Social determinants of dental health services utilisation of Greek adults

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Objectives: To identify the determinants of dental care utilisation among Greek adults, with a particular emphasis on socio-economic determinants. ***Methods***:   Data were collected through a national survey on health and health care services utilisation of a sample of 4,003 Greek adults stratified by geographic region, age and gender. A purpose made questionnaire was used during face-to-face interviews. A 2-stage model was developed to assess the impact of independent variables on dental utilisation likelihood and frequency. ***Results***: 39.6% (1,562) of Greek adults reported having visited a dentist within the last year. Among dental attenders, 32.6% reported prevention as the reason for visit. Statistically significant differences in dental care utilisation were observed in relation to demographic, socioeconomic and lifestyle factors. Logistic regression analysis showed that gender, age, income, education, place of residence, private insurance coverage and self-rated oral health are important determinants of dental services utilisation. Mean number of dental visits within previous year was 1.6. Results from Poisson regression analysis indicated that lower income level correlates to lower number of dental visits, while having visited for treatment (rather than for prevention) correlated to higher number of dental visits. ***Conclusions***: Greek adults do not exhibit satisfactory dental visiting behaviour. Extent of care sought is associated with need for treatment rather than preventive reasons. The findings confirm the existence of socioeconomic inequalities in dental services utilisation among Greek adults.

Key words: Dental services utilisation, inequalities in dental care utilisation, social determinants

Introduction

Likelihood and frequency of dental care services utilisation has been the focus of many research studies. Identifying the determinants of dental services utilisation is an important step towards developing oral health policies to ensure equity in oral health care.

Earlier findings on dental services utilisation in Greece have brought forward the role of education and income (Zavras et al., 2002; Zavras et al., 2004). In Greece, the major provider of dental care is the private sector. Dental fees are paid out-of-pocket and are reimbursed only at a low percentage by patient's Social Insurance Fund according to the Fund's fixed tariff.

The provision of dental care by the public sector is very limited. It is provided by the Dental Departments of the National Health System's (called ESY) Health Centres (situated in rural and semi-urban areas) and Hospitals (situated in urban areas). Dental care provided by Health Centres includes full care for children aged 0- to 18-years and emergency care for the adults. At hospital level, secondary dental care is provided, as well as emergency dental care for all urban population. Some Social Insurance Funds operate their own dental clinics in urban areas, where care is provided free of charge at the point of delivery. Overall, primary dental care of the public sector is fragmented and due to the numerous social insurance funds each with a varying dental coverage policy, there are inequities in dental coverage.

Greece has one of the highest dentist:population ratios in Europe and the vast majority of dentists work in the private sector in single practices (Widström and Eaton, 2004). In 2006, there were 1.27 dentists per 1,000 population. This figure varied among the 13 regions of the country between 0.7 (Ionian islands) and 1.72 (Attica, region of the capital city) (General Secretariat of National Statistical Service of Greece).

The present study aims to identify the determinants of dental care utilisation among Greek adults, with a particular emphasis on identifying socio-economic characteristics which may act as barriers to access to dental care services. Such findings are valuable in formulating future policies for improving equity in oral health care in Greece.

Material and method

The present study forms part of a wider survey at national level about health and health care services utilisation among the Greek adult population. The sample of 4,003 Greek citizens aged over 18-years-old represents a proportionate (by geographic region, age and gender) stratified national sample. Data were collected through personal interviews at respondents' residences by professional interviewers who followed a specified path according to market research standard methodology, and called both in the morning and evening

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A purpose made questionnaire was used, previously controlled for face and content validity. Interviewers were specifically trained in using the questionnaire. Interviews took place in June 2006, and data were transcribed, coded and analysed using STATA software programme.

Statistical analysis involved chi-square test, and Mann-Whitney U and Kruskal-Wallis tests for the analysis of number of dental visits, as well as Spearman's correlation co-efficient. However, for descriptive purposes mean numbers of dental visits are reported. A 2-stage model was developed to assess the impact of independent variables on dental utilisation likelihood and frequency.

