



ORIGINAL

## Dental caries, nutritional status and oral hygiene in schoolchildren, La Demajagua, 2022

### La caries dental, estado nutricional e higiene bucal en escolares de primaria, La Demajagua, 2022

Antonia María Lamorú-Pardo<sup>1</sup>  , Yousemy Álvarez-Romero<sup>2</sup>  , Darianna Rubio-Díaz<sup>2</sup>  , Aliannys González-Alvarez<sup>2</sup>  , Lauren Pérez-Roque<sup>2</sup>  , Luisa Sucel Vargas-Labrada<sup>3</sup>  

<sup>1</sup>Facultad de Ciencias Médicas Isla de la Juventud. Policlínico Docente Universitario “Juan Manuel Páez Inchausti”. Isla de la Juventud, Cuba.

<sup>2</sup>Facultad de Ciencias Médicas Isla de la Juventud. Isla de la Juventud, Cuba.

<sup>3</sup>Universidad de la Isla de la Juventud “Jesús Montané Oropesa”. Isla de la Juventud, Cuba.

**Cite as:** Lamorú-Pardo AM, Álvarez-Romero Y, Rubio-Díaz D, González-Alvarez A, Pérez-Roque L, Vargas-Labrada LS. Dental caries, nutritional status and oral hygiene in schoolchildren, La Demajagua, 2022. *Odontología (Montevideo)*. 2023; 1:8. <https://doi.org/10.62486/agodonto20238>

Submitted: 03-06-2023

Revised: 14-09-2023

Accepted: 13-12-2023

Published: 14-12-2023

Editor: Nairobi Hernández Bridón 

Corresponding Author: Antonia María Lamorú-Pardo 

#### ABSTRACT

**Introduction:** dental caries is the most common disease in children. Obesity is a worrisome disease in children.

**Objective:** determining the relationship between dental caries, nutritional status and oral hygiene in primary schoolchildren.

**Method:** a study with a non-experimental cross-correlational design was carried out in elementary school students from La Demajagua, Isle of Youth, in 2022. The sample was 100 children, being the same probabilistic and random.

**Results:** the male sex represented 52 %, 81 % had a high risk of caries involvement and the age group 9-11 was the most affected with 42 %. 81 % presented deficient oral hygiene and 41 % were overweight or obese.

**Conclusions:** no significant relationship between nutritional status and the degree of involvement of dental caries, but there is, between the latter and oral hygiene.

**Keywords:** Schoolchildren; Dental Caries; Oral Hygiene; Nutritional Status.

#### RESUMEN

**Introducción:** la caries dental es la enfermedad más frecuente en la edad infantil. La obesidad es una enfermedad preocupante en niños.

**Objetivo:** determinar la relación entre la caries dental, estado nutricional e higiene bucal en escolares de primaria.

**Método:** se realizó un estudio con diseño no experimental transversal correlacional en escolares de primaria de La Demajagua, Isla de la Juventud, en el año 2022. La muestra fue de 100 niños, siendo la misma probabilística y aleatoria.

**Resultados:** el sexo masculino representó el 52 %, el 81 % presentaron alto riesgo de afectación a caries y el grupo de edad 9-11 fue el más afectado con 42 %. Presentaron deficiente higiene bucal el 81 %, y el 41 % sobrepeso u obeso.

**Conclusiones:** no existe relación significativa entre el estado nutricional y el grado de afectación a la caries dental, pero sí entre este último y la higiene bucal.

**Palabras clave:** Escolares; Caries Dental; Higiene Bucal; Estado Nutricional.

## INTRODUCTION

Improving quality of life is a great responsibility. Maintaining oral health helps prevent the onset or recurrence of diseases that negatively affect humans. For Castellanos et al.<sup>(1)</sup>, health is not the absence of disease but a complete physical, mental, social, and spiritual well-being. For the Cuban Ministry of Public Health<sup>(2)</sup>, health and disease are not opposite phenomena but rather the organism's adaptation to the environment in which it lives; health is the balance between humans and their environment.

