## ORIGINAL ARTICLE

**Validation of the Oral Hygiene Habits Scale: Relationships with sociodemographic variables in the general and clinical population of Monterrey, Mexico.**

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**Abstract:** Several socioeconomic factors are associated with poor oral hygiene habits. A version of the Oral Hygiene Habits Scale (OHHS) was developed in Mexico to measure these factors; however, its relationship with sociodemographic variables has not been studied. The verification of these relationships could contribute to the validation of the scale. Objective: To evaluate the relationship between oral hygiene habits and sociodemographic variables of sex, age, schooling, self-defined socioeconomic stratum, occupation and marital status in the general and clinical population of Monterrey, Mexico. Materials and Methods: A general population sample (GPS) of 256 participants and a clinical sample (CPS) of 240 participants were studied. The OHHS consisted of an eight-item Likert scale of 4 points ranging from 0 to 4. A descriptive correlational study was performed with a cross-sectional design. Data were analyzed using the Mann-Whitney U test, Kruskal-Wallis test, Spearman correlation coefficient, Cramer's V coefficient, and multivariate aligned rank test. Results: In GPS and CPS groups, OHHS was related to sex, schooling, socioeconomic stratum, occupation and marital status, but not to age. There were no significant interactions between the samples (GPS and CPS) and sociodemographic variables. Conclusion: There is a statistically significant relationship between oral hygiene habits and some sociodemographic variables in the general and clinical population. This relationship supports the validity of the OHHS.

**Keywords:** *Oral Hygiene, Demographic Factors, General Population, Dental Clinic.*

## INTRODUCTION.

Several socioeconomic factors have been associated with poor oral hygiene habits, such as lower schooling level, lower socioeconomic stratum or lower income, and being male.[1-9] Brushing two or more times a day with fluoride toothpaste has been found to reduce caries by 40%. A large amount of bacterial plaque is a strong predictor of caries, consequently, limited access to dental care and oral hygiene products results in greater severity of caries and periodontal disease.[5] On the other hand, it has been shown that older age groups report a more frequent use of interproximal cleaning devices.[3]

In Mexico, oral hygiene habits have been studied in children and adolescents,[10-14] however, there are few studies and little data available regarding the adult population. The Oral Hygiene Habits Scale (OHHS) has been developed to measure these habits.[15] The Mexican OHHS was designed for conducting clinical and epidemiological research based on the recommendations of the American Dental Association.[16]

The relationship between sociodemographic variables and the OHHS have not been studied. The verification of this relationship could contribute to the validation of the scale. In addition, it is relevant to determine the potential differences in score when the instrument is applied to the general population and to populations under dental treatment.

The aim of the study was to evaluate the relationship between oral hygiene habits and the sociodemographic variables of sex, age, schooling, self-defined socioeconomic stratum, occupation and marital status in the general and clinical population of Monterrey, Mexico.

## MATERIALS AND METHODS.

### Participants

The study included two population samples, a general one (GPS) comprised by 256 participants, and a clinical one (CPS) comprised by 240 patients. Inclusion criteria for GPS were being 18 years or older, knowing how to read and write, and residing in the metropolitan area of Monterrey, Mexico. Inclusion criteria for CPS included receiving periodontal care or being under prophylactic dental treatment. Exclusion criteria were inability to perform dental self-cleaning, illiteracy and suffering from schizophrenia, autism or dementia. Participants failing to complete the OHHS were also excluded from the study.

### Instrument

The OHHS was applied along with closed questions about sociodemographic data. The OHHS consisted of eight Likert items with five categories ranging from 0 to 4. The validity of its contents[15] and the agreement of the results were validated by experts.

Scores in the [0 to 1] interval were interpreted as low (poor oral hygiene habits), in the [1 to 2.125] interval as medium, and in the [2.125 to 4] interval as high (good oral hygiene habits). These intervals correspond to [0 to 1.75], [1.75 to 3] and [3 to 4] for *brushing*, and [0 to 0.25], [0.25 to 1.25] and [1.25 to 4] for *flossing*.

