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ORIGINAL

Educational program "Healthy smile" for education preschool infants: knowledge on oral health

Programa educativo "Sonrisa saludable" para infantes de educación preescolar: conocimiento sobre salud bucodental

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ABSTRACT

Introduction: early childhood caries is a non-communicable disease of high prevalence worldwide, in Cuba and on the Isle of Youth. Prevention and control approaches encompass changing personal behaviors, working with families and educators, and developing health policies, creating enabling environments, promoting health, and directing health services toward universal health coverage.
Objective: determine the effectiveness of the "Healthy Smile" program for preschool children.
Methods: quasi-experimental before-after research was carried out where the sample was 95 preschool children from the La Demajagua-Atanagildo Cajigal towns in the period 2021-2023.
Results: before the educational intervention, the level of regular and poor knowledge prevailed in 76,8 % and 16,8 % respectively of the infants with a standard deviation of ±2,5; The level of knowledge increased after implementing the educational program, obtaining a good level of knowledge with 81,1 % (77) with a tendency towards a regular level of knowledge 18,9 % (18); standard deviation of ±1,4. The Student T test gave a value of tcalculated = 13,803, gl = 94 and p value = 0,000; therefore, there was evidence to reject the null hypothesis and accept the investigative hypothesis.
Conclusions: the implementation of the "Healthy Smile" program, involving families and educators, turned out to be effective since it modified ways and styles of life, also increasing the level of knowledge about oral health of infants.

Keywords: Educational Program; Educative Intervention; Oral Health; Knowledge Level.

RESUMEN

Introducción: la caries en la primera infancia es una enfermedad no trasmisible de alta prevalencia a nivel mundial, en Cuba y en la Isla de la Juventud. Los enfoques de prevención y control abarcan el cambio de comportamientos personales, el trabajo con las familias y educadoras, y el desarrollo de políticas de salud, la creación de entornos propicios, la promoción de la salud y la orientación de los servicios de salud hacia la cobertura sanitaria universal.
Objetivo: determinar la efectividad del programa "Sonrisa saludable" para infantes de preescolar.
Métodos: se realizó una investigación cuasi-experimental de tipo antes-después donde la muestra fue de 95 infantes de preescolar de los poblados La Demajagua-Atanagildo Cajigal en el período 2021-2023.

Resultados: antes de la intervención educativa prevalecía el nivel de conocimiento regular y malo en un 76,8 % y 16,8 % respectivamente de los infantes con desviación estándar de ±2,5; el nivel de conocimiento se incrementó después de implementar el programa educativo, obteniéndose un nivel de conocimiento bueno con un 81,1 % (77) con tendencia a un nivel de conocimiento regular 18,9 % (18); desviación estándar de ±1,4. La prueba T de Student dio un valor de t calculado= 13,803, gl=94 y p valor= 0,000; por lo que hubo evidencia para rechazar la hipótesis nula y aceptar la hipótesis investigativa.
Conclusiones: la implementación del programa "Sonrisa saludable", involucrando familias y educadoras resultó ser efectiva puesto que modificó modos y estilos de vida, incrementando además el nivel de conocimiento sobre salud bucal de los infantes.

Palabras clave: Programa Educativo; Intervención Educativa; Salud Bucodental; Nivel de Conocimiento.

INTRODUCTION

Early childhood caries (Early childhood caries - ECC) affects the teeth of children under six. According to the Global Burden of Disease Study[1] 2019, more than 530 million children worldwide have dental caries in primary teeth. Despite this, ECC was not considered necessary because those teeth exfoliate as the infant grows.

This pathology significantly influences infants, their families, and societies, affecting oral health, general health, and the infant's present and future quality of life. It is considered a non-communicable disease (NCD) of high prevalence worldwide, in Cuba and the Isle of Youth.

According to Montano et al.[2], the WHO reports that 60-90 % of children worldwide have dental caries, the most prevalent disease in Latin America and Asia. The same group of authors refer and quote: "The following research has shown the growing and worrying incidence and prevalence of caries in early childhood populations in recent decades: the IV National Oral Health Study in Colombia reported a prevalence of 43,77 % and 52,2 % in children aged three and five years respectively; in Wuhan, China the prevalence was 50,8 %, 63,6 % and 71,9 % for children aged three, four and five years, respectively. Another study published in Spain reported that of the 121 infants aged three to five years present on the day of screening, there was an incidence of 77,3 % in third graders. In another study carried out in the province of Havana in 2020-2022, 158 infants between two and five years of age were taken from the "William Soler Laeda" children's circle, and of them, 55 were affected with dental caries for 34,8 %."[2]

Prevention and control approaches include changing infant behavior, working with families and educators, developing health policies, creating enabling environments, promoting health, and orienting health services towards universal health coverage. Suppose oral health is considered an integral part of general health. In that case, it can be irrefutably elucidated that it impacts infants' well-being and quality of life. Assuming that the preschool age is where habits and actions are fundamentally acquired, this is considered the ideal age to incorporate healthy lifestyles and ways of life in infants that will accompany them throughout their lives.

