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AUTHOR(S)

Helena Guiney, N Woods, Helen P. Whelton, Karen Morgan

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Predictors of utilisation of dental care services in a nationally representative sample of adults

H. Guiney[1], N. Woods[2], H. Whelton[1] and K. Morgan[3]

[1] Oral Health Services Research Centre, Cork Dental School and Hospital, University College Cork, Ireland; [2]Centre for Policy Studies, University College Cork, Ireland; [3]Division of Population Health Sciences, Royal College of Surgeons in Ireland, Dublin, Ireland

Objective: The objective of this study was to identify the predictors of utilisation of dental care services in Ireland. ***Participants:*** The 2007 Irish Survey of Lifestyle, Attitudes and Nutrition is a cross-sectional study, conducted in 2006/2007 (n=10,364), by interviews at home to a representative sample of adults aged 18 years or over. ***Main outcome measures:*** Multivariate logistic regression was used to investigate the influence of socioeconomic, predisposing and enabling factors on the odds of males and females having a dental visit in the past year. ***Results:*** The significant predictors of visiting the dentist in the past year were for males: having 3rd level education, employment status, earning €50,000 or more, location of residence, use of a car, brushing frequently, and dentition status. For females, the predictors were being between 25-34 or 55-64 years-old, education level, earning €50,000 or more, location of residence, use of a car, brushing frequently and dentition status. ***Conclusions:*** Predictors of the use of dental services vary by gender. Predictors common to both genders were education level, higher income, location of residence, use of a car, brushing frequently and dentition status. Many of the predictors of dental visiting in the past year are also related to social inequalities in health. These predictors may be useful markers of impact for policies designed to address inequalities in access to oral health services.

Key words: *utilisation of dental services, dental health, adults, frequent brushing, socioeconomic status, income, education, gender, enabling factors, predisposing factors*

Introduction

The study of health care utilisation is an increasingly important topic in health services research. A frequently used measure of dental services use is whether an individual visited a dentist in the past year (Manski and Magder, 1998; Millar and Locker, 1999; Muirhead *et al.*, 2009; Pizarro *et al.*, 2009). Various conceptual models attempt to explain the use of health services. Andersen's (1995) behavioural model has been applied in dental contexts (Kiyak, 1986; Pizarro *et al.*, 2009) and suggests that use is a function of predisposing, enabling and need factors. According to Van der Heyden and colleagues (2003), it provides a useful analytic framework and starting point for the discussion of the use of health care. Predisposing factors include demographic characteristics (e.g. age, gender and marital status), social structure (e.g. education, occupation and number of individuals in the household), use of other health services and beliefs (e.g. attitudes and values concerning health and health services). Enabling factors, which affect one's ability to access the healthcare system, include health insurance, income, location of residence, and access to transportation and information. Need factors could be perceived or evaluated, e.g. number of natural teeth remaining, wear of complete or partial dentures, and perceived oral health, problems and need (Andersen, 1995; Kiyak, 1986).

The Irish health system has four key goals: better health for everyone, fair access, responsive and appropriate care delivery, and high performance (Department of Health and Children, 2001). In Ireland, at the time of the survey, oral health care was provided by a blend of public and private systems, partly financed by the government through taxation and partly by out-of-pocket fee-for-service. The system of oral healthcare is administered through four Health Services Executive (HSE) areas. Dentists can choose to work for the HSE or in private practice or both. At the end of 2009, there were 2,754 registered dentists (125 orthodontists and 37 oral surgeons) and 383 registered hygienists.

The Irish government has an impact on the demand for dental services in Ireland in a number of ways including the Dental Treatment Benefit Scheme (DTBS), the Dental Treatment Services Scheme (DTSS), and the availability of tax-relief on non-routine dental treatments. Established in 1960, the DTBS is a social insurance scheme in which employees (and their employers) make pay-related contributions. Those with sufficient contributions and their spouses were, at the time of the survey, entitled to receive an annual oral examination and a mild scale and polish every six months, free of charge. In addition, they were entitled to other treatments (e.g. fillings, extractions and dentures) at a subsidised rate as often as required. In 2007, 1.9 million adults were eligible for treatment under the DTBS. The DTSS, introduced in 1994, provided free dental care to Medical Card (MC) holders at the time of the survey. Most individuals aged 16 years or over obtain an MC if their income is below a certain level, if the cost of meeting medical needs causes

Correspondence to: Helena Guiney, Oral Health Services Research Centre, Cork Dental School and Hospital, Wilton, Cork, Ireland.
Email: h.guiney@ucc.ie

a person financial hardship, or if they have entitlement under EU regulations. The net income for a married couple to qualify for an MC is approximately €14,000; however number of dependents, capital, and expenses (such as rent) are also considered. In 2007, 1.3 million adults were eligible for treatment under the DTSS.

