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ORIGINAL ARTICLE

Oral hygiene habits in Portugal: results from the first Health Examination Survey (INSEF 2015)

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ABSTRACT

Oral health is a determinant for quality of life and preventive behaviours such as regular tooth brushing can reduce the risk of a wide spectrum of oral diseases. Adopting preventive behaviours increases the likelihood of being healthy and can be conditioned by demographic and socio-economic factors.

Objective: This study aims to describe preventive oral hygiene behaviours in the Portuguese population and assess their association with sociodemographic and socioeconomic factors.

Material and methods: A cross-sectional epidemiologic study was developed using data from the first Portuguese National Health Examination Survey. The target population comprised Portuguese community-dwelling residents aged between 25 and 74 years old. The percentage of individuals who brushed their teeth at least twice a day, provided that once was before sleeping, was considered the indicator showing a preventive behaviour, as this is recommended by the General Directorate of Health in Portugal. Poisson regression was used to identify factors independently associated with this behaviour.

Results: Sixty-five per cent of the participants reported tooth brushing as recommended. The prevalence of adoption of this preventive behaviour was higher among those living in urban areas and those who have higher educational level. Results show an association between being male and having low educational level with lesser adoption of preventive oral health behaviours.

Conclusion: These findings suggest a need for integrated approaches, from measures tackling social inequalities to actions focused on improving health literacy. It is also important to expand dental healthcare services and improve effective coverage to increase access for rural population.

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Introduction

Oral health is a state of being free from mouth and facial pain, oral and throat cancer, infection and sores, gum disease, tooth decay and loss, and other disorders that may limit one's ability to chew, bite, smile, speak and limit psychosocial wellbeing [1]. It is, thus, a determinant for one's quality of life. Around 48% of the world population suffers from some dental illness [2], even though regular tooth brushing may prevent dental loss and other diseases [3]. In Portugal, a study including individuals older than 15 years old reported a prevalence of daily tooth brushing of 97.6% out of which 72.7% brushed twice a day [4]. The same study showed 70% had lost at least one tooth and 6% were edentulous [4].

A study carried out in 2017 is in line with those findings, and showed that 97.8% of the population brushed their teeth regularly [5]. This study also reported that only 32.4% of the Portuguese population had full dentition. Another study also found that being a women, having high income and educational level were associated with better preventive behaviours towards oral health [6]. In fact, evidence has consistently shown that inequalities in healthcare are driven by social and economic factors [7]. Education, income and occupation play an important role in health status, which in turn is determined by (preventive) behaviour [8]. The importance of preventive care is well understood, particularly in oral health. At European and national level, cross-sectoral approaches with dental services being integrated into the health system, as well as preventive care, are endorsed and recognized as ways to improve citizens' oral health [9,10]. In addition, tailored approaches to specific groups such as children, older people and students should also be considered to improve the effectiveness of interventions. Finally, intergovernmental institutions strongly recommend that inequalities must be tackled not only through cross-sectoral approaches aiming at changing social and economic determinants but also through improving access to oral healthcare services [7].

In Portugal, the National Oral Health Promotion Plan (PNPSO) shows a clear concern for the most vulnerable.

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It not only targets children and youth through school health programs but also pregnant women, the eldest with social support and people living with HIV through a dentist cheque program [11]. Furthermore, there are intentions to gradually increase the population's access to dentists in primary health care units, framed by the National Health Plan 2012-2016/2020 [11].

As far as preventive care is concerned, the General Directorate of Health establishes as preventive behaviour brushing teeth at least twice a day, one being before sleep [12]. Other measures are recommended by the Portuguese Dental Association, such as the use of dental floss and a rich and varied diet, with special caution in sugar consumption [13].

Although there are some studies estimating the prevalence of oral diseases and hygiene habits [4,5] in Portugal, to the best of our knowledge none explores the effect of sociodemographic factors in the adoption of these preventive behaviours, as is recommended by the General Directorate of Health. Hence, the characterization of oral health preventive behaviours in Portugal and the study of their association with sociodemographic factors are essential for the identification of groups of high risk thus leading to the development of more targeted interventions. Consequently, this study aims to characterize oral hygiene practices in the Portuguese population and assess their association with sociodemographic factors.

