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PERIODONTAL STATUS AND SELECTED PARAMETERS OF ORAL CONDITION OF POLES AGED FROM 65 TO 74 YEARS

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ABSTRACT

INTRODUCTION. The goal of this study was the evaluation of the periodontal health by means of CPI score in inhabitants of big and small cities in the age range from 65 to 74 and making comparison with previous Polish and European studies from XXI century. Also an average number of natural teeth, the edentulous persons percentage, the percentage of people with oral function maintenance and prevalence of oral mucosal diseases were evaluated. There were also attempts to evaluate essential behaviours related to the oral health and the percentage of people that are treated with use of non-reimbursed or reimbursed services.

MATERIAL AND METHODS. Studies were conducted in 5 big cities: Warszawa, Szczecin, Wrocław, Białystok and Toruń, as well as in 4 towns, such as Oława, Police, Łobez and Elk. From sampling 7400 people aged from 65 to 74 years for the study reported only 807 people. In the mouth evaluated CPI score, number of natural teeth and prevalence of pathological lesions on cavity mucosa. Answers for questions on selected attitudes and health-seeking behaviours related to the oral health and the range of dental treatment were also analysed.

RESULTS. Distribution of values of CPI codes in the whole group was as follows: CPI0- 1.2%, CPI1- 9.4%, CPI2- 16.6%, CPI3- 21.8%, CPI4- 19.7% and the number of people excluded from examinations (1 tooth in the sextant or edentulous 31.3%). The state of the periodontium was worse in big cities and in men. An average number of teeth was 13.7 and was higher in big cities and in men. The percentage of edentulous persons was 28.9% and was higher in towns and in woman. The percentage of people with oral function maintenance was 25.15% and was higher in big cities and in men. The most three common pathologies of the oral cavity were leukoplakia and leukokeratosis that were found in 10.5% of examined people, candidiasis 5.82% and lichen planus 2.2%.

CONCLUSION. The state of the periodontium of Poles at the age from 65 to 74 has not been improved in XXI century, but also does not significantly differ from an average European level. An average number of remaining teeth of Poles at this age has increased, but remains under a European average; also the prevalence of edentulism has decreased, but still remains one of the highest in Europe. The percentage of people with oral function maintenance is very low, thus needs for prosthetic treatment and rehabilitation of masticatory ability remain high. Precancerous lesions in the oral cavity are quite common in this age group. Health-seeking behaviours related to the oral health of older Poles are inadequate and result from a low level of knowledge on dental prophylaxis.

Key words: *epidemiological oral health examination, periodontal diseases, tooth loss, oral mucosa diseases, oral health behaviours*

INTRODUCTION

The World Health Organisation significantly changed accents in periodontal goals of oral hygiene in the age range from 65 to 74 for 2020 in comparison

to 2010. In 2010, it was assumed that no more than 5% of people at this age was toothless, 75% had at least 20 functional dentitions and there should have been no more than 0.5 of dentition sextant with the highest CPI (Community Periodontal Index) score that is 4 (1). For

year 2020 assumptions are more general: reduction of a number of teeth extracted because of dental caries and periodontal diseases, reduction of a number of edentulous persons, increase of a number of remained natural teeth, increase of the percentage of people with at least 21 remained teeth, reduced prevalence of active periodontal infections oral mucosal diseases (2). This difference relates to deviation in epidemiological studies from the CPI score as a simple evaluation method for the periodontal health due to many limitations (3). However, the evaluation of this score allows relating actual studies to previous Polish and European studies and outlining the trend in the periodontal health improvement. For this group, the evaluation of number of teeth in the oral cavity, giving the edentulous persons by percentage and percentage of people with retained chewing function, that is of people having 21 or more natural teeth, is very important.