In this study, the 2-stage model involved a stepwise logistic regression model with the dependent variable being self-reported "dental visit or no visit, within last year", and a Poisson regression model with the dependent variable being self-reported "number of dental visits within last 12 months" (including only subjects who had reported a dental visit within last 12 months). Poisson regression was deemed appropriate due to the fact that the number of dental visits corresponds to number of counts. Data were obtained from responses to the question *"During the last year did you use any of the following dental services and how many times for a different reason?"* Answers included dentists working in: private practice, social insurance organization's facilities, hospital outpatient department, rural health center, university dental clinic. Zero visits were counted as no dental attendance within the last year. Respondents could also reply "I did not need dental care services". To avoid confusion, there was a specific note to clarify the concept of "course of treatment" denoted by the expression *"times for a different reason"*. Thus, relevant data reported in this study on 'number of dental visits' are actually 'number of courses of treatment'.

Independent variables were demographic, socio-economic, being covered by health insurance (public and private), self-rated oral and general health, self-reported presence of chronic disease and current smoking status. Household income was defined as self-reported monthly family income from any source in euros and is a 5-point scale ordinal measurement. Education is a 4-point scale ordinal measurement, the categories being "no education or up to elementary", "junior high school", "secondary" and "higher education (college, university, postgraduate)". In terms of insurance, it is noted that private health insurance coverage refers to general health insurance and does not necessarily include dental coverage. Self-rated oral and general health were measured on a 5-point ordinal scale (1: very good to 5: very bad) in response to two separate questions: *"How would you rate your (oral) health today?"*. Employment status was a nominal measurement, the response categories being "employer or self-employed", "employee", "working in family business without reimbursement", "housewife/student/pupil/on military service", "unemployed", "pensioner" and "other". Of all respondents, 16 were included in the "other" category and these were dropped from the analysis as no specific information could be derived for them. In the models, age was included as a continuous variable, self-rated oral and general health were included as ordinal variables, while for the remainder, dummy variables were constructed.

Self-rated oral and general health, and presence of chronic conditions have been included in this study because self-perceived general and oral health have been found to be associated with health services utilisation (Ståhlnacke et al., 2005) while interrelating to socio-economic factors. Non-communicable chronic diseases have common risk factors with oral diseases and can also have implications for oral health (Petersen et al., 2005). Smoking behaviour also interrelates with these factors (Laaksonen et al., 2005) and its inclusion was judged important due to the high smoking rates prevailing in Greece. In the present study's national sample, current smoking rate amounted to 46.8%, while another recent survey reported a relevant figure of 40% (Tountas, 2007).

Additionally, 'reason for dental visit' was used as an independent variable to the number of dental visits Poisson model. Reason for dental visit was derived from the question *"In case you used dental services what was the reason?"*. Answers *"for emergency"* and *"need for treatment"* were coded as having visited for treatment, and *"for my regular check-up"* and *"without any specific reason"* were coded as having visited for prevention. The availability of dental services was included as the number of dentists per 1,000 population. This information was available for each of the 13 regions of the country.

Results

In total, 39.6% (1,562) of Greek adults reported having visited a dentist within the last year. This percentage varied in relation to all the various demographic and socio-economic variables at statistically significant level, except for area of residence (urban vs rural) and for being covered by public health insurance or not (Table 1).

Women reported dental visiting (42.2%) at a higher rate than men (37.0%). Higher rates were also found for single (46%) as compared to married (38.6%) and divorced/separated/widowed (26.8%) adults. Dental visiting within past year varied also with age. More than 40% of individuals aged 18 to 54 years had visited a dentist compared to 34.2% of individuals aged 55 to 64 years, and 22.1% of adults aged 65 and over. Age was found to have a negative correlation with having had a dental visit within past year (Spearman's rho=-0.18, p<0.001) (Table 2).

Significant differences in dental visiting rates were also observed by household income, with only 25.1% of those with €0 – 499 monthly income having reported a dental visit, compared to 52.5% among those with €2,000 or higher income. Education was similarly associated with higher utilisation rates. The percentage of respondents with higher education having visited a dentist during the past year (51.6%) is almost double the percentage of those with no or up to elementary education only (26.9%). With regards to employment status, dental visiting rate ranged from 46.1% among the employers and self-employed to 24.6% among the pensioners. For the unemployed the relevant figure was 42.1%.

