

## ASPECTS OF DENTAL HEALTH IN ADULT RURAL POPULATION IN POLAND

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**Abstract:** Using the literature on the subject, an assessment was made of the state of the oral health in rural population: dental state, periodontal diseases, state and needs for prosthetic rehabilitation. The articles presents possible causes of this state of things.

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A healthy stomatognathic system and healthy oral cavity are the attributes of a healthy human being. The state of health of the oral cavity is measured with the indices which inform us about the frequency, exacerbation and course of pathogenic processes. At the same time the indices point to the effects and needs regarding dental, educational and health, prophylactic, therapeutic and rehabilitation actions. They also refer to the state of our dentition or dental caries, and the condition of soft tissue or periodontal diseases.

## DENTAL CARIES

Dental caries is a pathological process consisting in a decalcification and decay of tooth hard tissues. The development of dental caries is conditioned by the co-existence of the following basic etiological factors: presence of acid-forming micro-organisms in dental plaque, responsible for transforming carbohydrates into acids; presence of carbohydrates in the oral cavity, acting as a substrate for enzymatic bacterial transformations; susceptibility of tooth tissue to decalcification caused by their insufficient or incorrect mineralisation; time and frequency of other pathological factors affecting the tooth tissues. Besides the above mentioned elements, there are many factors which, to a smaller or greater degree, modify this process. Dental caries is a social disease of unequal prevalence, frequency and intensity. In the

epidemiological studies of dental caries the following indices are applied:

- frequency of dental caries - as a percentage of people suffering from the disease, calculated on the basis of the following formula: frequency of dental caries = number of people suffering from the disease / number of examined persons  $\times 100$ ;
- mean number of DMF - as the sum of teeth with active primary or secondary caries (D), teeth that were extracted due to caries (M) and teeth with fillings (F);
- intensity of dental caries calculated according to the following formula: dental caries intensity = DMF/x, where x indicates the number of people with DMF values  $> 0$ ;
- treatment index which is calculated according to the following formula: treatment index = F / D + F.

The frequency of dental caries in the total population of Poland, aged 35–44 years, examined in 1987, amounted to 99.6–100% and was very similar regardless of the sex and place of residence (big cities, small towns, villages). The intensity of dental caries, expressed by mean value of DMF number, amounted to 18.6; where D amounted to 4.1, M – 10.5, and F – 4.0; in women the value was a little higher (DMF – 20.0) than in men (DMF – 17.2). The treatment index for the total population amounted to 0.4 [10].

From the examinations performed in the Lublin province (eastern part of Poland) it follows that the DMF number in people aged 50–55 amounted to 20.8, where D

amounted to 2.2, M – 17.2, and F – 1.4, and in people aged 66–70 years the DMF number amounted to 26.6, where D amounted to 1.1, M – 25.1, and F – 0.4 [32]. In the Łódź province (central part of Poland), in people aged 35–44 years, these values were as follows: D – 3.84, M – 10.75, F – 4.58; in people aged 65–77 the values amounted to: D – 1.38, M – 23.75, F – 0.94. The data for the Łódź province came from the epidemiological studies carried out in 1987–1994 under the second stage of the International Comparative Studies of Dental Care Effectiveness. The comparison of the above results with the results of the studies performed 10–11 years ago produced no significant differences in the examined population in this respect, except for a smaller number of extracted teeth. The value of DMF for the Polish population (the Łódź province) amounted to 19.29 whereas for Japan this value amounted to 16.32, New Zealand – 20.92, San Antonio (USA) – 8.60, Sioux (USA) – 12.02. The comparison of these indices with the indices obtained in the first stage of the studies indicates an improvement of the state of health of the oral cavity in all countries except Poland. It should be noted that obtaining this type of data in the countries of Central and Eastern Europe under communism was not possible for political reasons. The comparison of frequency, individual DMF components and treatment index in the middle-age group and the senior group of the Polish population with other countries points to the small efficiency of prophylactic and therapeutic measures [23].

The analysis of the distribution of individual DMF components in rural adult population as compared to other social groups, based on the results of the epidemiological studies of the Polish population, indicates the following:

1. similar mean number of teeth with caries;
2. significantly greater number of extracted teeth (11.8 per person) than in small towns (10.5 per person) and big cities (7.9 per person);
3. significantly smaller number of teeth with fillings (2.6) than in small towns (4.0) and big cities (6.6). This means that the teeth treatment index for villages is the

lowest and amounts to 0.17, whereas for small towns it amounts to 0.49, and for big cities – 0.67 [10]. The above regularity is confirmed by the results obtained in, among others, the Warsaw province and the Gdańsk province (coastal area of Poland). Table 1 presents frequency of caries and mean value of DMF number in age group 35–44, according to residence in selected areas of Poland [9, 10, 14, 27, 31].

