Unit of Marketing Communication, Department of Services Marketing,
Faculty of Management and Economics of Services, University of Szczecin
Zakład Komunikacji Marketingowej, Katedra Marketingu Usług,
Wydział Zarządzania i Ekonomiki Usług Uniwersytetu Szczecińskiego

LESZEK GRACZ

Chosen socio-demographic conditionings of oral health status

Wybrane społeczno-demograficzne uwarunkowania stanu zdrowia jamy ustnej

Key words: oral health indices, education, place of living

Słowa kluczowe: wskaźniki stanu zdrowia jamy ustnej, wykształcenie, miejsce zamieszkania

INTRODUCTION

Improvement of social, economic and organizational conditions, favorable to oral cavity health (reliable information about sustaining oral cavity health, periodical dental check-ups and preventive activities) resulted in a decrease of expenditure on dental restorative services in economically developed countries.

Besides systemic and environmental conditioning, use of health services is visibly influenced by patient's individual factors. There is a strong relation between socio-demographic and socio-economic characteristics of patients and frequency of undertaking dental treatment. To those characteristics we can include gender, age, education (in case of children – parents' education), household economic situation and place of living [12,13,15].

Health policies of National Health Fund and the range of reimbursed services set out possibilities for different health agendas, including those concerning dentistry [9].

Results of international dental studies, information published in consecutive issues of Oral Global Data Bank and results of epidemiologic studies conducted in particular countries, show that in most of the developed countries prevalence of dental carries was severely limited, whereas in developing countries, including Poland, health status of oral cavity is highly unsatisfactory. Sociological studies have determined that it may be attributed to social, economic, organisational, medical and cultural factors [11].

Dental caries is commonly evaluated as the sum of decayed (D), missing (M), and filled (F) number of teeth (DMF). This index has been widely used to assess the status of oral cavity of societies across the globe [3]. The DMF Index indicates caries occurrence, including cured and recurring dental caries. The DMF Index remains one of the most commonly used epidemiological index for evaluation of dental caries prevalence [1].

Improvement of social conditions in developed countries resulted in the improvement of oral cavity health status – higher education corresponds with low DMF Index value [4], whereas decrease of education results in increase of DMF Index value [7].

THE AIM OF RESEARCH, MATERIAL, METHODS

The aim of research was to determine chosen socio-demographic conditionings of oral health status.

The research was conducted in 2012-2013 on 180 randomly chosen adult patients, aged between 35 and 44 years, both genders living in the area of West Pomerania region – in a big city of Szczecin (over 100.000 inhabitants), in smaller cities (under 100.000 inhabitants) and in villages. The analysis included dental examination of teeth status of 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.

Clinical examination included non-invasive and secure diagnostic methods such as using WHO scale probe and dental mirror under the artificial light. To evaluate the health status of oral cavity the DMF Index and its components – D (decayed teeth), M (missing teeth), and F (filled teeth) have been calculated.

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 and 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.

STATISTICAL ANALYSIS METHODS

All statistical calculations were performed with use of statistical software STATISTICA ver. 10.0 by StatSoft Inc. (2011) and Excel calculation sheet. Quantitative variables were determined by arithmetical mean, standard deviation, median, minimum and maximum (range) and 95% CI (confidence interval). Qualitative variables were determined by number and percentage. Significance of differences between two groups (independent variables model) was tested with significance test: t-Student or Mann-Whitney U test. Difference significance between more than two groups was tested with F (ANOVA) or Kruskal-Wallis test. Independence chi-square test was used for qualitative variables. To determine the relationship, strength and direction

between variables Pearson's and/or Spearman's correlation coefficients were calculated. The level of significance p=0.05 was chosen for conducted study.

RESULTS

The study involved 180 patients, 90 women and 90 men, who underwent dental examination determining their teeth and oral hygiene status. Study was conducted in a big city, smaller cities and villages. Each examined person completed a questionnaire on utilization of dental services, oral hygiene and access to dental services.

Tab. I. Gender of surveyed patients

Gender	N	%
Women	90	50.0
Men	90	50.0
Sum	180	100.0

The study involved 90 women and 90 men.

Tab. II. Place of living of surveyed patients

Place of living	N	%
Big city	60	33.3
Smaller cities	60	33.3
Villages	60	33.3
Sum	180	100.0

The survey involved 60 people from a big city, 60 from smaller cities and 60 from villages.

Tab. III. Place of living and gender of surveyed patients

Place of living	Women		Men	
	N	%	N	%
Big city	30	33.3	30	33.3
Smaller cities	30	33.3	30	33.3
Villages	30	33.3	30	33.3
Sum	90	100.0	90	100.0

The study involved 30 women and 30 men from a big city, 30 women and 30 men from smaller cities and also 30 women and 30 men from villages.

