturity and enter society in the role of adult<sup>(2)</sup>. This step is of great value, given that, in this stage, the acquired learning is not forgotten. According to the World Health Organization (WHO), adolescence is a stage between 10 and 19 years old<sup>(3)</sup>; on the other hand, the Brazilian legislation and the Child and Adolescent Statute (*Estatuto da Criança e do Adolescente - ECA*) consider adolescents individuals from 12 to 18 years of age<sup>(4)</sup>.

Adolescence is a phase of personality structuring and identity definition<sup>(5)</sup>. In search of a physical, psychological and social equilibrium, the adolescent shows extreme behaviour, sometimes exacerbating their positive attitudes, sometimes proving extremely careless with regard to their health care. Often, adolescence is seen as a period of increased risk for dental caries, due to the poor control of dental plaque and reduced attention to oral health<sup>(6)</sup>. This lifecycle represents a period of risk for oral health<sup>(7)</sup>.

The term ‘hebiatric dentist’ is used to specify the dental professional trained to assist adolescents<sup>(8)</sup>.

Adolescent’s oral health can be a good indicator of their overall health. Health education becomes one of the pillars of modern dentistry seeking the comprehensiveness of their actions<sup>(9)</sup>. The inclusion of adolescents in preventive programs targeted to them, along with a careful, clear-sighted and sensitive approach by the professional, can contribute to reaching adulthood in a healthy way<sup>(10)</sup>.

Undoubtedly, the promotion of oral health becomes an important strategy to combat oral diseases. Adolescents constitute the target population for the implementation of educational measures, among other reasons, because they have unique characteristics and attitudes, and different needs as well. Given the lack of educational methodologies on oral health for an adolescent audience, it stands out the importance of educational methods that are developed in environments of their interest, currently leading among them the computer<sup>(11)</sup>.

About 56 million people access the Internet in Brazil, and the largest part of this group is composed of young people between 10 and 19 years<sup>(12)</sup>. The trend of these connections is rising, as young people are being raised in an increasingly connected world, being, thus, possible to make use of this trend for educational actions<sup>(13)</sup>.

Grounded on the aforementioned factors and the demand for implementation of effective and specific educational approaches to the adolescent audience, this study aims to evaluate the effectiveness of a website developed as an educational tool on oral health for adolescents.

## METHODS

Cross-sectional, exploratory study, with a convenience sample and data collection involving adolescents enrolled in high schools of the city of Belém, Pará, during the 2012 school year.

The population of this study consisted of 198 adolescents, 160 being selected, aged 11-15 years, duly enrolled in schools and of both sexes, these constituting the inclusion criteria. Those who did not express interest in participating in the study and those who did not comprehensively answer to the questionnaires were excluded.

Prior to starting the study, the researchers were calibrated on the methodology and data collection. Additionally, the questionnaire was used as an evaluation tool with 10 adolescents, in a pilot study, aiming to identify possible doubts and verify if the time appraised for the questionnaire completion and for carrying out other activities was sufficient.

Two schools, one from the public network, and one from private network, with digital inclusion system and adequate space to carry out the activities, met the selection criteria requirements. By means of a letter to the direction of the schools, authorization to carry out this research was requested and, after collection, occurred the approach to the school students, informing them about the character, purpose and importance of the research, inviting them to participate. Adolescents and their parents signed a Free Informed Consent Form, totalling 160 valid questionnaires, 80 from each school.

The 'Plugged Dentistry' website was investigated, which is dedicated to provide adolescents with information about oral health, showing and teaching its importance in daily life, encouraging the development of healthy oral habits and self-care, also bearing a tool for the disabled.

In each school, the adolescents were divided into two groups of 40: 1) Experimental group, with access to the 'Plugged Dentistry' educational website, available at <http://www.odontologiaplugada.com.br>. It contained matters of interest, such as those related to gum disease, tooth decay, cosmetic dentistry, healthy eating, dental trauma and oral cancer. The access time to the site comprised 40 minutes. 2) Control group: interactive educational lecture addressing the same themes contained on the website, using slides, illustrative posters and macromodels, with 40 minutes of duration.

The evaluation instrument was a questionnaire composed of 12 objective and subjective questions, relating topics covered in both educational methodologies, which was applied in two stages: an initial one, to assess the students' prior knowledge, and a second one, after the applied methodology (website or lecture), in order to assess the level of knowledge they had acquired by the end of the activities.

The data settled on BioEstat 5.0 software composed tables containing information on the frequency measures for categorical variables, and mean and standard deviation for variables relating the answer got right. The chi-square test was used to verify the association between categorical variables, analysis of variance (ANOVA) to a criterion, and the Tukey's test for verification of the groups where there was significant difference regarding the data about getting the questions right. For decision-making in the analyses, the significance level ( $\alpha$ ) of 0.05 was adopted.

