



ORIGINAL ARTICLE

Self-reported oral health-related habits, attitudes and knowledge in adults from Portugal, Romania and Sweden—A comparative study

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Abstract

Objective: The aim of the present study was to compare the self-reported oral health knowledge, habits and attitudes of adults in Portugal, Romania and Sweden, each benefitting from a different oral health system.

Methods: A cross-sectional study was conducted on 1081 adults in the three countries, using an adapted version of the WHO oral health questionnaire. This survey took place between November 2015 and June 2016.

Results: The mean age of the respondents was 46.85 with 95% CI (45.84, 47.86). Over 85% of the Portuguese and the Swedish, but only 55% of the Romanians, reported having 20 or more teeth left ($P < 0.001$). Most Swedes visit the dental office regularly, but only 50.5% of the Portuguese and 20.6% of the Romanians do so ($P < 0.001$). Interdental cleaning aids and fluoridated toothpaste were used the most in Sweden and the least in Romania. Daily consumption of sweets was lowest for Portugal and highest for Romania ($P < 0.001$), and daily intake of fresh fruits and vegetables was lowest for Sweden ($P < 0.001$).

Conclusions: There is a difference between the three countries regarding oral health, diet, dental attendance and oral health-related quality of life, with Romania being in most need of improvement in these areas. The differences could be explained by the distinct healthcare systems adopted by the countries.

KEYWORDS

adults' oral health, attitudes, comparative study, habits, oral health related quality of life

1 | INTRODUCTION

Oral health is a goal for major global health strategies as it is an important element for both the general health and the quality of life of the individual.¹ Those proposed strategies focus a great deal on the prevention of oral diseases, as this approach has proved both effective in maintaining a good state of oral health and cost-efficient for both the individual and the society.¹⁻⁵

Although Europe has experienced a decrease in the number of caries lesions overall,³⁻⁶ mostly by including preventive measures as health strategies,⁶ there are still notable differences regarding the state of oral health among its countries.² On a national level, oral health is dependent on the economic situation, on the social and cultural determinants and, most importantly, on the health system and strategy of that country.⁷

In Europe, there are several health models currently implemented by its states,⁸ each with its own impact on the respective population's oral health state, knowledge, habits and related quality of life.

The Nordic Oral Health Model has been based, for a long time, on national preventive measures and strategies. It has provided free dental service for children and adolescents until the age of 20. It has encouraged and provided oral health education campaigns, prophylaxis services and regular check-ups delivered by dental hygienists and dentists.⁹

The Southern European Oral Health Model has limited governmental support and is based on insurance schemes and private provision of oral treatment and care. Only in recent years, national health promotion programmes and free treatment for people younger than 18 years have been provided by the government. Dental hygienists are increasingly active in oral health promotion and prophylactic national programmes.⁸

The Eastern European Health Model, active mainly in countries from the former Communist Bloc, is characterized by provision of curative oral health services in the private sector. There are no oral health promotion and prophylaxis programmes supported by the government on a national level. The national insurance system assures free treatment for people under 18 years of age; however, it is delivered only by some dentists. There are a very limited number of dental hygienists in these countries.^{10,11}

The aim of this study was to compare oral health-related knowledge, habits and quality of life, in three different parts of Europe, each benefitting from a different health system and national oral health strategy.

2 | MATERIALS AND METHODS

2.1 | Study population

A minimum convenience sample of 200 adults was obtained by each of the university partners, Karolinska Institutet, University of Lisbon, "Victor Babes" University in Timisoara and "Carol Davila" University in Bucharest, in accordance with the EuHyDens project recommendations.

2.2 | Methodology

A transversal survey took place between November 2015 and June 2016 in Portugal, Romania and Sweden, with the aim of providing information regarding oral health-related habits, attitudes and knowledge among adults.

The survey was part of the Erasmus+ project, "European Training Platform for Continuing Professional Development of Dental Hygienists—EuHyDens."

A questionnaire was developed for this purpose, within the project, by oral health specialists from the Faculties of Dental Medicine at Lisbon University, Carol Davila University of Medicine and Pharmacy in Bucharest, Victor Babes University of Medicine and Pharmacy in Timisoara, and Karolinska Institutet in Stockholm, respectively.