The scale's eight items had high internal consistency (α ordinal=.833 in GPS and .865 in CPS). Also, the OHHS presented a two-factor structure with good fit to the data and adequate invariance properties between GPS and CPS: "flossing" with four indicators (items 5, 6, 7 and 8) and very high internal consistency (α ordinal=.911 en GPS y .944 en CPS), and "brushing" with four indicators (items 1, 2, 3 and 4) and questionable internal consistency (α ordinal=.628 in GPS and .633 in CPS). Data had a non-parametric distribution.

### Procedures

A cross-sectional study was performed. Participants of the GPS group answered the questionnaire at home or at their workplace. They were selected for convenience. Participants of the CPS group were chosen in order of arrival at the university clinic and answered the questionnaire at the dental practice. They had signs and symptoms of periodontal disease (54.2%) or were under prophylactic dental treatment (45.8%). Data were collected between October 2015 and March 2016.

### Ethical aspects

Eligible subjects were informed about the aim of the study and agreed to participate by providing informed consent. Confidentiality of the information was respected at all times. The study was approved by the Bioethics Committee of the Ministry of Health (DEISC-19-01-16-16).

### Data analysis

Mann-Whitney U-test, Kruskal-Wallis test, Spearman correlation coefficient (rS) and Cramer's V coefficient were used to estimate the relationship between oral hygiene habits and sociodemographic variables. A rS or V value lower than .10 was interpreted as a trivial correlation, between .10 and .29 as a low correlation, between .30 and .49 as moderate, and between .50 and .69 as high, and ≥.70 as very high.[17] The multivariate aligned rank test was used to assess the differences between GPS and CPS.[18]

## RESULTS.

Table 1 shows the sociodemographic characteristics of GPS and CPS. Table 2 presents the associations between the sociodemographic variables under study and oral hygiene habits for the whole sample, GPS and CPS. There were no statistically significant interactions between total score, flossing or brushing with sociodemographic variables.

**Table 1**. Distribution of sociodemographic variables in the general population sample (GPS) and clinical population sample (CPS).

| Sociodemographic variables | | GPS (n = 256) | | CPS (n = 240) | |
|---|---|---|---|---|---|
| | | f | % | f | % |
| Sex | Female | 132 | 51.6 | 121 | 50.4 |
| | Male | 124 | 48.4 | 119 | 49.6 |
| Level of schooling | Primary | 14 | 5.5 | 20 | 8.3 |
| | Secondary | 40 | 15.6 | 37 | 15.4 |
| | High school | 41 | 16.0 | 54 | 22.5 |
| | Technical career | 35 | 13.7 | 29 | 12.1 |
| | Bachelor degree | 120 | 46.9 | 94 | 39.2 |
| | Postgraduate | 6 | 2.3 | 6 | 2.5 |
| Marital status | Single | 78 | 30.5 | 101 | 42.1 |
| | Married | 147 | 57.4 | 120 | 50.0 |
| | Divorced | 13 | 5.1 | 7 | 2.9 |
| | Widow(er) | 8 | 3.1 | 6 | 2.5 |
| | Separated | 3 | 1.2 | 0 | 0 |
| | Living partner | 7 | 2.7 | 6 | 2.5 |
| Occupation | Homemaker | 31 | 12.1 | 63 | 26.3 |
| | Worker | 18 | 7.0 | 11 | 4.6 |
| | Employee | 158 | 61.7 | 76 | 31.7 |
| | Business owner | 13 | 5.1 | 13 | 5.4 |
| | Student | 14 | 5.5 | 64 | 26.7 |
| | Unemployed | 2 | 0.8 | 3 | 1.3 |
| | Retiree | 20 | 7.8 | 10 | 4.2 |
| Socioeconomic stratum | Low | 12 | 4.7 | 13 | 5.4 |
| | Medium-low | 68 | 26.6 | 66 | 27.5 |
| | Medium-medium | 156 | 60.9 | 144 | 60.0 |
| | Medium-high and high | 20 | 7.8 | 17 | 7.1 |

