

# Periodontal status of Szczecin citizens aged 35–44 years according to the Community Periodontal Index

## Ocena stanu przyzębia mieszkańców Szczecina w wieku 35–44 lat przy użyciu Community Periodontal Index

Elżbieta Dembowska<sup>1</sup>, Urszula Jakubowska-Kocór<sup>2</sup>, Renata Samulak-Zielińska<sup>1</sup>, Katarzyna Sosińska<sup>2</sup>, Janina Czuryżkiewicz-Cyrana<sup>1</sup>, Mariusz Suwała<sup>1</sup>

<sup>1</sup> Zakład Periodontologii Pomorskiego Uniwersytetu Medycznego w Szczecinie al. Powstańców Wlkp. 72, 70-111 Szczecin  
Kierownik: dr hab. n. med. Elżbieta Dembowska

<sup>2</sup> Prywatny Gabinet Stomatologiczny ul. Bohaterów Warszawy 11b/5, 70-370 Szczecin  
Kierownik: dr hab. n. med. Elżbieta Dembowska

### SUMMARY

**Introduction:** The aim of the study was to identify the periodontal status of Szczecin citizens using the Community Periodontal Index (CPI), and to compare the results with those from selected European and world countries using the World Health Organization (WHO) database.

**Material and methods:** A sample of 250 patients was randomly selected using two-stage stratified sampling among people living in Szczecin aged 35–44 years. Participants were examined using the WHO CPI score at the Department of Periodontology, Pomeranian Medical University in Szczecin. Scores were compared with findings from previous research carried out in Poland and other countries.

**Results:** That only 4.4% of respondents had a healthy periodontium (5.76% of women and only 2.7% of men). Bleeding gums after probing (17.99%) and the presence of calculus (20.14%) were more frequently reported in women. The largest percentage

of respondents (44.8%) had periodontal pockets 3.5–5.5 mm deep, with more women (45.32%) than men (44.14%). In contrast, more men (25.23%) had deep periodontal pockets at least 6 mm deep, with only 10.79% in women. A survey conducted across Poland in 1987 showed 0.7% of people with a healthy periodontium which rose to 6.3% in 1995. Compared to studies available in the WHO database, the number of people with a healthy periodontium, i.e. CPI = 0 is lower than in Japan (18%) and Spain (15%), but higher than in the United Kingdom (4%) and China (0%).

**Conclusions:** Findings from the study indicate an increasing percentage of people in Poland suffering from periodontal disease. This brings us closer to results obtained in developed countries around the world.

**Key words:** periodontology, periodontal epidemiology, periodontitis epidemiology.

### STRESZCZENIE

**Wstęp:** Celem badania była ocena stanu przyzębia mieszkańców Szczecina przy użyciu Community Periodontal Index (CPI) oraz porównanie otrzymanych wyników z danymi pochodzącymi z wybranych krajów Europy i świata.

**Materiał i metody:** W badaniach uczestniczyło 250 osób w wieku 35–44 lat wybranych metodą losowania dwuwarstwowego spośród mieszkańców Szczecina. Stan przyzębia badanych oceniany był przy użyciu wskaźnika CPI w Zakładzie Periodontologii Pomorskiego Uniwersytetu Medycznego w Szczecinie, a uzyskane wyniki zostały porównane z wybranymi badaniami populacji Polski oraz dostępnymi danymi z całego świata.

**Wyniki:** Zaledwie 4,4% badanych posiadało zdrowe przyzębie (CPI = 0), w tym 5,76% kobiet i tylko 2,7% mężczyzn. U kobiet częściej stwierdzano krwawienie podczas zgłębnikowania (17,99%) oraz obecność kamienia nad- i poddziąsłowego (20,41%). Najwięcej osób (44,8%) miało kieszonki przyzębne o głębokości

3,5–5,5 mm, wśród nich 45,32% kobiet oraz 44,14% mężczyzn, w przeciwieństwie do kieszonek o głębokości powyżej 6 mm, które częściej występowały u mężczyzn (25,23%) niż kobiet (10,79%). Badania prowadzone w Polsce w 1987 r. pokazały, że osób ze zdrowym przyzęciem było zaledwie 0,7%; ich liczba wzrosła do 6,3% w 1995 r. Porównując dane dotyczące częstości występowania kodu CPI = 0 z wynikami zawartymi w bazie Światowej Organizacji Zdrowia, można stwierdzić, że te otrzymane w badaniu własnym są niższe od tych z Japonii (18% zdrowych) i Hiszpanii (15%), ale wyższe niż z Wielkiej Brytanii (4%) oraz Chin (0%).