The project was submitted and approved by the CESUPA Research Ethics Committee under opinion no. 113908, and Submission Certificate for Ethics Assessment no. 05164512.7.0000.5169.

## RESULTS

Table I shows the knowledge and oral health practices acquired by the adolescents in the control group and the experimental group after the completion of the educational activities. With respect to the concept and knowledge of dental decay, the adolescents in both groups had good performance: 50 (62.5%) in the control group and 61 (76.2%) in the experimental group. Statistically, there was no difference between groups ( $p=0.0592$ ), although it is noteworthy that the experimental group had a better numerical performance.

Regarding the knowledge of the causes of decay, 67 (83.7%) adolescents in the control group and 76 (95%) in the experimental group adequately answered the question, those in the experimental group also performing better ( $p=0.0209$ ).

As for the transfer of bacteria that cause caries, 69 (86.2%) of the adolescents in the control group correctly answered the question, and this group presented a more effective performance when compared with the experimental group, where 50 (62.5%) responded properly ( $p=0.0006$ ).

Concerning the conduct to be taken before a caries lesion, both the adolescents in the control group ( $n=70$ ; 87.5%) and the experimental group ( $n=73$ ; 91.2%) answered adequately, not showing significant differences ( $p=0.4415$ ).

As regards to knowledge about oral cancer, only 14 (17.5%) of the adolescents in the control group and 30 (37.5%) of the adolescents in the experimental group answered correctly, showing differences between groups ( $p=0.0046$ ). In spite of the relatively low knowledge and the inability to describe what oral cancer is, the adolescents in the control group ( $n=51$ ; 63.7%) and the experimental group ( $n=75$ ; 93.7%) reported having a relevant knowledge about the etiology of this disease, though the experimental group had a more satisfactory response ( $p<0.0001$ ).

Regarding the completion of the oral self-examination, 20 (25%) of the students in the control group and 18 (22.5%) of the students in the experimental group reported not having yet carried out this examination, with no difference between groups ( $p=0.7102$ ).

On the proceedings to be conducted before dental trauma situations, whatever the cause, the adolescents in the control group ( $n=68$ ; 85%) had a better performance in comparison with the experimental group ( $n=63$ ; 78.7%), both responding adequately ( $p=0.3048$ ). Nevertheless, regarding dental trauma prevention measures, while performing sports activities, only 18 (22.5%) of the adolescents in the control group reported having a pertinent and appropriate knowledge about preventive measures,

whereas, in the experimental group, 39 (48.8%) of the total answered correctly. Although the experimental group presented better performance relative to knowledge about dental trauma ( $p=0.0005$ ), it was noted that most of the students, in both groups, did not have a proper knowledge of the procedure to follow in the situation that has been described to them.

Among the adolescents participating in the study, 72 (90%) of the control group and 78 (97.5%) in the experimental group reported having adequate knowledge about healthy eating. Statistically, there was no difference

between groups ( $p=0.1025$ ), despite being observed that the experimental group had a relatively higher performance than the control group, presenting a greater number of students who answered correctly.

Regarding the knowledge acquired by the adolescents about gingival bleeding, 66 (82.5%) in the control group and 69 (86.2%) in the experimental group reported that it is not normal for the gums to bleed, with no difference of statistical significance between the groups ( $p=0.5136$ ). The experimental group, however, had a more effective performance.

Table I - Knowledge and oral health practices after the educational activities among adolescents of the control and experimental groups in absolute and percentage frequencies. Belém, PA, 2013.

Knowledge and practices	Control Group		Experimental Group		p*
	n	%	n	%	
Concept of dental caries					
Adequate	50	62.5	61	76.2	0.0592
Inadequate	30	37.5	19	23.8	
Causes of caries					
Adequate	67	83.7	76	95.0	0.0209
Inadequate	13	16.3	4	5.0	
Transmissibility of caries-forming bacteria					
Adequate	69	86.2	50	62.5	0.0006
Inadequate	11	13.8	30	37.5	
Proceedings before caries lesions					
Adequate	70	87.5	73	91.2	0.4415
Inadequate	10	12.5	7	8.8	
Knowledge of oral cancer					
Adequate	14	17.5	30	37.5	0.0046
Inadequate	66	82.5	50	62.5	
Knowledge of oral cancer etiology					
Adequate	51	63.7	75	93.7	<0.0001
Inadequate	29	36.3	5	6.3	
Performance of oral self-examination					
Did	20	25.0	18	22.5	0.7102
Did not	60	75.0	62	77.5	
Knowledge of healthy eating					
Adequado	72	90.0	78	97.5	0.1025
Inadequado	8	10.0	2	2.5	
Proceedings before dental trauma					
Adequate	68	85.0	63	78.7	0.3048
Inadequate	12	15.0	17	21.3	
Preventive approach of dental trauma in sports practices					
Adequate	18	22.5	39	48.8	0.0005
Inadequate	62	77.5	41	51.2	
Knowledge of gingival bleeding					
Adequate	66	82.5	69	86.2	0.5136
Inadequate	14	17.5	11	13.8	
Knowledge of periodontal disease					
Adequate	21	26.3	37	46.3	0.0085
Inadequate	59	73.7	43	53.7	
Total	80	100.0	80	100.0	-----

\* Chi-square Test.