**Table 2**. Correlation between the OHHS and sociodemographic variables.

| Sample | n | EHHB | Sex | Age | School. | SES | Occup. | MaritS. |
|---|---|---|---|---|---|---|---|---|
| | | | rS | rS | rS | rS | V | V |
| Total (MT) | 496 | TS | -.210*** | .068 | .222*** | .139** | .248** | .275* |
| | | B | -.207*** | .029 | .180*** | .132** | .196 | .205 |
| | | F | -.153** | .073 | .204*** | .126** | .210* | .209* |
| General (GPS) | 256 | TS | -.255*** | .089 | .309*** | .140* | .326* | .340 |
| | | B | -.233*** | .006 | .281*** | .140* | .248* | .266 |
| | | F | -.201** | .134* | .243*** | .108 | .269* | .250 |
| Clinical (CPS) | 240 | TS | -.161* | .053 | .129* | .127* | .318 | .355 |
| | | B | -.179** | .048 | .060 | .116 | .288** | .259 |
| | | F | -.104 | .021 | .158* | .144* | .280 | .295 |

**rS:** Spearman rank order correlation and **V:** Cramer V coefficient. **Significance:** * p<.05, ** p<.01, *** p<.001. **Oral Hygiene Health Scale (OHHS): TS:** Total score, **B:** brushing factor (items 2, 4, 5 and 6) and **F:** floss factor (items 7, 8, 9 and 10). **School.:** Schooling. **SES.:** Socioeconomic stratum. **Occup.:** Occupation. **MaritS.:** Marital Status.

## DISCUSSION.

The difference in the central tendency of OHHS between sexes showed that women have better oral hygiene habits in the GPS group among Mexican adults. This result is similar to that reported by Ospina et al.[8] in a sample of the general population in Colombia. Additionally, Mathur et al.[6] found the same tendency among adolescents in a sample of general population in India.

Regarding age, the OHHS showed that in the GPS group the younger the person the lower the frequency of flossing. Similarly, Rothen et al.[3] found that the use of interproximal cleaning devices is more frequent among the elderly. In addition, Mathur et al.[6] reported that in Indian adolescents among the general population, age had a significant effect on poor oral hygiene when evaluated clinically, *i.e.*, the younger the person the poorest their oral hygiene. Among participants in the CPS group, age was independent of the total scale score and its two factors. However, Buunk-Wekhoven et al.[19] found a significant relationship in patients receiving treatment at a university dental clinic in Uruguay.

As schooling increased, the total score on the scale and its factors in the GPS group also increased. Ospina et al.[8] identified schooling as the variable with greater strength of association with oral hygiene in a sample of the general population in Colombia. In the CPS group, schooling correlated positively with flossing, which is consistent with data reported by Vano et al.[5] in Italian adult patients, in whose oral hygiene habits were better at higher educational levels.

In the present study, belonging to medium-low socioeconomic stratum was associated with poor oral hygiene habits in GPS and CPS. In contrast, belonging to a medium-high or high socioeconomic stratum was associated with better habits. Furthermore, Vano et al.[5] found that a lower socioeconomic stratum had an adverse effect on the oral hygiene habits of Italian adults among the general population.

Retired participants, homemakers and students showed better oral hygiene habits in the GPS group regarding both factors. However, only brushing was significantly correlated with occupation in the CPS. Workers had poorer oral hygiene habits. Thapa et al.[20] reported that women from Ne-

pal, married and dedicated mainly to household chores with more flexible daily activities were more likely to brush their teeth twice a day compared to men who spent their days working away from home.

Regarding marital status, the OHHS showed better oral hygiene habits in divorced/separated and unmarried people in the GPS and CPS groups, in contrast to unmarried couples living together and married people, who had poorer habits. People without partners seem to take better care of their oral hygiene. The reason for this may be that these demographic groups are in search of a romantic partner or trying to consolidate a relationship, and as such may take better care of their overall hygiene. Another reason could be due to the family dynamics of people who live with their partner. Abbeg et al.[21] observed that having greater flexibility in the daily routine had an impact on the frequency and effectiveness of tooth brushing. However, they found that many families have little flexibility in their daily activities, leading to poor brushing habits. If this lack of flexibility is also an issue for the population of the present study it could explain their tendency to have poor oral hygiene habits.

