

FACTORS ASSOCIATED WITH THE USE OF ORAL HEALTH SERVICES IN OLDER PERUVIAN ADULTS: SECONDARY ANALYSIS OF POPULATION SURVEY, 2018

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ABSTRACT

Objectives. To identify the prevalence and factors associated with the use of oral health services in Peruvian older adults (OA) during 2018. **Materials and Methods.** Secondary analysis of data on 4,874 Peruvian OAs from the Demographic and Family Health Survey (ENDES) carried out in 2018. The use of oral health services was considered (yes/no) based on the six months prior to the application of the survey as a dependent variable. The independent variables were sex, age, area of residence, educational level, marital status, geographical domain, physical limitation, health insurance, spoken language, and welfare index quintile. A descriptive analysis was performed using absolute frequencies and weighted proportions, and a multivariate analysis using generalized linear models (Poisson regression). **Results.** From the total of OAs, 52.6% were women, 52.9% belonged to the 60-69 age group, 77% belonged to the urban area, and 81.1% had a health insurance. The prevalence of the use of dental care services in the last six months was 24.9%. Multivariate analysis found association with area of residence ($p < 0.001$), higher educational level ($p = 0.001$), health insurance affiliation ($p < 0.001$), geographic domain ($p = 0.019$), and all welfare index quintiles ($p < 0.001$). **Conclusions.** The prevalence of the use of dental care services in OAs was low, and its associated factors were the area of residence, educational level, health insurance, geographic domain, and welfare index quintiles.

Keywords: Oral health; Aged; Health services accessibility; Peru (source: MeSH NLM).

INTRODUCTION

Peru is undergoing a process of population ageing and it is estimated that by 2050 the proportion of older adults (OA) will reach 22% of the total population⁽¹⁾. This stage of life is characterized by more frequent oral health problems, such as dental caries, periodontal disease, and partial or total edentulism, which affect the person's quality of life and demand comprehensive and timely care from health services⁽²⁻⁴⁾. In addition, if left untreated, these oral conditions can lead to inequalities at the social, economic and health system levels^(5,6). In order to reduce these inequalities, access to oral health services for the population is of vital importance, not only in terms of coverage, but also of effective access⁽⁷⁾.

With the implementation of the Universal Health Insurance Act (Aseguramiento Universal de Salud, AUS) and

the Essential Health Insurance Plan (Plan Esencial de Aseguramiento en Salud, PEAS)⁽⁸⁾, the minimum benefits financed include primary preventive treatments (such as prophylaxis, placement of sealants and application of fluoride) and secondary preventive treatments (such as restorations, endodontics, and exodontics). However, rehabilitative treatments are not offered, despite the fact that edentulism is one of the main oral health problems and is directly associated with age, especially in those with low economic status^(9,10). In this sense, the only option to access oral rehabilitation treatments for older people in situations of poverty and extreme poverty was the intervention plan «Vuelve a Sonreír» (Smile Again) which was available for the period 2012-2016⁽¹¹⁾, being reactivated in mid-2019⁽¹²⁾. This period of inactivity may have lowered the possibilities of access to these treatments for OAs.

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There are factors related to the use of health services besides a person's affiliation to health insurance. Worldwide, studies in OAs report that being a woman, having a better economic position, higher educational level, and being affiliated with a private dental insurance are factors that increase the probabilities of access to dental health services⁽¹³⁻¹⁵⁾. In Peru, in 2014, a study in children under the age of 12 identified socioeconomic status, region of residence, area of residence, age group, educational level of caregivers, and type of health service as factors associated with the use of oral health services⁽¹⁶⁾. On the other hand, that same year, the use of oral health services in the last six months in peruvian OAs reached only 25%, the majority of which attended private dental facilities in the coast and in urban areas⁽¹⁷⁾. The social, economic and cultural multi-diversity of the peruvian population could have an impact on the use of oral health services, and this study is important to guide the decisions aiming to reduce the gaps in real use by unprotected population groups.

The Demographic and Family Health Survey of Peru (Encuesta Demográfica y de Salud Familiar de Perú, ENDES) provides descriptive information about the prevalence of dental service use among OAs according to socio-demographic variables; however, there is no representative and updated information evaluating the factors associated with the use of oral health services in OAs. Therefore, the objective of the present study was to identify the prevalence and factors associated with the use of oral health services in peruvian OAs during 2018.