Dental caries is the most widespread health problem among the population of all ages, according to Bertrán et al.<sup>(3)</sup>, and more frequent in children, according to Gumila et al.<sup>(4)</sup>, and although an apparent decline has been observed in recent years in developed countries, the same is not true in less wealthy countries. It is defined as a disease of external origin that begins after tooth eruption, ends with the softening of the tooth's hard tissue, and progresses to forming a cavity.<sup>(3)</sup>

According to Quilca et al.<sup>(5)</sup>, an individual's nutritional status is determined by diet. Good nutrition helps to lead a healthy life. It plays a vital role in developing and protecting overall health, unlike malnutrition, which is considered an abnormal state caused by nutrient deficiency or excess stored energy.

According to Alfonso<sup>(6)</sup>, obesity is the most persistent metabolic disease in humans, a risk factor. It has been considered an epidemic by the World Health Organization (WHO) since 1998, affecting all ethnic groups, sexes, and ages equally. In children, it is a worrying disease because it is significantly correlated with the subsequent development of cardiovascular diseases with a higher risk of mortality at an early age.

For Ortiz<sup>(7)</sup>, dental caries and body weight are related through the dietary component; therefore, any alteration in diet is of fundamental importance, primarily when associated with inadequate oral hygiene. The Cuban Ministry of Public Health<sup>(2)</sup> defines hygiene as a branch of medical science that aims to create and maintain optimal conditions for human life. It not only seeks the normal development of the individual and the community from a physical and psychological point of view but also creates the right environment to facilitate that development.

According to Ortiz<sup>(7)</sup>, the correct brushing technique with fluoride toothpaste is considered one of the most important preventive measures, and its effectiveness reduces the incidence of dental caries. Based on the above, the authors posed the following scientific problem: What is the relationship between the degree of dental caries, oral hygiene, and nutritional status?

The research objective was to determine the relationship between dental caries, nutritional status, and oral hygiene in primary school children in La Demajagua, Isla de la Juventud, from 2020 to 2022.

In this regard, the authors posed the following hypotheses:

- Research hypothesis: in patients with poor oral hygiene and high nutritional status, the incidence of dental caries increases.
- Null hypothesis: in patients with poor oral hygiene and high nutritional status, the incidence of dental caries decreases.

## METHOD

### Type of Study

A cross-sectional correlational study was conducted on primary school students in the La Demajagua health area belonging to the Dr. Juan Manuel Páez Inchausti University Polyclinic in the Special Municipality of Isla de la Juventud from 2020 to 2022.

### Population and sample

The sample was obtained through cluster probability sampling, which was calculated in two stages: the first was to select the school where the study was conducted, and the second was to choose the schoolchildren who took part in the survey. There are two primary schools in the Demajagua-Atanagildo People's Council, one of which was selected to carry out the research, and the number of schoolchildren participating was then calculated for a total of 100.

The school was selected by a lottery procedure, which consisted of numbering the schools on index cards. The cards were then shuffled in a box, and one was drawn, which turned out to be the size of the cluster (school). The number chosen was one, which was the Antonio Guiteras Holmes primary school.

Systematic sampling was used to select the students from the children studying at the previously selected school. This was calculated as follows:  $K=N/n$ , where  $N$  is the school enrollment, which was 313,  $n$  is the number of children selected, 100, and  $K$  is a systematic selection interval. For this procedure, a list was created

in Microsoft Office Excel with the names of all the children, and those who were part of the research were selected using the interval obtained, equal to three.

#### Inclusion criteria

Children aged 6-12 years old studying in La Demajagua whose legal guardians authorize their participation.

#### Exclusion criteria

Children who study in La Demajagua and live in areas far from the town.

#### Variables

Dependent: degree of dental caries, oral hygiene, nutritional status.

Independent: teaching methods (web media).

External: sex, age group.

