# Association between self-assessment and clinical oral health status in adults, Paraguay.

## Asociación entre la autoevaluación y el estado clínico de salud oral en adultos, Paraguay.

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**Abstract: Introduction:** Oral health can be defined as the absence of pathologies and disorders that affect the stomatognathic system. **Objetives:** This study aimed to determine the characteristics of self-assessment oral health status, in the clinical experience of dental caries, periodontal status, periodontal fixation loss  and to investigate the association between self-reported and clinical oral health status among Paraguayans adults during early 2017. **Material and Methods:** The design is cross-sectional. Two dentists carried out the oral examinations following the recommendations of the World Health Organization (WHO). **Results:** There were 333 adult participants with a mean age of  35 ± 13 years. Most (77.2%) of the participants were female. Missing teeth (5.32±6), filled teeth (3.56±4), and decayed teeth (2.55±3) were also detected. Almost half (48.0%) of participants had dental calculus, while 5.8% had a periodontal pocket and 48.6% periodontal fixation loss. The self-perception of oral health was poor in 12.3% of participants, fair in 29.8%, normal in 31.8%, good in 16.2%, and excellent in 9.9%. Oral health self-assessment was positive in 58.0% and negative in 42.0%. A statistically significant difference was found when comparing the DMFT index according to self-perception of oral health, the score being higher in those who had negative self-perception; obtaining similar results in the decayed component. **Conclusion:** Negative oral health self-perception was associated with a high DMFT index, of this, the decayed component was the only one that presented statistically significant differences.

*Keywords:* *Public health*; *oral health*; *adults*; *Paraguay*; *diagnosis*, *oral*; *self-assessment.*

**Resumen: Introducción:** La salud bucodental puede ser definida como la ausencia de patologías y trastornos que afectan el sistema estomatognático. **Objetivos:** Este estudio tuvo como objetivo determinar las características de la autoevaluación del estado de salud bucal, en la experiencia clínica de la caries dental, el estado periodontal, la fijación de la pérdida periodontal e investigar la asociación entre el estado de salud bucal autoinformado y clínico entre los adultos paraguayos a principios de 2017. **Material y Métodos:** El diseño es transversal. Dos odontólogos fueron calibrados para el examen bucal, siguiendo

las recomendaciones de la Organización Mundial de la Salud (OMS). **Resultados:** Participaron 333 sujetos, el promedio de edad fue de 34.93 (DE=12.64) años, 77.2% eran mujeres. El 21.1% de las piezas dentarias estaban perdidas, el 12.2% obturadas y el 9.2% cariadas. El 48.0% presentó cálculo dental, 5.8% el bolsa periodontal y el 48.6% pérdida de fijación. La autopercepción de salud bucal fue para el 12.3% pobre, el 29.8% regular, el 31.8% normal, el 16.2% buena y el 9.9% excelente. Tuvieron una autoevaluación de su salud oral positiva el 58.0% y negativa el 42.0%. Se encontró diferencia estadísticamente significativa al comparar el DMFT index según la autopercepción de salud oral, siendo mayor el puntaje en los negativos; obteniéndose resultados similares con el componente cariado. **Conclusión:** La autopercepción de salud oral negativa se asoció con un elevado DMFT index, de este, el componente cariado fue el único que presentó diferencias estadísticamente significativas.

*Palabra Clave: Salud pública; salud bucal; adulto; Paraguay; diagnóstico bucal; autoevaluación.*

## INTRODUCTION.

In developed countries, the prevalence of dental caries has decreased in recent years. However, in developing countries, the prevalence of dental caries has increased or stagnated due to high carbohydrate intake, as well as an absence of regular programs of fluoride incorporation, and preventive and integral programs in dental health services.[1]

In the Republic of Paraguay, 62.5% of the population is between 15-and 64-years-olds, with a demographic dividend,[2] whereas in Europe there is an aging population and a decrease in the birth rate.[3] When measuring the dental caries experience in the Paraguayan population in 1974 the DMFT Index was consistently higher for females than males.[4] When measuring the dental caries experience in the Lingua Indian Paraguayan Chaco population in 1984, the DMFT Index was 8.67 in 20–24-year-olds,[9.10] in 25–29-year-olds, 8.67 in 30–34-year-olds, 9.64 in 35–40-year-olds, and 9.84 in those >40-year-olds.[5] According to a national oral health inquiry carried out in 2017, the DMFT Index was 0.17 in 5- to 6-year-old children, 2.07 in 12-year-olds, and 4.14 in 15-year-olds.[6]