Organizations such as the WHO(1) and researchers such as Kenney, Kogan, and Crall [3] recommend preventive care from early childhood as the best strategy to avoid its appearance, which represents both an opportunity and a challenge for the development of educational programs with the aim that infants acquire healthy habits.

The aforementioned reveals the need for the design and implementation of educational programs on oral health for infants, their families, and educators, made up of actions that are structured and systematized using strategies of agreement and coordination, social participation, and permanent training of social actors, complemented with didactic resources to facilitate the motivation for the actions and their execution.

In Cuba, the Stomatology Department of the Ministry of Health 1983 elaborated the Stomatological Care Program for the population under 15 years of age, since this is a priority activity of the government's health policy, which is currently extended to children under 19 years of age. It does not define how to include health education in the school curriculum since schools are scenarios of high potential for promoting and developing health promotion, and infants are highly receptive and sensitive groups to its development.

Health promotion involves several differentiated disciplines, such as health sciences, psychology, education, and communication, which will be the core of the theoretical and practical program. The development of the educational component is promoted through educational techniques to knowledge and reflection on topics related to oral health and the responsibility of self-care as a critical factor in cultivating individual, family, and collective health.

In order to achieve concrete results through promotion, it is necessary to act at ages susceptible to change. If imitative learning of behavior is developed in the early childhood period and awareness begins to develop, this would be considered the ideal time for developing healthy behaviors, and the impact would be more significant in preventing oral diseases. Health promotion comprises a wealth of theoretical knowledge, applied research, action models, and examples of the practical application of communication knowledge.

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Nowadays, with the incorporation of information and communication technologies, educational programs must use technological didactic resources in the teaching and learning processes to ensure metacognition and the development of critical and reflective individuals; therefore, educational programs that incorporate digital didactic resources are essential in the training processes. An educational program with digital didactic resources can be defined as an independent digital collection of didactic sequences, contents, and educational activities, coherently organized to achieve a learning goal, which, being in the public domain and published under an open intellectual property license, must be designed with interoperable software and technical formats, so that they can be used, adapted and distributed without any restriction, in various educational contexts.[4]

The joint action of health personnel, educators, and legal guardians depends on infants having access to and the opportunity to transform the health information offered into knowledge, attitudes, and appropriate practices. The analysis of the above allowed the formulation of the following scientific problem: How effective will the educational program "Healthy Smile" be in the knowledge about the oral health of preschool children in the villages of La Demajagua-Atanagildo Cajigal in the period 2021-2023?

The research objective was to determine the effectiveness of the "Healthy Smile" program for preschool children in the villages of La Demajagua-Atanagildo Cajigal from 2021 to 2023.

The research results provide a study on the relationship between the use of didactic games, plays, and computer technologies and the level of knowledge about the oral health of infants and an educational program as a proposal to raise the level of knowledge of infants. The present research contributes to strengthening the joint effort to preserve the social conquests in health and education, consolidating an indissoluble link that needs to be sufficiently achieved in practice. The scientific novelty lies in proposing an educational program that increases knowledge about oral health in preschool children.

METHOD

Type of Study

A quasi-experimental, before-after, single-group research was carried out on preschool infants in the villages of La Demajagua-Atanagildo Cajigal, Isla de la Juventud, from 2021 to 2023.

Research design

GE: O1 --------X-------- O2
X: Application of the educational intervention.
GE: Experimental group.
O1: Test before the Educational Intervention.
O2: Test after the educational intervention.

Population and sample

The population consisted of preschool children from the villages of La Demajagua-Atanagildo Cajigal. The sample consisted of preschool children attending the Eliseo Reyes and Antonio Guiteras schools and the Alegres Mineritos Children's Circle. The units of analysis (95) met the following inclusion criterion: infants aged 5-6 years from the villages of La Demajagua-Atanagildo Cajigal, whose legal guardians consented to participate in the research.

Variables

Dependent: level of knowledge about the oral health of the infants.
Independent: "Healthy Smile" educational program.
Intervening: knowledge of legal guardians and educators; level of education of legal guardians and educators.

Methods

Theoretical methods (analytical-synthetic, inductive-deductive, historical-logical analysis, and system approach), empirical methods (observation, documentary analysis, survey, and experimental), and mathematical-statistical methods (descriptive and inferential) were used. The elaboration and presentation of the results were in tables and graphs.