Even though the adolescents of both groups have reported that gingival bleeding in periodontal health status is not normal, only 21 (26.3%) in the control group and 37 (46.3%) in the experimental group evidenced adequate and relevant knowledge about periodontal disease and the recommendations to avoid it. Although most of the students have not responded properly to this question, it is noticeable that the experimental group performed better ( $p=0.0085$ ).

Table II focuses on the amount of questions for which the adolescents of both groups got the answers right at different times, i.e., before and after the educational activities on oral health. It is observed that in the control group, the mean number of correct answers per student was 5.8 questions prior to the lecture and, in the experimental group, the mean was 6.5 questions, before accessing the website, thus allowing to verify that the groups were statistically similar at the initial moment. After the implementation of

educational activities, the control group had an average of 7.3 questions answered right, whereas in the experimental group the average was 8.4 questions, demonstrating that this group performed better than the control group ( $p<0.05$ ).

Table III displays the amount of appropriate responses on knowledge and practices regarding oral health, after completion of educational activities among the students of the control and experimental groups of public and private schools. Evaluating the students enrolled in the public school, it is noticeable that the ones in the control group had a worse performance than those in the experimental group ( $p<0.05$ ), with mean of 6.1 and 7.8 questions, respectively. Analysing the adolescents belonging to private school, it is observed that, after the lecture, the mean number of questions got right in the control group was 8.6 and, in the experimental group, 9.0 questions.

Table II - Measures of appropriate answers about oral health knowledge and practices among adolescents of the control and experimental groups in the moments before and after the implementation of educational activities. Belém, PA, 2013.

Measures	Control Group		Experimental Group	
	Before	After	Before	After
Sample	80	80	80	80
Mean	5.8 <sup>A</sup>	7.3 <sup>B</sup>	6.5 <sup>A</sup>	8.4 <sup>C</sup>
Standard deviation	1.7	2.2	1.4	1.7

$p<0.05$  (Analysis of Variance). Different letters in mean values represent statistically significant differences ( $p<0.05$  in Tukey's test).

Table III - Measures of appropriate answers about oral health knowledge and practices among adolescents of the control and experimental groups in public and private schools. Belém, PA, 2013.

Measures	Control Group		Experimental Group	
	Public School	Private School	Public School	Private School
Sample	40	40	40	40
Mean	6.1 <sup>A</sup>	8.6 <sup>BC</sup>	7.8 <sup>B</sup>	9.0 <sup>C</sup>
Standard deviation	1.8	1.9	1.7	1.4

$p<0.05$  (Analysis of Variance). Different letters in mean values represent statistically significant differences ( $p<0.05$  in Tukey's test).

## DISCUSSION

Health education is a crucial strategy in the process of building behaviours that promote and maintain health<sup>(14)</sup> and shall be so effective as to improve the subjects' knowledge. The school constitutes a favourable social and educational environment to address knowledge and behaviour change.

The alert for the understanding of adolescents and their needs is of key importance, mainly for the health or education professionals to endeavour in attempting to cause positive influence on this population, which can act as health agents

multipliers<sup>(15)</sup>. The technological revolution set the scene for changes in the teaching and learning process, with the Internet as an available and influential teaching aid, thanks to the popularization of its use and richness of content<sup>(16)</sup>.

With respect to the educational methodologies employed, the adolescents who joined in this study appeared interested, observers, critical and participatory as to the themes addressed in the applied activities. As occurred in a study performed in Vitória de Santo Antão, Pernambuco<sup>(15)</sup>, which evaluated, through semi-structured form, adolescents aged 10 to 16 years, of public and private school, about the

importance of oral health, where most of the adolescents demonstrated awareness and knowledge of caries, citing it as the best known oral disease.

The data obtained in this study diverges from a study conducted in the city of Araçatuba, São Paulo<sup>(17)</sup>, which evaluated, by means of the focus group technique and questionnaires, the adolescents' understanding as regards to oral health, revealing that more than half of the participants (56.67%) claimed ignorance about the transmissibility of decay and its bacteria, since the word 'transmission' was not understood, at the first moment, by the adolescents.