Periodontal illness can lead to chronic systemic illnesses, such as diabetes and cardiovascular pathologies, especially in older patients.[7] It has also been associated with type 2 diabetes mellitus, atherosclerosis and atherosclerotic complications, kidney disease and adverse results of maintenance therapy of renal hemodialysis, premature delivery, some forms of pneumonia, Alzheimer's disease and rheumatoid arthritis.[8]

Only a few studies have addressed oral epidemiological oral health in the Republic of Paraguay. These studies have reported a poor oral health condition in certain groups of the population, but there are no published data in adults in the Republic of Paraguay.

Here we aimed to determine the characteristics of self-assessment oral health status, in the clinical experience of dental caries, periodontal status, periodontal loss fixation and to investigate the association between self-reported and clinical oral health status among Paraguayans adults.

## MATERIALS AND METHODS.

The design of the study was cross-sectional. The sample included adults attending the Ministry of Public Health in the Republic of Paraguay (MSPyBS) establishments (Asunción and Paraguarí cities) at the Dentistry School of the National University of Asunción (UNA) and Community Center "Chacarita", during the first trimester of 2017, who were included in the study with sampling of consecutive cases. Participants were between 18- and 59-years-old and included both sexes, as well as naturalized Paraguayans and foreign nationals with more than 14 years of residence in the country.

For the calculation of the sample size, an infinite population was considered with 58% of patients who had a negative self-perception in Belarusian adults,[8] with a precision of 7% and a confidence level of 95% a minimum of 191 subjects is required for the study. Considering a 10% loss of information, it is suggested to recruit 212 patients.

Following random sampling in the clinics of the university, and sampling of consecutive cases in the clinics of the ministry and the community center, the final study sample consisted of 333 participants. The

patients who met the inclusion criteria were invited to participate in the study after their care in the dental clinics, previously explaining the objectives of the study. Those who agreed to participate signed the informed consent and subsequently the survey and oral examination were carried out.

Two dentists were trained and calibrated (Cohen's kappa=0.84; *p*=0.001). The recommended gauge by the World Health Organization (WHO) for epidemiological studies was applied. The experience of caries was evaluated by counting the number of decayed teeth (DT), filled teeth (FT), and missing teeth (MT), and this data was used to calculate the DFMT Index score. The Periodontal Community Index (CPI) was calculated using the highest value in the Ramfjört teeth test.[9] We used PCPUNC[15] periodontal probes[10] (HLW-Germany).

The variables considered were sociodemographic (age, sex, education), self-assessment oral health status, dental caries experience, periodontal health state and periodontal loss fixation.

To evaluate the self-assessment oral health status, patients were asked how they rated their oral health status, choosing one of the following based in a Likert-scale to 1 at 5 points: Excellent=1; Good=2; Normal=3; Fair=4; and Poor=5. Was categorized into two groups: positive (excellent, good or normal) and negative (fair or poor).[8]

Descriptive and inferential statistics were applied. The results were presented in Tables, for qualitative variables frequency and percentage were used, for quantitative variables measures of central tendency and dispersion were used. The Chi-square test was used to analyze the associations of oral health self-evaluation with sociodemographic variables. The relationships between the self-assessment of oral health and the clinical status of oral health were used using the Chi-square test and the Mann-Whitney U test.

All tests were used with a confidence level of 95%. Analyses were done using IBM SPSS program (Statistical Package social for Science) for Macintosh, version 22.0. The participants were informed about the aim of the investigation and who agreed to sign written informed consent. The participation was voluntary and the data collection was made confidentially. The autonomy of the person was respected, being free to participate or being able to withdraw from the study without this affecting their care in the institution or that of the person in their charge.

Thus, sufficient information about the study and the researcher's data were also provided for any subsequent consultation. No subject was discriminated against for any reason. Permission was requested from the corresponding authorities for its execution following the usual procedures of the country.