Tab. IV. Education of surveyed patients

Education	N	%
Primary	6	3.3
Vocational	40	22.2
Secondary	67	37.2

Education	N	%
Higher	67	37.2
Sum	180	100.0

In the study 3.3% of patients had primary education, 22.2% had vocational education, 37.2% had secondary education and 37.2% had higher education.

Tab. V. Education and gender of surveyed patients

Education	Women		Men	
	N	%	N	%
Primary	4	4.4	2	2.2
Vocational	21	23.3	19	21.1
Secondary	37	41.1	30	33.3
Higher	28	31.1	39	43.3
Sum	90	100.0	90	100.0

In the study 90 women and 90 men have indicated their education. Among women most had secondary education (41.1%), whereas among men most had higher education (43.3%).

Tab. VI. Education and place of living of surveyed patients

Education	Big city		Smaller cities		Villages	
	N	%	N	%	N	%
Primary	1	1.7	0	0.0	5	8.3
Vocational	14	23.3	7	11.7	19	31.7
Secondary	21	35.0	24	40.0	22	36.7
Higher	24	40.0	29	48.3	14	23.3
Sum	60	100.0	60	100.0	60	100.0

Most patients from a big city and smaller cities indicated higher education (respectively 40.0% and 48.3%), whereas most patients from villages indicated secondary education (36.7%).

Tab. VII. Mean values of DMF, D, M, F Indices of surveyed patients

	N	Mean
DMF	180	16.1
D	147	3.9
M	128	4.8
F	175	7.9

Mean value of DMF Index of examined patients was 16.1. On average examined patient had 7.9 filled teeth, 4.8 missing teeth and 3.9 decayed teeth.

Tab. VIII. Mean values of DMF, D, M, F Indices in relation to gender of surveyed patients

	Women		Men	
	N	Mean	N	Mean
DMF	90	15.8	90	16.4
D	74	3.5	73	4.3
M	64	4.5	64	5.0
F	89	8.1	86	7.7

Men had higher mean value of DMF Index (16.4) than women (15.8). Women had more filled teeth (8.1 for women and 7.7 for men) but less decayed teeth (3.5 for women and 4.3 for men) and missing teeth (4.5 for women and 5.0 for men).

Tab. IX. Characteristics of surveyed group regarding gender and values of DMF, D, M, F Indices

		Women	Men	Sum	p value
DMF	mean±SD	15.8±6.3	16.4±6.0	16.1±6.1	Z=-0.88 p=0.3806
	range	5.0-32.0	5.0-32.0	5.0-32.0	
	median	14.0	16.0	15.5	
	95%CI	[14.5;17.1]	[15.2;17.7]	[15.2;17.0]	
D	mean±SD	3.1±3.1	3.7±4.4	3.4±3.8	Z=-1.00 p=0.3194
	range	0.0-16.0	0.0-32.0	0.0-32.0	
	median	2.0	3.0	3.0	
	95%CI	[2.5;3.8]	[2.8;4.7]	[2.9;4.0]	
M	mean±SD	4.5±5.3	5.0±6.2	4.8±5.8	Z=-0.22 p=0.8256
	range	0.0-25.0	0.0-32.0	0.0-32.0	
	median	3.0	3.5	3.0	
	95%CI	[3.4;5.7]	[3.6;6.3]	[3.9;5.6]	
F	mean±SD	8.1±4.4	7.7±4.4	7.9±4.4	Z=0.47 p=0.6348
	range	0.0-23.0	0.0-20.0	0.0-23.0	
	median	7.0	7.0	7.0	
	95%CI	[7.2;9.0]	[6.8;8.6]	[7.3;8.6]	

There are no statistically significant differences between gender regarding values of DMF, D, M, F Indices.

Tab. X. Mean values of DMF, D, M, F Indices in relation to place of living of surveyed patients

	Big city		Smaller cities		Villages	
	N	Mean	N	Mean	N	Mean
DMF	60	17.9	60	13.4	60	17.1
D	50	5.1	51	3.4	46	3.1
M	38	4.3	47	3.2	43	6.7
F	58	8.4	59	7.4	58	8.0

Examined patients from smaller cities have lower mean value of DMF Index (13.4) than patients from a big city (17.9) and villages (17.1). Patients from villages have significantly higher number of missing teeth (6.7) than patients from a big city (4.3) and smaller cities (3.2). Examined patients from a big city had higher mean number of decayed teeth (5.1) than patients from both smaller cities (3.4) and villages (3.1).