**Wnioski:** Na podstawie otrzymanych wyników można stwierdzić, że w Polsce wzrasta odsetek osób cierpiących na chorobę przyzębia, podobnie jak w krajach rozwiniętych z całego świata.

**Słowa kluczowe:** periodontologia, epidemiologia w periodontologii, epidemiologia choroby przyzębia.

## INTRODUCTION

Periodontopathies, i.e. diseases of the periodontium, irreversibly destroy the masticatory system and, together with caries, are the most common causes of premature loss of teeth. Their consequences are not only aesthetic but functional: periodontal diseases affect the patient's general health and contribute to cardiovascular diseases, diabetes, obstructive pulmonary disease, cancer, chronic kidney disease, rheumatoid arthritis, obesity, and premature labour [1].

The primary source of knowledge about the occurrence and progress of diseases in the population is from epidemiological studies [2].

Epidemiological studies conducted in various countries may only be compared if they are carried out with a unified and systematic scheme. Once epidemiology became one of the ways of determining the prevalence of periodontal disease, various measures of evaluating periodontal status were introduced. In 1980, the World Health Organization (WHO) introduced the Community Periodontal Index of Treatment Needs (CPITN) [3, 4, 5], which is easy to determine by a specially designed WHO 621 tube.

World Health Organization maintains a global database of research carried out since the early 1980s, containing data tests carried out using the CPITN, currently available on the database of Niigata University in Japan [6].

Community Periodontal Index (CPI) is the first component of CPITN, and determines periodontal status with a code ranging from 0 to 4:

- 0 – healthy periodontal tissues,
- 1 – bleeding following mild probing,
- 2 – supra-gingival or sub-gingival calculus or defective margin of filling or crown,
- 3 – periodontal pockets with a depth of 3.5–5.5 mm,
- 4 – 6 mm or deeper periodontal pockets.

The World Health Organization used the CPI to prepare specific targets for 2010 for people aged 35–44 years:

1. Not more than 2% of people toothless.
2. 90% of the population with functional dentition (at least 20 functionally efficient teeth).
3. Not more than 0.25 sextant with CPI = 4 per person [7].

The objectives for 2020 are guided by the motto “think globally, act locally”, with the main focus on the creation of local and national health objectives which are to be modelled on the WHO document [8].

The aim of this paper was to compare the epidemiological status (CPI) of a population aged 35–44 years in Szczecin with available national and foreign reports.

## STATISTICAL METHODS

All continuous variables were tested for normality using the Kolmogorov–Smirnov test. The variables were described by their means, standard deviation, median, 25% and 75% quartiles, and minimum and maximum values.

The significance of statistical differences between men and women was analysed using Student's t-test or the Mann–Whitney U-test. For many groups we performed analysis of variance (ANOVA) or the Kruskal–Wallis test.

Discrete variables were described by number and frequency. Statistical relationships between discontinuous variables were measured with Pearson's  $\chi^2$  test.

The correlation between discrete variables, i.e. ordinal and nominal (variables coded 0/1) and continuous variables were examined using the Spearman rank correlation. The results are described by the coefficient of correlation  $r$  and the probability  $p$ .

In order to evaluate the dependence of risk of pathologies on various factors, a logistic regression model was used. The results are described by the odds ratio (OR) with 95% confidence and probability intervals. The probability in this model was calculated by Pearson's  $\chi^2$  test or the two-sided Fisher's exact test.

Differences in all the tests were deemed statistically significant at  $p < 0.05$ . A significance level  $p$  between 0.051–0.099 was deemed to be a trend on the border of statistical significance.

## RESULTS

In our study, respondents from the city of Szczecin (NW Poland, population 400,000) were selected in 2011 using two-stage stratified sampling (1<sup>st</sup> stage – sex, 2<sup>nd</sup> stage – age). 2000 people aged 35–44 years were randomly selected at the Ministry of Internal Affairs and Administration, and invited by letter and telephone to participate in the study.