**Table 1.** Self-assessment according to demographic factors.

| Demographic factors | | Self-assessment of oral health | | | | *p*-value |
|---|---|---|---|---|---|---|
| | | Positive | | Negative | | |
| | | n | % | n | % | |
| Sex | Male | 39 | 20.2 | 36 | 25.7 | 0.235 |
| | Female | 154 | 79.8 | 104 | 74.3 | |
| Education | None | 11 | 5.7 | 7 | 5.0 | 0.156 |
| | Primary | 46 | 23.8 | 35 | 25.0 | |
| | Secondary | 79 | 40.9 | 71 | 50.7 | |
| | Tertiary | 57 | 29.5 | 27 | 19.3 | |
| Ages | 18 - 29 | 81 | 42.0 | 56 | 40.0 | 0.927 |
| | 30 - 39 | 38 | 27.1 | 38 | 27.1 | |
| | 40 - 49 | 16 | 11.4 | 16 | 11.4 | |
| | 50 - 59 | 30 | 21.4 | 30 | 21.4 | |
| **Total** | | **193** | **58.0** | **140** | **42.0** | |

**Table 2.** Clinical oral health status of participants categorized by self-assessment oral health.

| Clinical oral health | | Self-assessment of oral health | | p-value |
| --- | --- | --- | --- | --- |
| | | Positive | Negative | |
| Number of decayed teeth | Mean ± SD | 2.0 ± 2.5 | 3.3 ± 3.3 | 0.001* |
| Adjusted mean to 5% | | 1.7 | 3.0 | |
| Number of missing teeth | Mean ± SD | 5.0 ± 6.1 | 4.8 ± 5.7 | 0.051 |
| Adjusted mean to 5% | | 4.3 | 5.3 | |
| Number of filled teeth | Mean ± SD | 3.7 ± 3.8 | 3.3 ± 3.2 | 0.558 |
| Adjusted mean to 5% | | 3.4 | 3.0 | |
| DMFT index | | 10.71 ± 6.8 | 12.43 ± 6.5 | 0.016* |

*: Statistically significant.

**Table 3.** Periodontal status of participants categorized by self-assessment oral health (n=329)

| Clinical oral health | | Self-assessment of oral health | | | | p-value |
| --- | --- | --- | --- | --- | --- | --- |
| | | Positive | | Negative | | |
| | | n | % | n | % | |
| Teeth with calculus | Yes | 90 | 27.4 | 76 | 23.1 | p=0.155 |
| | No | 101 | 30.7 | 62 | 18.8 | |
| Teeth with bleeding on probing | Yes | 34 | 10.3 | 24 | 7.3 | 0.923 |
| | No | 157 | 47.7 | 114 | 34.7 | |
| Teeth with periodontal pockets | Yes | 15 | 4.6 | 10 | 3.0 | 0.838 |
| | No | 176 | 53.5 | 128 | 38.9 | |
| Teeth with loss fixation | Yes | 44 | 13.4 | 40 | 12.2 | 0.222 |
| | No | 147 | 44.7 | 98 | 29.8 | |

## RESULTS.

Three-hundred-thirty-three participants were included in the study, with a mean age of 35 ± 13 years. Most (77.2%) participants were female and 25.2% had tertiary education.

Among our participants, the self-assessment of oral health condition categories were valued as poor by 12.3%, as fair by 29.7%, as normal by 31.8%, as good by 16.2%, and as excellent by 9.9%. Oral health self-assessment was positive in 58.0% and negative in 42.0%. When comparing self-reported oral health status with sociodemographic factors, no statistically significant differences were found. (Table 1).

The general DMFT Index was 11.43 ± 6.7. Among the participants, the mean (± standard deviation) number of decayed teeth (DT) was 2.55±2.90, missing teeth (MT) was 5.32±5.95, and filled teeth (FT) was 3.56±3.63. There is a statistically significant difference by sex for MT ($p=0.007$) being higher in women, but not for FT ($p=0.288$) and DT ($p=0.832$). A statistically significant difference was found when comparing the DMFT index according to the self-perception of oral health, the score being higher in the negatives; obtaining similar results for the decayed component (Table 2).

