

Use of Oral Health Services in Elderly Population in Colombia: Paradoxes and Controversies

Uso de Servicios de Salud Oral en la Población Adulta Mayor en Colombia: Paradojas y Controversias

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ABSTRACT: This study aims to analyze the prevalence of use of oral health services in elderly population in Colombia according to selected socio-demographic and health outcomes. Cross-sectional analysis with information for 2650 subjects ≥ 65 years provided by the 2007 National Public Health Survey. Variables: Use of oral health services, self-rated health, oral health problems, oral pain, dental caries, gum bleeding, sex, educative level and ethnic origin. Multivariate Logistic regressions were conducted for the use of health services and different demographic and health variables by means of Odds Ratio (OR), and 95% Confidence Intervals (95%CI). Analyses were conducted separately for men (M) and women (W). Logistic regression analysis showed that women with university studies (aOR 21.76; 95% CI 9.72–48.73), with dental problems (aOR 3.29; 95% CI 2.26–4.77), specifically gum bleeding (aOR 4.91; 95% CI 1.88–12.80) and men with dental caries (aOR 8.22; 95% CI 4.11–14.41) were more likely to report the recent use of oral health services. Use of oral health services is higher in people belonging to minority groups, but no statistically significant differences were found. Differences in the usage profile for elderly people were found according to socio-demographic and health variables. More research is needed in order to explain some controversial results.

KEY WORDS: oral health, dental health services, health services accessibility, health inequalities.

INTRODUCTION

Elderly constitutes an increasing population group in which demographic changes in developing countries are considered. According to data from the National Administrative Department of Statistics -DANE Colombia- and the Population Division of CEPAL -CELADE-, the percentage of total growth in older adult population -those >60 years- for Colombia and Latin America during the period of 1975–2005 was of 3.3% and 2.9% respectively (Nieto Antolinez & Alonso Palacio, 2012). Conversely, considering the Latin-American population projections for Colombia; the population of people ≥ 65 years of age will represent around the 6.4% for 2015 and the 10.8% for 2030 (Latin American and Caribbean Demographic Centre (CELADE) - Population Division, 2004).

However, when social and economic factors are analyzed, inequalities persist and this population is especially vulnerable (Albala *et al.*, 2005; Cardona *et al.*, 2006; Colombia, Profamilia, 2010; McMunn *et al.*, 2006). This situation is reflected by worse general (Albala *et al.*; Ramírez-Vélez *et al.*, 2008) and oral health indicators (Griffin *et al.*, 2012). Determinants such as poverty, ethnicity, sex, and health education are directly involved within oral health profiles in older people (Petersen *et al.*, 2010). In this context, accessibility to primary and specialized health care is considered a social determinant of health (Aday & Andersen, 1974). Knowledge about barriers and factors that affect the use of oral health services in the elderly is a key element in the design of public health policies to improve oral health

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in order to contribute to the quality of life of this group (Guay, 2004; Petersen & Yamamoto, 2005).

Specifically in Colombia, according to the last National Oral Health Study -ENSAB III; 1998-(Colombia. Ministerio de Salud, 1998), caries prevalence in elderly population is 51%, with an experience of 95%. DTMF index was 20.4. There is an existing decrease in the number of present teeth and a significant increase in the average of caries-related missing teeth. Other regional and local studies conducted in elderly populations confirm the high morbidity in oral health indicators (Concha Sánchez & Camargo Lemus, 2007; Díaz Cárdenas *et al.*, 2012). It is important at this point to consider that DTMF values correspond to an accumulative process of dental pathology.

Since the implementation of important reforms in the Health Social Security System in Colombia, several critics have been made because despite an increased number of insured people in the system, this situation did not guarantee equitable access to the different preventive and curative programs within the different levels of health care (Jaramillo *et al.*, 2000; Calderón *et al.*, 2011). These general aspects could be considered in the analyses when concerning barriers and determinants that affect the access and the use of oral health services.