Community Periodontal Index was used to assess the periodontal status of 250 people, altogether 1500 sextants. One toothless person (0.4% of the population) was excluded from the study. Table 1 shows that only 4.4% of respondents (11 people) had a healthy periodontium, comprising 8 women (5.76%) and only 3 men (2.7%).

Women more frequently reported bleeding in the gums after probing (CPI = 1; 17.99%) and the occurrence of calculus (CPI = 2; 20.14%), compared to 10.8% and 16.21% of men, respectively.

The largest percentage of respondents (44.8%) had periodontal pockets 3.5–5.5 mm deep, with more women (45.32%) than men (44.14%). In contrast, more men (25.23%) had deep periodontal pockets at least 6 mm deep (CPI = 4); only 10.79% in women.

The risk of CPI = 4 was nearly three times higher in men (OR = 2.82) than in women, which was confirmed statistically ( $p = 0.003$ ). Differences in the risk of other CPI scores between the sexes were not statistically significant (Table 1).

Broken down by sextants, a healthy periodontium (CPI = 0) occurred in 228 sextants (15.20%), bleeding gums (CPI = 1) in 310 sextants (20.67%), with supra- and sub-gingival calculus (CPI = 2) present in 358 sextants (23.87%). Most sextants, i.e. 467 sextants (31.13%), had pockets with a depth of 3.5–5.5 mm

**TABLE 1.** Percentage of sample populations with individual Community Periodontal Index (CPI) scores and odds ratio (OR) and the significance of differences between sexes (women/men) for individual CPI scores

CPI	Total (%)	Women (%)	Men (%)	OR	95% CI	Interval	p
0	11 (4.4)	8 (5.76)	3 (2.7)	0.46	0.12	1.77	0.26
1	37 (14.8)	25 (17.99)	12 (10.8)	0.56	0.27	1.17	0.12
2	46 (18.4)	28 (20.14)	18 (16.21)	0.78	0.4	1.49	0.45
3	112 (44.8)	63 (45.32)	49 (44.14)	0.97	0.59	1.6	0.9
4	43 (17.2)	15 (0.79)	28 (25.23)	2.82	1.42	5.61	0
Toothless	1 (0.4)	0	1 (0.9)				

(CPI = 3). Pockets with a depth of at least 6 mm (CPI = 4) were observed in 105 sextants (7%). 32 sextants were excluded from the study (2.13%) due to an insufficient number of teeth, as evaluated by CPI (Table 2).

Table 2 shows the number of sextants with a particular CPI score, broken down by gender, along with the chance of the incidence of sextants with a particular CPI code. In both groups there were sextants excluded from the study; 12 sextants in women (1.44%) and 20 in men (3%), a statistically significant difference ( $p = 0.042$ ).

Sextants with a healthy periodontium were observed in 150 women (17.99%), compared to only 78 (11.71%) in men. A similar proportion was found for CPI = 1, with 205 sextants in women

(24.58%) and 105 in men (15.77%). These differences between the sexes were statistically significant for both CPI scores ( $p = 0.001$  and  $p = 0.000$ , respectively).

There were 192 sextants in women (23.02%) and 166 in men (24.92%). There was no statistically significant difference here. A value of CPI = 3 was more common in men with 229 sextants (34.38%) than in women with 238 (28.54%). Also, out of 105 sextants with CPI = 4, only 37 were found in women (4.44%) and 68 in men (10.21%). These differences were statistically significant ( $p = 0.015$  for CPI = 3 and  $p = 0.000$  for CPI = 4).

By examining the relationship between the sexes, one can see that men had more than a two times higher risk of having sextants with CPI = 4 (OR = 2.45) and excluded sextants (OR = 2.12) than women. They were also at a higher risk of CPI = 3 and CPI = 2 (OR = 1.31 and OR = 1.11). The chance of men having sextants with CPI = 1 (OR = 0.57) and a healthy periodontium CPI = 0 (OR = 0.6) was significantly lower compared to the women. This is illustrated in Table 2.

Table 3 presents data on the average number of sextants with a particular CPI score in respondents.

On average one person had 0.91 sextants with code CPI = 0; 1.08 sextants per woman, and 0.7 sextants per man.