Tab. XI. Characteristics of surveyed group regarding place of living and values of DMF, D, M, F Indices

		Big city	Smaller cities	Villages	p value
DMF	mean±SD	17.9±6.8	13.4±4.3	17.1±6.2	F=12.27 p=0.0001
	range	5.0-32.0	6.0-27.0	5.0-32.0	
	median	18.0[1]	13.0[1,2]	16.0[2]	
	95%CI	[16.1;19.6]	[12.3;14.5]	[15.5;18.6]	
D	mean±SD	5.1±5.5	2.9±2.1	2.4±2.3	H=11.06 p=0.0040
	range	0.0-32.0	0.0-9.0	0.0-9.0	
	median	3.5[1]	3.0	2.0[1]	
	95%CI	[3.7;6.5]	[2.3;3.4]	[1.8;3.0]	
M	mean±SD	4.3±4.8	3.2±4.1	6.7±7.4	H=5.63 p=0.0600
	range	0.0-16.0	0.0-25.0	0.0-32.0	
	median	2.0	2.0	4.5	
	95%CI	[3.1;5.5]	[2.2;4.3]	[4.8;8.6]	
F	mean±SD	8.4±5.7	7.4±2.9	8.0±4.1	H=0.31 p=0.8567
	range	0.0-23.0	0.0-15.0	0.0-22.0	
	median	8.0	7.0	7.0	
	95%CI	[7.0;9.9]	[6.6;8.1]	[6.9;9.0]	

The DMF Index values were significantly higher among people from a big city comparing to people from smaller cities. The DMF Index values were significantly lower among people from smaller cities comparing to people from villages. Value of D was significantly higher among people from a big city comparing to people from villages.

Tab. XII. Mean values of DMF, D, M, F Indices in relation to education of surveyed patients

	Primary		Vocational		Secondary		Higher	
	N	Mean	N	Mean	N	Mean	N	Mean
DMF	6	21.5	40	18.1	67	15.6	67	15.0
D	6	3.8	34	3.6	56	4.3	51	4.6
M	5	12.8	35	9.3	48	6.4	40	3.9
F	6	7.0	38	7.3	65	7.6	66	9.3

Patients with higher education have the lowest value of DMF Index (15.0), the lowest mean number of missing teeth (3.9) and the highest mean numbers of decayed teeth (4.6) and filled teeth (9.3).

Tab. XIII. Characteristics of surveyed group regarding education and values of DMF, D, M, F Indices

		Primary	Vocational	Secondary	Higher	p value
DMF	mean±SD	21.5±6.2	18.1±6.0	15.6±5.7	15.0±6.3	H=13.15 p=0.0043
	range	14.0-30.0	5.0-30.0	6.0-32.0	5.0-32.0	
	median	22.0	19.0[1]	14.5	13.0[1]	
	95%CI	[15.0;28.0]	[16.0;20.2]	[14.2;17.1]	[13.3;16.5]	
D	mean±SD	3.8±1.8	3.6±2.7	4.3±3.9	4.6±4.6	H=1.42 p=0.7016
	range	2.0-7.0	0.0-9.0	0.0-20.0	0.0-32.0	
	median	3.0	2.0	3.0	3.0	
	95%CI	[1.9;5.8]	[2.5;4.4]	[2.6;4.6]	[2.4;4.7]	
M	mean±SD	12.8±8.3	9.3±6.7	6.4±5.7	3.9±2.9	H=27.80 p=0.0001
	range	0.0-20.0	0.0-30.0	0.0-32.0	0.0-11.0	
	median	13.5[1]	8.0[2.3]	3.0[2]	1.0[1.3]	
	95%CI	[2.0;19.4]	[5.8;10.5]	[3.1;6.1]	[1.6;3.0]	
F	mean±SD	7.0±1.4	7.3±4.9	7.6±3.8	9.3±4.7	H=10.17 p=0.0172
	range	5.0-9.0	0.0-22.0	0.0-23.0	0.0-20.0	
	median	7.0	6.0[1]	7.0	8.0[1]	
	95%CI	[5.5;8.5]	[4.9;8.3]	[6.5;8.4]	[7.9;10.2]	

The DMF Index values were significantly higher among people with higher education. Value of M Index was significantly higher among people with primary education comparing to people with higher education and was significantly higher among people with vocational education comparing to people with secondary and higher education. Value of F Index was significantly higher among people with vocational education comparing to people with higher education.