In general, cohort studies acknowledged the importance of periodontitis as an independent risk factor of atherosclerosis, coronary disease, heart attack, and even cardiovascular mortality. The meta-analysis of 7 cohort studies from years 1993 to 2003 regarding 35.681 patients confirmed a significant relationship between periodontitis and occurrence of the coronary heart disease (summary estimate of risk ratio was 1.24, 95% confidence interval 1.01-1.51, $p=0.048$) adjusted by confounding variables for age, gender, smoking, BMI, study quality and method of periodontal disease assessment (4). Already this example demonstrates an importance of periodontitis for cardiovascular diseases, which are known to be the first cause of death among adult Poles. Thus, from one side the knowledge on periodontitis and number of teeth in the age range from 65 to 74 demonstrates previous attempts in the preventive healthcare and dental treatment, and on the other side may explain the clinical course of many modern-age diseases, such as diabetes, atherosclerosis and osteoporosis. In XXI century, dental transregional epidemiological studies for this age group were conducted in Poland in years 2002 and 2009 (5).

The goal of actual studies was the evaluation of the periodontal health by means of CPI score in inhabitants of big and small cities in the age range from 65 to 74 and making comparison with previous Polish and European studies from XXI century. Also an average number of teeth at this age, the edentulous persons percentage, the percentage of people with oral function maintenance and prevalence of oral mucosal diseases were evaluated. There were also attempts to evaluate essential health-seeking behaviours related to the oral health and the percentage of people that are treated with use of non-reimbursed or reimbursed services.

MATERIAL AND METHODS

Studies were conducted in 5 big cities: Warszawa, Szczecin, Wrocław, Białystok and Toruń, as well as in 4 towns, such as Oława, Police, Łobez and Ełk. In the Ministry of Internal Affairs and Administration, a group of one thousand people in the age range from 65 to 74 was chosen by two-level sampling for every big city and 600 people for towns. In total, 7400 people were chosen for the study. These data were passed to studies supervisors in respective voivodeships to invite (by mails or telephone) these people to participate in the examination conducted in stationary dental offices. The following number of people attended examinations in the period from October 15 2013 to January 31 2014: Warszawa - 199, Szczecin - 198, Wrocław - 147, Białystok - 72, Toruń - 39, Oława - 46, Police - 41, Łobez - 30 and Ełk 35. In total, 807 people (455 women and 352 men) were examined, i.e. referral for examinations was 10.9%. All patients gave consent to the examination and data processing by signing appropriate statements approved by ethical committees in medical universities of Warszawa, Szczecin, Wrocław and Białystok. Exclusion criteria were general (f.e. bacterial endocarditis in medical history) and local (f.e. acute odontogenic state) contraindications for a periodontal examination.

Examinations were conducted in an artificial light by means of a dental mirror and a periodontal probe 621 WHO. The probe is graduated every 1 mm at one end and on the other one by sections up to 3.5 mm, from 3.5 to 5.5 mm, 8.5 and 11.5 mm, and is ended with a ball in a diameter of 0.5 mm. For aims of this work, the evaluation of CPI score, number of teeth and occurrence of pathological clinical lesions in the oral cavity mucosa were chosen by means of detailed anamnestic and clinical periodontal examinations. In individual dentition sextants (anterior and posterior teeth in jaws) the highest value of CPI code was evaluated. Calculation of a number of teeth did not include third molars.

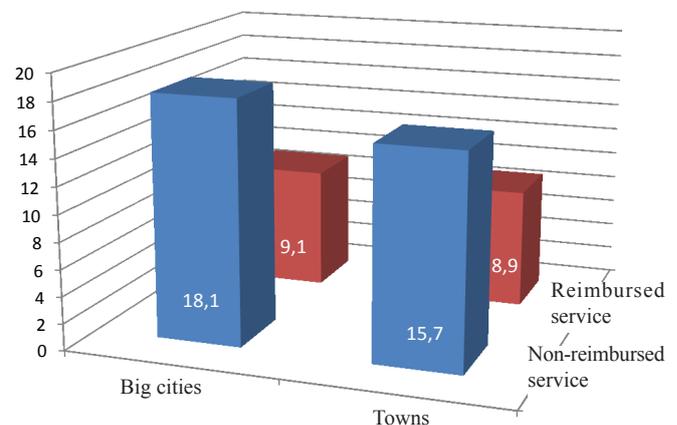


Fig. 1 The average number of teeth in towns and big cities depending on the type of dental care

Answers for questions on selected essential attitudes and health-seeking behaviours related to the oral health (reason and frequency of dental visits, number of teeth brushing during the day, toothbrush change frequency during the year, flossing of approximal surfaces). The range of dental treatment (only reimbursed services, only in offices that provide non-reimbursed services or mixed services) were also answered (Fig 1- dental examination chart).