There were 1.24 sextants with CPI = 1 (bleeding gums) per person, 1.47 sextants per woman and 0.95 per man, a statistically significant difference at  $p = 0.003$ .

**TABLE 2.** Number of sextants with a given Community Periodontal Index (CPI) score and odds ratio (OR) between sexes

CPI	Women (%)	Men (%)	Total (%)	OR	p
0	150 (17.99)	78 (11.71)	228 (15.2)	0.60	0.001
1	205 (24.58)	105 (15.77)	310 (20.67)	0.57	0.000
2	192 (23.02)	166 (24.92)	358 (23.87)	1.11	0.390
3	238 (28.54)	229 (34.38)	467 (31.13)	1.31	0.015
4	37 (4.44)	68 (10.21)	105 (7)	2.45	0.000
X	12 (1.44)	20 (3.00)	32 (2.13)	2.12	0.042
Total	834 (100)	666 (100)	1500 (100)		

**TABLE 3.** Mean number of sextants with a given Community Periodontal Index (CPI) value, by total and sex

CPI	Sex	n	Mean	SD	Min.	Max.	Q25	Median	Q75	p
0	Women	139	1.08	1.9	0	6	0	0	2	0.13
	Men	111	0.7	1.54	0	6	0	0	0	
	Total	250	0.91	1.75	0	6	0	0	1	
1	Women	139	1.47	1.67	0	6	0	1	3	0
	Men	111	0.95	1.46	0	6	0	0	2	
	Total	250	1.24	1.6	0	6	0	1	2	
2	Women	139	1.38	1.72	0	6	0	1	2	0.45
	Men	111	1.5	1.7	0	6	0	1	2	
	Total	250	1.43	1.71	0	6	0	1	2	
3	Women	139	1.71	1.9	0	6	0	1	4	0.13
	Men	111	2.06	1.9	0	6	0	2	4	
	Total	250	1.87	1.91	0	6	0	1	4	
4	Women	139	0.27	0.94	0	6	0	0	0	0
	Men	111	0.61	1.34	0	6	0	0	1	
	Total	250	0.42	1.15	0	6	0	0	0	
X	Women	139	0.09	0.43	0	3	0	0	0	0.09
	Men	111	0.18	0.7	0	6	0	0	0	
	Total	250	0.13	0.57	0	6	0	0	1.5	

One person had 1.43 sextants with CPI = 2, without a significant difference between the sexes.

The number of sextants with pockets with a depth of 3.5–5.5 mm per respondent was as high as 1.87; 2.06 per man and 1.71 per woman, although this difference was not statistically significant.

On average one person had 0.42 sextants with CPI = 4; 0.27 per woman, and 0.61 per man, a statistically significant difference at  $p = 0.003$ .

## DISCUSSION

Our study showed that only 4.4% of respondents had a healthy periodontium (CPI = 0). A comparison of these results with studies from the same year (2012) on the periodontal status of 35–44 year old populations in other Polish cities showed that the CPI = 0 score in Szczecin was the highest (Lublin 3.8%; Wrocław 0.3%; Kielce 0%, Warsaw, Białystok 0%) [9]. Twenty-four years prior to our study, in a survey conducted across Poland in 1987, only 0.7% of people had a healthy periodontium [10], which rose to 6.3% in 1995 [11], and in 2002 further to 15.4% of respondents living in large cities [12].

In our study of the Polish population in 2012 CPI = 1 was found in 14.8% of people, while in the study in 1987 across Poland it was only 1% [10]. In an epidemiological study of populations in 5 Polish cities in 1992 CPI = 1 was observed in 1.7% [13], while in a subsequent study in Poland (entire country) in 1995 it rose to 9.5% [11]. Data from 2002 for the entire country and the 16 largest Polish cities found CPI = 1 in 23.1% and 25.2% of participants, respectively [12].

The presence of calculus (CPI = 2) was observed in 18.4% of the people participating in our study. This is so far one of the lowest scores compared with previous studies. In the study from 1987 this CPI score was reported in 42.3% of participants [10], while in 1992 it was found in 37% of the surveyed population [13]. In another national survey in 1995 – 50.1% of the population had CPI = 2 [11], while in 2002 it was 41.4%. In 16 provincial capitals in 2002 – 42% of the surveyed population had CPI = 2 [12].