In Portugal, the questionnaire was distributed through community organizations and clinical practices in Lisbon and the Portalegre area. The responsible persons of those locals were contacted and informed of the study and then gave their approval for questionnaire distribution.

In Romania, the questionnaire was distributed through dental practices, providing general public dental care, in Bucharest and Timisoara and their rural surroundings. Managers and doctors of dental offices located both in the centre and on the outskirts of Bucharest and Timisoara and in the rural surroundings of the two cities were contacted by phone, and the details regarding the survey were explained to them. The questionnaire was then distributed to patients, courtesy of the managers and/or doctors working in the dental practices, who agreed to take part in the survey.

In Sweden, eight clinics were involved in the distribution of the questionnaire. The clinics represented general public dental care, private dental care in different parts of Sweden, and the Department of Dental Medicine, Karolinska Institutet in Stockholm. The clinic managers were contacted and informed of the study and then gave their approval.

2.3 | Questionnaire

The questionnaire in this present study was based on the World Health Organization oral health survey questionnaire for adults,¹² which was modified according to the purpose of the project. Seventeen questions were included in the questionnaire with closed answer alternatives. The questions covered oral health issues concerning: self-perceived oral and general health status, oral hygiene and dietary habits, relation with the oral health specialists, tobacco use, the participants knowledge about oral health and oral health-related quality of life.

The questionnaire, which was originally designed in English, was translated by the country partners members, oral health specialists, fluent in English, and native speakers into Portuguese, Romanian and Swedish. It was then administered to all adults who accepted to participate in the survey.

2.4 | Ethical approvals

The survey was approved by the Ethics Committees (Portugal March 8th, 2016, Romania, 87/03.2016, Sweden Dnr: 2016/270-31/1) of the above-mentioned universities. Each adult who accepted to participate in the survey was given an information sheet which contained an informed consent. All participants gave their informed consent prior to answering the questionnaire.

2.5 | Statistical analysis

Data analysis used the IBM SPSS version 22. The responders were divided into three age groups, under 41, 41-64 and older than 65, when comparing age-related variables.

The association between qualitative variables used Pearson chi-square test and Fisher's exact test. One-way ANOVA parametric test, Kruskal-Wallis and median non-parametric tests were considered for multiple comparison of quantitative variables. A *P* value of 0.05 or less was considered statistically significant.

3 | RESULTS

3.1 | Demographic characteristics

A total number of 1081 adults responded to the questionnaire: 200 from Portugal, 608 from Romania and 273 from Sweden. The synopsis of the responses is shown in Table 1.

The mean age of participants was 46.85 with 95% CI (45.84, 47.86). The Portuguese and the Romanian respondents were significantly younger than the Swedish ($P < 0.001$).

The majority of participants in all countries belong to 41-64 years old age group. Most of the respondents lived in an urban environment. Portugal presented the lowest number of participants with Higher/University degree ($P < 0.001$) as shown in Table 1.

3.2 | Perceived oral and general health

Respondents were asked for their opinion regarding their general health and oral health, which includes both status of the teeth and the gums. Results can be seen in Table 1.

Over 60% of respondents in each country consider their general health to be good or very good, the percentage of the Swedes being significantly higher compared to the others ($P < 0.001$). For all countries, fewer participants regarded their oral health as being good or very good, when compared to general health. Significantly ($P < 0.001$), more Swedes consider their oral health as being good or very good, than the respondents of the other two countries.

In Portugal and Romania, people consider their teeth health as being poorer than their gum health; in Sweden, more respondents regard their teeth health as being better than their gum health (Table 1).

3.3 | Aspects regarding reported state of dental health

A significant difference was noted in the frequency of people having 20 or more teeth; only 55% of the Romanian but more than 85% of the Portuguese and Swedes had 20 or more teeth (Table 2).