Scientific literature has researched about the factors that affect the access and utilization of oral health services in elderly population (Baldani *et al.*, 2010; Machado *et al.*, 2012; Marshman *et al.*, 2012). In the case of Colombia, research on the elderly is mainly focused on oral health and quality of life, which is been developed through local and regional scientific agendas (Aranzazu *et al.*, 2007; Concha Sánchez & Camargo Lemus; Díaz Cárdenas *et al.*; Duque Duque *et al.*, 2013). In this context, the 2007 National Public Health Survey (Encuesta Nacional de Salud Pública; ENSP-2007, in Spanish) provides an opportunity to research at a national level since it includes several questions related to the use of different health services and specifically those related with dentistry (Colombia. Ministerio de la Protección Social. [Ministry of Social Protection]). In this sense, It is important to study the oral profiles by means of analyzing the differences amongst age groups from a life cycle perspective (Sisson, 2007). Accordingly, the objective of this study is to analyse the prevalence of use of oral health services in elderly population in Colombia according to selected socio-demographic characteristics and health outcomes.

MATERIAL AND METHOD

A national cross-sectional study was used. Data from the 2007 National Public Health Survey (Encuesta Nacional de Salud Pública, ENSP-2007, in Spanish) were collected and a multiple-stage stratified sampling was used. One adult was selected to complete the survey, and for this study we used information from subjects ≥ 65 years. For additional information, see the publication by the Ministry of Social Protection, Republic of Colombia and other research conducted using the same methodology (Agudelo-Suarez *et al.*, 2014; Colombia. Ministerio de la Protección Social).

The exposure variable was the recent use of oral health services. This information was gathered from question 1352b of module 2 in the household survey: How long ago did you (last) visit a dentist or oral hygienist? The variable was re-categorized in two alternatives of dental visit: Never/time > 1 year (No recent use), time ≤ 1 year (recent use). To evaluate general and oral health status several perceived outcomes were used separately: 1) self-rated health (Question 1001: How would you rate your current health status?) was categorized as good (good/very good) or poor (fair/poor/very poor); 2) Any oral health problem (Question 1317a: Have you had any dental, oral, and gum problem in the last 30 days? Yes/No); 3) Oral pain (Yes/No); 4) Dental caries (Yes/No); 5) Gum bleeding (Yes/No). Other explicative variables were included in the analysis: educative level (\leq primary, secondary, university), ethnic origin (This information was gathered from question 750: "Which ethnic group do you belong to?" With 6 answer choices: Indigenous, Romani, Raizal, Palenquero, Afro-Colombian, and None). The variable was re-categorized in Yes/No.

Weights derived from a complex sample design were included. All the analyses were elaborated for men (M) and women (W) separately. A descriptive study of the frequency of the variables analysed was carried out. Prevalence of use of oral health services was measured with 95% Confidence Intervals (95% CI). The logistical regression was used to estimate the relationship between the variable usage of oral health services, and the other variables; first crudely, and then adjusting for other variables according to previous literature. Results were recorded as odds ratio (OR) with 95% confidence intervals (95%CI).

This paper is based on secondary analysis and the survey has accomplished the ethical requirements for human being research according to international standards and Colombian regulations.

RESULTS

No considerable differences in prevalence of recent use of oral health services were found between men and women. Specific analysis shows that prevalence is higher in Women with University studies, those belonging to an ethnic group, and those reporting poor oral health indicators (Table I).

After adjusting in multivariate models, women with university studies (aOR 21.76; 95% CI 9.72–48.73), with dental problems (aOR 3.29; 95% CI 2.26–4.77), specifically gum bleeding (aOR 4.91; 95% CI 1.88–12.80) and men with dental caries (aOR 8.22; 95% CI 4.11–14.41) were more likely to report the recent use of oral health services (Table II).

DISCUSSION

In this report, differences in the recent oral health services usage were found according to socio-demographic and health variables. Higher use of these services was reported in women with university studies, people belonging to an ethnic group, and those perceiving poor health indicators. When conducting segmented analysis by gender, no significant statistically differences were found between men and women. To the best of our knowledge this is one of the first studies analyzing the use of oral health services in elderly population in Colombia.