Private health insurance was found to be associated with a higher dental visiting rate (51.3%), compared to a rate of 37.9% among those without a private insurance scheme.

Table 1. Dental services utilisation of Greek adults within last year by selected variables

	Base (n)	% with dental visit within last year	
Entire study population	3,941	39.6%	
Gender			
Men	1,935	37.0%	p<0.01
Women	2,006	42.2%	
Marital Status			
Single	1,145	46.0%	p<0.001
Married	2,346	38.6%	
Divorced or separated, widowed	406	26.8%	
Household income			
€0 – €499	343	25.1%	p<0.001
€500 – €999	933	31.3%	
€1,000 – €1,499	734	43.3%	
€1,500 – €1,999	474	40.7%	
€2,000 +	444	52.5%	
Education			
No or up to elementary	951	26.9%	p<0.001
Junior high school	609	33.7%	
Secondary	1,498	42.9%	
Higher education	731	51.6%	
Employment status			
Self-employed, employer	781	46.1%	p<0.001
Employee	1,345	43.7%	
Employed in family business without reimbursement	73	31.5%	
Housewife / student	754	40.2%	
Unemployed	178	42.1%	
Pensioner	747	24.6%	
Area of residence			
Rural	1,438	40.4%	p>0.05
Urban	2,503	39.2%	
Private insurance			
Yes	474	51.3%	p<0.001
No	3,369	37.9%	
Public insurance			
Yes	3,743	39.4%	p>0.05
No	162	45.1%	
Chronic disease			
Yes	1,429	33.0%	p<0.001
No	2,476	43.5%	
Current smoker			
Yes	1,830	42.8%	p<0.001
No	2,086	36.8%	

Table 2. Correlation of age, and self-rated oral and general health with dental services utilisation of Greek adults within last year

	Dental visit within last year (Spearman's rho)	n	
Age	-0.18	3921	p<0.001
Self-rated oral health	-0.04	3786	p<0.001
Self-rated general health	-0.08	3894	p<0.001

Table 3. Logistic regression results on dental utilisation

Independent variables	Dependent variable: Dental visit or not, within last year			
	OR	p	95% C.I.	
Self-rated oral health[*]	1.175	<0.001	1.073	1.286
Age	0.978	<0.001	0.972	0.984
Gender[†]	1.374	<0.001	1.162	1.624
Monthly income over €2,000[‡]	1.661	<0.001	1.302	2.118
Monthly income of €1,000-€1,500[‡]	1.383	0.001	1.137	1.683
Higher education[§]	1.956	<0.001	1.518	2.520
Secondary education[§]	1.354	0.005	1.096	1.673
Rural residence	1.342	0.001	1.124	1.602
Private insurance	1.652	<0.001	1.282	2.129

$R^2 = 0.06$, n=2576, p<0.001, Goodness of fit: Hosmer – Lemeshow chi2(8) = 9.91, p>0.05

[*] Self rated oral health: 1= very good to 5= very bad

[†] Reference group for gender: men

[‡] Reference group for income: 0 – 500 €

[§] Reference group for education: No or up to elementary

In relation to perceived health and reported chronic conditions and smoking behaviour, self-rated oral health and self-rated general health were found to have significant but not strong negative correlations with having had a dental visit within past year (Spearman's rho=-0.04 and -0.08 respectively) (Table 2), indicating that better self-rated oral and general health are associated with higher dental visiting rates. Subjects reporting having a chronic health problem for which they needed to take medication on a regular basis were found to underutilise dental services (33%) when compared to those without any such health problem (43.5%). Finally, current smokers reported a higher dental visiting rate (42.8%) than the non-smokers (36.8%).

Logistic regression analysis examining the simultaneous effect of all the above independent variables showed that significant separate effect on the decision to receive any *vs* none dental care exert the gender, age, household income, education, area of residence, private insurance, and self-rated oral health (Table 3).

The model shows increased probability of dental care utilisation with age and worse self-rated oral health. The odds of visiting a dentist are higher for women than for men, for people with monthly family income of €1,000 – 1,499 and over €2,000 compared to those with a monthly family income of €0 – 499, and for well educated adults in relation to those with no or up to elementary education. Finally, individuals insured under a private health plan have higher odds of visiting a dentist compared to those without private insurance, all other variables held constant.