Tab. XIV. Mean values of DMF, D, M, F Indices in relation to place of living and gender of surveyed patients

	Big city				Smaller cities				Villages			
	Women		Men		Women		Men		Women		Men	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
DMF	30	18.3	30	17.4	30	13.5	30	13.4	30	15.6	30	18.5
D	25	5.5	25	6.8	24	3.4	27	3.3	25	2.6	21	3.7
M	19	6.8	19	6.8	25	4.8	22	3.3	20	8.0	23	10.6
F	30	9.5	28	7.9	29	7.0	30	8.0	30	8.1	28	8.4

Men (18.5) living in villages have higher DMF Index value than women (15.6). Women and men from smaller cities have similar values of DMF Index (respectively 13.5 and 13.4). Women (5.5) and men (6.8) from a big city have higher mean number of decayed teeth than patients from respective groups from smaller cities and villages.

Tab. XV. Mean values of DMF, D, M, F Indices in relation to education of surveyed patients from a big city

	Education of patients from a big city							
	Primary		Vocational		Secondary		Higher	
	N	Mean	N	Mean	N	Mean	N	Mean
DMF	1	23.0	14	16.8	21	17.6	24	18.5
D	1	3.0	11	4.3	19	6.0	19	7.6
M	1	15.0	10	7.5	15	7.3	12	5.0
F	1	5.0	14	8.1	20	7.4	23	10.4

Patients from a big city with primary education had significantly higher DMF Index value (23.0) and mean number of missing teeth (15.0). Patients from a big city with higher education had the lowest mean number of missing teeth (5.0) and highest mean number of decayed teeth (7.6) and filled teeth (10.4).

Tab. XVI. Mean values of DMF, D, M, F Indices in relation to education of surveyed patients from smaller cities

	Education of patients from smaller cities							
	Primary		Vocational		Secondary		Higher	
	N	Mean	N	Mean	N	Mean	N	Mean
DMF	0	-	7	17.4	24	14.3	29	11.8
D	0	-	7	4.7	22	3.9	22	2.4
M	0	-	7	9.7	20	3.5	20	2.8
F	0	-	6	3.5	24	7.8	29	8.1

Patients with higher education have the lowest mean number of decayed (2.4) and missing teeth (2.8) and highest mean number of filled teeth (8.1)

Tab. XVII. Mean values of DMF, D, M, F Indices in relation to education of surveyed patients from villages

	Education of patients from villages							
	Primary		Vocational		Secondary		Higher	
	N	Mean	N	Mean	N	Mean	N	Mean
DMF	5	21.2	19	19.4	22	15.0	14	15.6
D	5	4.0	16	2.7	15	2.7	10	3.9
M	4	12.3	18	10.2	13	10.0	8	5.1
F	5	7.4	18	7.9	21	7.7	14	9.9

Patients with higher education have the lowest mean number of missing teeth (5.1) and the highest mean number of filled teeth (9.9).

DISCUSSION

Education, socio-economic factors, occupation and living conditions influence on health behaviour of patients. It is assumed that the source of diversity of health status very often lies in socio-economic conditionings [5,8,14].

Numerous authors [6,10] emphasise the significant influence of socio-demographic factors on the number of healthy teeth. Hamaska et al. [2] proved that patients with lower education more often extract their teeth comparing to patients with higher education.

This study has shown that the higher the education of examined patients the lower the mean value of DMF Index. Patients with higher education had also the lowest mean number of missing teeth and the highest mean number of filled teeth. The worst value of DMF Index was noticed amongst patients with primary education. In this group of patients and also in group of patients with vocational education there were largely higher numbers of missing teeth than amongst patients with secondary and higher education.

It was noticed that women have lower mean value of DMF Index than men. Women, comparing to men, have lower mean number of decayed and missing teeth and higher mean number of filled teeth.

Carried out research showed that there is a visible difference between oral cavity health of patients from different areas. Examined patients from smaller cities have lower mean value of DMF Index than patients from a big city and villages.

CONCLUSIONS

Following conclusions were drawn from the study:

1. Men have higher mean value of DMF Index and more decayed and filled teeth than women.

2. Patients from smaller cities have the lowest value of DMF Index and the most missing and filled teeth, comparing to patients from a big city and villages.
3. The lower the education of examined patients the higher the mean value of DMF Index and mean number of missing teeth.
4. The higher the education of patients from smaller cities the lower the mean value of DMF Index.
5. Patients from villages with higher education have the lowest mean number of missing and filled teeth.
6. Patients with higher education have the highest mean number of filled teeth.

