ASSOCIATION OF CARIES EXPERIENCE WITH SOCIAL AND BEHAVIOURAL FACTORS AMONG ADULTS OF DIFFERENT AGES FROM IASI COUNTY, ROMANIA

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Abstract

The purpose of the present study is to determine the possible occurrence of SES disparity in caries experience (DMFT) in young adult and adult samples, and to establish whether differences in oral hygiene behaviors or preventive attitude can cause this disparity. **Materials and method:** A cross-sectional study, conducted over 10 months in 2011, involved completion of a structured questionnaire with information about the demographic profile, educational status, income, occupation, dental visits, reason of the visits, oral hygiene practices, dietary habits, underlying systemic diseases, smoking. Oral health status was obtained through clinical examination, using the World Health Organization (WHO) oral health assessment form (Basic Oral Health Surveys, 1997). The examination was conducted by a single, trained, calibrated examiner (dentist). **Results:** The study was conducted on a sample group formed of 327 young adults (229 females and 98 males; mean age: 21.99 years, SD: 2.30) with ages between 18-26 years, and on 161 adults (97 females and 64 males; mean age: 34.96 years, SD: 5.59) with ages between 27- 45 years. The prevalence of dental caries in young adults was 96.3% (females: 72.7%, males: 27.3%). The mean value of DMFT/S for females and males was 8.24 (4.99)/13.67 (8.86), and 7.02 (6.15)/11.77 (10.70), respectively. Significant differences were observed in caries prevalence and experience between sexes ($p<0.05$). The prevalence of dental caries in adults was 97.5% (females: 61.8%, males: 38.2%). The mean value of DMFT/S for females and males was 9.44 (4.32)/16.86 (10.40) and 8.45 (5.19)/15.64 (12.02), respectively. No significant difference was noticed in the prevalence between sexes ($p<0.05$). The authors found out that the mean values of caries experience (DMF) and of decayed and missing components have a significant increase in subjects with medium and low SES levels, comparatively with those with a high SES level. **Conclusions:** The prevalence of dental caries registred high values in both groups. Oral health behaviors were found to be highly associated with the socio-economic level of young adults, while the most recent dental visit and tooth-brushing frequency were not significantly associated with SES in the case of adults.

Keywords: *dental caries, socio-economic factors, adults, questionnaire*

INTRODUCTION

The oral health status of adolescents and adults has improved during the last decades, even if not all groups enjoy the same oral health condition. This situation is caused by the differences in oral status, influenced by social determinants, such as economic, environmental and life style factors [1].

A substantial number of studies, discussing the relationship between the socio-economic status (SES) and the general health condition, evidenced a reverse relationship between SES and the incidence and prevalence of disease – namely, as the socio-economic status increases, the disease, illness, and their impacts decrease [2], a situation valid for health conditions related to life style factors and infectious diseases [3], as well as for self-ratings of health status, disability days, health practitioner ratings [2], and oral health status [4].

Generally, SES is measured by indices of human capital, such as income, education or occupational prestige that offer advantages to individuals and families [5]. Another approach is to assign a social status position based on ecological measures [6] derived from the place of residence [7].

The relationship between SES and oral health was evaluated in numerous studies, becoming an important argument for the implementation of oral health programs. Identifying the sources of caries disparities in adolescents and young adults has important implications for disparities

prevention and treatment efforts, which should be targeted as effectively as possible.

The purpose of the present study is to determine a possible SES disparity in caries experience (DMFT) of young adults and adult samples, and to establish whether the differences in oral hygiene behaviors or preventive interventions can account for this disparity.

MATERIALS AND METHOD

The study, cross-sectional in nature and with ethical clearance, was obtained from the institutional ethical committee.

All subjects available during the period of study, conducted over a period of 10 months in 2011, were considered for analysis.

The study involved filling in of a structured questionnaire aimed at collecting information on the demographic profile, educational status, income, occupation, dental visits and their reasons, oral hygiene practices, dietary habits, exposure to fluorides, underlying systemic diseases, awareness towards oral diseases, frequency and duration of smoking.

The oral health status of the subjects was established through direct oral clinical examination, using the World Health Organization (WHO) oral health assessment form (Basic Oral Health Surveys, 1997) [8]. Dental caries was assessed using dentition status and treatment needs.