All examiners (periodontists) were calibrated (the intra and inter-examiner calibration) in the Department of Periodontology and Oral Diseases, Medical University of Warsaw at the beginning of the study. The examinations were carried within a program financed by The Health Ministry „Ocena stanu zdrowia jamy ustnej i jego uwarunkowania w populacji polskiej w wieku 35-44 i 65-74 lat” („Oral cavity health condition and determinants in Polish population in the age range from 35 to 44 and 65 to 74”).

RESULTS

Distribution of values of CPI codes in the whole group was as follows: CPI0- 1.2%, CPI1- 9.4%, CPI2- 16.6%, CPI3- 21.8%, CPI4- 19.7% and the number of people excluded from examinations (1 tooth in the sextant or edentulous 31.3%). The state of the periodontium was worse in inhabitants of big cities (CPI0 - 0.75% and CPI4 – 21.9%) in comparison to towns (CPI0 - 3.64% and CPI4 – 18.8%). The mean number of sextants with CPI codes was as follows: CPI0 – 0.5, CPI1-4 – 3.4, CPI2-4 – 2.7, CPI3-4 – 1.6, CPI4 – 0.5; 2.3 excluded. The state of the periodontium was worse in men (CPI1-4 3.8 vs. 3.3, CPI4 – 0.6 vs 0.4) with a higher number of excluded sextants in women (2.5 vs. 2.2).

An average number of remaining teeth in the whole group was 13.7 and was higher in big cities (14.3 vs. 12.8) and in men (14.4 vs. 12.6). The percentage of edentulism was 28.9% and was higher in towns (29.8% vs. 27.9%) and in woman (30.5% vs. 27.5%). The percentage of people with oral function maintenance in shortened dental arches (at least 20 remaining natural teeth) was 25.15% and was higher in big cities (27.8% vs. 23%) and in men (27.6% vs. 23.3%).

The most three common clinical pathologies of the oral cavity were leukoplakia and leukokeratosis that were found in 10.5% of examined people (significantly higher occurrence in men - 13.9% vs 7.9%), candidiasis 5.82% and lichen planus 2.2%.

In the examined group 21.7% of people did not visit a dental office throughout the year, 32.8% visited a dental office once, 20.8% twice and 24.6% more than twice. The main reason for a visit was pain (48.8%). In the examined group 5.7% of people did not use a toothbrush during

the day, 18% did it once a day, 50.2% twice a day and 26% more than twice a day. Only 17.22% of examined people was regularly flossing the approximal surfaces. As much as 19.2% of examined people did not use a toothbrush or did not change it throughout the year, 36.1% changed a toothbrush once a year, 22.5% twice a year and 22.2% more than twice a year. 21.7% of examined people, who do not use dental treatment were excluded, 25.8% of people were only treated privately with use of non-reimbursed services, 23.1% were treated only with use of reimbursed services and 29.6% were using reimbursed services and sometimes were paying for dental treatment. Depending on the type of dental care (only non-reimbursed or reimbursed services) in residents of big cities a number of remaining teeth in people using non-reimbursed services was average twice higher (18.9 vs. 9.1), and in town this difference was also significant, although not as spectacular (15.7 vs. 8.9).

DISCUSSION

Table I presents a comparison of the periodontium state indicated by CPI score in Polish national studies covering people in the age range from 65 to 74. In actual studies the state of the periodontium is much worse (the lowest percentage of people with CPI 0 and definitely the highest, over 41% percentage of people with gingival pockets over 3.5 mm). This result is influenced by higher and higher number of retained teeth among Poles at this age and clinical symptoms of periodontitis associated with these teeth. In own studies, only inhabitants of cities were evaluated, whereas previous studies were conducted also in villages where a number of teeth is lower and the state of the periodontitis better. It is worth to underline that in the own study only calibrated periodontists were conducting studies, what in comparison to previous studies could have an impact on the evaluation of the CPI score. The actual studies confirmed previous observations (5) of worse state of the periodontium in men and inhabitants of towns, what should be related to a higher number of teeth in these groups. In 2004, periodontal goals of WHO for 2010 for the age range from 65 to 74, that is 0.5 of sextant from CPI4 were realised. The number of Polish inhabitants at this age with an active periodontitis has been increasing.