REFERENCES

1. Broadbent J.M., Thomson W.M.: For debate: problems with the DMF index pertinent to dental caries data analysis. Community Dent. Oral Epidemiol. 2005, 33, 400–409.
2. Hamaska A.H., Sasa I., Quadach M.: Risk indicators associated with tooth loss in Jordanians adults. Comm. Dent. Oral Epidemiol., 2000, 28, 67-72.
3. Jakobsen J.R., Hunt R.J.: Validation of oral status indicators. Community Dent. Health 1990, 7, 279–284.
4. Miura H. et al.: Socioeconomic factors and dental caries in developing countries: a cross-national study. Soc. Sci. Med., 1997, 44, 2, 269-272.
5. Ostrowska A.: Społeczne czynniki warunkujące zachowania prozdrowotne – bilans dekady. Promocja Zdrowia. Nauki Społeczne i Medycyna, 2000, 19, 46-65.
6. Popowski W. et al.: Stan uzębienia i potrzeby lecznicze osób w wieku 35-44 lat zamieszkałych w regionie warszawskim. Nowa Stomat., 2001, 1, 10-15.
7. Radford J.R. et al.: Caries-associated micro-organisms in infants from different socio-economic backgrounds in Scotland. J. Dent., 2000, 30, 2, 108-114.
8. Syrek E.: Teoretyczne standardy zdrowia dzieci i młodzieży, a ich środowiskowe uwarunkowania. Katowice 1997.
9. Szatko F., Grzybowski A.: (2000 A), Wybrane mechanizmy decydujące o korzystaniu przez uczniów z określonej pasty do czyszczenia zębów. Przegl. Stomat. Wieku Rozwoj., 2000, 1/2000. (29). 18-24.
10. Szatko F. et al.: Stan i potrzeby stomatologiczne 18-letniej młodzieży z grupy szczególnego ryzyka. Nowa Stomat., 2006, 1, 23-26.
11. Szatko F.: Ważniejsze determinanty stanu zdrowotnego jamy ustnej. Przegl. Stomat. Wieku Rozw., 1996, 2/3, 120-124.
12. Świderska J., Gracz L.: Influence of economic factors on access to health care in the area of dentistry. Impact of a lifestyle on wellness and prosperity, Wyd. NeuroCentrum, Lublin 2009, 435-452.

13. Świderska J., Gracz L.: Influence of income of patients using dental services on chosen health behaviours in a range of oral cavity hygiene. Cultural conditioning for wellness, Wyd. NeuroCentrum, Lublin 2012, 295-310.
14. Świderska J., Gracz L.: Economic conditionings of not undertaking the dental treatment by patients. Societal conditioning for wellness, Wyd. NeuroCentrum, Lublin 2012, 323-341.
15. Young D.W. et al.: Value-based partnering in healthcare: a framework for analysis. Journal of Healthcare Management, 2001, vol. 46, nr 2, 56.

ABSTRACT

The aim of research was to determine chosen socio-demographic conditionings of oral health status. Study included 180 patients, 90 women and 90 men, aged 35-44 from a big city, smaller cities and villages of West Pomerania region. Dental examination was performed, which allowed to evaluate oral health status. Questionnaire including utilization of dental services, oral hygiene and access to dental services was completed by patients. Men have higher mean value of DMF Index and more decayed and filled teeth than women. The lower the education of patients, the higher the mean value of DMF Index and higher the number of missing teeth. Patients with higher education have lowest number of missing teeth, regardless of their place of living. Patients from smaller cities have the lowest value of DMF Index and the most missing and filled teeth, comparing to patients from a big city and villages.

STRESZCZENIE

Celem pracy było poznanie wybranych społeczno-demograficznych uwarunkowań stanu zdrowia jamy ustnej. Grupę badawczą stanowiło 180 pacjentów, 90 kobiet i 90 mężczyzn w wieku 35-44 lata z dużego miasta, małych miejscowości i wsi województwa zachodniopomorskiego. Przeprowadzono lekarskie badanie stomatologiczne, które pozwoliło określić stan zdrowia jamy ustnej pacjentów oraz badanie ankietowe dotyczące między innymi korzystania przez pacjentów ze świadczeń stomatologicznych, higieny jamy ustnej, dostępu do opieki stomatologicznej. Mężczyźni mają wyższą wartość wskaźnika PUW, więcej zębów z próchnicą i więcej zębów usuniętych. Im niższe wykształcenie badanych pacjentów, tym wyższa średnia wartość wskaźnika PUW i wyższa liczba usuniętych zębów. U pacjentów z wyższym wykształceniem obserwuje się najniższą liczbę usuniętych zębów, niezależnie od ich miejsca zamieszkania. Pacjenci z mniejszych miejscowości mają niższą wartość wskaźnika PUW oraz najwięcej zębów usuniętych i wypełnionych, w porównaniu do pacjentów z dużego miasta i ze wsi.

Artykuł zawiera 20130 znaków ze spacjami