The examination was conducted by a single, trained and calibrated examiner (dentist). The calibration was done on a group of 20 patients examined by the same investigator, at two different times, with a time gap of 6 hours between examinations. The intra-examiner agreement was found to be 93%. The examination was conducted at one particular location, on a foldable chair, under natural daylight, using a mouth mirror and a CPI probe. After completion of oral examination, the questionnaire was filled in by the examiner himself through personal interactions with the participants to the study, to assure uniformity in data collection and to avoid misinterpretation of the questions by the subjects. The collected data were computer-analyzed with the informatic program SPSS for Windows 20.0. Quantitative data were determined by average values and standard deviation, while the qualitative ones were analyzed by frequencies and percent ratios.

RESULTS

The experimental sample group was formed of 327 18-26 year-old young adults (229 females and 98 males; mean age: 21.99 years, SD: 2.30) with ages between 18 and 26 years, and of 161 adults (97 females and 64 males; mean age: 34.96 years, SD: 5.59) with ages between 27 and 45 years. Table 1 presents the sample distribution by age group and socio-demographic and behavioral components.

The prevalence of dental caries in young adults was 96.3% (females: 72.7% and males: 27.3%). The mean DMFT/S values for females and males, presented in Table 2, were 8.24 (4.99)/13.67 (8.86) and 7.02 (6.15)/11.77 (10.70), respectively. Significant differences were observed in caries prevalence and experience between sexes ($p<0.05$). However, no significant difference was registered as to the decayed components ($p<0.05$).

The prevalence of dental caries in adults was 97.5% (females: 61.8% and males: 38.2%). The mean DMFT/S values for females and males, presented in Table 3, were 9.44 (4.32)/16.86 (10.40) and 8.45 (5.19)/15.64 (12.02), respectively. Significant differences were observed in the prevalence between sexes ($p<0.05$). However, no gender differences in caries experience or its components were observed ($p>0.05$ in all cases).

As to the association between SES and caries experience at surface level between both age groups, it was found out that the mean values of caries experience (DMF) and of decayed and missing components have a significant increase in subjects with medium and low SES level, comparatively with those with a high SES level. However, the mean value of the filled component was higher at medium SES level among young adults and at high SES level in adults, but the association was not statistically significant (Table 4).

Table 1

Sample description of 18-26 and 27-45 year-old subjects by socio-demographic and behavioral factors

Characteristics	18-26 yr old		27-45 yr old	
	N	%	N	%
Sex				
Boys	229	70.0%	97	60.2%
Girls	98	30.0%	64	39.8%
Background				
Urban	304	93%	147	91.3%
Rural	23	7.0%	14	8.7%
Socio-economic status				
High level	143	43.7%	67	41.6%
Medium level	91	27.8%	52	32.3%
Low level	93	28.4%	42	26.1%
Last dental visit				
Last year	137	41.9%	80	49.7%
This year	150	45.9%	75	46.6%
Many years ago	40	12.2%	6	3.7%
Reason for the last dental visit				
Dental check	99	30.3%	51	31.7%
Dental pain	49	15.0%	16	9.9%
Treatment	158	48.3%	88	54.7%
Tooth extraction	11	3.4%	2	1.2%
Other	10	3.1%	4	2.5%
Tooth-brushing frequency				
Once a day	30	9.2%	6	3.7%

The association between oral health behaviors and SES for the two age groups is presented in Table 5. Oral health behaviors - such as last dental visit, its reasons, tooth-brushing frequency, eating sugary food between meals and smoking – were found as highly associated with the socio-economic level of young adults, while the last dental visit and tooth-brushing frequency were not significantly associated with SES in the case of adults.

