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***Use of dental services reimbursed by the National Health Fund
and health of the oral cavity of examined patients***

**Korzystanie z usług stomatologicznych refundowanych
przez Narodowy Fundusz Zdrowia a stan zdrowia jamy ustnej
badanych pacjentów**

INTRODUCTION

In many highly developed countries medical care, available to all citizens, covers the prevention and treatment of diseases, both in private and public sectors [1, 2, 4, 5]. In the countries of Central and Eastern Europe, as a result of political system transformations and organisational changes in National Health Service, a growing number of citizens have limited access to private health care, mainly because of economic reasons [9].

Results of international dental researches, information published in consecutive issues of Oral Global Data Bank and results of epidemiologic researches conducted in particular countries shows, that in most of the developed countries, morbidity due to dental caries was severely limited, whereas in developing countries, including Poland, health status of oral cavity is highly unsatisfactory. On the grounds of sociological studies, this state of affairs may be attributed to social, economic, organisational, medical and cultural conditionings [3, 6, 8].

The range of services reimbursed by the National Health Fund from public funds is determined by the Minister of Health. It covers scope of services and dental materials entitled to the insurance holders in Poland. The scope differs for two groups of beneficiary: adults and adolescents under 18 and women in pregnancy and childbed. The health benefit package includes basic preventive services against caries disease and periodontal diseases. It covers treatment of dental caries with use of specific

dental materials, endodontic treatment for certain age groups, and for certain cases, surgical, prosthetic and orthodontic services. Additionally, some procedures (prosthetic, orthodontic) can only be performed at certain time intervals. Some procedures are also limited based on age of the patients. This includes fissure sealing and orthodontic treatment. All of the above can have an influence on the health status of the oral cavity of patients undertaking treatment reimbursed by the National Health Fund.

MATERIAL AND METHOD

The research was conducted in 2012-2013 on 180 randomly chosen adult patients (aged between 35 and 44 years), both sexes living in a big city (over 100.000 inhabitants), in smaller cities (under 100.000 inhabitants) and in villages West Pomerania region. The analysis included dental examination of teeth status of adult patients, prevalence of caries and evaluation of oral hygiene and was conducted among patients undertaking private dental treatment or treatment reimbursed by the National Health Fund. The research was approved by Ethics Committee by Regional Medical Council in Szczecin.

Clinical examination included use of non-invasive and secure diagnostic methods such as using a WHO scale probe and dental mirror under the artificial light. Lamp for polymerization of the fillings was also used to evaluate the cavities on teeth contact areas.

The study was based on an anonymous survey, including single and multiple choices close-ended and open-ended questions.

Following WHO recommendation, the research determined most important socio-economic determinants of chosen groups of patients, also evaluated socio-demographic characteristics such as: gender and place of living. Socio-economic status and education – factors acknowledged as one of the socio-medical indicators of health – were subject of the research.

Results of the survey allowed to evaluate patients' behaviours helping in oral disease prophylaxis, determine main factors influencing undertaking the dental treatment especially including psycho-emotional and socio-economic conditionings of using health care.

STATISTICAL ANALYSIS METHODS

In this paper, statistical analysis was performed on the basis of chi-square distribution. Null hypothesis was stated about the independence of analysed variables. Discontinuous variables were described by quantity and prevalence. To confirm the results statistics were calculated with Pearson's χ^2 test and independent sample t-test. General statistical measures such as mean, standard deviation, minimum and maximum were calculated. Results were put in tables with number of degrees of freedom (df) and test probability (p). Alternative hypothesis ought to be assumed if test probability were lower than statistical significance. When this probability was higher than statistical significance level, there were no foundations to reject the null hy-

pothesis. In conducted analyses the level of significance $\alpha=0,05$ was chosen. Auxiliary calculations were performed in MS Excel 2007. For statistic calculations SOFA software was used.

RESULTS

Tab. I. Gender of surveyed patients

Gender	N	%
women	90	50.00
men	90	50.00
total	180	100.00

Ninety women and 90 men took part in the examination.

Tab. II. Place of living of surveyed patients

Place of living	Gender		Total
	women	men	
big city	30	30	60
smaller cities	30	30	60
villages	30	30	60
total	90	90	180

Sixty patients (30 women and 30 men) live in big city, 60 patients (30 women and 30 men) live in smaller cities and 60 patients (30 women and 30 men) live in villages.

Tab. III. Education of surveyed patients

Education	N	%
primary	6	3.59
vocational	34	20.36
secondary	62	37.13
higher	65	38.92
total	167	100.00

Among 180 patients, 167 have given information on their education. The majority of patients has higher (65 patients) and secondary (62 patients) education. Vocational education was selected by 34 patients, and primary – by 6.