Recently, Poland has seen the worrying trend of a growing proportion of people with CPI = 3. In the study from 2011 it was 44.8%, significantly higher than in previous studies – 41% in 1987 [10], 43.7% in 1992 [13], 24.4% in 1995 [11], 15.7% (entire country) and 13.5% (16 provincial capitals) in 2002 [12].

Similarly, there has been a growing proportion of patients with CPI = 4. The results obtained in Szczecin in 2011 (17.2%) were higher than in previous years; in 1987 it was 15% [10], in 1992 in five major Polish cities it was 16% [13], in 1995 it was 5% [11], while in 2002 – 2.2% across Poland and 2.1% in 16 major cities [12].

The above figures show that the number of people with a healthy periodontium grew steadily from 1987 until the survey of 2012, when a decrease in the number of people with CPI = 0 was found. A similar situation was observed for bleeding gums after probing (CPI = 1). There was a significant decrease in the

number of patients with CPI = 2 (calculus) compared to previous years. There was also an increase in the proportion of people with periodontal pockets with a depth of 3.5–5.5 mm and those 6 mm deep or deeper. This was probably due to the more rapid pace of life, which increases stress levels and causes people to have less and less time, which results in the neglect of oral hygiene, and hence a decline in the number of people with a healthy periodontium and an increase in the number of patients with gingivitis. On the other hand, universal access to health care and the growing awareness of patients resulted in a reduced percentage of people with calculus. Growing health awareness and motivation to preserve one's own teeth contribute to the decision to retain teeth which in previous times would have been extracted. This indirectly resulted in an increased number of patients with periodontal pockets. Unfortunately, large and incorrectly performed fillings, especially on the contact surfaces in the molars or abnormal permanent dentures, can also cause local periodontal pockets.

Compared to European studies available in the WHO database in Niigata the number of people with a healthy periodontium, i.e. CPI = 0 (4.4% in our study on the population of Szczecin) is lower than in Spain (15%), Hungary (11%), Greece (10%), France (9%), Denmark and Slovakia (8%), Croatia and Ireland (6%) and Israel (5%). Compared to our results, a smaller percentage of people with a healthy periodontium was recorded in the Netherlands and the United Kingdom (4%), Italy, Portugal and Turkey (3%), Finland (2%), and Belgium, Germany and Norway (1%). In Belarus, Estonia and Russia, there were no subjects with CPI = 0 (0%).

In Poland, in the present study, CPI = 1 occurred in 14.8% of people, one of the highest incidences in Europe. A higher percentage was observed only in Turkey (24%), Norway (19%), and Greece and Denmark (16%); the lowest percentage of patients with CPI = 1 is reported in Russia and the UK (1%), Portugal, Estonia and Belarus (0%).

In contrast, CPI = 2 in our study (18.4%) was one of the least frequent scores in Europe – compared to Ireland (71%), France (63%), Hungary (57%), and Portugal and Spain (47%). A lower rate occurred only in Russia (15%), Germany (14%) and Norway (13%).

The incidence of CPI = 3 in our study in Poland in 2012 was 44.8%. This is lower than Belarus (63%), the UK (62%), Norway (58%), and Russia (54%), while still much higher than in countries with the lowest incidence of CPI = 3 in Europe, such as Ireland and France (13%), Hungary and Spain (22%), Greece (24%), and Denmark, Finland, Slovakia and Turkey (29%).

Less optimistic is the number of respondents with CPI = 4. More people with deep pockets are observed only in Belgium (30%), Russia (29%) and Germany (21%). The lowest incidences of CPI in Europe are much lower: in Ireland (2%), Greece (3%), Spain (4%), and Denmark, Finland, Turkey and Hungary (6%).

Outside Europe, a higher proportion of patients with CPI = 0 than in our study on the population in Szczecin (4.4%) can only be found in Japan (18%), Cyprus (9%), Australia (6%), and Canada (5%). It was lower than in the USA (4%), Bangladesh (3%), and



India (2%). The lowest percentage of people with CPI = 0 occurs in Brazil, Chile and Nigeria (1%), and Egypt, and China (0%).