Table 2

Mean caries experience (DMF) at tooth and surface level by gender (18-26 year-old subjects, n=327)

	Total		Female		Male		*p-value*
	Mean	(SD)	Mean	(SD)	Mean	(SD)	
DT	2.95	(3.22)	2.91	(3.10)	3.04	(3.48)	0.795
MT	0.63	(1.03)	0.70	(1.06)	0.46	(0.93)	0.014
FT	4.29	(3.65)	4.62	(3.57)	3.52	(3.73)	0.001
DMFT	7.87	(5.38)	8.24	(4.99)	7.02	(6.15)	0.005
DS	3.55	(4.20)	3.41	(3.70)	3.87	(5.20)	0.691
MS	3.02	(5.17)	3.30	(5.17)	2.36	(5.15)	0.010
FS	6.48	(6.20)	6.83	(6.25)	5.65	(6.05)	0.027
DMFS	13.10	(9.47)	13.67	(8.86)	11.77	(10.70)	0.015

p was calculated using the Mann-Whitney U test

Table 3

Mean caries experience (DMF) at tooth and surface level by gender (27-45 year-old subjects, n=161)

	Total		Female		Male		*p-value*
	Mean	(SD)	Mean	(SD)	Mean	(SD)	
DT	3.30	(3.16)	3.67	(3.27)	2.73	(2.93)	0.091
MT	1.20	(1.39)	1.12	(1.36)	0.88	(1.44)	0.120
FT	4.72	(3.39)	4.64	(3.39)	4.84	(3.42)	0.792
DMFT	9.04	(4.69)	9.44	(4.32)	8.45	(5.19)	0.202
DS	4.02	(3.96)	4.36	(4.06)	3.52	(3.78)	0.164
MS	5.04	(7.04)	5.47	(6.56)	4.38	(7.72)	0.119
FS	7.75	(6.92)	7.68	(7.37)	7.84	(6.23)	0.799
DMFS	16.37	(11.05)	16.86	(10.40)	15.64	(12.02)	0.195

p was calculated using the Mann-Whitney U test

DISCUSSION

Some reduction in the prevalence of dental caries was recorded in both developed and developing countries, but the prevalence remains high in populations with low socio-economic status. Therefore, the socio-economic indices are associated with risk factors for dental caries [9-11]. The socially disadvantaged individuals also experience difficulties with regard to health in general. A low socio-economic status, low monthly household income and low educational level are associated with less access to dental services and oral hygiene products, poorer knowledge regarding oral health and oral hygiene and, consequently, a higher frequency and severity of dental caries [12-14].

Table 4

Mean values of decayed, missing and filled surfaces (dmfs/DMFS) by socio-economic status and statistical significance of the differences between groups

Caries	High SEP		Medium SEP		Low SEP		p value
Prevalence	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	for trend
18-26 year old							
DS	1.76	(1.38-2.15)	3.93	(3.13-4.73)	5.92	(4.82-7.03)	<0.001
MS	0.51	(0.22-0.80)	5.44	(4.28-6.60)	4.49	(3.16-5.82)	<0.001
FS	6.41	(5.50-7.33)	7.33	(5.68-8.98)	5.75	(4.70-6.81)	0.570
DMFS	8.69	(7.49-9.89)	17.03	(15.01-19.06)	16.03	(14.08-17.98)	<0.001
27-45 year old							
DS	1.34	(0.95-1.73)	5.65	(4.58-6.73)	6.29	(4.96-7.61)	<0.001
MS	1.30	(0.65-1.95)	8.40	(6.14-10.67)	6.83	(4.43-9.24)	<0.001
FS	9.33	(7.73-10.93)	6.73	(4.75-8.72)	6.48	(4.34-8.61)	0.058
DMFS	11.97	(10.08-13.86)	20.67	(16.77-24.57)	18.08	(15.32-20.82)	0.027

p for trends was calculated using negative binomial regression models

In the analysis of the associations between socio-economic indices and dental caries, schooling of the subject was the most frequently used socio-economic index. Lower schooling was statistically associated with greater severity of dental caries in six out of nine multivariate analyses. Other studies, which analyzed the income of the subjects, showed that a lower income was significantly associated with a higher severity of dental caries [15].

A higher prevalence of dental caries, a higher mean number of untreated dental caries and teeth missing because of dental caries were discovered among the subjects belonging to the lower SES category than in those of the upper classes.

The mean number of teeth filled because of dental caries was higher among the subjects of the upper class, whereas none of the subjects in the lower class had fillings. The higher caries experience among the subjects in lower classes in comparison with the upper ones may be attributed to their poor oral hygiene practices [16], lack of awareness on the etiological factors for oral diseases [17] and poor utilization of dental services [18] which, in turn, may be related to costs [16,17], lack of knowledge and motivation toward dental care [16,17] and lack of awareness on the provision of reimbursement for dental care [19], the low priority given to dental health, as well as the lack of perception of the fact that teeth are worth saving [20].