In general terms, research focused on the accessibility of oral health services in Colombia and developing countries are scarce (de la Fuente-Hernández *et al.*, 2010; Matos & Lima-Costa, 2007; Pilger *et al.*, 2011; Wu *et al.*, 2013). Studies conducted in Brazil found that the elderly tend to seek out oral health services in low frequency (Matos & Lima-Costa; Pilger *et al.*). Other study assessing the recent use

Table I. Characteristics of the sample, Prevalence and confidence Intervals (95% CI) of use for dental services in population ≥65 years according to the selected variables. Colombia, 2007^a.

Variables	Women			Men		
	Sample		Prevalence of use of dental services (%; 95%CI)	Sample		Prevalence of use of dental services (%; 95% CI)
	n	%		n	%	
Education						
<= Primary	1085	76.7	23.7 (21.0–56.3)	893	73.4	21.7 (18.9–24.4)
Secondary	275	19.5	36.5 (30.5–42.5)	261	21.5	44.2 (38.0–50.5)
University	54	3.8	87.0 (77.2–96.9)	61	5.1	57.4 (44.1–70.6)
Ethnic group						
No	1262	88.5	28.4 (25.8–30.9)	1028	84.0	29.1 (26.2–31.9)
Yes	164	11.5	29.9 (22.3–37.4)	196	16.0	26.7 (20.2–33.1)
Self-rated health						
Good	606	42.5	31.8 (28.0–35.6)	708	57.8	29.9 (26.5–33.4)
Poor	820	57.5	26.0 (22.9–29.1)	516	42.2	27.0 (23.1–30.9)
Dental problems						
No	1263	88.6	26.0 (23.5–28.4)	1076	87.9	26.1 (23.4–28.8)
Yes	163	11.4	52.2 (43.4–61.0)	148	12.1	48.3 (39.8–56.8)
Oral-dental pain						
No	1340	93.1	28.0 (25.6–30.5)	1140	93.2	28.6 (25.9–31.2)
Yes	87	6.9	38.0 (26.0–50.0)	84	6.8	31.3 (20.7–41.9)
Dental caries						
No	1374	96.3	28.2 (25.7–30.6)	1377	96.2	27.1 (24.5–29.7)
Yes	52	3.7	41.5 (25.2–57.8)	47	3.8	72.1 (57.5–86.7)
Gum bleeding						
No	1398	98.1	28.0 (25.6–30.4)	1202	98.2	28.5 (25.9–31.1)
Yes	28	1.9	65.0 (40.8–84.6)	22	1.8	40.9 (18.1–63.7)
Total	1426	100.0	28.5 (26.1–30.9)	1224	100.0	28.7 (26.1–31.3)

a= Missing value (education level, n= 20; 0.8%).

∞ Table II. Multivariate analysis for the use of dental services in population ≥65 years (Crude/adjusted Odds Ratio and 95% confidence intervals - 95%CI-). Colombia, 2007.

Variables	Women			Men		
	cOR (95% CI)	cOR (95% CI)	aOR (95% CI)	cOR (95% CI)	cOR (95% CI)	aOR (95% CI)
Education^a						
<= Primary	1.00	1.00	1.00	1.00	1.00	1.00
Secondary	1.54 (1.27-1.87)	1.86 (1.40-2.48)	1.91 (1.43-2.56)	2.04 (1.70-2.46)	2.86 (2.14-3.83)	2.96 (2.18-4.00)
University	3.68 (3.17-4.27)	20.94 (9.46-46.36)	21.76 (9.72-48.73)	2.65 (2.06-3.40)	4.85 (2.85-8.24)	5.72 (3.27-10.01)
Ethnic group^b						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.06 (0.81-1.35)	1.06 (0.74-1.53)	1.17 (0.80-1.72)	0.92 (0.71-1.18)	0.89 (0.63-1.25)	1.03 (0.72-1.48)
Self-rated health^c						
Good	1.00	1.00	1.00	1.00	1.00	1.00
Poor	0.82 (0.69-0.96)	0.75 (0.60-0.95)	0.90 (0.70-1.14)	0.90 (0.75-1.08)	0.87 (0.68-1.12)	1.17 (0.89-1.54)
Dental problems^c						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.01 (1.67-2.42)	3.10 (2.16-4.43)	3.29 (2.26-4.77)	1.85 (1.52-2.25)	2.64 (1.86-3.76)	3.04 (2.10-4.39)
Oral-dental pain^c						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.34 (0.98-1.82)	1.57 (0.96-2.57)	1.78 (1.08-2.94)	1.10 (0.79-1.53)	1.15 (0.71-1.86)	1.39 (0.85-2.28)
Dental caries^c						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.47 (1.01-2.14)	1.76 (0.93-3.31)	1.84 (0.94-3.61)	2.66 (2.16-3.28)	6.92 (3.53-16.41)	8.22 (4.11-14.41)
Gum bleeding^c						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	2.32 (1.67-3.24)	4.86 (1.94-12.20)	4.91 (1.88-12.80)	1.44 (0.86-2.39)	1.82 (0.77-4.29)	1.88 (0.78-4.57)
Total^d	1.00	1.00	1.00	1.01 (0.89-1.14)	1.01 (0.85-1.20)	0.93 (0.78-1.14)