In comparison to national and superregional European studies conducted after 2000, better state of the periodontium in the population of people at the age from 65 to 74 was just in Hungary (2004) CPI3+4- 37.2% (26.2 and 11%) (6) and in Spain (2005) CPI3+4- 38% (27.2 and 10.8%) (6). Worse state of the periodontium was found in Greeks (2005) CPI3+4- 59.9% (44.5 and 15.4%) (7), Bulgarians (2002) CPI3+4- 63.5% (44.1 and 19.4%) (7), the Dutch (2001) CPI3+4- 66% (46 and

20%) (8) and the Germans (2005) CPI3+4- 87.8% (48 and 39.8%) (9). Relatively good results of Poland in the scale of Europe may result from a very high percentage of excluded sextants (in own studies 31.3%). It is confirmed by observations from 2000 of Slovak patients at the age from 65 to 74 and demonstration of only 15% of people with gingival pockets (CPI3+4) with an average number of excluded sextants in the WHO database, the highest on the world, that amounts to 4.3 (10). Analysis of the actual WHO database in the Niigata University regarding periodontal diseases suggests departing from using the CPI score in epidemiological studies. There are only four quite actual European data (Denmark 2001, Hungary 2003, Germany 2005 and Spain 2005) for the age range from 65 to 74 (10).

In comparison to studies from 2002 and 2009 a significant, almost twofold increase of number of remaining teeth in Poles at the age from 65 to 74 (Table II) is visible. It is a very positive trend in improvement of the state of the oral cavity of older Poles. All recent Polish studies demonstrate better prevalence of remaining teeth in men of this age. The actual average difference amounts to around 2 teeth in favour of males and is similar to a difference from a study conducted in 2002. Also the trend of better retention of teeth by inhabitants of big cities is stable. In previous studies it was observed for inhabitants of villages. In this regard due to a significant increase of a number of retained teeth in Poles at the age of 65 to 74 within the last 12 years, our country gained an average European level. The lowest number of retained teeth had Hungarians (2004) - 9.1 (11), Greeks (2005) - 11.1 (12) and Danes (2001) - 12.4 (8); a similar number was found in the Germans (2005) - 13.6 (9), whereas the highest in Spanish (2005) - 14.2

(6) and Swiss people (2002)- 17.6 (13). The comparable data are not complete, because epidemiological studies of the oral cavity of people over 60 were conducted often in other age groups. Main medical reasons for teeth loss in adults is dental caries and periodontitis, much more rarely orthodontic or prosthetic indications and trauma. Dental carries is definitely more common reason for teeth extraction than periodontitis. For example, the distribution of reasons of teeth extraction in the Scottish population was as follows: caries 54%, periodontitis 15%, orthodontic indications 9%, prosthetic indications 6%, other reasons were heterogenic and difficult to unambiguously determine (14). In own studies the relationship between a number of teeth and type of dental care (non-reimbursed and reimbursed services) was shown. It has a direct correlation with economic situation, and is particularly visible in big cities.

Another profitable observation in this age group of Poles is a significant reduction of percentage of edentulism in the last 5 years by as much as 15% (Table III). Also this time observations of bigger edentulous in women and inhabitants of towns are confirmed. These differences have been reduced, especially in comparison to 2002, with almost 8% higher percentage of edentulous in women and over 12% higher percentage of edentulous in inhabitants of villages. In spite of such a huge improvement almost 29% of edentulous in Poles at the age from 65 to 74 remains one of the highest percentage in Europe. In last 14 years in available publications, higher percentage was found only in Greece (2005) - 31.5% (12). In other countries edentulous persons at this age was much more rare: Germany (2006) - 22.6% (14), Hungary (2004) - 19.8% (11), Denmark (2001) - 17.8% (8), Spain (2005) - 16.9% (6) and Switzerland (2002)

Table I Comparison of the periodontal state expressed by the CPI index in transregional studies ranging in age from 64 to 75 years in Poland in the XXI century