MATERIALS AND METHODS

DESIGN AND STUDY POPULATION

A secondary analysis of the information presented in the ENDES 2018 —conducted by the National Institute of Statistics and Data Processing (Instituto Nacional de Estadística e Informática, INEI) (<http://inei.inei.gob.pe/microdatos/>)— was made. The ENDES collects health information from peruvian inhabitants on life habits, maternal and child health, use of health services, communicable and chronic diseases, among others. The survey had a two-stage, probabilistic, balanced sample type, stratified and independent at the departmental level and by rural urban area. The sampling and analysis unit are households and persons residing in the household respectively. More details on sample design, data collection, and data quality can be found in the ENDES report (<http://bit.ly/2wNiH0y>). For the present study, the databases of the ENDES 2018 health and household questionnaires were used.

KEY MESSAGES

Research Motivation. In Peru, there is no representative and up-to-date information available evaluating the factors associated with the use of oral health services in older adults (OA).

Main Findings. OAs living in the urban area and in the jungle were less likely to use dental services six months prior to the survey, and OP with higher education, health insurance coverage and a higher welfare index quintile were more likely to use them.

Implications. There are factors associated with the use of dental services in OAs that should be considered for the reduction of inequalities in oral health.

A total of 33,794 people over the age of 15 and with complete information were included in the ENDES 2018 health questionnaire. The sample selected for this study was made up of adults in the age of 60 or older, defined as OAs according to peruvian legislation⁽¹⁸⁾. Twenty-eight thousand nine hundred twenty (28,920) people were excluded from the analysis because they were under the age of 60. The 4874 OAs included have complete information on all the variables considered in the study (Figure 1).

VARIABLES AND MEASUREMENTS

The main variable for the study was the use of oral health services during the six months prior to the survey (yes/no), collected through self-report and obtained from variables coded as QS311, QS312U and QS312C in the ENDES 2018 questionnaire. The independent variables considered in the analysis and their codes appearing in the questionnaire are the following: sex (male/female) QSSEXO; age (60-69/70-79/80-89/90 or older), grouped from variable HV105; area of residence (urban/rural) HV025; educational level (no education or pre-school/elementary/secondary/higher education) HV106; marital status (married or cohabiting/single/widowed or separated), recoded from HV115; geographical domain (Lima Metropolitan area/other coastal cities/highlands/jungle) SHREGION; physical limitation (yes/no), developed from questions on limitations to move, see, hear, speak, understand, or interact (QH13A1-A6); health insurance affiliation (yes/no) QS26; spoken language (Quechua and indigenous/other languages), recoded from variable QS25AA; and welfare index quintile (lower quintile, second quintile, middle quintile, fourth quintile, upper quintile) HV270. The variables used and their codes