Material and methods

A cross-sectional epidemiologic study was carried out using data from the first Portuguese National Health Examination Survey (INSEF), developed in 2015 by the National Health Institute Doutor Ricardo Jorge (INSA) in partnership with the Norwegian Institute of Public Health. The five Portuguese Regional Health Administrations of the mainland and the Regional Health Secretariats of the Autonomous Regions of Azores and Madeira have collaborated in the survey. The INSEF study design is described in detail elsewhere [14,15]. In summary, the target population was non-institutionalized individuals aged between 25 and 74 years, living in Portugal for more than 12 months and able to follow an interview in Portuguese. INSEF sample was selected using a probabilistic two-stage stratified cluster design and was designed to be representative at the national level and as well at regional level. The minimum required sample size was established at 600 at regional level (4200 at national level) in order to estimate an expected prevalence of 50%, with a precision of 5% for a 95% confidence level, considering a design effect of 1.5. Participants completed a physical examination, gave a blood sample and answered a general health questionnaire. Data were collected between February and December 2015 by computer-assisted personal interviews, performed by trained nurses. Demographic and socioeconomic characteristics of participants included age group (24–34; 35–44; 45–54; 55–64; 65–74), sex, degree of urbanization of the residence area (rural; urban), marital status (single; married or living with a partner; divorced; widowed), education and income. Education was categorized into 4 categories, according to the 2011 International Standard Classification of Education (ISCED-2011) [16]: ISCED 0 level (No formal education/Basic (1st cycle)), ISCED 1–2 levels (Basic (2nd cycle)/Basic (3rd cycle)), ISCED 3–4 levels (Secondary/Post-secondary), ISCED 5–8 levels (Higher/Post-graduate). Individual income was obtained from household monthly available income applying Organization for Economic Co-operation and Development (OECD) modified equivalence scale [17], to account for differences in household composition, and was categorized into quintiles. Participants' oral hygiene habits were assessed by the following close-end questions: 'How many times per day do you brush your teeth?'(Once a day/Twice a day/More than twice a day/Sometimes/Never/Doesn't know/Doesn't answer/Not applicable) and 'Do you brush your teeth before going to sleep?' (Yes/No). It was considered as a recommended preventive behaviour if participants declared tooth brushing at least twice per day, with one being before sleep [12]. Descriptive statistics (counts and percentages) were used to provide characterization of the sample. The proportion of the population that complied with recommended toothbrushing practices was estimated for the overall sample and separately for women and men stratified by age group, educational level, marital status, income and urbanization. Design adjusted Rao-Scott version of chi-square test was used to compare estimates among population subgroups. To identify factors associated with adherence to recommended oral hygiene behaviours, adjusted prevalence ratios (aPR [95% CI]) were estimated for regular tooth brushing according to age group, educational level, marital status, income and urbanization using Poisson regression. On the multivariable analysis, we assessed statistical significance of theoretically plausible two-way interactions using adjusted Wald test. In the presence of statistically significant interactions we opt to present results of regression models stratified by sex. Sampling weights were used in data analysis. All estimates were weighted to match the population distribution in terms of geographic region, age group and sex in 2015 [18]. The significance level was set to 5%. The statistical package [SVY] of software Stata 15.1 was used for data analysis [19]. INSEF protocol was approved by the Ethics Committee of the National Health Institute Doutor Ricardo Jorge and by the National Data Protection Authority (Authorization n°9348/2010). All survey participants provided written informed consent.

Results

Participants' description

The study sample was composed of 4907 individuals (52.5% women and 47.5% men), corresponding to a participation rate of 43.7%. Approximately 64% of participants were under 54 years of age. Almost 2/3 had less than secondary education and ≍62% were professionally active. Seventy-four per cent lived in urban areas and the majority (68.4%) were married or lived with a partner. Further information about participants´ characteristics can be found in Table 1.