### METHOD

Theoretical methods (analytical-synthetic, inductive-deductive, historical-logical analysis, and systems approach), empirical methods (observation, document analysis, surveys, and experiments), and mathematical-statistical methods (descriptive and inferential statistics) were used. The results were presented in tables and graphs, expressed in absolute and relative frequencies and percentages. Homogeneity tests were applied using the non-parametric Chi-square statistic to evaluate the relationship between two categorical variables.

#### Techniques and procedures

Digital bibliographic searches were conducted on topics related to the research topic to define the problem and prepare the document. After explaining the research project in detail, the educational institution's director and the children's legal guardians were asked to provide authorization through informed consent.

All children who took part in the research underwent a thorough, noninvasive examination of their oral cavity using oral mirrors, a probe, natural and artificial light, and protective and barrier methods (face masks, caps, disposable gloves) while seated in a dental chair. A dental assistant compiled a dental medical history.

The following indices and table were used to determine the degree of dental caries and the individual effects of dental caries.

$$\text{Índice COP- D} = \frac{\sum \text{COP individual}}{\text{Total de individuos examinados}}$$

$$\text{Índice coe - D} = \frac{\sum \text{coe individual}}{\text{Total de individuos examinados}}$$

To calculate individual oral hygiene, the Love Index was used, where a few drops of Placdent gel were applied to the patients' tongues, and they were instructed to spread it over the surfaces of their teeth without swallowing it and then spit it into the chair's spittoon. The calculation was made using the following equation:

$$\text{Índice Love} = \frac{\text{No. de superficies teñidas}}{\text{Superficies examinadas}} \times 100$$

#### Surfaces examined

A previously calibrated digital scale was placed on a horizontal, flat, and firm surface to measure body weight. The schoolchildren were instructed to stand on a paper towel in the center of the scale, wearing light clothing and no shoes. Height was measured using a simple stadiometer drawn on the wall of the educational institution's physical education teachers' room. The child was instructed to stand with their ankles together, their back as straight as possible, their shoulders and head touching the vertical surface of the wall, and then their height was recorded.

The data were recorded on the data collection form, and then each child's weight was evaluated in relation to their height, compared with current Cuban reference values according to sex.

A website was designed with information downloaded from updated bibliographies and images of dental caries, nutritional status, and oral hygiene. This was a teaching tool for future educational activities on promotion and prevention in primary school children.

The sources of information used during the research were:

- Dental, medical history.
- Table for determining individual dental caries.
- Datasheet.

### Techniques for processing and analyzing the results

The data collected were organized into a database for subsequent statistical analysis. Percentages were used as summary measures for the selected variables. The results were expressed in tables and graphs to understand better the data obtained.

A computer with Windows 10 operating system and Microsoft Word and Excel programs from Microsoft Office 2019 were used for both procedures. To evaluate the relationship between two categorical variables, the non-parametric Chi-square analysis statistic was used, taking into account a significance value of  $p \leq 0,05$ . It was calculated using the following equation:

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

$\chi^2$  = Chi-square.

$O_i$  = observed value.

$E_i$  = expected value.

The analysis and discussion were conducted with other studies from the bibliography consulted to reach conclusions and issue relevant recommendations.

### Ethical considerations

All information obtained during the research was used solely for scientific purposes, taking into account the informed consent of the educational institution's director and each student's legal guardians.

### RESULTS

52 % of the sample was male and 48 % was female. The age group with the highest participation was 9-11, with 56 %, while 13 % were 12 (figure 1).

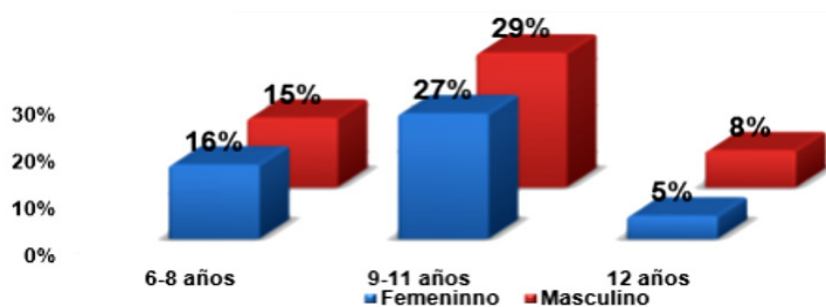


Figure 1. Distribution of the study sample by age and gender. La Demajagua 2020-2022

81 % of children had a high degree of dental caries. In the 9-11 age group, 47 % had a high degree of caries, and in the 6-8 age group, 22 % had a high degree of caries (figure 2).