Tab. IV. Income of surveyed patients

Income	N	%
up to 300 PLN	3	1.67
301-500 PLN	16	8.94

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Income	N	%
501-800 PLN	38	21.23
801-1200 PLN	39	21.79
1200 PLN and more	83	46.37
total	179	100.00

Of 180 patients, 179 have given information on their income. Majority of examined patients have income of 1200 PLN and more. The income between 801-1200 PLN was declared by 39 patients, whereas 38 patients have income of 501-800 PLN. Among examined patients, 16 people declared income of 301-500 PLN, and 3 patients declared income of up to 300 PLN per person in a household.

Patients were asked if they undertake treatment reimbursed by the National Health Fund. The answers of women and men, and inhabitants of big city, smaller cities and villages have been compared.

Tab. V. Frequency of undertaking treatment reimbursed by National Health Fund in relation to gender and place of living

Treatment reimbursed by the National Health Fund		always	often	sometimes	rarely	never
Gender	women	11	36	15	14	13
	%	12.36	40.45	16.85	15.73	14.61
	men	11	26	27	9	14
	%	12.64	29.89	31.03	10.34	16.09
Place of living	big city	9	18	14	11	8
	%	15.00	30.00	23.33	18.33	13.33
	smaller cities	3	14	18	8	17
	%	5.00	23.33	30.00	13.33	28.33
	villages	10	30	10	4	2
	%	17.86	53.57	17.86	7.14	3.57

Similar percentage of both men (12.64%) and women (12.36%) always undertake treatment reimbursed by the National Health Fund. Patients from smaller cities (5.00%) least often among all patients undertake treatment reimbursed by the National Health Fund.

Tab. VI. Results of chi-distribution: frequency of undertaking treatment reimbursed by National Health Fund in relation to place of living

Statistic	Result	df	p
Pearson's correlation	28.907	8	<0.001

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Results of chi-square distribution prove that there is a statistically significant correlation ($p < 0.05$) between frequency of undertaking treatment reimbursed by National Health Fund and place of living.

The frequency of undertaking the treatment reimbursed by the National Health Fund in relation to education and income of surveyed patients has been examined.

Tab. VII. Frequency of undertaking treatment reimbursed by National Health Fund in relation to education and income

Treatment reimbursed by the National Health Fund		always	often	sometimes	rarely	never
Education	primary	2	3	1	0	0
	%	33.33	50.00	16.67	0.00	0.00
	vocational	10	15	6	1	1
	%	30.30	45.45	18.18	3.03	3.03
	secondary	8	23	16	7	8
	%	12.90	37.10	25.81	11.29	12.90
	higher	1	14	17	13	18
%	1.59	22.22	26.98	20.63	28.57	
Income	up to 300 PLN	1	1	0	1	0
	%	33.33	33.33	0.00	33.33	0.00
	301-500 PLN	4	8	3	1	0
	%	25.00	50.00	18.75	6.25	0.00
	501-800 PLN	3	21	9	1	2
	%	8.33	58.33	25.00	2.78	5.56
	801-1200 PLN	4	14	9	5	7
	%	10.26	35.90	23.08	12.82	17.95
	1200 PLN and more	10	17	21	15	18
%	12.35	20.99	25.93	18.52	22.22	

Patients with primary education most often, among all patients, always undertake dental treatment reimbursed by the National Health Fund (33.33%), whereas patients with higher education undertake such treatment least often (1.59%). The higher the education of examined patients the less often they undertake reimbursed treatment.

Patients with income up to 300 PLN most often, among all patients, always undertake treatment reimbursed by the National Health Fund (33.33%), whereas with income of 501-800 PLN undertake such treatment least often (8.33%). The higher the income of examined patients the less often they undertake reimbursed treatment.

Tab. VIII. Results of chi-distribution: frequency of undertaking treatment reimbursed by National Health Fund in relation to education

Statistic	Result	df	p
Pearson's correlation	36.721	12	<0.001

Results of chi-square distribution prove that there is a statistically significant correlation ($p < 0.05$) between frequency of undertaking treatment reimbursed by National Health Fund and education.

Tab. IX. Results of chi-distribution: frequency of undertaking treatment reimbursed by National Health Fund in relation to income

Statistic	Result	df	p
Pearson's correlation	29.990	16	0.018

Results of chi-square distribution prove that there is a statistically significant correlation ($p < 0.05$) between frequency of undertaking treatment reimbursed by National Health Fund and income.

The impact of undertaking treatment reimbursed by the National Health Fund on oral cavity status has been examined. Variables such as mean number of teeth, mean number of decayed teeth, mean number of missing teeth and mean number of filled teeth have been determined.