When considering age categories, almost half (48.3%) of the Romanians aged 65 or older reported having between 0 and 9 natural teeth. This is significantly more ($P < 0.005$) than the 33.3% of the Portuguese and only 2.3% of the Swedish, for the same age group and number of teeth (Figure 1). Fewer Romanians report having 20 or more teeth for all three age categories than the corresponding percentages of respondents in Portugal and Sweden, and the difference is significant ($P < 0.005$; Figure 1).

Regarding removable dentures, 17% of the Portuguese declared having a partial denture, which was the highest percentage of the three countries ($P < 0.001$). Less than 5% of participants from all three populations declared having a full upper or lower denture, with the highest percentage for Romania and the lowest for Sweden (Table 2).

3.4 | Responder's source of information regarding oral health

The source of information regarding oral health was different for the three countries. The Swedish participants got information mainly from the dental hygienist (79%) and the dentist (65.5%). The participants from Portugal received oral health information mainly from the dentist (63.5%) and less from the dental hygienists (25.5%). In Romania, 67% of the respondents reported that family was the most important provider of oral health information, followed by the dentist (64.6%) and the school (42.3%)—Table 3.

3.5 | Relation to dental professionals

Over 70% of adults in Sweden and Romania have visited a dentist within the previous year, while in Portugal only 53% of the respondents did. Close to 85% of Swedes, but only 27% of Portuguese and 11% of Romanians, had visited a dental hygienist within the previous year. On the other hand, 52% of Portuguese and 84.2% of Romanians reported that they have never visited a dental hygienist.

Regarding the reason for visiting the dental office (Table 3), the majority of Swedes went on a regular basis. Only half of the participants from Portugal visited a dentist on a regular basis, and 36.4% of the respondents sought professional dental care only when a problem appeared. In Romania, over 50% declared going to the dentist only when they experienced a dental problem and 23% visited a dentist only if the dental problems persisted.

3.6 | Oral hygiene habits

In all three countries, over 94% of respondents brushed their teeth once or twice daily and 97% used toothpaste. The use of fluoride

	Country			P
	Portugal	Romania	Sweden	
Participants	200	608	273	
Gender				
Male	42%	36.8%	44.7%	0.069 ^a
Female	58%	63.2%	55.3%	
Mean age (95% CI)	43.31 (41.14, 45.48)	44.96 (43.64, 46.28)	53.64 (51.67, 55.62)	<0.001 ^b
Age distribution				
40 y or younger	37.0%	41.3%	26.4%	<0.001 ^a
41-64 y old	55.5%	43.8%	41.8%	
65 y or older	7.5%	15.0%	31.9%	
Residence—Urban	83%	69.7%	73.6%	0.001 ^a
Education distribution				
Secondary education	59.6%	33.1%	34.4%	<0.001 ^a
Vocational school	6.1%	7.1%	11.4%	
Higher/university education	34.3%	59.8%	54.2%	
Self-perceived state of health				
(Very)Good general health	67.5%	72.8%	92.3%	<0.001 ^a
(Very)Good gums health	56.3%	61.8%	75.7%	<0.001 ^a
(Very)Good teeth health	43.4%	52.6%	81.6%	<0.001 ^a

^aFisher's exact test.

^bANOVA test.

toothpaste was reported by over 80% of respondents in both Sweden and Portugal, and by a lower percentage, 66.5%, in Romania; the rest of the respondents declare mainly not knowing whether their toothpaste contained fluoride (Table 3).

A power toothbrush was used by significantly fewer Portuguese, 12.5%, and Romanians, 19.6% when compared to the Swedes, 60.4% ($P < 0.001$). The use of interdental aids was highest among Swedish respondents and lowest for Romanians (Table 3).

Regarding tobacco use, there were significantly more smokers among Romanians compared to the respondents from Portugal and Sweden (Table 3).

3.7 | Dietary habits

Nine categories of foods and drinks were recorded. The percentages of respondents that report consuming the respective foods/drinks on a daily basis can be followed in Table 4.

Concerning sugar consumption, Romania has the highest consumption of sweets/candy and chewing gum with sugar for people under 65 years. Romanians also report the highest consumption of drinks with sugar or sugar-free and coffee/tea with sugar for all age groups (Table 4).