Among those reporting dental services utilisation within last year with, additionally, a valid number of dental visits, the mean number of dental visits (courses of treatment) was 1.6 (SD=1.1, n=1,522), the median being 1.0. Among them, the vast majority reported one (66.6%) or two visits (18.9%) (Table 4). Of the 1,522 reporting at least one dental visit, 1,446 gave valid answers for the reason for last dental visit. Of these, 32.6% used dental services for prevention while 67.4% utilised dental services for treatment. Those who visited for prevention had a significantly lower mean

Table 4. Frequencies of numbers of dental visits among those who had visited within the previous year

Number of dental visits (among those who had visited the dentist within the previous year)	n	%
1	1,013	66.6
2	287	18.9
3	108	7.1
4	59	3.9
5	33	2.2
6	12	0.8
7	9	0.6
8	1	0.1
Total	1,522	100.0

number of dental visits 1.5 (median=1, n=471), as compared to those who had visited for treatment (mean number of visits=1.7, median=1, n=975) (p=0.01). Similar analysis revealed that the residents of urban areas had a significantly lower mean number of dental visits (1.6, median=1, n=957) than their rural counterparts (mean number of visits=1.7, median=1, n=565) (p<0.01). Number of dental visits was also found to correlate significantly but not strongly with income (Spearman's rho=0.07, n=1,086, p<0.05) and self-rated oral health (Spearman's rho=0.07, n=1,484, p<0.01), indicating that the higher the income and the worse the self-rated oral health, the higher the number of dental visits. Finally, number of dental visits correlated negatively but weakly with the number of dentists per 1,000 population (Spearman's rho=-0.09, n=1,522, p<0.001), suggesting that the higher the dentists' availability the lower the number of dental visits. No other significant differences in the number of dental visits or correlations were detected. It is noted that among the employment status groups, those working in family business (unpaid work) exhibited the highest mean number of dental visits (1.9) but this did not reach statistical significance.

The results of the Poisson regression analysis examining the simultaneous effect on number of dental visits of all the previously described independent variables, including additionally the reason for dental visit, are presented in Table 5. The variables that have a statistically significant separate effect are reason for visit, income and dentists' availability. Monthly income of €500 – 1,499 and higher number of dentists per 1,000 population correlate to lower number of dental visits, while visiting for treatment correlated to higher number of dental visits.

Discussion

Greek adults do not exhibit satisfactory dental visiting behaviour, given that only 39.6% of them reported having visited a dentist within last year, the minority of whom (32.6%) have done so for prevention. Compared to the average of the EU-25 countries (62%) (Special Eurobarometer, 2007) these percentages are rather low. Thus, oral health promotion policies reinforcing regular dental visiting need to be adopted in Greece.

The likelihood of having visited a dentist within the previous year varied by demographic and socioeconomic characteristics, smoking behaviour and oral and general health status.

Private health insurance, in contrast to public sector social insurance, was found to be associated with increased likelihood of dental visiting. The vast majority of the Greek population is covered by the obligatory social insurance which in terms of oral care coverage is rather inadequate and thus cannot be considered as an enabler to dental visiting. The effect of insurance coverage on the decision to obtain medical care and the mix of services purchased has previously been reported (Bhatti et al., 2007; Manning et al., 1985). Furthermore, in the US where the dental care market is private, as is the case in Greece, the strong association of demand for dental care with household income and insurance has been documented (Macek et al., 2004; Manski et al., 2002).

However, in Greece, private health insurance (not necessarily including a dental component) is usually a part of a comprehensive private health plan, mostly available through employment schemes. It may be argued that in this study private health insurance acts as a proxy measure of socio-economic and occupational profile. In the study sample, people with private insurance coverage offered by their employer are mostly young in age

and of middle and high income. It can be claimed that private insurance coverage seems to act as enabler to dental care, lowering the perceived cost of dental care by reducing the price paid at the point of service.