Among the participants, 1.2% were edentulous. Of the 329 patients who were evaluated, 40.4% had

a healthy periodontal state, 5.7% had bleeding with probing and needing oral hygiene instructions, 48.0% presented dental calculus, 5.2% had pockets of 4–5mm, and 0.6% had pockets of 6–7mm, for which they needed root scaling and radicular polishing. Regarding periodontal fixation loss, 50.2% were healthy, 40.8% had losses of 4–5mm, and 7.8% losses of 6–8mm. No association was found between periodontal health status and oral health self-assessment (Table 3).

## DISCUSSION.

Here we aimed to determine the characteristics of self-assessment overall oral health status, the clinical dental caries experience, periodontal status, periodontal loss fixation and to investigate the association between self-reported and clinical oral health status among Paraguayans adults.

Negative oral health self-perception was associated with a high DMFT index, of which the decayed component was the only one that presented statistically significant differences. This could be because the presence of caries in the patients of this study is accompanied by pain. In another study, a negative self-evaluation has been associated with the presence of pain and difficulty in pronouncing words as an important trigger factor.[11]

The DMFT Index in this study (11.43) was higher than that reported for Lingua Indian Paraguayan Chaco (20-to 40-years-old) in 19845; higher (7.33) than patients attending the School of Dental Medicine in Case Western Reserve University,[12] higher (6.38) than Syrian and Iranian refugees in Germany,[13] and higher (6.83) than refugees in a region of the federal state of Schleswig-Holstein, Germany,[14] and lower to that reported in adults between 20 and 64 years old in Piracicaba, Saint Paul, Brasil,[15] and in Chilean adults(14.6).[16]

Regarding dental caries experience, Paraguayan adults have lower FT (3.56) than Latino immigrants groups in Los Angeles, United States (6.29), but higher than an adult female population in Nigeria and Syrian, and Iranian (1.5) refugees in Germany. Paraguayans adults have a mean of DT (2.55) similar to Latino adult immigrants (2.47), lower than refugees in Germany (2.55), and higher than the female population in (1.8) Nigeria.[13,17,18] The mean edentulous value in this study (1.2) was lower than the 3.5 reported for adults in Southern Vietnam.[19] This could be due to the fact that Paraguay is a developing country where access to

health services continues to be limited, therefore, this is reflected by seeing almost half of filled teeth compared to Latinos in another country where there is greater coverage in Health. But this country still maintains an intermediate level of caries experience.

In our study, the proportion of patients with good, very good and excellent in their self-assessment (58.8%) was lower (64%) than of immigrants. Slightly higher than the 51% reported for adults in Yemení.[20] A lower percentage in our study were rated as having poor oral health (12%) compared than the 27% of the elderly reported as having poor oral health among institutionalized adults aged 65 years or older in Norway.

The diversity of the results could be explained due to the low access to dental health services, since limited access has been reported in the Itapúa Department as reported by Caballero *et al.*,[21] That is not alien to the reality of other departments of the country, that is, because the number of dentists varies considerably by health region according to data from the Directorate of Surveys, Statistics and Census of Paraguay.[22]

This study included patients from the department of Paraguarí. In addition, there are other influencing factors such as the wide diversity of ages of study participants, their level of knowledge about oral health and their awareness about the importance of oral health. Studies have reported that there is concordance between what is reported and the dental clinic.[8,23]

In our study, no differences in perception were found by periodontal health status, while a study carried out in Turkish adults did find a statistically significant difference carried out by Beşiroğlu *et al.*,[24] Although close to half of the patients had dental calculus and periodontal loss fixation, we observed many patients with gingival retraction but relatively few with a periodontal pocket, which could explain this finding. In a Chinese study including patients less than 18-years-old, 93.5% presented with dental calculus,[25] which is almost double the value recorded in our study.

The limitations of our study include its small sample and the non-inclusion of indigenous populations, as well as the absence of data on other determinants of oral health status. The sample only covers two health regions and the non-inclusion of indigenous populations, which is why it would not be prudent to extrapolate to the entire population. However, the sample could be considered representative in

terms of social strata, since it includes a very socio-economically disadvantaged sector such as the Barrio Ricardo Brugada known as "La Chacarita". The patients who attended FOUNA are from different parts of the country, who go for affordable costs and good referrals, as well as the patients who came from the Pirayú health center who reside in the interior of the country, where there are very few private dental practices. There is inequity in access to health services.

## CONCLUSION.

Negative oral health self-perception was associated with a high DMFT index, of which the carious component was the only one that presented statistically significant differences.

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