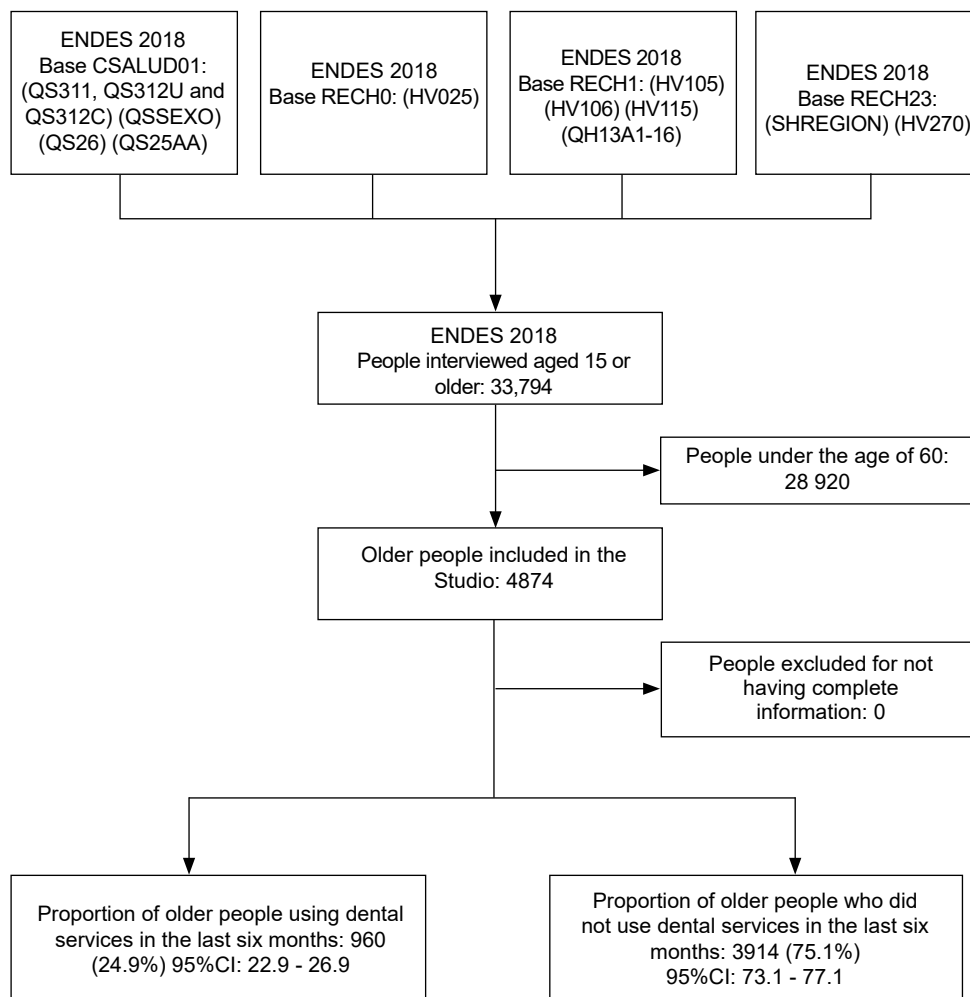


Figure 1. Flowchart for the selection of older people included in the analysis, Demographic and Family Health Survey (ENDES) 2018.

can be identified in the INEI's Virtual Documentation System of Statistical Research (<https://bit.ly/2pj935U>).

STATISTICAL ANALYSIS

The statistical software Stata® v14.2 (Stata Corporation, College Station, Texas, USA) was used for the analysis. The characteristics of the survey sampling were specified, including weighting according to strata and design, using the svy command. The variables used were HV001 (conglomerate), peso15_amas (weighting factor), and HV022 (stratum). Using the same command, the subpop option () was used to make estimates of the subpopulation (adults over 60 years old). Categorical variables and the prevalence of dental service use were described using absolute frequencies and weighted proportions were estimated with 95% confidence

intervals. For the bivariate analysis, the Chi-square statistical test was used, setting a p-value of 0.05.

Generalized linear models (GLM) with the Poisson regression and log link function were used, taking as a dependent variable the use of oral health services during the last six months prior to the survey ⁽¹⁹⁾. For the adjusted model, the variables that had a value of p <0.2 ⁽²⁰⁾ in the crude model were included. Crude and adjusted prevalence ratios (PR) with 95% confidence intervals were reported, with a value of p <0.05 considered statistically significant. Multicollinearity among independent variables was assessed using Stata's collin command in order to obtain precise parameters for the estimates. In all cases, the variance inflation factor was less than 10, so correlation between the variables was considered low.

ETHICAL CONSIDERATIONS

The study did not require the approval of an ethics committee because it is an analysis of secondary data that is in the public domain and it does not allow the identification of the evaluated participants. The databases used in this study can be obtained from the INEI's website (<http://inei.inei.gob.pe/microdatos/>).

RESULTS

Most of the OAs included in the analysis were female (52.6%) and in the 60-69 age group (52.9%), with a mean age of 70.1 years (SD 7.81); three out of four belonged to the urban area; and the majority of OAs (29.1%) attained elementary school level. More than half of the OAs were married and eight out of ten had health insurance (Table 1).

The prevalence of dental service use during the last six months was 24.9%; 95%CI: 22.9-26.9. In OAs residing in urban areas it was 28.1%; 95%CI: 25.7-30.7, in OAs with higher level of education it was 45.8%; 95%CI: 39.9-51.8%, in health insurance affiliates it was 26.8%; 95%CI: 24.6-29.2, in those living in Lima Metropolitan area it was 34.5%; 95%CI: 30.2-39.1, in those with higher level of welfare it was 42.1%; 95%CI: 36.9-47.5%. These subgroups had a higher use of dental services than the other categories of the evaluated variables ($p < 0.001$). Also, the OAs that spoke Spanish, Portuguese, or other foreign languages reported a higher percentage of dental service use (26.6%; 95%CI: 24.2-29.2) than those that spoke Quechua and indigenous languages (20.4%; 95%CI: 17.3-23.9) ($p = 0.005$) (Table 1).

The crude model reported an association between the use of dental services and all variables except sex, age group, physical limitation, and being single compared to being married/cohabiting (Table 2). However, the adjusted model found association with area of residence ($p < 0.001$), higher education level compared to no education or pre-school ($p = 0.001$), health insurance affiliation ($p < 0.001$), jungle as geographic domain compared to Lima Metropolitan area ($p = 0.019$), and all welfare index quintiles ($p < 0.001$) (Table 2).