In the multivariate analysis of the likelihood of dental visiting, apart from private health insurance coverage, additional factors with a significant separate effect were age, gender, self-rated oral health, income, education and living in a rural area. It is worthy of note that in bivariate analysis, area of residence was of no statistical significance to the likelihood of having visited the dentist within the previous year. However, according to the multivariate analysis model, living in a rural area is associated with increased likelihood of dental care utilisation. This separate effect is exhibited after accounting for the remaining variables of the model, which are exactly the variables which characterise the residents of rural areas as compared to their urban counterparts (study sample rural residents are characterised at statistically significant level by being older, having lower income, having education up to junior high school, reporting worse oral health, and not having private insurance). Further research is required to determine the reasons for increased likelihood of dental services utilisation among the rural population.

Self-rated oral health has been found as an important determinant of the utilisation of dental services. Furthermore, it is interesting that while in bivariate analysis better self-rated oral health was associated with greater likelihood of dental utilisation, in multivariate analysis the relationship was inversed. After controlling for the remaining variables of the model, better self-rated oral health is associated with lower dental utilisation. This highlights the importance of the role of socio-economic variables which mediate critically the effect between perceived oral health and dental services utilisation. Socio-economic variables (namely income and education), even in the presence of insurance, are significant determinants of dental utilisation, a finding previously reported (Millar and Locker, 1999).

In the present study, the higher likelihood for dental visiting among those with the highest income (above €2,000 /month) may represent a different case mix from those with an income of €1,000 to €1,499/month. Further research would be interesting to examine the hypothesis that the former attend for "luxurious" dental care while the latter for necessary care. Similar may be the hypothesis for educational level, comparing those with higher

Table 5. Poisson regression results on number of visits among those receiving dental care within the last year

Independent variables	Dependent variable: Number of dental visits, within last year			
	Coeff.	p	95% C.I.	
Constant	0.628	0.000	0.340	0.916
Monthly income €500 – €999*	-0.202	0.038	-0.394	-0.110
Monthly income €1,000 – €1,499*	-0.207	0.032	-0.396	-0.018
Having visited for treatment	0.138	0.010	0.032	0.243
Number of dentists per 1,000 population	-0.153	0.020	-0.282	-0.024

R^2 = 0.0056, n=1,003, p<0.05, Goodness of fit chi2 = 618.653, p>0.05
* Reference group for income categories: €0–€499

education to those with secondary education. Both exhibit greater likelihood for dental attendance compared to the remaining educational groups, but the reasons behind this may be different.

According to the number of dental visits model, monthly income levels of €500 to €1,499 and higher dentists' availability are associated with lower number of dental visits. Additionally, visiting for treatment (as opposed to prevention) has a separate effect, and is associated with higher number of dental visits. The negative effect of dentists' availability needs to be further explored, given that the current measurement does not reflect small area dentists' availability. It is a regional level aggregate measurement and may act as a proxy measure of geographic, social and economic development characteristics of the regions.

In conclusion, our study confirms previous research findings that different sets of variables influence the likelihood and extent of dental care utilisation (Sintonen and Linnosmaa, 2000). Older adults and elderly are known to have increased oral health problems (Millar and Locker, 1999; Petersen et al., 2004) whereas socioeconomic factors are strongly related to dental utilisation (Wamala et al., 2006). Lower dental attendance among people of low income and educational attainment is also reported in previous research (Hjern et al., 2001; Österberg et al., 1998; Petersen et al., 2004).

Age, gender, education, income, place of residence, private health insurance and self-rated oral health influence the decision to receive care. However, it seems that once the decision to seek dental care is made, income and treatment (instead of a preventive reason) determine the amount of care obtained.

These findings confirm the existence of socioeconomic inequalities in dental care use among Greek adults. Low socioeconomic status, known from national surveys to be associated with low level of oral health, is connected to lower likelihood of dental services utilisation, thus unmet needs are prevalent in this population group. Extent of care sought is associated with need for treatment rather than preventive reasons. Since provision of dental care in Greece is mainly private and private is insurance limited, costs are mostly covered by out-of-pocket payments, therefore lower income individuals are mostly affected. There are important implications for oral health policy and the provision of affordable dental care in vulnerable segments of the population and the development of an oral health promotion policy in the country. If high risk approaches to oral health promotion are adopted in Greece targeting the socio-economically vulnerable groups, these should be tailored according to the above findings, so that their effectiveness is increased.

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