In the Gdańsk province the state of dentition expressed with the respective indices did not differ significantly, irrespective of the residence (big cities, small towns, villages). The dental caries frequency amounted to 100%, the average DMF number equalled 17.09 and was higher in women than in men. On the other hand, the average number of teeth with fillings per one person was over twice as high for the big cities as for the rural areas. With a similar number of teeth with caries, the above indices point to a significantly smaller availability of dental treatment for persons residing in rural areas. The analysis of the number of extracted teeth, depending on residence and sex, indicates that this number is higher for women than for men, with a very large percentage of people with a greater number of extracted teeth for the village population. In the examined group of people aged 35–44 years no toothless cases were found. Much higher therapeutic needs were found in women than in men, the greatest needs in the field of fillings were for rural population [31].

The Warsaw region may serve as a typical example of a senior population aged 55–64, 65–75, and above 75 years. A better state of dentition was found in men than in women – higher percentage of healthy teeth and fewer extracted teeth. The lowest percentage of healthy teeth and the highest percentage of extracted teeth referred to the rural population. The most crucial aspect for this age group is the percentage of people suffering from toothlessness. In the first age group this percentage amounted to 37.0%, and in the other two groups taken together the percentage amounted to 62.8% [12]. It should be pointed out that the percentages for different countries

**Table 1.** Frequency of caries and mean value of DMF number in age group 35–44, according to residence in selected areas of Poland.

Area of Poland		Incidence (%)	DMF	D	M	F
entire	urban	99.6–100	17.8	3.3	7.9	6.6
	rural		18.9	4.5	11.8	2.6
south west	urban	100	18.38	5.20	9.54	3.64
	rural	100	19.09	4.19	12.02	2.88
north east	urban	100	18.12	5.22	9.68	3.22
	rural	100	17.68	4.98	10.45	2.25
coast	urban	100	16.80	4.41	5.41	7.16
	rural	100	17.09	4.46	7.40	3.01
central	urban	99.5	18.18	3.8	8.5	5.7
	rural	100	19.49	20.99	3.9	13.8

were as follows: Austria – 30.0%, Denmark – 60.0%, the former German Democratic Republic – 58.0%, Iceland – 72.0%, Sweden – 20.0%, Switzerland – 25.0% and England – 79.8% [30].

### PERIODONTAL DISEASES

The diseases of tissues holding teeth in their sockets, periodontal pathologies, are caused by bacteria placed in the dental plaque and mainly in the subgingival plaque located in the parodontal pocket. These bacteria exert their pathological influence upon the parodontal tissues in a direct and indirect form. The direct action is connected with the secretion of certain enzymes which damage the connective tissue and the bone tissue, and with the toxins, especially endotoxins produced by Gram-negative bacteria. The indirect action of these bacteria consists in weakening the defence reactions, or in stimulating excessive reactions which are unfavourable to the host [7, 22].

The CPITN - index (Community Periodontal Index of Treatment Need) is used as an index pointing to the state of dentition and the related periodontal treatment needs. This index is applied to assess the parodontal tissue in 6 sextants, with the help of the following scale: 0 – healthy parodontium, 1 – bleeding when probed with a special instrument - the WHO tube, 2 – depth of gingival pocket up to 3 mm and tartar, 3 – depth of pocket 4–5 mm, 4 – depth of pocket 6 mm or more, X – sextant excluded from the examination [21].

The above quoted epidemiological studies on the total population of Poland indicate that only 0.7% of the people aged 35–44 years had healthy parodontium (1% of women and 0.3% of men). 43.3% of the examined people suffered from bleeding gums and tartar, 41% had pathologic pockets 3.5–5.5 mm deep, and 15% had pockets above 6 mm deep. The above indices point to considerable treatment needs regarding parodontium. By comparison with other countries, the results for the population of Poland are unfavourable, and only in the population of such countries as Bangladesh, Nepal and India, the health state of parodontium has been found to be worse [7].