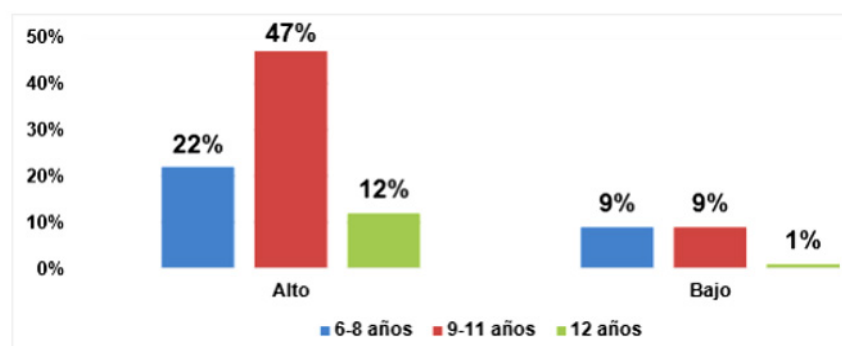


Figure 2. Distribution of the study sample according to the degree of dental caries

Poor oral hygiene was found in 81 % of the children studied, with 39 % of females and 42 % of males affected (figure 3).

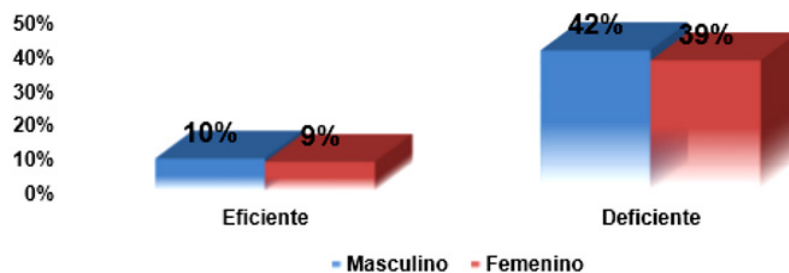


Figure 3. Distribution of the study sample according to oral hygiene

Only 56 % of children had normal weight, distributed equally between both sexes, with 28 % (figure 4).

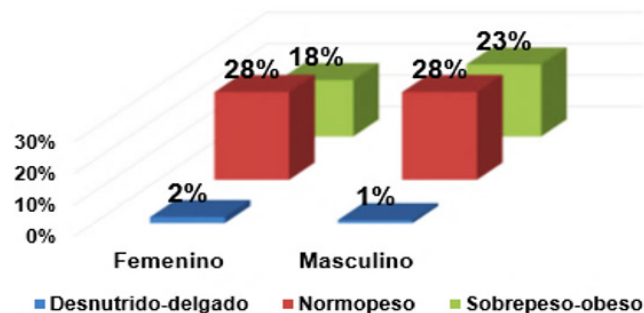


Figure 4. Distribution of the study sample according to nutritional status

Of the schoolchildren with a high degree of dental caries, 49 % were of normal weight, 30 % were overweight or obese, and 2 % were malnourished and thin (figure 5).



Figure 5. Distribution of the study sample according to nutritional status and degree of dental caries

Of the 81 % of schoolchildren with a high degree of caries, 78 % had poor oral hygiene; of the 19 % with a low degree of caries, 16 % were determined to have efficient oral hygiene (figure 6).