a= Adjusted OR for ethnic group, self-rated health and dental problems; b= Adjusted OR for education, self-rated health and dental problems; c= Adjusted OR for education, ethnic group; d= Adjusted OR for education, ethnic group, self-rated health and dental problems

of this kind of services found out that 1.9% out of 736 elders referred that have never used dental services in a State of Brazil (Oliveira *et al.*, 2013). Other studies reported that the majority of the participants (89.3%), had not been to the dentist in the last 3 months and more than a half of them hadn't consulted in many years (Benedetti *et al.*, 2007). These results showed a higher demand of oral health services in the elderly Brazilian population in comparison with the Colombian counterparts. The differences between these findings could be explained from the multiple determinants that influence the use of oral health services which include demographic, socioeconomic, psychological, cultural aspects, previous experience in the use of services, the health system and the politics in different cities and countries (Baldani *et al.*).

The differential gender analysis showed results comparable with other studies in which despite a greater use of health services is reported by women, no statistically significant differences were found. A study comparing trends in the usage of dental services by means of the National Household Survey (1998-2003) (Matos & Lima-Costa) showed that men were less likely to visit the dentist during a year, in comparison with women. Studies that analyze both sexes independently infer that women have more preventive trends driven by higher levels

of expression and emotion. This behavior is partly explained by the role that women took on as caregivers and the importance of these women for being in an adequate condition to meet the health care of their families. Literature also mentions the association of the frequent use of health services with aspects such as their acceptance when searching professional help, compliance with treatment plans, and finally showing no objection to the adoption of their own sick role (Wu *et al.*). In the case of men, health professional consultations are associated with fragility and loss of physical strength that would weaken the distinctive masculine role (Viacava *et al.*, 2001; Sánchez López *et al.*, 2006).

Regarding education, as presented in other similar research, a higher level of education is associated to a higher demand and utilization of health services (Matos & Lima-Costa; Pilger *et al.*). The education level is a strong predictor of a higher frequency of dental visits (Matos & Lima-Costa). These findings may be explained in part by the best knowledge of the habits and practices that promote oral health. Also, more educated people, could have a greater knowledge about the functioning of the health system, patient rights and responsibilities as users of the health service networks and as citizens, a better understanding of the mechanism and guarantees for accessing oral health services, which allows a greater access to information and training (Wu *et al.*).

In a research conducted in Brazil from data provided for a survey in elders, 70.2% reported a positive self-perceived health (excellent or good) (Benedetti *et al.*). In our study, more than a half reported a negative self-perceived health (higher in females). Subsequently, a positive health perception is related with a low use of oral health services (higher in males). The social perception of health could be explained by the elderly's adaptation capacity during the life cycle (Arango & Ruiz, 2006; Oliveira *et al.*).