The lower SES categories had a higher mean number of untreated carious lesions (D component) and a higher mean number of missing teeth, as a result of dental caries (M component). The mean number of filled teeth (F component) was significantly higher among the subjects of the upper class, while none of the subjects of the lower SES category had fillings.

This situation highlights the need for assessing separately the individual components of DMFT between the SES categories, rather than just comparing the DMFT scores all together.

Tooth-brushing with fluoride tooth paste seems to have a preventive effect on caries risk, although the quality of the studies performed particularly among adults is poor. Recommending tooth-brushing as a strategy in managing caries is based on the fact that a more frequent tooth-brushing with a fluoride dentifrice and a good oral hygiene seem to be associated with reduced caries risk. Some studies, that include clinical measures of oral hygiene, suggest that a good oral hygiene, involving not only frequent brushing but also effectiveness of brushing, are associated with reduced caries risk [21].

In the present study, oral health behaviors – such as last dental visit, reasons for the last

Table 5

Distribution of oral health behaviors by age groups and socio-economic level (18-26 year-old, n=327 and 27-45 year-old, n=161)

Characteristics	High SES		Medium SES		Low SES		p value	High SES		Medium SES		Low SES		p value
	n	%	n	%	n	%		n	%	n	%	n	%	
Last dental visit							0.002							0.161
Last year	59	43.1%	47	34.3%	31	22.6%		34	42.5%	26	32.5%	20	25.0%	
This year	74	49.3%	27	18.0%	49	32.7%		33	44.0%	24	32.0%	18	24.0%	
Many years ago	10	25.0%	17	42.5%	13	32.5%		0	0.0%	2	33.3%	4	66.7%	
Reason for the last dental visit							<0.001							<0.001
Dental check	44	44.4%	23	23.2%	32	32.3%		37	72.5%	8	15.7%	6	11.8%	
Dental pain	18	36.7%	12	24.5%	19	38.8%		0	0.0%	7	43.8%	9	56.2%	
Treatment	73	46.2%	53	33.5%	32	20.3%		28	31.8%	33	37.5%	27	30.7%	
Tooth extraction	0	0.0%	3	27.3%	8	72.7%		0	0.0%	2	100%	0	0.0%	
Other	8	80.0%	0	0.0%	2	20.0%		2	50.0%	2	50.0%	0	0.0%	
Tooth-brushing frequency							0.019							0.216
Once a day	16	53.3%	4	13.3%	10	33.3%		0	0.0%	3	50.0%	3	50.0%	
Twice a day	79	37.8%	63	30.1%	67	32.1%		41	40.6%	32	31.7%	28	27.7%	
Three times a day	48	54.5%	24	27.3%	16	18.2%		26	48.1%	17	31.5%	11	20.4%	
Sugary food between meals							0.003							0.031
Yes	85	38.3%	62	27.9%	75	33.8%		62	45.6%	39	28.7%	35	25.7%	
No	58	55.2	22	27.6	17	17.1		25	20.0	11	52.0	7	28.0	

p was calculated using Pearson Chi-Square

dental visit, tooth-brushing frequency, eating sugary food between meals and smoking - were found as closely associated with the socio-economic level in young adults, while the last dental visit and tooth-brushing frequency were not significantly associated with SES in the case of adults.

CONCLUSIONS

The investigation evidenced a high prevalence of dental caries in young adults and adults, and a significant relationship among the prevalence of dental caries, mean number of untreated dental caries, mean number of teeth missing because of caries, and SES.

Oral health behaviors such as last dental visit, reason for the last dental visit, tooth-brushing frequency, eating sugary food between meals and smoking were found to be closely associated with the socio-economic level in young adults, while the last dental visit and tooth-brushing frequency were not significantly associated with SES in the case of adults.

A direct relationship was established between the mean number of teeth filled because of dental caries and SES. The overall treatment need was higher among the subjects in the lower SES group. The results of the present study support the need to develop a balanced oral health system, which will improve oral health outcomes.

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