The urban residence area group was less likely (aPR 0.62; 95%CI: 0.48-0.80) to use dental services than the rural residence area group, and OAs living in the jungle were less likely (aPR 0.73, 95%CI: 0.56-0.95) to use dental services than those living in Lima Metropolitan

area. OAs with a higher level of education (aPR 1.94; 95%CI: 1.33-2.83) who are affiliated to some health insurance (aPR 1.58; 95%CI: 1.23-2.03) and in a higher welfare index quintile (higher quintile: aPR 3.84; 95%CI: 2.68-5.51) are more likely to use dental services compared to those who have a lower level of education, are not affiliated to any insurance, or are in a lower welfare index quintile respectively (Table 2).

DISCUSSION

Our study reported that only 24.9% of peruvian OAs used dental health services during the six months prior to their participation in ENDES 2018, which represents a 0.1% reduction in relation to the 25% reported in 2014⁽¹⁷⁾, suggesting that current oral health programs and strategies in our country would not be increasing the opportunities for the use of oral health services in this population. It was also reported that educated OAs, health insurance enrollees, and those in a higher welfare index quintile were more likely to use dental services than their reference categories, whereas urban residents and those living in the jungle were less likely to use these services. Thus, the public dental health measures implemented nationwide should consider the characteristics associated with the use of dental services in order to redirect human and economic resources to the population with the greatest social disadvantage and contribute to the reduction of inequalities in the use of these services.

OAs residing in the urban area had less probabilities of using dental services compared to those living in the rural area. The latter concentrates the poor regions of the peruvian highlands or jungle, which have shown above-average prevalence of use of dental health services in previous studies⁽¹⁷⁾, even in other population groups, such as children under the age of 12⁽²¹⁾. In addition, a recent study indicates that the use of services in rural areas has increased after the implementation of the AUS⁽²²⁾. The reason may be the activity of some conditional cash-transfer programs such as "JUNTOS", which offer economic incentives to people living in poverty or extreme poverty in exchange for using health services⁽²³⁾. The strengthening and expansion of such programs could increase the use of dental services in other regions of Peru.

Having a higher educational level increased the likelihood of using dental services in the OAs in our study. This is consistent with a study on OAs in Chile, which reported that those who had a complete secondary or higher

Table 1. Characteristics of peruvian older adults who used dental services, Demographic and Family Health Survey (ENDES) 2018.

Characteristics	Older adults surveyed		Use of dental services in the last six months			p value
	n	Weighted proportion	n	Weighted proportion	95%CI	
Total	4874	100.0	960	24.9	22.9-26.9	
Sex						0.306
Male	2203	47.4	446	26.0	23.0-29.3	
Female	2671	52.6	514	23.8	21.3-26.5	
Age Group (years)						0.640
60-69	2634	52.9	558	26.1	23.5-28.8	
70-79	1575	30.1	308	24.1	20.6-28.0	
80-89	581	14.9	84	22.7	16.9-29.8	
90 or more	84	2.1	10	20.3	9.0-39.6	
Marital Status						0.009
Married or cohabiting	2631	53.2	552	26.5	23.9-29.3	
Single	757	16.9	157	28.6	23.4-34.4	
Widow(er) or separated	1486	29.9	251	19.8	16.4-23.7	
Area of Residence						<0.001
Rural	2165	23.0	319	13.9	12.1-16.0	
Urban	2709	77.0	641	28.1	25.7-30.7	
Education						<0.001
No education or pre-school	1091	15.6	134	12.4	9.3-16.3	
Elementary	2236	29.1	346	18.1	15.6-21.0	
Secondary	934	25.8	235	26.8	22.8-31.2	
Tertiary	613	19.4	245	45.8	39.9-51.8	
Health Insurance						<0.001
No	828	18.9	128	16.3	12.6-20.9	
Yes	4046	81.1	832	26.8	24.6-29.2	
Geographical Domain						<0.001
Metropolitan Lima	547	37.3	178	34.5	30.2-39.1	
Other coastal cities	1252	25.1	280	22.8	20.0-25.8	
Highlands	2180	27.9	376	17.9	15.6-20.3	
Jungle	895	9.7	126	13.3	10.7-16.4	
Physical Limitation						0.606
No	4437	91.9	897	25.0	23.0-27.2	
Yes	437	8.1	63	22.8	15.9-31.6	
Welfare Index Quintiles						<0.001
Lower	2047	22.5	261	10.9	9.3-12.7	
Second	903	16.1	166	16.7	13.4-20.6	
Middle	691	16.4	128	19.3	15.3-23.9	
Fourth	644	21.1	180	30.9	25.8-36.6	
Upper	589	23.9	224	42.1	36.9-47.5	
Language/Tongue Learned during Childhood						0.005
Other*	2855	71.5	611	26.6	24.2-29.2	
Quechua and indigenous languages	2019	28.5	349	20.4	17.3-23.9	