Ethnicity plays an important role as predictor of health inequalities that are reflected in the morbidity, mortality, and health services accessibility. Our results are comparable to one study assessing the relationship between ethnicity and the use of oral health services in Brazilian elders; founding significant statistically differences since the utilization was higher in white people, and they found sex differences too. In research approaches in developed countries, for instance the US population, results showed that

African-American and Indigenous had the lowest expected rate of preventive dental care, but there were no statistically significant differences between racial and ethnic groups' trends regarding specific preventive dental care from 1999 to 2008 (Wu *et al.*). The heterogeneity of the minority ethnic groups should be considered when analyzing the social determinants of oral health since inequalities are been expressed in morbidity indicators (Skaar & Hardie, 2006).

The main strength of this study is the large sample that gives value to the measures obtained, which could be representative of elders in Colombia in the localities and regions. However, when interpreting the results, it is important to take the study's limitations into account. The indicators studied were based on the interviewees' own perception of the utilization of health services and this situation depends of the individual experience and could generate memory bias in the results. Because of the availability of data in the survey, results are limited to some health and socio-demographic variables, and it is important to consider other important predictors and determinants that could affect the use of oral health services. The cross-sectional design of the study avoids assessing causality in the relationships observed. Results and their limitations evidence the necessity to conduct further research through primary data from qualitative and quantitative methods for identifying barriers to determinants to oral health services accessibility from different key informants (elders, and health providers).

The utilization's demand of health services by the older population regarding the oral component should be a topic to include in the public health agenda in Colombia, taking into account changes in the demographic profile specifically because of the aging population. Also, the recognition that dental care is determined by multiple factors including disease profiles, educational level, socioeconomic status, income levels, employment characteristics, quality of life itself, the health system insurance, and other socio-demographic characteristics should be included. An alternative that would allow greater use of oral health services for elderly adults could be the possibility of generating a link between medical practice and health promotion, and disease prevention programs. It is clear that some changes that enable accessibility in terms of expanding the availability of professionals, and strategies in public hospital networks to meet the demand for dental care are necessary within the health system.

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RESUMEN: Analizar la prevalencia de los servicios de salud *oral* en la población adulta mayor en Colombia de acuerdo a diferentes variables socio-demográficas y de salud. Estudio transversal con la información de 2650 sujetos ≥ 65 años según la Encuesta Nacional de Salud Pública de 2007 (ENSP-2007). Variables: Uso de los servicios de salud *oral*, salud autopercebida, percepción de problemas de salud *oral*, dolor *oral*, caries dental, sangrado de las encías, sexo, nivel educativo y origen étnico. Se realizó un análisis multivariado por medio de regresión logística para el uso de los servicios de salud *oral* y las diferentes variables mediante el cálculo de Odds Ratio (OR) con sus intervalos de confianza IC al 95% (IC95%). Los análisis se realizaron por separado para hombres (H) y mujeres (M). El análisis de regresión logística mostró que las mujeres con estudios universitarios (ORa 21,76; IC95% 9,72–48,73), con problemas dentales (ORa 3,29; IC95%: 2,26–4,77), especialmente sangrado de las encías (ORa 4,91; IC95% 1,88–12,80) y los hombres con caries dental (ORa 8,22; IC95% 4,11–14,41), tuvieron mayor probabilidad de reportar el uso reciente de los servicios de salud oral. El uso de servicios de salud oral fue mayor en personas que pertenecen a grupos minoritarios, aunque no fue estadísticamente significativo. Las diferencias en el perfil de uso de servicios de salud oral para los adultos mayores se encuentran en función de variables socio-demográficas y de salud. Se necesita más investigación para explicar algunos resultados controvertidos.

PALABRAS CLAVE: salud oral, servicios de salud oral, accesibilidad a los servicios de salud, desigualdades en la salud.