Table 1. INSEF study participants' characteristics (2015).

Participants' characteristics	*n*	%
Sex ($n = 4911$)		
Women	2646	52.5
Men	2265	47.5
Age group (n=4911)		
25–34	714	18.3
35–44	1135	23.5
45–54	1193	22.4
55–64	1098	19.9
65–74	771	15.9
Education ($n = 4907$)		
No schooling/1st cycle of basic education (ISCED 0 level)	1516	27.7
2nd/3rd cycle of basic education (ISCED 1–2 level)	1595	31.5
Secondary school (ISCED 3–4 level)	958	21.4
Higher education (ISCED 5–8 level)	838	19.4
Occupation ($n = 4908$)		
Employed	2975	61.9
Unemployed	549	11.3
Other[a]	1384	26.8
Urbanization of living area ($n = 4911$)		
Rural	1397	26.4
Urban	3514	73.6
Marital status ($n = 4911$)		
Single	822	20.0
Married/living as a couple	3433	68.4
Divorced	408	7.0
Widow/widower	248	4.6
Income ($n = 4644$)		
1Q (lowest)	1131	20.8
2Q	1039	20.7
3Q	799	19.1
4Q	850	20.3
5Q (highest)	825	19.1

[a]Retired, house husbands/housewives or students.

Prevalence of recommended oral hygiene practice

Overall, 65% of participants declared that they brush their teeth at least twice a day, one before sleeping (Table 2). Concerning age group, there is a gradual decrease according to age, with the lowest prevalence being in the oldest group. Also, there is a clear increase along the education and income stratum, with individuals at the top reporting recommended oral hygiene practices (84.6% versus 47.9% among those with the lowest educational level; and 79% versus 53.5% for those in the lowest quintile). As far as sex is concerned, this is reported by 54% of the men and 75.1% of the women. Significant differences between men and women ($p < .001$) were found.

After stratification by sex, a clear pattern of adherence to recommended oral hygiene practices was observed in women for age, educational level and income: tooth brushing as recommended decreased with age and increased with education and income. A similar pattern was observed in men, except for age, as men from the age group 24–35 years presented a lower prevalence than men aged 35–44 years and there seemed to be no differences above 45 years. In addition, men and women who are employed and who live in urban areas had a higher prevalence of preventive oral hygiene practice (80.2% and 56.4% for employment status and 79.1% and 57.6% for urbanization of living area, respectively for women and men). Concerning marital status, single women presented the highest prevalence of recommended

Table 2. Proportion of individuals who reported tooth brushing at least twice a day, including one before sleeping according to participants' characteristics.