The objective of this study was to identify the predictors of utilisation of dental services in Ireland according to gender. The hypothesis was that there is a relationship between socioeconomic status (as measured by education, employment and income) and utilisation of dental services.

Methods

The 2007 national Survey of Lifestyle, Attitudes and Nutrition (SLÁN) in Ireland, is a cross-sectional survey conducted in 2006/07 using face-to-face interviews with adults aged 18 years or over. The sampling frame was the *GeoDirectory*, a list of all addresses in the Republic of Ireland, compiled by An Post (postal service), which distinguishes between residential and commercial establishments. The sample (n=10,364) was selected by multi-stage probability sampling, and stratification was by percentage distribution across the country, age groups, social classes and urban-rural location. It was representative of the general population in Ireland when compared with Census 2006 figures and was weighted to match the Census for analysis (full details in Morgan *et al.*, 2008).

Administered by trained interviewers in the respondents' own home, the questionnaire included information on health, health-related behaviours, use of health care services, and general household information. Three questions focused on dental care: use of services (dentists, dental hygienists or orthodontists), presence of teeth/dentures and frequency of brushing. The outcome variable, dental care service use in the past year, was elicited by the question 'When was the last time you visited a dentist, dental hygienist or orthodontist on your own behalf?' Whether the visit was for preventive or curative reasons was not asked.

Selection of variables was guided by Andersen's behavioural model and a review of literature. Predisposing factors were demographic (age, gender and marital status), social structure (level of education, employment status, country of birth, number of individuals in household), and beliefs (importance of oral health is reflected in frequency of brushing); and enabling factors were level of income, location of residence and access to a car. Health status was measured by a description of number of teeth present (whether the respondent had all 32 natural teeth, some missing but no dentures, partial dentures or edentulous).

The measure of utilisation of dental health care services was the percentage claiming a visit to the dentist in the past year. To control for heteroscedasticity (gender difference in variances), we estimated the model separately for males and females. The percentage of adults using the dental services in the past year was obtained, and chi-squared tests were used to analyse the associations between pattern of attendance and explanatory variables. Only statistically significant variables were included in the final multivariate analysis. The effect of these variables on the outcome variable were analysed using multiple logistic regression. The adjusted Odds Ratios (OR) and their corresponding 95% Confidence Intervals were obtained. A relationship was considered to be statistically significant when $p<0.05$. The analyses were performed using SPSSv15.0.

Results

Table 1 presents the results of the multivariate analyses. Females were more likely to have visited the dentist in the past 12 months than males (55.7% vs. 48.3%; $p<0.0001$). Age was not significant in using dental services in the past year for males. For females, the odds of using dental services in the past year was less for 25-34 year-olds (OR=0.6; 95%CI: 0.5-0.8) and 55-64 year-olds (OR=0.7; 95%CI: 0.5-1.0) than 18-24 year-olds.

Level of education was associated with use of dental services. Compared to those with primary education only, females with 2nd or 3rd level education had greater odds of using dental services in the past year of 1.9 (95%CI: 1.5-2.3) and 2.2 (95%CI: 1.8-2.8) respectively. Males with 3rd level education also had greater odds of 1.5 (95%CI: 1.2-1.8). Males in employment had lower odds of visiting the dentist in the past year (OR=0.8; 95%CI: 0.7-1.0) than those unemployed.

Both males and females with net household income greater than €50,000 were significantly more likely to use dental services than those with a net household income under €20,000: (OR=1.3; 95%CI: 1.0-1.7) and (OR=1.3; 95%CI: 1.0-1.6) respectively. The odds of visiting were less for males and females living outside of cities than in cities (OR=0.8; 95%CI: 0.7-0.9). Those with access to a car were approximately one and a half times more likely than those without to use dental services (for males, 95%CI: 1.2-1.8, and for females, 95%CI: 1.2-1.7). The odds of using dental care services were higher for those who brushed more frequently, more so for females (OR=1.7; 95%CI: 1.4-2.1) than males (OR=1.5; 95% CI: 1.3-1.7).

About 37.8% of males and 40.9% of females had all their own natural teeth (mean ages 32.2 and 32.6 respectively); 7.6% of males and 12.0% of females were edentulous (mean ages 68.0 and 71.5 respectively). As number of teeth decreases, so does the odds of utilisation of dental services: the odds of visiting in the past year was 0.8 (95% CI: 0.6-1.0) for males with partial dentures compared to those with all 32 teeth. The odds of visiting was also less for the edentulous males (OR=0.2; 95%CI: 0.1-0.3) and females (OR=0.2; 95%CI: 0.1-0.2).