REFERENCES

- Aday, L. A. & Andersen, R. A framework for the study of access to medical care. *Health Serv. Res.*, 9(3):208-20, 1974.
- Agudelo-Suárez, A. A.; Martínez-Herrera, E.; Posada-López, A.; Sánchez-Patiño, D. & Viñas-Sarmiento, Y. Ethnicity and self-perceived oral health in Colombia: a cross-sectional analysis. *J. Immigr. Minor. Health*, 16(1):111-8, 2014.
- Albala, C.; Lebrão, M. L.; León Díaz, E. M.; Ham-Chande, R.; Hennis, A. J.; Palloni, A.; Peláez, M. & Pratts, O. The Health, Well-Being, and Aging ("SABE") survey: methodology applied and profile of the study population. *Rev. Panam. Salud Publica*, 17(5-6):307-22, 2005.
- Aránzazu, M., G. C.; Boada, C., H.; Martínez, L., C. A. & Uribe, M. M. M. Percepciones de la salud general, oral y visual del adulto mayor que asiste a las clínicas de la Universidad Santo Tomás, factores que influyen su calidad de vida. *Rev. Ustasalud Odontol.*, 6:87-95, 2007.
- Baldani, M. H.; Brito, W. H.; Lawder, J. A.; Mendes, Y. B.; da Silva, F. F. & Antunes, J. L. Individual determinants of dental care utilization among low-income adult and elderly individuals. *Rev. Bras. Epidemiol.*, 13(1):150-62, 2010.
- Benedetti, T. R.; de Mello, A. L. & Gonçalves, L. H. Elderly people living in Florianópolis: self-perception of oral health conditions and use of dental services. *Cien. Saude Colet.*, 12(6):1683-90, 2007.
- Calderón, C. A.; Botero, J. C.; Bolaños, J. O. & Martínez, R. R. The Colombian healthcare system: 20 years of achievements and problems. *Cien. Saude Colet.*, 16(6):2817-28, 2011.
- Cardona, D.; Estrada, A. & Agudelo, H. B. Quality of life and health conditions of the elderly population of Medellín. *Biomedica*, 26(2):206-15, 2006.
- Colombia. Ministerio de Salud. *III Estudio Nacional De Salud Bucal - ENSAB III. II Estudio Nacional de Factores de Riesgo de Enfermedades Crónicas - ENFREC II*. Bogotá, Ministerio de Salud, 1999.
- Colombia. Profamilia. *Encuesta Nacional de Demografía y Salud*. ENDS-2010. Bogotá, Profamilia, 2010.
- Concha Sánchez, S. C. & Camargo Lemus, D. M. Análisis de la asociación entre la calidad vida y la condición oral de las personas mayores vinculadas a tres instituciones geriátricas de Bucaramanga: II Fase. *Rev. Ustasalud Odontol.*, 6:75-86, 2007.
- de la Fuente-Hernández, J.; Sumano-Moreno, O.; Sifuentes-Valenzuela, M. C. & Zelocuatecatl-Aguilar, A. Impacto de la salud bucal en la calidad de vida de adultos mayores demandantes de atención dental. *Univ. Odontol.*, 29(63):83-92, 2010.
- Díaz Cárdenas, S.; Arrieta Vergara, K. & Ramos Martínez, K. Impacto de la Salud Oral en la Calidad de Vida de Adultos Mayores. *Rev. Clin. Med. Fam.*, 5(1):9-16, 2012.
- Duque Duque, V. E.; Tamayo Castrillón, J.; Echeverri Cadavid, P. A.; Gutiérrez Osorio, A. Y.; Sepúlveda Correa, D.; Giraldo