Year	N	Environment	CPI0	CPI1	CPI2	CPI3	CPI4	Excluded sextants
2002	811	Urban, rural	4.8%	13.6%	19.9%	11.7%	2.3%	47.6%
2009	615	Urban, rural	7.8%	15.1%	15.4%	7.6%	1.6%	52.4%
2014	807	Big cities, towns	1.2%	9.4%	16.6%	21.8%	19.7%	31.3%

Table II Comparison of the average number of teeth in transregional studies of people aged from 64 to 75 years in Poland in the XXI century

Year	Mean of teeth (\pm SD)	Women/men	Environment
2002	6.3 \pm 5.5	5.6 vs. 7.7	Urban/rural 9.1 vs 4.4
2009	6.6 \pm 6.1	6.2 vs. 7.2	Urban/rural 6.7 vs. 6.4
2014	13.7 \pm 8.1	12.6 vs. 14.4	Big cities/towns 14.3 vs 12.8

Table III Comparison of the edentulous persons percent in transregional studies of people aged from 64 to 75 years in Poland in the XXI century

Year	Percent	Women/men	Environment
2002	41.6%	44.4% vs. 36.8%	Urban/rural 35.6% vs 47.9%
2009	43.9%	45.7% vs. 41.2%	Urban/rural 43.5% vs. 44.7%
2014	28.9%	30.5% vs. 27.5%	Big cities/towns 27.9% vs 29.8%

- 13.2% (13). In all of these countries the percentage of edentulous persons has been reduced for the last two decades, and in most of them edentulous is also higher in women, but this difference is being effaced (15). In spite of it significant differences in edentulous exist between European countries, as well as between geographic regions within a country, between groups of different level of education, place of living, income and lifestyle.

In own studies, occurrence of at least 20 natural remaining teeth indicating an oral function maintenance applied to around 25% of all examined people, and was 4% higher in men and almost 5% in big cities. This result is three times worse from WHO global goals from oral health 2010. It is difficult to relate actual result to studies of this age group of Poles in 2002 and 2009 (5), because in previous studies an oral function maintenance was defined as at least 20 natural or dental restorations in a functional contact. In available publications only one quite actual relation (2004) to Hungarians at this age was found – 21 or more teeth in 22.6% of examined people (11). Maintenance of oral function in older people with shortened dental arches in the highest extent is influenced by sociodemographic and economic factors (16).

Relatively often occurrence of oral precancerous lesion, that is leukoplakia, in older Poles draws attention. That is why the necessity to promote oncological prophylaxis, and especially minimal anti-smoking intervention in this age group, is confirmed.

Health-seeking behaviours regarding oral hygiene of older Poles are bad. 78.3% of examined people visit an office regularly (at least once a year). The main reason of a visit was pain (48.8%). Just 25% of examined people were used to attend periodic control visit without a clear reason. In Germany, 88.8% of people at the age from 65 to 74 visit an office at least once a year (9), in Denmark 88.2% (8) and the main reason for a visit is control of the oral cavity. From own studies, 5.7% of older Poles do not use a toothbrush to clean their teeth or prosthetic restoration, 19.2% do not use a toothbrush or does not change it throughout the year and only 17.2% of them floss approximal surfaces. In this range, worse results demonstrate Greeks at the age from 65 to 74: 60% of examined people visited an office mainly due to the pain, 14.5% did not use a toothbrush at all during the day, and only 7.5% (7) regularly flossed approximal surfaces (7).

CONCLUSION

To sum up, the state of the periodontium of Poles at the age from 65 to 74 has not been improved in XXI century, but also does not significantly differ from an average European level. An average number of remain-

ing teeth of Poles at this age has increased, but remains under a European average. A crucial factor which determines teeth retention at this age is socio-economic and life-style factors. Also the percentage of edentulous persons has decreased, but still remains one of the highest in Europe. The percentage of people with oral function maintenance is very low, thus needs for prosthetic treatment and rehabilitation of stomatognathic system remain high. Precancerous lesions in the oral cavity are quite common in this age group, that is why screening studies within oncologic prophylaxis in this age group should also relate to the oral cavity. Health-seeking behaviours related to the oral health of older Poles are inadequate and result from a low level of knowledge on dental prophylaxis and low economic status.

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