Techniques and procedures

All the children in the sample were interviewed about oral health before and after the implementation of the educational program to determine their level of knowledge about oral health. The interview was applied using didactic games and heuristic conversations with the infants. The oral health knowledge interview consisted of 18 questions (evaluation: Good [16-18 points]; Fair [11-15 points]; Bad [6-10 points]; Very Bad [0-5 points]).

An educational program called "Healthy Smile" was designed and implemented in the elementary schools

Antonio Guiteras and Eliseo Reyes and the children's circle "Alegres Mineritos" in the towns of La Demajagua-Atanagildo Cajigal. The program included a total of 30 sessions aimed at providing knowledge about oral health to preschool children, as well as training their legal guardians and educators. The program was implemented for four months, with two weekly frequencies in the academic years 2021-2023.

To determine the validity of the data collection instrument and the program, expert criteria were used, among which were included Methodologists of the Municipal Direction of Education of that education, pedagogues of that education and higher education, doctors in Stomatology and Medicine, Specialists in General Comprehensive Stomatology, Orthodontics, Prosthesis, Maxillo-Facial Surgery, General Comprehensive Medicine, Pediatrics, Biostatistics, Higher Education, Masters in Community Oral Health, Stomatological Emergencies, Clinical Trials, Preschool Education and Interdisciplinary Studies of Latin America, the Caribbean and Cuba; Graduates in education of children's circles, psychologists, defectologists and art instructors.

For the instrument's reliability, a pilot test was applied in the Héctor Pérez Llorca elementary school in Nueva Gerona to 5% of the population, who had the same characteristics as the sample, using Crombach's Alpha Coefficient. Validity and reliability were above 95 %, which was interpreted as high.

Techniques for processing and analyzing the results

The data were coded and processed using the SPSS 22.0 statistical package. The statistical analysis used simple frequencies, percentages, and mean and standard deviations to show the individual behavior of the variables under study. Statistical inference tests were applied in the inferential analysis, such as Pearson's nonparametric Chi-square test (x^2) and the contingency test for nominal and categorical variables. The confidence level for the test was 95 % with an error level $\alpha = 0,05$.

Statistical hypothesis test: Student's t-test.

Decision rule: reject the null hypothesis if $p < 0,05$ (significance level).

Ethical considerations

The data obtained in the study were used in compliance with the Declaration of Helsinki.

Limitations

The authors consider the research's main limitation to be the educational program's implementation time.

RESULTS

Before the implementation of the educational program "Healthy Smile," the average score of the level of knowledge about the oral health of preschool children was 12,4 (standard deviation of ±2,5), considered as a regular level of knowledge (11-15); in addition, it could be seen that the minimum score was 4 (very bad) and the maximum score was 16 (good). After implementing the educational program, the average score was 16,4 (standard deviation ±1,4), considered to be a good level of knowledge (16-18); in addition, the minimum score was 11 (fair), and the maximum score was 18 (good) (Figure 1).

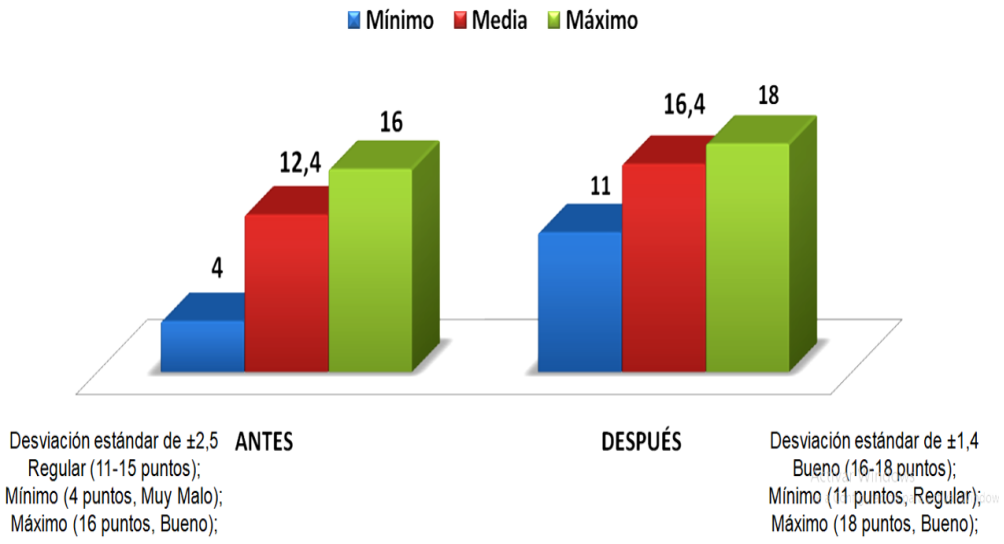

Figure 1. Average score of the knowledge level about preschool children's oral health before and after the implementation of the educational program. La Demajagua-Atanagildo Cajigal, 2021-2023