Tab. X. Frequency of undertaking treatment reimbursed by National Health Fund in relation to mean number of teeth, mean number of decayed teeth (D), missing teeth (M) and filled teeth (F)

Treatment reimbursed by the National Health Fund	Mean number of teeth	Mean D	Mean M	Mean F
always	26.0	4.1	5.9	5.9
never	29.3	2.6	2.7	9.7

Patients always undertaking treatment reimbursed by the National Health Fund have lower mean number of teeth. Patients always undertaking treatment reimbursed by the National Health Fund have higher mean number of decayed and missing teeth and lower mean number of filled teeth.

Tab. XI. Results of independent samples t-test: frequency of undertaking treatment reimbursed by National Health Fund in relation to mean number of teeth

Statistic	Result	df	p
Independent Samples t-test	-2.642	47	0.011

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Results of independent samples t-test prove that there is a statistically significant correlation ($p < 0.05$) between frequency of undertaking treatment reimbursed by National Health Fund and mean number of teeth.

Tab. XII. Statistical measures: frequency of undertaking treatment reimbursed by National Health Fund in relation to mean number of teeth

Group	N	Mean	CI 95%	Standard Deviation	Min	Max	Skew	p abnormal
always	22	26.0	23.615 - 28.385	5.707	16.0	32.0	-0.574	0.125
never	27	29.259	28.258 - 30.260	2.654	24.0	32.0	-0.511	0.073

Tab. XIII. Results of independent samples t-test: frequency of undertaking treatment reimbursed by National Health Fund in relation to mean number of missing teeth

Statistic	Result	df	p
Independent Samples t-test	2.488	47	0.016

Results of independent samples t-test prove that there is a statistically significant correlation ($p < 0.05$) between frequency of undertaking treatment reimbursed by National Health Fund and mean number of missing teeth.

Tab. XIV. Statistical measures: frequency of undertaking treatment reimbursed by National Health Fund in relation to mean number of missing teeth

Group	N	Mean	CI 95%	Standard Deviation	Min	Max	Skew	p abnormal
always	22	5.864	3.426 - 8.301	5.833	0.0	16.0	0.550	0.112
never	27	2.741	1.740 - 3.742	2.654	0.0	8.0	0.511	0.073

Tab. XV. Results of independent samples t-test: frequency of undertaking treatment reimbursed by National Health Fund in relation to mean number of filled teeth

Statistic	Result	df	p
Independent Samples t-test	-3.103	47	0.003

Results of independent samples t-test prove that there is a statistically significant correlation ($p < 0.05$) between frequency of undertaking treatment reimbursed by National Health Fund and mean number of filled teeth.

Tab. XVI. Statistical measures: frequency of undertaking treatment reimbursed by National Health Fund in relation to mean number of filled teeth

Group	N	Mean	CI 95%	Standard Deviation	Min	Max	Skew	p abnormal
always	22	5.909	4.673 - 7.145	2.959	1.0	12.0	0.350	0.698
never	27	9.741	7.804 - 11.677	5.134	1.0	23.0	1.049	0.029

Tab. XVII. Frequency of undertaking treatment reimbursed by National Health Fund in relation to treatment needs

Treatment reimbursed by the National Health Fund	Lack of treatment needs		Filling on 1 surface		Filling on 2 and more surfaces	
	N	%	N	%	N	%
always	3	13.64	9	40.91	14	63.64
never	6	22.22	8	29.63	15	55.56
	Pulp treatment and filling		Extraction		Prosthetic treatment	
	N	%	N	%	N	%
always	7	31.82	8	36.36	10	45.45
never	3	11.11	3	11.11	5	18.52

Patients always undertaking treatment reimbursed by the National Health Fund more often need prosthetic treatment, pulp treatment, extraction and filling on 1 surface.

Tab. XVIII. Frequency of undertaking treatment reimbursed by National Health Fund in relation to malocclusions

Treatment reimbursed by the National Health Fund	Lack of malocclusions		Early stage malocclusions		Advanced malocclusions		Sum of both types	
	N	%	N	%	N	%	N	%
always	14	63.64	6	27.27	2	9.09	8	36.36
never	18	66.67	8	29.63	1	3.70	9	33.33

There no significant differences in the occurrence of malocclusions of patients always or never undertaking treatment reimbursed by the National Health Fund

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Tab. XIX. Frequency of undertaking treatment reimbursed by National Health Fund in relation to teeth wear

Treatment reimbursed by the National Health Fund	No wear		Enamel wear		Dentin exposure	
	N	%	N	%	N	%
always	11	50.00	7	31.82	4	18.18
never	18	66.67	5	18.52	4	14.81

Patients always undertaking treatment reimbursed by the National Health Fund have more often enamel wear. Patients always undertaking treatment reimbursed by the National Health Fund more often have teeth wear.