Number of individuals in a household and whether an individual was born in the Republic of Ireland did not contribute significantly to the overall equation.

Discussion

The SLÁN survey is the most recent survey of general health in Ireland, and provides important measures of socioeconomic status and enabling and predisposing factors. This is the first time that the relationship between utilisation of dental services in Ireland and so many predisposing and enabling factors has been analysed.

Approximately half of the adults surveyed (48.3% of males, 55.7% of females) had used dental services in the past year. This compares favourably with Catalonia

Table 1. Results of the multivariate analyses

	Males (n=4,369)			*Females (n=5,995)*		
	OR	*(95% CI)*	*p-value*	*OR*	*95% CI*	*p-value*
Age						
18-24	Ref			Ref		
25-34	1.1	(0.8-1.3)	0.641	0.6	(0.5-0.8)	0.000
35-44	1.1	(0.9-1.4)	0.463	0.8	(0.6-1.0)	0.100
45-54	1.2	(0.9-1.5)	0.235	1.0	(0.8-1.4)	0.790
55-64	1.0	(0.7-1.3)	0.873	0.7	(0.5-1.0)	0.023
65+	0.8	(0.6-1.1)	0.106	0.8	(0.6-1.2)	0.343
Education						
Primary	Ref			Ref		
Second level	1.2	(1.0-1.5)	0.070	1.9	(1.5-2.3)	0.000
Third level	1.5	(1.2-1.8)	0.001	2.2	(1.8-2.8)	0.000
Household Income						
Less than €20,000	Ref			Ref		
€20-30,000	1.0	(0.8-1.2)	0.862	1.1	(0.9-1.3)	0.495
€30-40,000	1.1	(0.9-1.5)	0.280	1.0	(0.8-1.3)	0.750
€40-50,000	1.3	(1.0-1.6)	0.055	1.1	(0.9-1.4)	0.526
€50,000+	1.3	(1.0-1.7)	0.026	1.3	(1.0-1.6)	0.043
Employment						
In employment	0.8	(0.7-1.0)	0.013	1.1	(1.0-1.3)	0.110
Not in employment	Ref			Ref		
Location of Residence*						
Other	0.8	(0.7-0.9)	0.000	0.8	(0.7-0.9)	0.003
City	Ref			Ref		
Use of a car						
Yes	1.5	(1.2-1.8)	0.000	1.4	(1.2-1.7)	0.000
No	Ref			Ref		
Brushing						
Twice a day or more	1.5	(1.3-1.7)	0.000	1.7	(1.4-2.1)	0.000
Less often or never	Ref			Ref		
Dentition Status						
All 32 teeth	Ref			Ref		
Some missing but no dentures	1.0	(0.8-1.1)	0.681	1.1	(0.9-1.3)	0.194
Teeth and partial dentures	0.8	(0.6-1.0)	0.024	1.0	(0.8-1.2)	0.819
Edentulous	0.2	(0.1-0.3)	0.000	0.2	(0.1-0.2)	0.000

* Other includes open country, village, or town; City includes cities and Dublin city and county.

(Spain) (34.3%) (Pizarro *et al.*, 2009) and Turkey (40.4%) (Mumcu *et al.*, 2004), but is less than Finland (Suominen-Taipale *et al.*, 2000) and Denmark (Christensen *et al.*, 2007) (64%). Utilisation rates are similar to those found for 16-24, 35-44 and 65+ year-olds examined in the 2000/02 national survey of adult oral health (Whelton *et al.*, 2007). The existence of gender differences in utilisation of dental services has been well documented (Álvarez and Delgado, 2002; Christensen *et al.*, 2007; Grytten and Holst, 2002; Millar and Locker, 1999; Mumcu *et al.*, 2004; Pizarro *et al.*, 2009; Suominen-Taipale *et al.*, 2000). Age, being significant for females but not males, was also found to be an important determinant of utilisation of dental services in other studies (Álvarez and Delgado, 2002; Christensen *et al.*, 2007; Pizarro *et al.*, 2009; Suominen-Taipale *et al.*, 2000). According to Kiyak and Reichmuth (2005), views of the purpose, maintenance, and appearance of teeth vary for those born in the 1930s, 1950s, and 1980s. In the 1930s, dentistry was developing new anaesthetics to make receiving care less painful. Those born in the 1950s and later benefited from water fluoridation (introduced in Ireland in 1964) and fluoride toothpastes (introduced in the 1970s), and were influenced by toothpaste commercials. In recent decades, there has been a move towards preventive and aesthetic dentistry (Kiyak and Reichmuth, 2005).