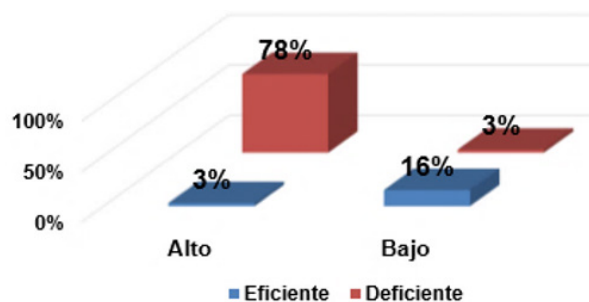


Figure 6. Distribution of the study sample according to the degree of dental caries and oral hygiene

## DISCUSSION

In Aguilar *et al.*<sup>(8)</sup> study 52,3 % were female and 47,7 % were male. Dr. María del Pilar *et al.*<sup>(9)</sup> study sample included 2148 boys and 2586 girls. In the study conducted in Florida, United States, by McCabe *et al.*<sup>(10)</sup>, 53,5 %

of the participants were female and 45 % were male. In the survey by Bertrán<sup>(3)</sup>, most children were in the 6-7 age range, accounting for 43,1 %, and females predominated with 54,1 %.

Cabrera-Escobar et al.<sup>(11)</sup> found that 47,8 % had a high degree of dental caries, and similarly, 73,5 % of the population studied by Chávez-Meléndez<sup>(12)</sup> fell into this category. Dr. Vélez et al.<sup>(13)</sup> reported in his research that 48 % of all children had a high degree of caries.

In the study conducted by Garcés et al.<sup>(14)</sup> in a private hospital, 16 % of children had a high degree of dental caries. In Bertrán et al.<sup>(3)</sup> research 89 children were affected by dental caries, representing 30,6 %, with schoolchildren in the 8-9 age group being the most affected. The data from the present study are significantly consistent with the above findings. The work carried out by Cipriano et al.<sup>(15)</sup> shows that 62 % had poor oral hygiene, with a higher percentage among females. Similarly, Marbán et al.<sup>(16)</sup> found that 50,9 % of his sample fell into this category. Garcés et al.<sup>(14)</sup> found that males and females had poor oral hygiene, with females at 77 %.

A study conducted in Spain<sup>(17)</sup> showed that obesity is the most common multifactorial disorder among children aged 5-15 years, with a prevalence of 34,1 %. In Paraguay, Díaz et al.<sup>(18)</sup> found that 3,9 % of children were moderately malnourished, 9,8 % were at risk of malnutrition, and 65,7 % were of adequate weight, while 20,6 % of children were overweight or obese. Of those with normal weight, males accounted for the highest percentage, at 67,3 %. The results of this study are consistent with those of the previous research, as the majority of the sample was of normal weight, but they do not coincide in gender. After applying the statistic to the data obtained in Figure 5 to test the hypothesis, where  $p \leq 0,05$  was proposed as the significance value, the result was  $\chi^2=3,57$ ,  $Gl=2$ ,  $p=0,16$ , thus concluding that the research hypothesis is accepted.

The study by Jamelli et al.<sup>(19)</sup>, who mentions that nutritional status is unrelated to dental caries, is consistent with the present investigation. Aquino et al.<sup>(20)</sup> found no statistically significant evidence between these variables, similar to that Ayala et al.<sup>(21)</sup> reported in Venezuela.

When applying the statistician using the data obtained in figure 6 to test the hypothesis, where  $p \leq 0,05$  was proposed as the significance value, the result was  $\chi^2=64,8$ ,  $Gl=1$ ,  $p=0$ , thus concluding that the degree of dental caries and oral hygiene are significantly related, rejecting the null hypothesis.

## CONCLUSIONS

Males and the 9-11 age group predominated; there was a high degree of dental caries in the schoolchildren who participated in the study. Poor oral hygiene was prevalent and constituted one of the problems encountered. Although most of the children were of normal nutritional status, those who were overweight or obese were notable. In addition to contributing to the research, the website design is a learning tool that provides content aimed at improving lifestyle. There is no relationship between nutritional status and the degree of dental caries, but there is a relationship between the latter and oral hygiene.