All analyses included the weighting factor and sample specifications of ENDES 2018

*Other: Spanish, Portuguese, or other foreign language.

95% CI: 95% confidence interval

Table 2. Two-Stage model for the use of dental services by peruvian older adults as a dependent variable, Demographic and Family Health Survey (ENDES) 2018.

Variable	Factors associated with the use of dental services					
	Crude model			Adjusted model *		
	PR	95%CI	p value	RPa	95%CI	p value
Sex						
Male	Ref.	-	-	-	-	-
Female	0.92	0.77-1.08	0.305	-	-	-
Age Group (years)						
60-69	Ref.	-	-	-	-	-
70-79	0.92	0.77-1.11	0.401	-	-	-
80-89	0.87	0.64-1.18	0.368	-	-	-
90 or more	0.78	0.36-1.67	0.519	-	-	-
Marital Status						
Married or cohabiting	Ref.	-	-	Ref.	-	-
Single	1.08	0.86-1.35	0.503	1.09	0.89-1.33	0.397
Widow(er) or separated	0.75	0.61-0.93	0.007	0.85	0.70-1.03	0.102
Area of Residence						
Rural	Ref.	-	-	Ref.	-	-
Urban	2.02	1.71-2.38	<0.001	0.62	0.48-0.80	<0.001
Education						
No education or pre-school	Ref.	-	-	Ref.	-	-
Elementary	1.46	1.07-1.99	0.016	1.17	0.85-1.61	0.337
Secondary	2.16	1.56-2.98	<0.001	1.36	0.94-1.99	0.107
Tertiary	3.69	2.71-5.01	<0.001	1.94	1.33-2.83	0.001
Health Insurance						
No	Ref.	-	-	Ref.	-	-
Yes	1.64	1.25-2.15	<0.001	1.58	1.23-2.03	<0.001
Geographical Domain						
Metropolitan Lima	Ref.	-	-	Ref.	-	-
Other coastal cities	0.66	0.55-0.79	<0.001	0.85	0.71-1.02	0.077
Highlands	0.52	0.43-0.62	<0.001	0.88	0.71-1.09	0.248
Jungle	0.39	0.30-0.50	<0.001	0.73	0.56-0.95	0.019
Physical Limitation						
No	Ref.	-	-	-	-	-
Yes	0.92	0.64-1.30	0.611	-	-	-
Per Capita Expenditure Quintiles						
Lower	Ref.	-	-	Ref.	-	-
Second	1.54	1.18-2.01	0.002	1.97	1.47-2.64	<0.001
Middle	1.77	1.35-2.33	<0.001	2.30	1.61-3.29	<0.001
Fourth	2.85	2.25-3.60	<0.001	3.32	2.31-4.77	<0.001
Upper	3.87	3.17-4.73	<0.001	3.84	2.68-5.51	<0.001
Language/Tongue Learned during Childhood						
Other	Ref.	-	-	Ref.	-	-
Quechua or Indigenous languages	0.77	0.63-0.93	0.006	1.20	0.98-1.47	0.070

*Model adjusted for all variables with a value of $p < 0.2$ in the bivariate analysis PR: Prevalence Ratio, aRP: Adjusted Prevalence Ratio, 95%CI: 95% Confidence Interval

educational level were more likely to use dental services within a year prior to the survey, compared to those with a lower educational level ⁽²⁴⁾. In this regard, a higher level of education is associated with a person's income level, and a better economy provides the resources to access health services in terms of cost of care and treatment (in the case of private services), purchasing of medicines, and transportation to the health center, which may favor the presence of inequalities in access to health ⁽²⁵⁾. Also, a lower educational level may imply less health care awareness. It is therefore essential to strengthen oral health promotion messages aimed at OAs in order to raise awareness and increase the likelihood of using dental services in this population ⁽²⁵⁾.