Regarding the consumption of fresh fruits and vegetables, Sweden has significantly lower percentages of daily consumption for people younger than 65 years, when compared to Portugal and

Romania. Also, for all countries, the percentage of daily consumption of fresh fruits and vegetables is increasing with age, but the increase is significant only for Portugal ($P = 0.001$, test of linear dependence) and Sweden ($P = 0.027$, test of linear dependence; Table 4).

3.8 | Knowledge regarding oral health issues

The questionnaire included a series of statements regarding oral health issues. The respondents were required to choose, based on their own knowledge, one of the following answers: "Agree," "Disagree," and "Don't know." The percentages of correct answers for the three countries can be observed in Figure 2.

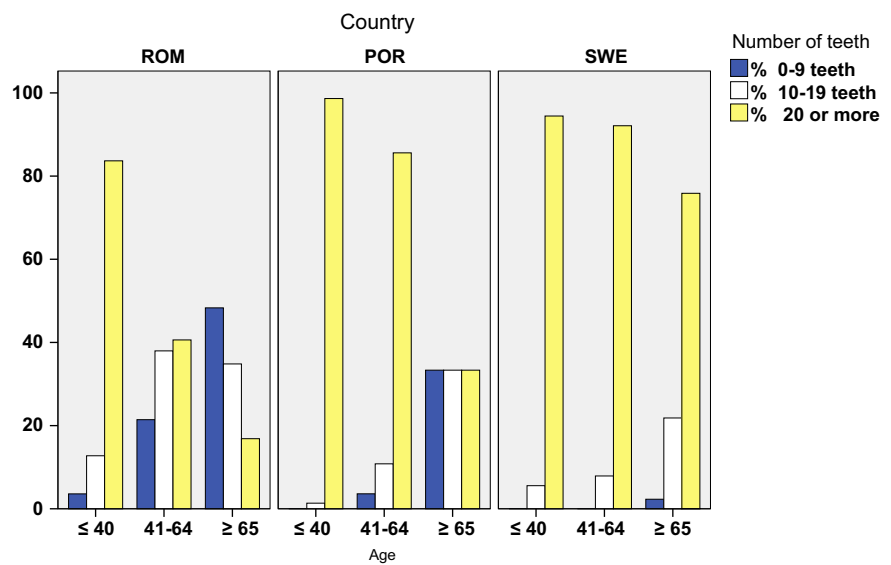
More than 90% of respondents from Portugal and Sweden agree with "Eating sweets can lead to caries", "Daily oral hygiene prevents caries" and "Daily oral hygiene prevents periodontal disease." The corresponding percentages are significantly lower ($P < 0.05$, Pearson chi-square test) for Romanians: 75%-90%.

The percentages of respondents who agree with the statement "Smoking compromises periodontal health" are significantly lower in comparison with the percentages of people in agreement with the three above-mentioned assertions ($P < 0.05$, for paired samples *t* test): 73.5% for Portugal, 66.4% for Romania and 60.3% for Sweden. It is to be underlined that the statement "Periodontal disease is related to general health" is the least known of in the three countries (with percentages 50%-55%).

TABLE 1 Demographic characteristic and perceived health for the three countries

TABLE 2 Reported state of oral health for the three countries

	Country			P
	Portugal (%)	Romania (%)	Sweden (%)	
Number of teeth distribution				
0-9 teeth	4.5	18	0.7	<0.001 ^a
10-19 teeth	9.0	27.1	11.7	
20 teeth or more	86.5	55.0	87.5	
Full lower denture ^b				
41-64 y old	1.8	4.5	0	0.029 ^a
65 y or older	13.3	14.8	1.2	0.002 ^a
All ages	2	4.3	0.4	0.002 ^a
Full upper denture ^b				
41-64 y old	1.8	5.6	2.7	0.217 ^a
65 y or older	33.3	13.6	3.5	0.001 ^a
All ages	3.5	4.8	2.2	0.186 ^a
Partial denture ^b				
41-64 y old	24.3	12.4	4.4	<0.001 ^a
65 y or older	40	33	4.7	<0.001 ^a
All ages	17	11.3	3.7	<0.001 ^a

^aFisher's exact test.^bFrequencies for "age under 40" are very small.**FIGURE 1** Distribution of the number of teeth depending on age group and country

For each respondent, we have defined the score of oral health knowledge, *OH-Knowledge-score*, as the number of items/statements (Figure 2) for which the respondents gave the correct answer—thus, the values for the *OH-Knowledge-score* can be 0 through 5.