Belonging to the general or the clinical population did not have an impact on the relationship between OHHS and its factors with sociodemographic variables. The average OHHS scores and their factors were equivalent between the two samples, except for a difference with a trivial effect size in the factor *brushing*, and between the patients who were treated for periodontal pathology and those who needed prophylactic dental treatment. Consequently, the scale can be applied to both populations without requiring differential scores. And similarly to what has been reported previously[8,10,11], the OHHS revealed relatively poor habits: the brushing median corresponded to "frequently", and "never" in the case of *flossing*.

A limitation of the present study is the use of non-probabilistic sampling. Consequently, the results should be used as hypotheses in future research within the same populations (general population and patients under dental treatment at a university clinic of an industrial city in northern Mexico). It is recommended that this study be replicated using proba-

bilistic samples. We suggest comparing people from the general population who meet the exclusion criterion for not having received treatment for periodontal disease with patients seeking treatment for periodontitis to test the discriminant validity of OHHS.

## CONCLUSION

There is a statistically significant relationship between oral hygiene habits and some sociodemographic variables in the general and clinical population. This relationship supports the validity of the OHHS.

**Validación de la Escala de Hábitos de Higiene Bucal: Relaciones con variables sociodemográficas en población general y clínica de Monterrey, México.**

**Resumen:** Antecedentes: Diversos factores socioeconómicos se asocian a pobres hábitos de higiene bucal. En México se ha creado la Escala de Hábitos de Higiene Bucal (EHHB), pero su relación con variables sociodemográficas no ha sido estudiada. La verificación de estas relaciones podría contribuir a la validación de la escala. Objetivo: Evaluar la relación entre hábitos de higiene bucal y las variables sociodemográficas de sexo, edad, escolaridad, estrato socioeconómico autodefinido, ocupación y estado civil en población general y clínica. Materiales y Métodos: Se estudió una muestra de población general (MPG) de 256 participantes y otra de población clínica (MCO) de 240 participantes. La EHHB es una escala de ocho ítems tipo Likert de 4 puntos que varía de 0 a 4. Se realizó un estudio descriptivo correlacional con un diseño transversal. Los datos fueron analizados mediante la prueba U de Mann-Whitney, la prueba de Kruskal-Wallis, el coeficiente de correlación de Spearman, el coeficiente V de Cramer y la prueba de rangos alineados multivariada. Resultados: En la MPG y la MCO, la EHHB mostró relación con el sexo, la escolaridad, el estrato socioeconómico, la ocupación y el estado civil, pero fue independiente de la edad. No hubo interacciones significativas entre las muestras (MPG y MCO) y las variables sociodemográficas. Conclusión: Existe una relación estadísticamente significativa entre los hábitos de higiene bucal y algunas variables sociodemográficas en población general y clínica. Esta relación sustenta la validez de la EHHB.

**Palabras clave:** *Higiene Bucal, Factores Demográficos, Población General, Clínica Dental.*

## REFERENCES.

1. Lee JY, Divaris K. The ethical imperative of addressing oral health disparities: a unifying framework. J Dent Res. 2014;93(3):224–30.

2. Guarnizo-Herreño CC, Watt RG, Fuller E, Steele JG, Shen J, Morris S, Wildman J, Tsakos G. Socioeconomic position and subjective oral health: findings for the adult population in England, Wales and Northern Ireland. BMC Public Health. 2014;14:827.

3. Rothen M, Cunha-Cruz J, Zhou L, Mancl L, Jones JS, Berg J. Northwest PRECEDENT network. Oral hygiene behaviors and caries experience in Northwest PRECEDENT patients. Community Dent Oral Epidemiol. 2014;42(6):526–35.

4. Hou R, Mi Y, Xu Q, Wu F, Ma Y, Xue P, Xiao G, Zhang Y, Wei Y, Yang W. Oral health survey and oral health questionnaire for high school students in Tibet, China. Head Face Med. 2014;10:17.