Providing health insurance to the OAs population can increase the opportunities to use dental services ⁽²⁶⁾. In this regard, it is important to note that two out of ten participants in our study were not affiliated to health insurance, and only 16% of the uninsured OAs population sought dental care in the six months prior to the survey. These results show that the lack of health insurance reduces the possibilities of using public health services for a good fraction of peruvian OAs, conditioning them to pay a greater out-of-pocket sum to be attended in the public or private sector. This problem may have negative repercussions on the economy of the OAs and/or their household, bearing in mind that almost 30% of peruvian households have an OAs as head of household ⁽²⁷⁾. In addition, it should be noted that dental services rank fourth among the health services that cause the greatest out-of-pocket spending in our country ⁽²⁸⁾.

OAs from the jungle region were less likely to use dental health services than those living in the coast. This result is consistent with the report on the prevalence in the use of oral health services in the peruvian jungle in 2014, which reached 69.6%, whereas the use in the coast reached 84.6% ⁽¹⁷⁾. The low use of oral health services in the peruvian jungle occurs even among children under the age of 12 ⁽¹⁶⁾.

One of the reasons behind this disparity would be that, even after the increase in the use of oral health services in the jungle region due to the implementation of AUS in 2009, the concentration curve of service use continues to favor the population with the highest purchasing power ⁽²²⁾, a problem considering that the jungle is one of the natural regions with the highest proportion of people living in monetary poverty ⁽²⁹⁾.

Other factors that affect the opportunities for dental service use may be the absence of health services and/

or dental professionals in some areas of the peruvian jungle, and the remoteness of health centers. For OAs with little or no autonomy to move around, remoteness becomes a determining factor in health service use given their high dependence on third parties to get to the place ^(30,31).

The probability of using the dental services for the OAs with the highest level of welfare was higher than that of the lower quintile, and there was also a marked step-gradient in each lower income category (40.5% for the upper quintile and 10% for the lower quintile). The reasons behind this finding could be that the population with lower purchasing power has limited access to oral rehabilitation treatments that are not covered by the PEAS, as they tend to be more complex and costly. Likewise, the National Plan "Vuelve a Sonreír" (Smile Again), in charge of rehabilitating the peruvian population of OAs in situations of poverty and extreme poverty, has presented a considerable period of inactivity, which may have led to a decrease in the probabilities for OAs with lower incomes to access this type of treatment.

On the other hand, only four out of ten 60-year-old OAs are affiliated to some type of pension system ⁽²⁷⁾, and pensions very rarely exceed the national minimum living wage, reducing the options for the use of dental services for this population group. In addition, it should be borne in mind that out-of-pocket expenditure on health increases with age due to the presence of comorbidities, disabilities, and other chronic health problems in the OAs, decreasing the opportunities for access, especially to dental health, where a large part of the treatments are only carried out in the private sphere ^(32, 33). These findings are consistent with a recent study reporting that the inequality gap in the use of dental health services in peruvian OAs is increasing in recent years in favor of the population group with higher income ⁽²²⁾.

One of the limitations of the study is the use of ENDES databases to carry out the analysis, a data collection process where the respondent may have incurred memory biases due to the self-reporting nature of the main study variable. In addition, because the database does not contain information on the need for treatment, we cannot know to what extent this variable influences the use of dental services in the peruvian OAs population. Likewise, the transversal design of the primary study does not allow us to evaluate causal relationships. Despite the limitations, this study assesses the factors associated with the use of dental health services using ENDES data, which offer a level of national representativeness and

uses standardized questionnaires for the data collection process, reducing the possibility of information bias.

In conclusion, the use of dental services in the OAs population is low and has not increased in recent years. Also, associated factors were area of residence, educational level, health insurance affiliation, geographic domain, and welfare index quintile. In this sense, the dental health of the older people in Peru requires a reform that takes into account the characteristics reported as associated in our study and similar ones.

Although further research is required to confirm our hypotheses, we can infer that the inequalities identified respond to several aspects, among which stand out the limited options for oral health treatments offered in public health services, the prolonged deactivation of plans such as “Vuelve a Sonreír” (Smile Again)—aimed at addressing the needs not covered in the public health system in the poor and extremely poor population—, the considerable number of peruvian OAs still without health insurance,

and the lack of oral health promotion campaigns aimed at OAs; all of them converge in the lack of resources of the population to access opportune and quality treatments beyond the private sector, resulting in a considerable out-of-pocket expense. Therefore, establishing mechanisms to counteract the problem in dental service use should be one of the priorities of the government through the Ministry of Health of Peru; otherwise, oral health will continue to be a privilege of people with greater spending capacity.

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