Detailed information for the individual regions of Poland is presented below. In the Opole province (south-west of Poland) it was found that for 91.7% of the examined people suffering from various parodontal changes, the treatment need relating to the improvement of oral cavity hygiene, removal of dental deposits, correction of fillings, and curettage of pathologic pockets, was biggest for the rural population (70% – villages, 55.0% – medium size towns, 50.0% – big cities) [9]. Within the same age group almost all people in the examined population of the Poznań province (western Poland) needed periodontal intervention, with the predominant percentage of 72.5% of the population requiring prophylactic – therapeutic procedures at the basic level of health care [26].

As regards senior citizens (55–64, 65–74, and above 75 years), as much as 99.1% suffered from more or less

advanced parodontal changes, and the majority (68.58%) required basic dental care [23].

This type of study carried out on middle-aged farmers in the Lublin province indicated that no single person had healthy parodontium, and that 90.8% of the examined people needed instruction and procedures aimed at improving the efficiency of their oral cavity hygiene [6]. In the Łódź province, only 3.9% of the population of villages and small towns had healthy parodontium, whereas this percentage for the population of big cities amounted to 13.7% for people aged 35–44 years and 16.0% for the people aged 65–74 years, and the intensity of pathological symptoms was bigger in the latter age group. The additional sociological studies performed in this province allowed some generalisations from which it ensues that the population of villages and small towns pays much less attention to the hygiene of the oral cavity and that their health awareness is low. Furthermore, very few dentists instruct their patients on the oral cavity hygiene and very few of them are prepared to remove dental deposits or tartar, and the availability of special periodontal services is poor [27].

By making a comparison on the basis of the above mentioned international comparative studies, it can be stated that in Poland and certain other countries, the state of oral cavity hygiene was highly unsatisfactory, the treatment needs were high, and that the character of the periodontal treatment needs and their percentage distribution were similar [21].

### STATE AND NEEDS FOR PROSTHETIC REHABILITATION

The significant incidence of dental caries and periodontal diseases in the rural population results in a considerable number of lost teeth. In their studies on 35–44 year old people, constituting a representative sample group for the total population of Poland, Nowak *et al.* discovered that the average number of lost teeth per person in the population of big cities amounted to 13.4, in medium-sized towns – 15.6, in small towns – 17.6, and in rural population – 19.0. Furthermore, they discovered that the statistically significant differences in the incidence of dental defects concerned only the population of big cities and villages [17]. In the rural population from different regions of Poland, the high number of extracted teeth and a relatively high percentage of senior people who lost all their teeth, points to a significant negligence in dental prophylaxis. Molar teeth and premolar teeth are those most frequently lost [4, 5, 8, 24].

As regards permanent teeth, the first molar teeth are the teeth that are lost most often and at the youngest age. Reduced resistance to dental caries, poor oral hygiene and lack of prophylactic measures are among the most common factors contributing to the significant damage in permanent teeth at a young age. Drop *et al.* [3], in her evaluation of sixth teeth in the rural population of the Lublin province, found out that these teeth are extracted

**Table 2.** Extraction needs in age group 35-44, according to residence in selected areas of Poland.

Area of Poland		Extraction needs (%)
entire	urban	26.7
	rural	38.9
south west	urban	28.33
	rural	40.0
north east	urban	45.0
	rural	53.3
coast	urban	41.66
	rural	31.66
central	urban	33.8
	rural	52.4

too early and that, among other therapeutic needs, the need for extraction in adult people is very high. In individual age groups, the need for extraction is bigger than the need for endodontic treatment. The evaluation of the needs for endodontic treatment in three populations of the Kraków province (southern Poland) proved that overall, such treatment was needed more in the rural population and that negligence in this respect applied both to adults and children [1]. At a relatively young age members of the rural population lose those teeth which are responsible for maintaining the height of occlusion. The increased number of lost teeth intensifies the loss of chewing ability. Comparative studies in the Białystok region indicate that the loss of chewing ability concerns an ever growing number of rural population. It can be observed that in each teeth group more teeth are extracted in women than in men [13, 24].