The mean values of the *OH-Knowledge-score* for Portugal, Romania and Sweden are 4.07, 3.73 and 4.02, respectively. The mean score for Romania is significantly lower ($P < 0.002$ for multiple comparison ANOVA test).

3.9 | Oral health-related quality of life

Eleven items describing the impact of oral health problems on quality of life were recorded. Respondents were asked about the frequency of experiencing some problems during one year before the survey. Figure 3 shows the most frequent inconveniences reported by respondents as "often" or "very often."

The percentage of respondents with (very) often bleeding gums had the highest values: 14.5% for Romania and Sweden, and it was

TABLE 3 Comparison between survey results for the three countries

	Country			P
	Portugal (%)	Romania (%)	Sweden	
Source of oral health information				
Home	57.0	66.8	55.9%	0.002 ^a
School	41.5	42.3	44.5%	0.772 ^a
Media	53.5	27.5	9.6%	<0.001 ^a
Internet	20.0	18.3	5.5%	<0.001 ^a
Dental hygienist	25.5	17.6	79.0%	<0.001 ^a
Dentist	63.5	64.5	65.5%	0.922 ^a
Frequency of tooth brushing				
Once a day	17.5	22.6	11.2%	<0.001 ^a
Twice or more daily	78.5	71.7	87.7%	
Objects used for dental hygiene				
Power toothbrush	12.5	19.6	60.4%	<0.001 ^a
Manual toothbrush	92.0	88.0	66.3%	<0.001 ^a
Dental floss	52.5	39.6	60.1%	<0.001 ^a
Interdental brushes	12.0	8.6	40.3%	<0.001 ^a
Water jet	5.0	12.2	—	<0.001 ^a
Toothpicks	34.0	30.3	39.7%	<0.05 ^a
Use of fluoride toothpaste				
Yes	80.5	66.5	89.7%	<0.001 ^a
No/don't know	19.5	33.5	10.3%	
Last visit to the dentist				
Less than 1 y ago	53	71.4	75.7%	<0.001 ^a
More than 1 y ago	45	28.1	24.3%	
Never	2	0.5	0%	
Last visit to the dental hygienist				
Less than 1 y ago	27.5	11.1	84.9%	<0.001 ^a
More than 1 y ago	20.5	4.6	13.9%	
Never	52	84.2	1.3%	
When do you visit the dental professional?				
Regular check-ups	50.5	20.6	82.8%	<0.001 ^a
When a problem appears	36.4	56.4	13.9%	
When the problem persists	13.1	23.0	3.4%	
Daily cigarette smokers	15.7	25.7	8.1%	<0.001 ^a

^aFisher's exact test.

significantly lower for Portugal ($P = 0.006$ for Pearson chi-square test). The percentages of "pain," "difficulty in biting foods," "difficulty with chewing" and "embarrassed because of teeth" were significantly higher in Romania (with P between 0.001 and 0.047 for Pearson chi-square test). There was no statistically significant difference between the three countries for "dry mouth," "avoided smiling because of teeth" and "difficulty with speech and pronunciation." The frequencies of items "days off work because of problems with teeth or gums," "difficulty doing daily activities" and "reduced participation in social activities" were small (less than 2%).

4 | DISCUSSION

The results of this study showed a number of differences regarding self-reported oral state of teeth, oral health knowledge and habits between the three surveyed populations. These variations were to be expected, given the existing differences between Portugal, Romania and Sweden regarding past political regimes, current economic situation and health policies. The following discussion will explore the relationship between the survey findings and the different health systems applied in the three studied countries.