- Ramírez, O. & Agudelo Suárez, A. Calidad de vida relacionada con la salud bucal en adultos mayores que consultan a la IPS Universitaria de Medellín y sus factores asociados. *Rev. C. E. S. Odontol.*, 26(1):10-23, 2013.
- Griffin, S. O.; Jones, J. A.; Brunson, D.; Griffin, P. M. & Bailey, W. D. Burden of oral disease among older adults and implications for public health priorities. *Am. J. Public Health*, 102(3):411-8, 2012.
- Guay, A. H. Access to dental care: solving the problem for underserved populations. *J. Am. Dent. Assoc.*, 135(11):1599-605, 2004.
- Jaramillo, I.; Martínez, R.; Olaya, S.; Reynales, J.; Uribe, C.; Castaño, R. A.; Garzón, E.; Almeida, C.; Travassos, C.; Basto, F.; Angarita, J. & Céspedes, J. E. Efectos de la reforma de la seguridad social en salud en Colombia sobre la equidad en el acceso y la utilización de servicios de salud. *Rev. Salud Publica*, 2(2):145-64, 2000.
- Latin American and Caribbean Demographic Centre (CELADE) - Population Division. Demographic Bulletin. Latin America and Caribbean: Population estimates and projections. Santiago de Chile, CELADE- ECLAC, United Nations, 2004.
- Machado, L. P.; Camargo, M. B.; Jeronymo, J. C. & Bastos, G. A. Regular use of dental services among adults and older adults in a vulnerable region in Southern Brazil. *Rev. Saude Publica*, 46(3):526-33, 2012.
- Marshman, Z.; Porritt, J.; Dyer, T.; Wyborn, C.; Godson, J. & Baker, S. What influences the use of dental services by adults in the UK? *Community Dent. Oral Epidemiol.*, 40(4):306-14, 2012.
- Matos, D. L. & Lima-Costa, M. F. Trends in the use of dental services by elderly Brazilians and related socio-demographic factors based on the National Household Survey (1998 and 2003). *Cad. Saude Publica*, 23(11):2740-8, 2007.
- McMunn, A.; Breeze, E.; Goodman, A.; Nazroo, J. & Oldfield, Z. Social determinants of health in older age. In: Marmot, M. & Wilkinson, R. G. (Eds.). *Social determinants of health*. 2nd ed. Oxford, Oxford University Press, 2006. pp.267-96.
- Nieto Antolínez, M. L. & Alonso Palacio, L. M. ¿Está preparado nuestro país para asumir los retos que plantea el envejecimiento poblacional? *Rev. Cient. Salud Uninorte*, 23(2):292-301, 2012.
- Oliveira, R. F. R.; Ferreira, R. C.; Santos, R. M. S.; Marques, A. P. S. F.; Rodrigues, C. A. Q. & Nasci-Mento, J. E. Elderly: use of dental services, behaviors and subjective health. *Unimontes Científica*, 14:202-18, 2013.
- Petersen, P. E.; Kandelman, D.; Arpin, S. & Ogawa, H. Global oral health of older people--call for public health action. *Community Dent. Health*, 27(4 Suppl. 2):257-67, 2010.
- Petersen, P. E. & Yamamoto, T. Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. *Community Dent. Oral Epidemiol.*, 33(2):81-92, 2005.
- Pilger, C.; Menon, M. H. & Mathias, T. A. Socio-demographic and health characteristics of elderly individuals: support for health services. *Rev. Lat. Am. Enfermagem*, 19(5):1230-8, 2011.
- Ramírez-Vélez, R.; Agredo, R. A.; Jerez, A. M. & Chapal, L. Y. Health-related quality of life and conditions of health in non-institutionalised elderly people in Cali, Colombia. *Rev. Salud Publica (Bogota)*, 10(4):529-36, 2008.
- Sánchez López, M. P.; Aparicio García, M. E. & Dresch, V. Anxiety, self-esteem and self-perceived satisfaction as predictors of health: differences between men and women. *Psicothema*, 18(3):584-90, 2006.
- Sisson, K. L. Theoretical explanations for social inequalities in oral health. *Community Dent. Oral Epidemiol.*, 35(2):81-8, 2007.
- Skaar, D. D. & Hardie, N. A. Demographic factors associated with dental utilization among community dwelling elderly in the United States, 1997. *J. Public Health Dent.*, 66(1):67-71, 2006.
- Viacava, F.; Travassos, C. M.; Pinheiro, R. S. & Brito, A. Projeto: gênero e utilização de serviços de saúde no Brasil, financiado pela OPS. Rio de Janeiro, Departamento de Informações em Saúde/Centro de Informação Científica e Tecnológica/Fundação Oswaldo Cruz, 2001.
- Wu, B.; Liang, J.; Luo, H. & Furter, R. Racial and Ethnic Variations in Preventive Dental Care Utilization among Middle-Aged and Older Americans, 1999-2008. *Front. Public Health*, 1:65, 2013.

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