	Women ($n = 2643$)			Men ($n = 2264$)			Overall ($n = 4907$)		
	%	95% CI	*p* Value[a]	%	95% CI	*p* Value[a]	%	95% CI	*p* Value[a]
Tooth brushing									
At least twice a day, one before bed	75.1	71.7, 78.2		53.9	49.8, 58.0		65.0	61.7, 68.2	
Once or less	24.9	21.8,28.3		46.1	49.8,58.0		35.0	31.8, 38.3	
Age group			.001			.0177			.0007
25–34	83.3	77.2, 88.0		59.3	48.9, 68.9		71.5	65.6, 76.8	
35–44	78.3	73.4, 82.5		63.0	55.0, 70.4		70.9	65.6, 75.8	
45–54	77.1	72.0, 81.5		47.0	41.0, 53.1		62.7	58.3, 66.9	
55–64	72.3	67.6, 76.5		49.2	42.7, 55.8		61.4	56.6, 66.1	
65–74	62.7	52.8, 71.7		49.0	38.8, 59.2		56.6	48.4, 64.3	
Educational level			<.001			<.001			<.001
No schooling/1st cycle of basic education (ISCED 0 level)	58.6	51.6, 65.3		34.9	28.6, 41.8		47.9	42.5, 53.4	
2nd/3rd cycle of basic education (ISCED 1–2 level)	74.9	69.9, 79.3		50.3	44.4, 56.2		61.4	56.5, 66.1	
Secondary school (ISCED 3–4 level)	81.0	76.7, 84.7		68.0	61.3, 74.1		74.7	70.8, 78.2	
Higher education (ISCED 5–8 level)	90.8	85.9, 94.1		74.5	65.0, 82.1		84.6	80.3, 88.1	
Occupation			.0001			.0869			.0025
Employed	80.2	76.6, 83.3		56.4	52.2, 60.6		68.2	65.0, 71.2	
Unemployed	77.6	67.4, 85.3		51.8	42.8, 60.7		65.7	57.6, 73.0	
Other[b]	64.3	57.1, 70.9		47.7	39.2, 56.4		57.4	51.0, 63.7	
Urbanization of living area			<.001			.0012			<.001
Rural	63.6	58.0, 68.9		43.9	38.1, 49.8		54.0	51.2, 56.8	
Urban	79.1	75.1, 82.6		57.6	52.3, 62.7		69.0	64.7, 72.9	
Marital status			.0019			.5067			.2005
Single	84.9	80.3, 88.6		57.1	45.3, 68.2		70.1	62.2, 77.1	
Married/living as a couple	73.8	70.4, 77.0		52.1	47.9, 56.4		63.4	60.5, 66.3	
Divorced	74.0	61.4, 83.5		60.6	49.5, 70.7		67.7	58.1, 75.9	
Widow/widower	64.2	51.3, 75.4		55.4	31.2, 77.3		62.7	50.2, 73.8	
Income			.0001			<.001			<.001
1Q (lowest)	67.2	58.6, 74.8		36.7	29.0, 45.2		53.5	46.6, 60.3	
2Q	70.3	62.6, 77.0		44.6	35.7, 53.9		58.3	51.2, 65.0	
3Q	74.0	66.2, 80.6		53.9	46.8, 60.8		64.8	59.3, 70.0	
4Q	83.2	78.9, 86.7		59.6	52.0, 66.7		71.6	67.1, 75.8	
5Q (highest)	86.6	82.0, 90.2		72.5	63.8, 79.9		79.0	73.6, 83.6	

[a]Design adjusted Rao-Scott version of chi-square test (5% significance level).
[b]Retired, house husbands/housewives or students.

Table 3. Poisson regression for men and women for tooth brushing at least twice a day, including one before sleep.

	Women			Men		
	aPR	95% CI	*p* Value	aPR	95% CI	*p* Value
Age group						
25–34	Ref			Ref		
35–44	0.99	0.88, 1.11	.804	1.05	0.85, 1.29	.650
45–54	1.06	0.94, 1.20	.303	0.88	0.67, 1.16	.355
55–64	1.06	0.92, 1.21	.418	1.02	0.80, 1.31	.845
65–74	0.95	0.80, 1.12	.513	1.04	0.86, 1.26	.655
Educational level						
No schooling/1st cycle of basic education (ISCED 0 level)	Ref			Ref		
2nd/3rd cycle of basic education (ISCED 1–2 level)	**1.24**	1.09, 1.42	.002	**1.38**	1.11, 1.72	.005
Secondary school (ISCED 3–4 level)	**1.33**	1.16, 1.53	<.001	**1.71**	1.32, 2.22	<.001
Higher education (ISCED 5–8 level)	**1.46**	1.26, 1.69	<.001	**1.83**	1.43, 2.34	<.001
Urbanization of living area						
Rural	Ref			Ref		
Urban	**1.17**	1.04, 1.33	.011	**1.18**	1.03, 1.34	.016
Marital status						
Single	Ref			Ref		
Married/living as a couple	0.97	0.89, 1.05	.395	1.03	0.79, 1.35	.823
Divorced	0.90	0.77, 1.04	.148	1.17	0.91, 1.52	.208
Widow/widower	0.92	0.73, 1.16	0.475	1.13	0.71, 1.78	.606
Income						
1Q (lowest)	Ref			Ref		
2Q	1.03	0.92, 1.15	.563	1.13	0.84, 1.51	.415
3Q	1.01	0.86, 1.19	.855	1.27	0.97, 1.65	.083
4Q	1.09	0.96, 1.25	.187	**1.39**	1.08, 1.79	.013
5Q (highest)	1.06	0.94, 1.20	.311	**1.48**	1.13, 1.92	.005

aPR: adjusted prevalence ratio; 5% significance level.
Bold values refer to statistically significant associations.

practices (84.9%), whereas widows presented the lowest (64.2%). In men, the highest prevalence was observed for divorced individuals (60.6%) and the lowest for married ones (52.1%).