The proportion of patients with CPI = 1 (14.8%) is high not just in the European context but also in the global context. In Argentina this proportion is 14%, in Australia, Japan and the USA 10%. In Bangladesh, it is as low as 1%, while in China and Nigeria only 0%.

The percentage of people with CPI = 2 in our study was 18.4%, one of the lowest results in the world, with lower results found only in Chile (5%), Brazil (13%) and Nigeria (15%). A high percentage of patients with CPI = 2 is reported in China (64%), Cyprus (61%), Australia (47%), Japan (45%), and Argentina (43%).

The study population of Szczecin showed 44.8% of respondents with CPI = 3, and a greater proportion of subjects with

this score can be found in Brazil (63%), Canada (52%), Chile (50%), and Nigeria (45%). Our results are still about two times higher than in countries with the lowest percentage of people with CPI = 3, such as Cyprus (19%), Japan (23%), and Argentina (26%). Our results are close to China (32%), and the USA (38%), while in Bangladesh, Egypt, and India it is 40%.

The 17.2% of people with CPI = 4 in our study was higher than in Cyprus (1%), China and Japan (4%), and Australia (13%), Argentina (14%), and Egypt (16%). It was still two times lower than in Chile (41%), Nigeria (39%), and similar to Bangladesh and Canada (21%), the USA and Brazil (20%), and India (19%) [6].

The exact data patterns for selected countries are shown in Table 4.

TABLE 4. Authors' own results versus selected studies from world countries (Community Periodontal Index – CPI)

Country	Year	Population	Percentage of a given CPI score in a population				
			0	1	2	3	4
Belarus	2001	393	0	0	24	63	13
Belgium	1997	111	1	5	30	34	30
Croatia	2000	412	6	6	41	32	15
Denmark	2000	762	8	16	41	29	6
Estonia	1987	434	0	0	34	53	13
Finland	1982	299	2	7	56	29	6
France	1989	88	9	6	63	13	10
Germany	2005	904	1	12	14	52	21
Great Britain	1988	603	4	1	20	62	13
Greece	2005	1182	10	16	47	24	3
Hungary	2003	743	11	5	57	22	6
Ireland	1989	395	6	8	71	13	2
Israel	2008	254	5	10	38	33	14
Italy	1985	21352	3	4	45	36	14
Holland	1986	418	4	6	34	48	7
Norway	2003	149	1	19	13	58	8
Portugal	1984	616	3	0	47	38	8
Russia	1991	85	0	1	15	54	29
Slovakia	2000	147	8	5	44	22	4
Spain	2005	540	15	13	47	22	4
Turkey	1987	494	3	2	38	29	6
Argentina	2000	1012	3	14	43	26	14
Australia	1995	923	6	10	47	24	13
Bangladesh	1990	198	3	1	36	40	21
Brazil	1988	359	1	4	13	63	20
Canada	1994	2110	5	6	16	52	21
Chile	1995	878	1	3	5	50	41
China	1997	1572	0	0	64	32	4
Cyprus	1992	545	9	9	61	18	1
Egypt	1990	100	0	8	36	40	16
India	1989	300	2	2	37	40	19
Japan	2005	441	18	10	45	23	4
Nigeria	1990	314	1	0	15	45	39
USA	1991	2839	4	10	27	38	20
Authors' own results	2011	250	4.4	14.8	18.4	44.8	17.2

## CONCLUSIONS

Our study shows that the prevalence of periodontal disease is correlated with the sex of patients.

Considerably more sextants with CPI = 3 (periodontal pockets with a depth of 3.5–5.5 mm) and CPI = 4 (periodontal pockets deeper than or equal to 6 mm) were visible in men. Among them, 34.38% of sextants had CPI = 3 and 10.21% of sextants had CPI = 4. These results are statistically significantly higher than in women, in whom CPI = 3 was observed in 28.54% of sextants, and CPI = 4 in 4.44% of sextants ( $p = 0.015$  and  $p = 0.000$ , respectively).

Taking into account the average number of sextants with a given CPI score per person, statistically significantly more sextants with CPI = 4 were observed per man (0.61) than per woman (0.27;  $p = 0.003$ ). Similarly, the risk of having sextants with CPI = 4 was three times higher among men than women (OR = 2.82, 95% CI).