An essential condition in the educational process in oral health is to listen and understand the patient<sup>(18)</sup> and/or the individual who is receiving guidance. From the moment that they correctly interpret the word, their understanding and participation on the issue tend to increase. The use of technical language becomes so commonplace in dentists' lives that they do not realize that this kind of vocabulary escapes the understanding of the layperson<sup>(19)</sup>.

Despite decay being the most targeted oral disease by the media and overall educational and preventive campaigns<sup>(20)</sup>, and though adolescents have shown adequate knowledge about this disease in the current investigation, adolescence is, by its very nature, a period of caries activity exacerbation, as a result of physical, psychological and social changes inherent in the period, thus increasing the incidence of carious lesions<sup>(21)</sup>.

It was observed that oral cancer is a narrowly diffused issue among the adolescents participating in the current study, since they did not have much knowledge of the subject. This result is in line with a study held in Campina Grande, Paraíba<sup>(22)</sup>, which assessed, by using a questionnaire, the knowledge of adolescents aged 10 to 19 years on oral health, pointing that 436 (83%) of the adolescents reported not having knowledge about oral cancer, showing that this issue is not widespread indeed. As the educational activities were performed in this study, the adolescents reported that the subject had really aroused their interest, thus increasing their participation in the discussion. Therefore, they asked many questions, elucidated doubts regarding the discussed topic and situations they had witnessed or heard in some stage of their lives, in the environment where they live. The scarcity and/or lack of relevant disclosure on oral cancer may be responsible for the weak knowledge of these adolescents on the topic. It is thus evident the need for health education that includes prevention and educational strategies in relation to the topic addressed.

Like the media and other means of communication, which have a prominent influence on the dissemination of information regarding oral health, the dental surgeon plays an extremely important role in health education, as evidenced in a study in Duque de Caxias, Rio de Janeiro<sup>(14)</sup>

), where the assessment of adolescents between 13 and 19 years of age, through questionnaires addressing questions concerning the oral health and consultation to the dentist, pointed out the dentist as the main source of information on oral health.

The professional who deals with the hebiatric patient should encourage them to adopt a balanced diet, bearing in mind that, in addition to dental caries, obesity is also one of the nutritional diseases with more increasing rates in recent years and is generally associated with a sedentary lifestyle and poor eating habits, which can lead to serious disorders in their overall health, and oral abnormalities<sup>(10)</sup>. Approaching the adolescent patient about diet is not an easy task. The guidelines on the time and frequency of food ingestion, and its consistency as well, should be further strengthened in order to enable a wise sugar consumption<sup>(21)</sup>.

The results of this study allow us to infer that the gingival bleeding was not seen as a common situation by the adolescents, but as an oral health problem that would deserve treatment. On the other hand, there are studies<sup>(14,17)</sup> revealing that some adolescents consider the gingival bleeding a normal event, not associating this change with any kind of disease. The relatively weak knowledge of periodontal disease on the part of the adolescents implies the need for such oral health problem to be addressed in a more expressive and meaningful way.

The lifestyle and inconsistency inherent in the adolescence render the individuals, during this phase, more susceptible to accidents of different kinds<sup>(21)</sup>.

During the educational activities that were carried out, the use of mouthguards for trauma prevention was the most cited preventive behaviour by the adolescents because, according to them, they would help to distribute the impact and hence protect the teeth and surrounding structures.

The socioeconomic criterion used in this study was the type of school, and it demonstrated to be relevant to the prior knowledge and to that obtained after the educational intervention, influencing the amount of correct answers.

Like the research in question, national studies<sup>(15,23)</sup> that evaluated, by means of a questionnaire, the knowledge about oral health among adolescents aged 10 to 16 years old also revealed that this socioeconomic variable influences on aspects related to knowledge and practices on oral health. The lack of relevant information and appropriate practices on these issues, and the difficulties of access to health services posed to the most deprived part of the population become manifest in this difference.

Motivation and oral health education are powerful tools that, when used in a pleasant, attractive, captivating and amusing way to transmit information, show effectiveness, this being the main objective of the investigated website,

which was developed in a modern approach, from the aesthetic point of view, pleasantly and consistently addressing, in the language of adolescents, various issues related to oral health, with images, texts, sounds and games. As this study has shown, the website proved to be partially effective in certain topics. The audio containing information about these issues presented slow loading and flaws during playback, these problems being more evident in the public schools, due to the low speed of the network. The guidance and support to the hebiatric patient contribute to the formation of a healthy generation in the broadest sense of the word, since dental health reflects the overall health of the individual.

## CONCLUSION

The results of this study lead to the conclusion that the two educational methods caused some change in the knowledge acquired by the adolescents, which is reflected on the number of correct answers they got. However, as it could be seen, the experimental group performed better after access to the website, showing its real effectiveness.

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