TABLE 4 Daily consumption of specific foods/drinks, per country and age groups

Food/drink	Age	Country			Statistical significance ^a
		Portugal (%)	Romania (%)	Sweden (%)	
Fresh fruits and vegetables	<41	52.05	62.15	56.31	R > S, P = 0.004
	41-64	75.68	67.42	66.05	S < R, P = 0.037; S < P P < 0.001
	>64	80.00	71.11	66.14	P > 0.05
Biscuits, cakes, cream cakes	<41	10.96	15.20	13.16	P > 0.05
	41-64	8.11	12.98	10.49	P > 0.05
	>64	0.00	10.59	12.02	P < R, P = 0.007; P < S, P = 0.001
Jam or honey	<41	2.74	6.83	5.33	P > 0.05
	41-64	1.80	16.48	10.72	R > P, P < 0.001; R > S, P = 0.005
	>64	0.00	18.39	15.05	P < R, P < 0.001; P < S, P = 0.001
Sweets/candy	<41	5.48	22.49	15.99	R > P, P < 0.001; R > S, P < 0.001
	41-64	1.80	12.84	8.52	R > P, P < 0.001; R > S, P = 0.035
	>64	6.67	4.55	2.67	P > 0.05
Chewing gum with sugar	<41	6.85	28.11	19.54	R > P, P < 0.001; R > S, P < 0.001
	41-64	1.83	17.83	10.63	R > P, P < 0.001; R > S, P < 0.001
	>64	0.00	1.18	2.17	P > 0.05
Soft or sport drinks, fruit juices with sugar	<41	6.85	25.70	18.27	R > P, P < 0.001; R > S, P < 0.001
	41-64	1.80	13.18	9.11	P < R, P < 0.001
	>64	0.00	10.34	7.07	P < R, P = 0.007
Soft or sport drinks, fruit juices sugar-free	<41	4.11	13.65	9.64	R > P, P = 0.01; R > S, P < 0.001
	41-64	1.82	6.59	4.78	P > 0.05
	>64	6.67	11.36	6.99	P > 0.05
Tea with sugar	<41	4.11	12.50	8.91	R > P, P = 0.025; R > S, P < 0.001
	41-64	9.01	19.85	13.37	R > P, P < 0.001; R > S, P < 0.001
	>64	13.33	23.26	13.04	R > S, P < 0.001
Coffee with sugar	<41	27.40	43.60	33.16	R > P > S, P = 0.027
	41-64	44.55	52.67	40.41	S < R, P < 0.001; S < P, P < 0.001
	>64	33.33	44.94	27.66	S < R, P < 0.001

Abbreviations: P, Portugal; R, Romania; S, Sweden.

^aOne-way ANOVA.

4.1 | Perceived oral health and reported state of oral health

Regarding the perceived state of teeth and gums, Sweden has the highest percentage of respondents who reported their oral health state as being good/very good, while Portugal had the lowest.

Regarding the state of oral health, the respondents from Romania reported having the least number of teeth from the three countries. Also, the present survey results showed that they tend to lose their teeth earlier in life than people from Portugal or Sweden. These findings are particularly alarming since the participants from Romania were younger than the ones from Sweden.