Before implementing the "Healthy Smile" educational program, there was a predominance of regular knowledge about oral health in preschool children in the villages of La Demajagua-Atanagildo Cajigal from 2021 to 2023. Of the 100 % (95) of the infants, 4,2 % (4) had a good level of knowledge, 76,8 % (73) had a regular level of knowledge, 16,8 % (16) had a poor level of knowledge, and 2,1 % (2) an inferior level of knowledge.

After implementing the educational program, 81,9 % (77) of the units of analysis obtained a good level of knowledge with a tendency to a fair level of knowledge in 18,9 % (18). No infant was left with a wrong or appalling level of knowledge about oral health after the implementation of the educational program (Figure 2).

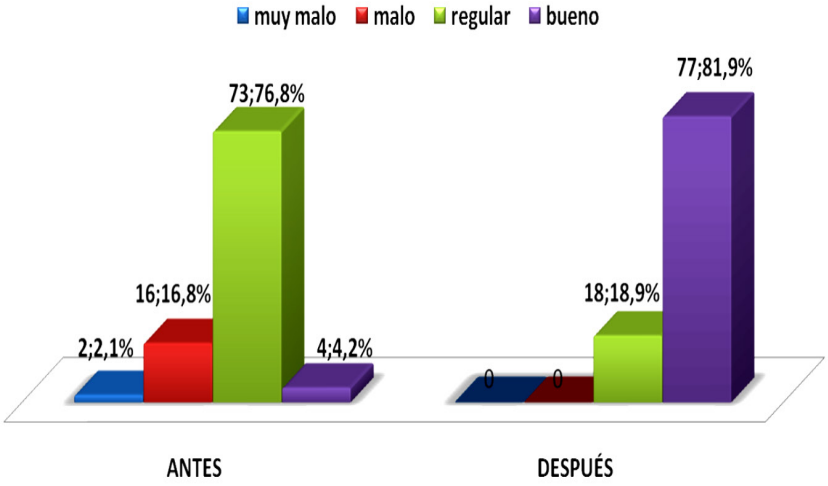

Figure 2. Level of knowledge about oral health of preschool infants.

The Student's t-test for the effectiveness of the intervention by implementing the "Healthy Smile" educational program indicated that there was a difference between the scores before the intervention, with a mean of 12,35 and standard deviation of ±2,457 and the scores after the intervention with a mean of 16,39 and standard deviation of ±1,371. This indicated that the knowledge score after implementing the educational program increased by -4,042 points with a standard deviation of ±2,854 and a standard error of 0,293. Student's t-test gave a t-value= -13,803, gl=94, and p-value= 0,000; therefore, there was statistical evidence to demonstrate that the educational program was effective in increasing the oral health knowledge of preschool infants (Figure 1).

Estadístico de muestras emparejadas	N	Media	Desviación estándar	Media de error estándar
Puntaje antes de la intervención	95	12,35	2,457	0,252
Puntaje después de la intervención	95	16,39	1,371	0,141

Prueba de muestras emparejadas	Diferencias emparejadas					t	gl	Sig. (bilateral)
	Media	Desviación estándar	Media de error estándar	95% de intervalo de confianza de la diferencia				
				Inferior	Superior			
Puntaje antes de la intervención-puntaje después de la intervención	-4,042	2,854	0,293	-4,624	-3,461	-13,803	94	0,000

In legally responsible persons with secondary level, in the survey applied before, the average score was 10,69, with a standard deviation of ±3,301, increasing significantly after the educational intervention in the second survey with an average score of 16,23 with a standard deviation of ±1,301.

In legal guardians with pre-university level, in the test applied before, the average score was 12,43 with a standard deviation of ±2,281, increasing the score after the educational intervention with an average score of 16,41 with a standard deviation of ±1,395.

In legal guardians and educators at the university level, in the survey applied before, the average score was

13,50 with a standard deviation of ±1,605, which increased after the educational intervention during the second survey with an average score of 16,43 and a standard deviation of ±1,399. The higher the level of education of the legal guardians and educators, the higher the level of knowledge acquired after the educational program was implemented (Figure 3).