The total or partial loss of teeth causes disorders in the proper functioning of the stomatognathic organ. Such loss impedes, among others, the mechanical processing of food, articulation of sounds, and disturbs the functioning of the mandibular joint. Morphological and functional changes, as well as aesthetic aspects, account for the necessity of stomatognathic organ rehabilitation. The rehabilitation is achieved with the use of various types of prosthetic restorations. In spite of regional variations in the demand for prosthetic treatment, the individual regions of Poland do not manifest major differences. The number of women using prosthetic restorations is bigger than the number of men, as regards both fixed and removable dentures. Moreover, women need to repair or replace their dentures more often than men as the frequency with which they use their dentures is also bigger [24]. The above situation is connected with the greater number of teeth losses in Polish women as compared to men, and with a greater attention women pay to the appearance of their teeth [18].

In relation to the needs, the condition and number of prosthetic restorations in the examined group of adults

from the rural population is insufficient and unsatisfactory [24]. In the rural population of the Warsaw region a particularly high demand for prosthetic treatment, especially with regard to partial dentures, could be observed [11]. The same situation referred to the Poznań province [25]. In the Białystok province (north-east Poland) the demand for partial dentures in the rural population was smaller than in town population [29]. Table 2 presents extraction needs in age group 35–44, according to residence in selected areas of Poland [9, 10, 15, 27, 31].

It seems that the significant loss of teeth and the low number of prosthetic restorations used by the rural population of Poland is caused, first of all, by low health awareness and secondly, by worse conditions for the realisation of dental health needs, as was confirmed by the studies. These studies show that while the realisation level of prosthetic needs in Poland is low (12.06% on the average), the level of their realisation in the rural population is considerably lower [19]. The percentage of people requiring dental prosthetic rehabilitation in Poland was higher than the percentage in the 9 countries included in the studies. Furthermore, in Poland the smallest number of people used complete dentures and the biggest number of people needed prosthetic treatment as compared to USA, Canada, Australia, Japan, New Zealand, Ireland, Norway, and Western and Eastern parts of Germany [20].

## CONCLUSION

The above quoted facts point to an unsatisfactory state of oral health in the adult rural population of Poland. It seems that the following are the major factors bearing upon this situation: individual attitudes and behaviours with positive or negative motives for dental treatment – on the one hand, and social – living conditions and organisation of dental care - on the other.

Unquestionably, fear of dental treatment is a negative factor. Most people treat an appointment with a dentist as an unpleasant experience and therefore try to avoid contacts with a dentist as much as they can. If, additionally, there are some other factors which stand in the way of making an appointment, the negative motivation for treatment is even more intense. Another common factor that is closely connected with the lack of periodontal and prosthetic provisions in the rural population is the poor availability of dental services, and special services in particular. Poor access to a dentist is also of major importance – small number of dentists, long queues, insufficient quotas of admitted patients, and as a result – few patients seen by a dentist in one day, shortage of finances for travelling expenses and fees for appointments, shortage of free time due to daily schedule or work on a farm, long distances, poor public transport connections to dentists working in towns, lack of confidence in a dentist working in a local health centre – often due to his/her reputation developed over the years in his/her community. Shortage of dentists, especially in smaller population centres, undoubtedly contributes to a disturbing fluctuation

of dentists who work in rural areas and thereby have poorer chances of raising their qualifications, getting extra work, finding a job for his/her spouse, or a proper school for children [16].

The demand for emergency dental help in the rural population is bigger than in town population and is a consequence of difficulties in access to the dentist's surgeries in rural primary medical care centres. The above situation points to an insufficient provision of treatment services [2]. Those members of the rural population who, besides their work on farms, also work in towns, have better access to medical services. As they have extra money from their extra work they can make an appointment with their occupational consultant or see a doctor in his/her private office.

Behaviours associated with oral cavity diseases are subject to the same attitudes as in the case of general diseases. Residents of villages resort to seeing a doctor only when they suffer from troublesome diseases or the diseases which they regard as dangerous, and their diseases are often treated using domestic methods. These are usually traditional folk medicine remedies that are accepted by official medicine.

Unquestionably, another negative factor that bears upon this situation is a very low level of health education in the rural adult population [28]. Ignorance of the essence of a disease, its method of prevention and treatment, is not conducive to pro-health behaviours. It seems that the above situation is in close relation with a low level of education – in most cases only a primary or trade school education. The living conditions are also of great importance. Poor financial situation of many families, sometimes a life of poverty, also does not contribute to pro-health behaviours.

Furthermore, a conviction of the small importance role of aesthetic reasons, so characteristic of the rural population, does not contribute to the care of the oral cavity.

It seems that the levelling of economic, social, organisational and cultural differences between country and town might be conducive to the improvement of health in the rural areas.

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