In women, sextants with CPI = 0 (healthy periodontium) and CPI = 1 (bleeding gums during probing) are more common than among men (17.99% and 24.58%). In men these levels are 11.71% and 15.77%, respectively. These values are statistically significantly different ( $p = 0.001$  for CPI = 0 and  $p = 0.000$  for CPI = 1).

Similarly, the average number of sextants with CPI = 1 per person was higher among women (1.47 sextant) than in men (0.95 sextant), this difference being also statistically significant ( $p = 0.003$ ).

We can see the worrying trend of a reduced percentage of people with a healthy periodontium in Polish studies (CPI = 0). In our study it amounted to 4.4%, compared to 6.3% in 1995.

The number of persons with CPI = 3 has increased to 44.8% from the 24.4% reported in 1995.

The number of people with CPI = 4 (17.2% in our study) has also significantly increased compared to the previous study in 1995, with only 5% of the population [10, 11, 12, 13].

From these data it can be inferred that an increasing percentage of people in Poland suffer from periodontal disease.

This brings us closer to results obtained in developed countries around the world. The percentage of people with CPI = 4 in the USA is 20%, with Canada and Germany at 21% [14, 15, 16].

## REFERENCES

1. Van Dyke T.E., van Winkelhoff A.J.: Infection and inflammatory mechanisms. *J Periodontol.* 2013, 84, 1–7.
2. Jańczuk Z., Ciągło A.: Podstawy epidemiologii chorób narządu zucia. Centrum Edukacji Medycznej, Warszawa 1999.
3. Ainamo J., Barmes D., Beagrie G., Cutress T., Martin J., Sardo-Infirri J.: Development of the World Health Organization (WHO) community periodontal index of treatment needs (CPITN). *Int Dent J.* 1982, 32, 281–291.
4. Pilot T., Miyazaki H.: Global results: 15 years of CPITN epidemiology. *Int Dent J.* 1994, 44, 553–560.
5. Baelum V., Papapanou P.N.: CPITN and the epidemiology of periodontal disease. *Community Dent Oral Epidemiol.* 1996, 24, 367–368.
6. Periodontal Country Profiles. An overview of CPITN data in the WHD Global Oral Data Bank. <http://www.dent.niigata-u.ac.jp/prevent/periodio.html> (1.09.2015).
7. Banach J.: Co z realizacją periodontologicznych celów zdrowia Światowej Organizacji Zdrowia do 2010 r. w Polsce? *Dent Med Probl.* 2002, 39, 9–12.
8. Hobdell M., Petersen P.E., Clarkson J., Johnson N.: Global goals for oral health 2020. *Int Dent J.* 2003, 53, 285–288.
9. Górska R., Pietruska M., Dembowska E., Wysokińska-Miszczuk J., Włosowicz M., Konopka T.: Częstość występowania chorób przyzębia u osób w wieku 35–44 w populacjach dużych aglomeracji miejskich. *Dent Med Probl.* 2012, 1, 19–27.
10. Jańczuk Z., Banach J., Lisiecka K.: Epidemiologia chorób narządu zucia populacji polskiej. *Czas Stomatol.* 1991, 44, 389–395.
11. Jańczuk Z.: Stan narządu zucia polskiej populacji. *Nowa Stomatol.* 1997, 2, 45–49.
12. Iwanicka-Frankowska E., Wierzbicka M., Szatko F., Pierzynowska E., Zawadzkiński M.: Stan zdrowia jamy ustnej polskiej populacji osób dorosłych w wieku 35–44 lat w latach 1998–2002. *Stom Współcz.* 2003, 10, 9–14.
13. Dembowska E.: Ocena stanu przyzębia i periodontologicznych potrzeb leczniczych u osób w wieku 35–44 lat w Polsce. *Ann Acad Med Stetin.* 1995, 41, 245–258.
14. Demmer R.T., Papapanou P.N.: Epidemiologic patterns of chronic and aggressive periodontitis. *Periodontol 2000.* 2010, 53, 28–44.
15. Hugoson A., Norderyd O.: Has the prevalence of periodontitis changed during the last 30 years? *J Clin Periodontol.* 2008, 35 (8), 338–345.
16. Pilot T., Miyazaki H.: Global results: 15 years of CPITN epidemiology. *Int Dent J.* 1994, 44, 553–560.