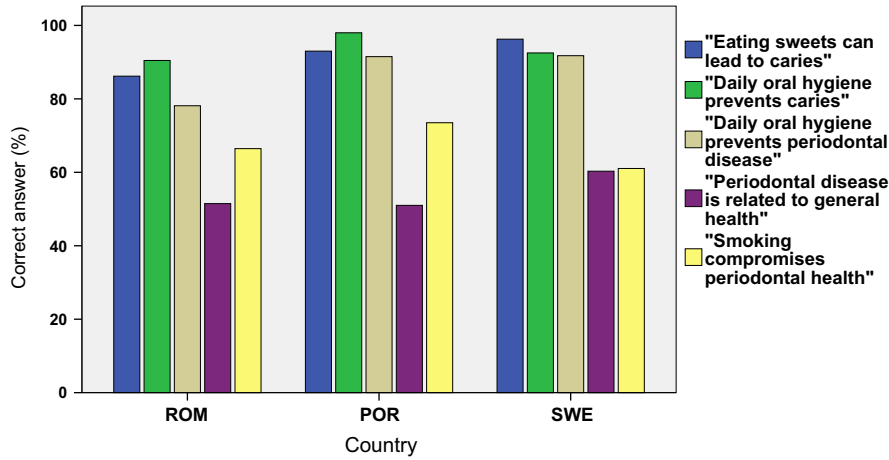


FIGURE 2 Knowledge regarding oral health issues for the three countries

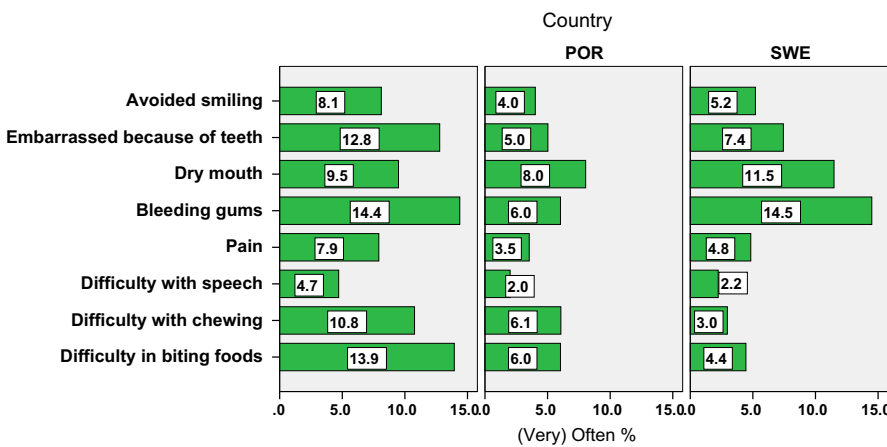


FIGURE 3 The percentage frequency of the most common inconveniences reported by the respondents

Some studies have shown that self-rating of oral health can be used as a good indicator of clinical findings.¹³⁻¹⁵ In this study, however, there seems to be a lack of consistency between the perceived state and the reported state of oral health, for the Romanian respondents. That is to say that the reported state of teeth, difficulty with chewing and biting, and reported pain for the Romanian respondents were poorer than for the respondents in the other countries, but they considered their state of oral health as being better than the Portuguese did. This inconsistency could mean that, for the Romanian respondents, the expectations of good oral health are somewhat lower and also that the understanding of what good oral health means differs.

4.2 | Oral health information and knowledge

Both the groups from Portugal and Romania acknowledge the “dentist” and “home” as being the main sources of oral health information, while the Swedish recognize the dental hygienist and the dentists, in that order, as their main sources of oral health information.

It must also be noted that significantly more Swedes gain oral health information from dental hygienists.

This is consistent with the fact that Romania has a very small number of dental hygienists practicing, while Portugal benefits from

more than 30 years of dental hygiene education programmes, and Sweden has an even longer and successful experience regarding the dental hygienist profession.

4.3 | Relation to dental professionals

Most of the Swedes had regular check-ups at a dental office. Dental attendance on a regular basis was more precarious in Portugal and quite low in Romania. In Portugal and Romania, the tendency was to seek professional dental help only if a dental problem appears and/or persists. The Euro barometer 2010²⁴ reported “emergency” as the reason for their last visit to the dentist for 40% of Romanians, 25% of Portuguese and 18% of Swedish participants; those reported percentages are similar to the ones in this study for Sweden, but lower for Portugal and Romania. Nevertheless, both inquiries revealed that the Swedes had the highest frequency of dental attendance from the three countries, followed by the Portuguese and the Romanians.

The precarious dental attendance in Romania could be explained by the lack of nationwide oral health promotion and education programmes. Similarly, as the 2012 Oral Health Report² also suggests, another reason could be the decentralization of the health services during the transition period following the fall of the communist

regimes in the Eastern European countries. Another reason could be the fact that oral care is funded by the state mostly for children until the age of 18 and for special categories and partially for employed adults,¹¹ but the sums that are covered by the state are quite low, making dental treatment in Romania quite expensive for a large number of inhabitants.