Socio-economic differences were observed in the use of dental services. This association was also found in other countries (Christensen *et al.*, 2007; Manski and Magder, 1998; Suominen-Taipale *et al.*, 2000). This study indicates that in Ireland, higher educated groups make more use of dental services than the less educated: a finding confirmed by other studies (Manski and Magder, 1998; Mumcu *et al.*, 2004; Suominen-Taipale *et al.*, 2000). According to Álvarez and Delgado (2002), education may be correlated with high health consciousness, which in turn stimulates preventive behaviour (such as regular visits for a check-up).

As out-of-pocket payments and co-payments represented a high share of dental health care financing in Ireland at the time of the survey, ability to pay was an important determinant of utilisation of dental services.

Those with higher household income had greater odds of visiting the dentist than those with a household income of less than €20,000. Other studies have also found a positive effect of income on the utilisation of dental services (Álvarez and Delgado, 2002; Christensen *et al.*, 2007; Grytten and Holst, 2002; Manski and Magder, 1998). In a study of dental care utilisation among low income Canadians, Muirhead *et al.* (2009) found that dental care utilisation was a "competing financial demand for economically constrained adults".

As with Van der Heyden *et al.* (2003), our results show education to be more influential than income, which may indicate that cognitive barriers are more important than financial barriers. The low odds of dental attendance for males in employment could reflect a lack of flexibility in taking time off work to visit the dentist. It has been suggested by Cauley (1987), that individuals who are in full-time employment may incur a larger "time price" of visiting a physician than those not in full-time employment.

There are still important socio-economic differences in the use of dental services. Two principles of equity that are often discussed are 'equal access to health care for those in equal need' and 'equal utilisation of health care for those in equal need'. 'Equal access for equal need' relates to the opportunity to use the needed health services rather than actual utilisation, therefore differences in the rates of utilisation by socio-economic groups do not automatically reflect inequities (Van der Heyden *et al.*, 2003). According to Oliver and Mossialos (2004), those in equal need and with equal opportunities to access health care ('equal access for equal need') may not make equal use of those opportunities due to, for example, lifestyle preferences and/or levels of risk aversion. In addition, some individuals (or groups of individuals) may be better informed and more capable of accessing and making full use of health care than others. The latter is regarded as an unacceptable reason for differences in use of healthcare (Oliver and Mossialos, 2004).

'Equal utilisation for equal need' does not allow for differences in lifestyle preferences and/or levels of risk aversion, therefore equal access to health care for those in equal need is regarded as the most appropriate principle of equity for the healthcare policy maker to pursue (Oliver and Mossialos, 2004). Access to services has improved for those on low incomes since the introduction of the DTSS in 1994; however there are those who may not realise their entitlements. Therefore, perhaps there is a need to increase awareness of the availability of the schemes and the importance of regular dental visits. Health promotion has played a significant role in improving general health behaviour among adults but has received less attention in dentistry.

The lower utilisation rates associated with residence outside a city is supported elsewhere (Kiyak and Reichmuth, 2005; Millar and Locker, 1999). It is worth noting that oral health services are mainly established in urban centres: this may help to explain why having use of a car appeared to be an enabling factor in utilisation of services.

Tooth brushing is a health behaviour, which indicates oral health attitudes: the positive association between tooth brushing frequency and utilisation of dental services is supported by Suominen-Taipale *et al.* (2000). Overall, almost 10% of the sample was edentulous, which is similar to the 11.6% found in the 2000/02 national survey of adult oral health (Whelton *et al.*, 2007) giving us confidence that the sample is representative of the Irish population in terms of dental health. Retention of natural teeth is increasing (Whelton *et al.*, 2007); therefore demand for dental services is likely to increase. The relationship between number of teeth and utilisation of dental services is similar to that found elsewhere (Álvarez and Delgado, 2002; Nguyen *et al.*, 2005; Suominen-Taipale *et al.*, 2000).

While our data analyses have provided important information, they have some limitations. The utilisation of health services is assessed by means of self-reporting, which could affect the validity of the information as the respondents may have difficulty recalling exact attendance. Unfortunately, due to confidentiality, we are unable to validate their self-reported utilisation by examining dental records. Studies of the frequency of dental visits are mostly based on self-reporting, and although individuals can overestimate actual consumption, according to Gilbert *et al.* (2002), this method is "sufficiently valid for most important research questions, using adequate study design and sample size", and survey data represents a flexible method for gathering information. In our study, the aim was not to estimate the absolute level of dental care utilisation but to explore differences according to socio-economic characteristics. Further, SLÁN data do not reveal if visits were to a dentist, hygienist or orthodontist, or if they were preventive or therapeutic. We believe that these methodological concerns do not compromise the final conclusions.