Multivariate model adjustment

On the multivariable analysis, we adjusted the Poisson regression model for the overall sample and assessed statistical significance of theoretically plausible two-way interactions of the Sex variable with the others included in the model: Sex*Income, Sex*Education, Sex*Marital status, Sex*Urbanization. Interaction terms Sex*Income ($p = .0329$) and Sex*Education ($p = .0043$) were statistically significant, meaning that the effect of socioeconomic background on tooth brushing practices depends on sex. Since the effects of education and income varied among men and women, we opt to present the results of Poisson regression by stratum, fitting separate models for men and women.

Table 3 shows results obtained from Poisson regression models adjusted for urbanization of living area, age group, marital status, education and income, for women and men. Regarding women, results show that preventive tooth brushing practices were independently associated with education level and urbanization of living area. No statistical significant association between recommended toothbrushing practices and age group, marital status or income was found. Data indicate that women living in urban areas have significantly higher prevalence of tooth brushing practices than those living in rural areas (17% higher). Education also showed significant differences between educational levels: women with higher educational level were 1.46 times more likely to comply with recommended toothbrushing practices than women with a lower educational level. Regarding men, similar modelling shows that recommended oral hygiene practices were associated with educational level and urbanization of living area. We also found income to be associated with preventive behaviour. No statistically significant associations were found between recommended oral hygiene practices and marital status or age group. Men living in urban areas had a prevalence of recommended oral hygiene practices 18% higher than men living in rural areas. As far as educational level is concerned, differences observed were greater in men than in women: men with higher educational level had 1.83 times higher prevalence than those with less than 4 years of education (1st cycle of basic education). Regarding income, men at the fourth and fifth quintile had 1.39 and 1.48 higher prevalence of tooth brushing when compared with men at the first quintile.

Discussion

This study revealed that 65% of the participants brush their teeth at least twice a day, including once before sleeping. This cut off point was established by the National Oral Health Program, along with other preventive measures to keep good oral health like using dental floss and fluoride toothpaste [12]. Adherence to recommended practices was higher among women (75.1%). Studies have shown that women are more prone to adopt health preventive behaviours particularly in dental care [20]. These differences may be explained by female perception regarding the impact that a good oral health can have in their quality of life and well-being [21]. Our findings are in line with other studies that report differences between men and women in relation to health preventive behaviour, including tooth brushing

frequency [6,22,23]. Nonetheless, it is worth to say that social desirability might also contribute to the fact that people reported more adherence to this practice than they really do.

Another key finding of our study was that the effects of education and income on tooth brushing practices are different between men and women. In particular, we found educational level was associated with proper tooth brushing practices both in women and in men, as well as a gradient showing that higher educational levels are associated with the occurrence of this practice. It is of note that the effect of education is more pronounced in men than in women. In fact, the secondary level of education changes the effect of regular toothbrushing practice in women but not in men (prevalence ratio of 0.8). The same occurs for women in the highest income categories (prevalence ratios of 0.73 and 0.63, respectively).