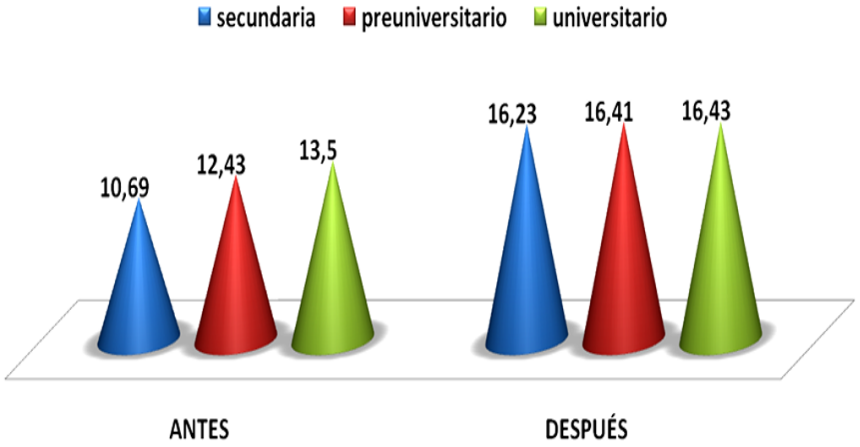

Figure 3. Average score of the level of knowledge according to the level of education of legal guardians and educators.

DISCUSSION

Through the observation method, it was possible to identify the main problems as follows:

- ✓ Insufficient materials related to the promotion and prevention of CHD in educational institutions.
- ✓ Lack of flexibility in the organization and schedules to favor the necessary practices of a healthy lifestyle.
- ✓ Hygiene conditions do not correspond at the desired level with the formation of appropriate habits.
- ✓ A fluid practice in integrating educational institutions and stomatologists is not achieved at the desired levels, in many cases due to a Lack of creativity, thus limiting the multisectoral nature of actions promoting health.

These difficulties are evidence of a contradiction between what can and should be done regarding health promotion and prevention of CHD in schools. For this reason, the authors consider it necessary to investigate children's knowledge of oral health to design an educational program that strengthens the cohesion between agencies, organizations, and social actors.

According to Montano et al.[2], health promotion intervenes in the social dimension of the health determinants of the population. It is an integrating category, essentially intersectoral and of social participation, so it goes beyond the health sector's boundaries and far beyond the exclusive competence of medical action.

In order to decide what to do about CCD, it is not enough to have knowledge about the reported frequency statistics and apply a health strategy but also to analyze the level of knowledge that the infant, his legal guardian, and educators have about the disease, as well as the aspects related to the hygiene practiced daily and the attitude towards it.

The data obtained during the research demonstrate the need to design and implement educational programs for the instruction and education of infants from an early age and during their formative process without neglecting the training of families and educators. The authors assume that this would be the ideal way to increase everyone's knowledge and perception of the risk of getting sick, consequently decreasing the high rates of prevalence and incidence of CHD and thus contributing from the health-education perspective to the quality of life of infants.

After applying the statistician, it was possible to demonstrate that the educational program "Healthy Smile," designed and implemented to increase the knowledge about the oral health of preschool children, was adequate. It was also possible to demonstrate that the higher the level of education of legal guardians and educators, the higher the level of oral health knowledge acquired after the program was implemented.

About the effect of educational programs applied in populations of children, there is a coincidence with the results obtained in Ecuador,[5] Peru,[6] Ciego de Avila[7], and Venezuela[8,9] in studies of oral health intervention in

the educational context. After the interventions were implemented, their effectiveness was demonstrated by increasing oral health knowledge to good in the intervened children (47,3 %; 93 %; 86,20 %; 86,67 %).

It also coincides with the results obtained by Leyva et al.[10], Batista et al.[11], and Montano et al.[2] in studies of oral health educational intervention. After the interventions were implemented, their effectiveness was demonstrated by increasing oral health knowledge to good in the intervened children (88 %; 92,4 %; 88,2 %).

Findings similar to those of the present research have been reported in other investigations where children can grasp and reproduce educational messages promoting self-care in interrelation with the family, educators, and previous motivation of the same, raising their value scale oral health.

In preschool children's developmental and creative formative process, new results are reached, and the new methods and strategies are not to replace the traditional ones but to integrate them to meet the requirements of evolution and improvement. CCD affects the oral and general health, and the quality of life of infants throughout their lives, and it is essential that every human being with the competence to do so becomes involved in its prevention. Infants, families, and educators must understand that... "a mouth without molars is like a millstone without stones, and a tooth is much more valuable than a diamond..." [12].

CONCLUSIONS

Implementing the "Healthy Smile" program, involving families and educators, proved effective since it modified lifestyles and increased knowledge about infant oral health.

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CONFLICT OF INTEREST

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