5. Vano M, Gennai S, Karapetsa D, Miceli M, Giuca MR, Gabriele M, Graziani F. The influence of educational level and oral hygiene behaviours on DMFT index and CPITN index in an adult Italian population: an epidemiological study. Int J Dent Hyg. 2015;13(2):151–7.

6. Mathur MR, Tsakos G, Parmar P, Millett CJ, Watt RG. Socioeconomic inequalities and determinants of oral hygiene status among Urban Indian adolescents. Community Dent Oral Epidemiol. 2016;44(3):248–54.

7. Sreenivasan PK, Prasad KVV, Javali SB. Oral health practices and prevalence of dental plaque and gingivitis among Indian adults. Clin Exp Dent Res. 2016;2(1):6–17.

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8. Ospina D, Herrera Y, Betancur J, Agudelo HB, Posada A. Higiene bucal en la población de San Francisco, Colombia, y sus factores relacionados. Rev Nac Odontol. 2016;12(22):23–20.

9. Aung EE, Ueno M, Zaitsu T, Kawaguchi Y. Oral Health Behaviors and Related Factors in Myanmar Population. Dent Health Curr Res. 2015;1(1)

10. Mazariegos-Cuervo ML. Salud Bucal del Preescolar y Escolar. 1a Ed. México, D.F: MBM Impresora, S.A; 2011.

11. Mazariegos-Cuervo ML, Stanford-Camargo A. Salud Bucal en la Adolescencia. 1a Ed. México, D.F: Impresora y Encuadernadora Progreso, S.A; 2012.

12. Molina-Frechero N, Durán-Merino D, Castañeda-Castaneira E, Juárez-López ML. [Dental caries experience and its relation to oral hygiene in Mexican children]. Gac Med Mex. 2015;151(4):485–90.

13. Soria-Hernández MA, Molina-F N, Rodríguez-P R. Hábitos de higiene bucal y su influencia sobre la frecuencia de caries dental. Acta Pediatr Mex. 2008;29(1):21–4.

14. Romero-Castro NS, Paredes-Solís S, Legorreta-Soberanis J, Reyes-Fernández S, Flores-Moreno M, Andersson N. Prevalencia de gingivitis y factores asociados en estudiantes de la Universidad Autónoma de Guerrero, México. Rev Cubana Estomatol. 2016;53(2):9–16.

15. Rodríguez NI, Moral J. Design and content validation of the Oral Hygiene. Habits Scale. J Oral Res. 2016;5(4):159–67.

16. Mouth Healthy: Brushing Your Teeth. American Dental Association (ADA); [Cited 2016 Dec]. Available from:http://www.mouthhealthy.org/en/az-topics/b/brushing-your-teeth .

17. Ellis PD. The Essential Guide to Effect Sizes: Statistical Power, Meta-Analysis, and the Interpretation of Research Results. 1a Ed. United Kingdom: University Press, Cambridge; 2010.

18. Oliver Rodríguez JC, González Álvarez J, Rosel Remirez J. Análisis no paramétrico de la interacción de dos factores mediante el contraste de rangos alineados. Psicothema. 2009;21(1):152–8.

19. Buunk-Werkhoven YAB, Dijkstra A, van der Schans CP, Jaso ME, Acevedo S, Parodi Estellano G. Evaluación y Promoción de la Actitud hacia la Higiene Oral en Pacientes de la Facultad de Odontología de la Universidad Católica del Uruguay. Actas Odontol. 2008;5(2):13–20.

20. Thapa P, Aryal KK, Mehata S, Vaidya A, Jha BK, Dhimal M, Pradhan S, Dhakal P, Pandit A, Pandey AR, Bista B, Pokhrel AU, Karki KB. Oral hygiene practices and their socio-demographic correlates among Nepalese adult: evidence from non communicable diseases risk factors STEPS survey Nepal 2013. BMC Oral Health. 2016;16(1):105.

21. Abegg C, Croucher R, Marcenes WS, Sheiham A. How do routines of daily activities and flexibility of daily activities affect tooth-cleaning behavior? J Public Health Dent. 2000;60(3):154–8.