## BIBLIOGRAPHIC REFERENCES

1. Castellanos-Suárez JL, Díaz-Guzmán LM, Lee-Gómez EA. Medicina en odontología. Manejo dental de pacientes con enfermedades sistémicas. 3a ed. México: El Manual Moderno; 2015. p. 435-452
2. Cuba. Ministerio de Salud Pública. Higiene y epidemiología para estudiantes de estomatología. La Habana: Ciencias Médicas; 2004. p. 172
3. Bertrán-Herrero G, Ortiz-Perera G, Sánchez-Quintero OM, Calzadilla-Mesa XM. Caries dental en niños de 6-12 años. Escuela primaria Antonio Maceo Grajales 2019-2020. En: Congreso Internacional Estomatología 2020. Cuba: Universidad de Ciencias Médicas de La Habana, Facultad de Estomatología "Raúl González Sánchez". 2020. <http://www.estomatologia2020.sld.cu/index.php/estomatologia/2020/pape>.
4. Gumila-Jardines M, Cuenca-Garcell K, Soto-Cortés A, Pérez-Bondar V, Rivalta-del- Río L. Diagnóstico terapéutico para la atención de pacientes con caries dental. Revista Cubana de Medicina Militar 2019; 48 (2). <https://revmedmilitar.sld.cu/index.php/mil/article/view/234>
5. Quilca-Soto Y, Mamani-Cahuata LD. Influencia del Índice de masa corporal y hemoglobina en caries, niños de 6-12 años, Callalli, Tisco, Tuti, provincia Caylloma-Arequipa, 2016. [Tesis para optar el grado académico de: Doctor en ciencias de la salud]. Universidad Nacional del Altiplano. 2018. <https://doi.org/10.26788/riepg.v8i3.1071>
6. Alfonso-Guerra JP. Obesidad. Preguntas y respuestas. La Habana: Científico-Técnica; 2012. p. 5-125. ISBN 978-959-05-0651-2
7. Ortiz-Palacios Y. La situación periodontal en los adolescentes de una secundaria básica urbana. En: Congreso Internacional Estomatología 2020. Cuba: Universidad de Ciencias Médicas de La Habana, Facultad de



Estomatología “Raúl González Sánchez”. 2020. <http://actasdecongreso.sld.cu/index.php>

8. Zelocuatecatl-Aguilar A, Ortega-Maldonado M, De-la-Fuente-Hernández J. Asociación entre índice de masa corporal y las condiciones bucales en escolares. *Rev Odont Mex* 2005; 9(4): 185-190. <https://doi.org/10.22201/fo.1870199xp.2005.9.4.15958>

9. Adriano-Anaya MP, Caudillo-Joya T, Juárez-López MLA, Caudillo-Adriano PA. Obesidad y caries dental problemas de salud pública en una población escolar. *Int. J. Odontostomat.* 2014; 8 (3): 475-480. <http://dx.doi.org/10.4067/S0718-381X2014000300024>

10. McCabe M, Dávila ME, Tomar SL. Caries dental e índice de masa corporal en niños de origen hispano. *Rev Odontol Los Andes* 2015; 10 (1): 17-23.

11. Cabrera-Escobar D, Herrera-Nordet M, Gispert-Abreu EA, Duque-Fuerte M. Riesgo de caries dental en niños atendidos en el hogar en el período 2006-2007. *Rev Cubana Estomatol* 2009; 46(2). <https://revestomatologia.sld.cu/index.php/est/article/view/2611>

12. Chávez-Meléndez J. Caries dental y su relación entre los hábitos alimenticios e higiene bucal en infantes de 06-36 meses en el programa Cred-Abancay, 2017 en el Centro de Salud Villa Gloria. [Tesis para optar por el título de cirujano dentista]. Universidad Tecnológica de Los Andes. 2018. <https://repositorio.utea.edu.pe/handle/utea/131>

13. Vélez-Astudillo RA, Alvear-Córdova MC, Villavicencio-Caparó E. Evaluación del riesgo de caries en escolares con discapacidad intelectual de 6-12 años. *Rev Odont Mex.* 2020; 24(4): 233-242.