DISCUSSION

Results of modern socio-economic researches show higher influence of social, economic, organizational and cultural determinants than personal conditionings on oral cavity health. Economic conditionings are perceived as superior to the previously listed determinants. In majority of countries where political transformation has taken place and the annual spending on health care were couple times lower than in developed countries, oral cavity health state of inhabitants is considered by WHO as equally low. Socio-economic status and strictly related variable such as place of living are the strongest determinants which were determined in Poland [7].

In was noticed in the research that similar percentage of both men (12.64%) and women (12.36%) always undertake treatment reimbursed by the National Health Fund.

The research showed that the higher the education of examined patients the less often they undertake reimbursed treatment. It was also noticed that the higher the income of examined patients the less often they undertake reimbursed treatment.

Patients always undertaking treatment reimbursed by the National Health Fund have higher mean number of missing teeth, lower mean number of filled teeth and higher mean number of decayed teeth. They also more often have the need of prosthetic treatment, pulp treatment, extraction and filling on 1 surface.

There were no significant differences in the occurrence of malocclusions of patients always or never undertaking treatment reimbursed by the National Health Fund.

Patients always undertaking treatment reimbursed by the National Health Fund have more often enamel wear. Patients always undertaking treatment reimbursed by the National Health Fund more often have teeth wear.

CONCLUSIONS

- Similar percentage of men and women always undertake treatment reimbursed by the National Health Fund. Patients from smaller cities least often undertake treatment reimbursed by the National Health Fund.
- The higher the education of examined patients the less often they undertake reimbursed treatment.
- The higher the income of examined patients the less often they undertake reimbursed treatment.
- Patients always undertaking treatment reimbursed by the National Health Fund have higher mean number of missing teeth, lower mean number of filled teeth and higher mean number of decayed teeth.
- Patients always undertaking treatment reimbursed by the National Health Fund more often need prosthetic treatment, pulp treatment, extraction and filling on 1 surface.
- Patients always undertaking treatment reimbursed by the National Health Fund more often have teeth wear.

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ABSTRACT

The aim of the work was to determine the frequency with which patients undertake treatment reimbursed by the National Health Fund. It was determined, if there is an influence of frequency with which patients undertake reimbursed treatment on the health status of oral cavity. A particular attention was focused on socioeconomic status of patients undertaking treatment reimbursed by the National Health Fund. The research was conducted in 2012-2013 on 180 randomly chosen adult patients (aged between 35 and 44 years), both sexes living in a big city (over 100.000 inhabitants), in smaller cities (under 100.000 inhabitants) and in villages. The analysis included dental examination of teeth status of adult patients, prevalence of caries and evaluation of oral hygiene. Similar percentage of both women and men undertake treatment reimbursed by the National Health Fund. Patients from smaller cities least often undertake treatment reimbursed by the National Health Fund. The higher the education and income of examined patients, the least often they undertake the treatment reimbursed by the National Health Fund. Patients who always undertake reimbursed treatment have more intensified dental caries.

STRESZCZENIE

Celem pracy było określenie częstości wyboru świadczeń refundowanych przez Narodowy Fundusz Zdrowia oraz świadczeń prywatnych. Zbadano wpływ częstości korzystania z leczenia refundowanego na stan zdrowia jamy ustnej. Zwrócono uwagę na sytuację socjoekonomiczną pacjentów, wybierających leczenie refundowane przez Narodowy Fundusz Zdrowia oraz określono ich stan zdrowia jamy ustnej w porównaniu z wynikami stanu zdrowia pacjentów korzystających z leczenia prywatnego. Badanie było prowadzone w latach 2012-2013 wśród 180 losowo wybranych pacjentów w wieku 35-44 lata, obu płci, zamieszkujących duże miasto (powyżej 100 000 mieszkańców) oraz mniejsze miasta (poniżej 100 000 mieszkańców) i wsi. Pacjentów poddano badaniu stomatologicznemu w celu ustalenia stanu zdrowia jamy ustnej i poziomu higieny. Ponadto przeanalizowano zachowania związane z utrzymaniem higieny i zdrowiem jamy ustnej. Pacjenci z małych miast najrzadziej korzystają z leczenia refundowanego. Stwierdzono, że im wyższe wykształcenie i dochód pacjentów, tym rzadziej korzystają oni z leczenia refundowanego. U pacjentów korzystających zawsze z leczenia refundowanego zauważa się nasiloną chorobę próchnicową.

Artykuł zawiera 20816 znaków ze spacjami