The high percentage of participants reporting regular dental attendance in Sweden is the consequence of efficient national oral health programmes which support mandatory routine check-ups.⁹

4.4 | Oral hygiene habits

More than 30% of Romanians did not use fluoride toothpaste or did not know if their toothpaste contained fluoride. This, we believe, is indicative for lack of knowledge about the benefits of topical use of fluoride. The main contributor to the decline in dental caries seen worldwide is the frequent use of fluoride dentifrices according to Marinho, 2009.¹⁶

4.5 | Dietary habits

In Romania, the reported dietary habits indicate the highest consumption of sugar, from sweet foods, drinks or chewing gum with sugar, although over 80% of the participants agreed that "Eating sweets can lead to caries." Other studies^{17,18} also reported that correct oral health knowledge does not necessarily lead to proper oral health habits. This could be indicative for the need of further quality education supported by motivational interviewing to lead to behavioural change,^{19,20} especially in Romania.

Oral health-related quality of life seems to be lowest for Romania, as more Romanians reported a higher frequency for functional limitation and pain, social and psychological disabilities.

The present study revealed that, from the three studied groups, the Swedish respondents had the best reported state of oral health, oral hygiene habits and knowledge and dental professional attendance. On the other hand, the respondents from Romania reported the highest percentage of missing teeth, having the poorest hygiene habits, especially regarding use of fluoride and interproximal cleaning and reported the least dental professional attendance frequency on a regular basis, from the three countries. Meanwhile, the respondents from Portugal reported a better oral health status, hygiene habits and dental attendance when compared to Romanians, but worse than the Swedish. These results are consistent with the results of the Eurobarometer 2010.²⁴

4.6 | Study results and the National Health System

It is well documented that applying preventive measures, including plaque control and education in oral health, will lead to a decrease in the incidence of oral health disease.³⁻⁵ The findings of Kino et al²⁰ showed that the higher the quality of education and health care in a country the lower the occurrence of health risk behaviours. When preventive measures and oral health education are concerned, studies show the important role that dental hygienists in this field have and the benefits of their work.²¹⁻²³

Indeed, the results obtained for the three countries are consistent with the fact that Sweden has benefited from the Northern Health System that has been applying national oral health promotion policies and putting to good use the dental hygienist profession in this process. On the other hand, Romania, as a former Eastern Communist Bloc state, has no national strategy for oral health promotion and a reduced number of dental hygienists, with only scarce oral health promotion programmes on a local level, showed the poorest results in this survey.

The results for Portugal are in line with the fact that Portugal is a beneficiary of national oral health policies, and the existence of dental hygienists involved in these strategies and those advantages began in more recent times than in the Northern European states.

5 | LIMITATIONS

We acknowledge as limitations of this study that the population was mostly urban and that the rural areas where the survey took place were mostly closer to urban areas. Also, the respondents constitute a convenience sample and were in most cases patients of dental and dental hygiene clinics.

6 | CONCLUSIONS

There is a difference between Portugal, Romania and Sweden in terms of oral health, diet, dental professional attendance habits and oral health-related quality of life, with Romania being in most need of improvement in these areas.

The differences could be explained by the distinct healthcare systems adopted by the three countries. Regarding Sweden, the positive impact of a supportive health system, promoting preventive strategies for a long time and making good use of a complex professional dental team that includes dental hygienists working alongside dentists and dental assistants, was shown.

The variations across the three countries indicate that Romania would benefit the most from a correct oral health promotion strategy at a national level and from the scope of practice offered by dental hygienists.

7 | CLINICAL RELEVANCE

7.1 | Scientific rationale for the study

This research provides information regarding oral health state, knowledge and habits of adults in three countries, belonging to different regions and health systems in Europe.

7.2 | Principal findings

There are significant differences between the studied populations, and those variations can be explained by the health system and the

existence or lack of active dental hygienists in each of the studied countries.

7.3 | Practical implication

Oral health-reported state, knowledge and habits of adults are in relation to the health system, and this information can be used to improve oral health services and national health strategies.

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