Moreover, a similar pattern was found with income, but only for men in the fourth and fifth quintiles: men in the highest income quintile had higher prevalence compared with men from the lowest. This overall gradient is well supported by the literature and is described as an inequality phenomenon which arises from social and economic factors [24]. We observed rural areas to have less preventive tooth brushing practices regardless of sex, age, education and income. This was also found in a previous study, though the indicator was brushing less or more than twice daily [6]. It argued that rural areas have less preventive practices because urban areas have more capital in health, meaning better access, higher educational levels, more information – and literacy – and younger population [6]. Actually, a study carried out in the USA showed that age-adjusted edentulousness is more likely among those living in rural areas than in urban areas [25] and access, defined as the 'timely use of personal health services to achieve the best possible outcomes', to oral healthcare services in rural areas is also harder to reach [25]. Another study, carried out in Brazil, also found a strong association between tooth loss and living in rural areas even after adjustment for demographic and socio-economic variables [26]. This might explain our finding that rural areas are less prone to adopt this preventive care because the percentage of edentulous is probably higher, probably also due to poor access. Although reducing inequalities through multisectoral approaches is a key to improve oral health [27], it is also important to improve health coverage and access [28]. In particular, it is important to tackle inequalities through social policies and pair them with more focused approaches like prevention campaigns, as well as increasing health literacy and awareness of risk factors. Nonetheless, it is important to assure improved access and high coverage, as it can foster preventive behaviours through professional counselling. Otherwise, it is likely that the lack of adequate, universal health services and effective coverage, together with adverse social factors, also can impact oral health through the lack of preventive behaviours.

Limitations

One of the limitations of this study is the response rate. Nevertheless, it is in line with response rates obtained in similar surveys. Although this study is a health examination survey, dental examination was not performed and data used was collected through questionnaire. Dental examination could allow an objective assessment of the participants' oral health and associations between oral hygiene practices and actual dental health status. Another limitation was recall bias, as information was collected using a questionnaire and participants may not remember their practices accurately or omit details. On the other hand, participants may have reported preventive practices due to social desirability and thus biased the results to some extent. Still, INSEF tried to minimize this bias by asking questions in a privacy setting and by the conduction of the interview by a health professional.

Despite these limitations, in this study, a baseline description of oral hygiene practices in the Portuguese population was established and may be used in the future to evaluate trends. In addition, results of the present study provide valuable information that may contribute to the enhancement of prevention-oriented dental education.

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References

[1] Oral Health. World Health Organization [internet]. Geneva: WHO [cited 2018 April 10]. Available from: http://www.who.int/oral_health/publications/factsheet/en/

[2] Kassebaum NJ, Smith AGC, Bernabé E. Global, regional, and national prevalence, incidence, and disability-adjusted life years for oral conditions for 195 countries, 1990–2015: a systematic analysis for the global burden of diseases, injuries, and risk factors. J Dent Res. 2017;96:380–387.

[3] FDI World Dental Federation. Oral Health Worldwide – A report by FDI Worls Dental Federation. Geneva: FDI World Dental Federation; 2015. [cited 2018 April 10]. Available from: https://www.omd.pt/content/uploads/2017/12/fdi-oral-health-worldwide.pdf

[4] Melo P, Marques S, Monteiro Silva O. Portuguese self-reported oral-hygiene habits and oral status. Int Dent J. 2017;67:139–147.

[5] Ordem dos Médicos Dentistas. Barómetro da Saúde Oral 2017 [Oral Health Barometer 2017] [Internet]. Lisboa: Ordem dos Médicos Dentistas; 2017. Portuguese [cited 2018 April 10]. Available from: https://www.omd.pt/content/uploads/2017/12/barometro-saude-oral-2017.pdf

[6] Almeida F. Determinantes de saúde oral. Evidência para Portugal [Determinants of oral health. Evidence for Portugal] [master's thesis]. Lisboa: Universidade de Lisboa; 2016. Portuguese.

[7] Marmot M. Social determinants of health inequalities. Lancet. 2005;365:1099–1104.