14. Garcés-Martínez KL, Perero-Villamar JS. Índice de higiene bucal simplificado en niños de 6-12 años. [Trabajo de grado previo a la obtención del título de odontólogas]. Universidad de Guayaquil. 2020. <http://repositorio.ug.edu.ec/handle/redug/48522>

15. Cipriano-Martínez D, Chipana-Herquinio C. Asociación entre la higiene oral y la prevalencia de caries dental en escolares de 6 a 12 años de edad de la institución educativa San Gabriel, Villa María del Triunfo, en 2017. *Rev. Cient. Odontol.* 2018; 6(2): 167-176. <https://doi.org/10.21142/2513-2754-0602-2018-167-176>

16. Marbán-González R, Yedra-Vargas DA. Caries dental y factores de riesgo en escolares. La Lisa. 2019-2021. En: Jornada Científica de residentes y profesionales de la APS 2022. Cuba: Policlínico Docente Cristóbal Labra. 2022. <https://jorcienciapdcl.sld.cu/index.php/jorcienciapdcl2022/2022/paper/viewPaper/219>

17. Ministerio de Sanidad, Agencia Española de Seguridad Alimentaria y Nutrición, Observatorio de la Nutrición y de Estudio de la Obesidad (NAOS). Prevalencia de sobrepeso y obesidad en España en el informe “The heavy burden of obesity” (OCDE 2019) y en otras fuentes de datos. 2019. [http://www.aecosan.msssi.gob.es/AECOSAS/docs/documentos/nutricion/observatorio/Resumen\\_resultados\\_informe\\_OCD-NAOS.pdf](http://www.aecosan.msssi.gob.es/AECOSAS/docs/documentos/nutricion/observatorio/Resumen_resultados_informe_OCD-NAOS.pdf)

18. Díaz V, Funes P, Echague G, Sosa L, Ruiz I, Zenteno J, et. al. Estado nutricional-hematológico y parasitosis intestinal de niños escolares de 5 a 12 años de cuatro localidades rurales de Paraguay. *Mem. Inst. Investig. Cienc. Salud.* 2018; 16(1): 26-32. [https://doi.org/10.18004/mem.iics/1812-9528/2018.016\(01\)26-032](https://doi.org/10.18004/mem.iics/1812-9528/2018.016(01)26-032)

19. Jamelli SR, Rodríguez CS, de-Lira PI. Nutritional status and prevalence of dental caries among 12-year-old children at public schools: a case-control study. *Oral Health Prev Dent* 2010; 8(1):77-84. PMID: 20480058

20. Aquino-Canchari CR, Cuya-Salvatierra GN. Índice de masa corporal y su relación con la prevalencia de caries dental en escolares de Huando, Huancavelica, Perú, 2016. *Rev. CES Odont* 2018; 31(1): 3-10. <https://doi.org/10.21615/cesodon.31.1.1>

21. Ayala-Escandón CL, Zambrano-Palencia OR, Franco-Trejo CS. Asociación del sobrepeso y caries dental en niños de 3-6 años. *Revista de Odontopediatría Latinoamericana* 2013; 3 (1). <https://doi.org/10.47990/alop.v3i1.50>

## FINANCING

The authors did not receive funding for the development of this article.

### CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

### AUTHORSHIP CONTRIBUTION

*Conceptualization:* Antonia María Lamorú-Pardo.

*Research:* Antonia María Lamorú-Pardo, Yousemy Álvarez-Romero, Darianna Rubio-Díaz, Aliannys González-Alvarez, Lauren Pérez-Roque, Luisa Sucel Vargas-Labrada.

*Data curation:* Darianna Rubio-Díaz, Aliannys González-Alvarez, Lauren Pérez-Roque.

*Formal analysis:* Antonia María Lamorú-Pardo, Yousemy Álvarez-Romero, Luisa Sucel Vargas-Labrada.

*Methodology:* Antonia María Lamorú-Pardo.

*Writing - original draft:* Antonia María Lamorú-Pardo.

*Writing - review and editing:* Luisa Sucel Vargas-Labrada.