[8] Social Determinants of Health. World Health Organization [internet]. Geneva: WHO [cited 2018 April 10]. Available from: http://www.who.int/social_determinants/en/

[9] DGS Programa Nacional de Promoção da Saúde Oral [National Program for the Promotion of Oral Health]. Lisbon: Direção-Geral da Saúde. Portuguese. [cited 2018 April 10]. Available from: https://www.dgs.pt/paginas-de-sistema/saude-de-a-a-z/programa-nacional-de-promocao-de-saude-oral.aspx

[10] Patel R. The state of oral health in Europe. Policy recommendations. Platform for Better Oral Health in Europe 2012; [cited 2018 April 10]. Available from: http://www.oralhealthplatform.eu/our-work/the-state-of-oral-health-in-europe/

[11] Despacho n° 8591-B/2016; 2016. [cited 2018 April 10]. Available from: https://dre.pt/application/conteudo/74843527

[12] DGS Escovagem dos dentes [Toothbrushing]. Lisboa: Direção-Geral da Saúde; Portuguese. [cited 2018 April 10]. Available from: https://www.saudeoral.min-saude.pt/sisoPnpsoRepo/Folheto_Escovagem_Dentes_Como_Fazer_i007736.pdf

[13] Prevenção e higiene oral [internet]. Lisboa: Ordem dos Médicos Dentistas. Portuguese [cited 2018 April]. Available from: www.omd.pt/publico/prevencao-higiene-oral/

[14] Nunes B, Barreto M, Gil AP, et al. The first Portuguese National Health Examination Survey (2015): design, planning and implementation. J Publ Health 2018. doi: pubmed/pubmed/fdy150.

[15] Gaio V, Antunes L, Namorado S, et al. Prevalence of overweight and obesity in Portugal: results from the First Portuguese Health Examination Survey (INSEF 2015). Obes Res Clin Pract. 2018;12:40–50.

[16] Eurostat. International Standard Classification of Education (ISCED). [cited April 2018]. Available from: http://ec.europa.eu/eurostat/statistics-explained/index.php/International_Standard_Classification_of_Education_(ISCED)

[17] OECD. OECD Project on Income Distribution and Poverty. [cited April 2018]. Available from: http://www.oecd.org/eco/growth/OECD-Note-EquivalenceScales.pdf

[18] Lumley R. Complex surveys: a guide to analysis using R. Hoboken (NJ): John Wiley & Sons; 2010.

[19] Stata corp. Stata Statistical software. Release 15. College Station,Tx. Statacorp: LP; 2017.

[20] Fukai K, Takaesu Y, Maki Y. Gender differences in oral health behavior and general health habits in an adult population. Bull Tokyo Dent Coll. 1999;40:187–193.

[21] Mc Grath C, Bedi R. Gender variations in the social impact of oral health. J Ir Dent Assoc. 2000;46:87–91.

[22] Sakalauskienė Z, Vehkalahti MM, Murtomaa H. Factors related to gender differences in toothbrushing among Lithuanian middle-aged university employees. Medicina (Kaunas). 2011;47:180–186.

[23] Maes L, Vereecken C, Vanobbergen J, et al. Tooth brushing and social characteristics of families in 32 countries. Int Dent J. 2006;56:159–167.

[24] Entry points for addressing socially determined health inequities [internet]. Geneva: World Health Organization. [cited 2018 April 10]. Available from: http://www.euro.who.int/en/health-topics/health-determinants/social-determinants/policy/entry-points-for-addressing-socially-determined-health-inequities

[25] Fos P, Hutchison L. The state of rural oral health: a literature review. Rural healthy people 2010: a companion document to healthy people 2010.Volume2. College Station: The Texas A & M University System Health Science Center, School of Rural Public Health, Southwest Rural Health Research Center; 2003. [cited 2018 April 10]. Available from: https://www.ruralhealthresearch.org/publications/312

[26] Barbato PR, Nagano HCM, Zanchet FN, et al. Perdas dentárias e fatores sociais, demográficos e de serviços associados em adultos brasileiros: uma análise dos dados do Estudo Epidemiológico Nacional. *Cad Saúde Pública. 2007;23:1803–1814.

[27] Moysés S. Inequalities in oral health and oral health promotion. Braz Oral Res. 2012;26:86–93.

[28] Lourenço A, Pita Barros P. Cuidados de Saúde Oral. Universalização [Oral healthcare. Universalization]. Nova Healthcare Initiative. Lisbon: Nova School of Business & Economics; 2016 [cited 2018 April 10]. Available from: https://www.omd.pt/content/uploads/2017/12/cuidados-saude-oral.pdf