In conclusion, utilisation of dental services differs across the sample. The association between socio-economic status (education, employment, and income) and utilisation of dental services persisted even after controlling for other factors. For males, significant predictors of visiting the dentist in the past year were having 3rd level education, employment, earning €50,000 or more, location of residence, use of a car and their own teeth which they brush frequently. For females these factors were being aged 25-34 and 55-64, education level, earning €50,000 or more, location of residence, use of a car, brushing frequently and having their own teeth.

The present paper is a starting point for further analysis. Many of the predictors of dental visiting in the past year are also related to social inequalities in health. These predictors will be useful markers of impact for policies designed to address inequalities in access to dental services. Further research addressing socio-economic differences in the reasons for visiting (or not visiting) a dentist is required to provide policymakers with the evidence needed to take action to reduce socio-economic inequalities in the provision of dental health care. Investigations also need to be performed to follow utilisation of dental services over time.

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References

Álvarez, B. and Delgado, M.A. (2002): Goodness-of-fit techniques for count data models: an application to the demand for dental care in Spain. *Empirical Economics* **27**, 543-567.

Andersen, R.M. (1995): Revisiting the Behavioral Model and Access to Medical Care: Does it Matter? *Journal of Health and Social Behavior* **36**, 1-10.

Cauley, S. D. (1987): The Time Price of Medical Care. *The Review of Economics and Statistics* **69**, 59-66.

Christensen, L.B., Petersen, P.E. and Steding-Jessen, M. (2007): Consumption of dental services among adults in Denmark 1994-2003. *European Journal of Oral Sciences* **115**, 174-179.

Department of Health and Children (2001): *Quality and Fairness: a health system for you*. Dublin: Stationery Office.

Gilbert, G.H., Rose, J.S. and Shelton, B.J. (2002): A prospective study of the validity of data on self-reported dental visits. *Community Dentistry and Oral Epidemiology* **30**, 352-362.

Grytten, J. and Holst, D. (2002): Do young adults demand more dental services as their income increases? *Community Dentistry and Oral Epidemiology* **30**, 463-469.

Kiyak, H.A. (1986): Explaining patterns of dental service utilization among the elderly. *Journal of Dental Education* **50**, 679-687.

Kiyak, H.A. and Reichmuth, M. (2005): Barriers to and enablers of older adults' use of dental services. *Journal of Dental Education* **69**, 975-986.

Manski, R.J. and Magder, L.S. (1998): Demographic and Socioeconomic Predictors of Dental Care Utilization. *Journal of the American Dental Association* **129**, 195-200.

Millar, W.J. and Locker, D. (1999): Dental insurance and use of dental services. *Health Reports* **11**, 55-67.

Morgan, K., McGee, H., Watson, D., Perry, I., Barry, M., Shelley, E., Harrington, J., Molcho, M., Layte, R., Tully, N., van Lente, E., Ward, M., Lutomski, J., Conroy, R. and Brugha, R. (2008): *SLÁN 2007: Survey of Lifestyle, Attitudes & Nutrition in Ireland. Main Report*. Dublin: Department of Health and Children.

Muirhead, V. E., Quinonez, C., Figueiredo, R. and Locker, D. (2009): Predictors of dental care utilization among working poor Canadians. *Community Dentistry and Oral Epidemiology* **37**, 199-208.

Mumcu, G., Sur, H., Yildirim, C., Soylemez, D., Atli, H. and Hayran, O. (2004): Utilisation of dental services in Turkey: a cross-sectional survey. *International Dental Journal* **54**, 90-96.

Nguyen, L., Häkkinen, U. and Rosenqvist, G. (2005): Determinants of dental service utilization among adults - the case of Finland. *Health Care Management Science* **8**, 335-345.

Oliver, A. and Mossialos, E. (2004): Equity of access to health care: outlining the foundations for action. *Journal of Epidemiology and Community Health* **58**, 655-658.

Pizarro, V., Ferrer, M., Domingo-Salvany, A., Benach, J., Borrell, C., Pont, A., Schiaffino, A., Alamnza, J., Tresserras, R. and Alonso, J. (2009): The utilization of dental care services according to health insurance coverage in Catalonia (Spain). *Community Dentistry and Oral Epidemiology* **37**, 78-84.

Suominen-Taipale, A.L., Widström, E., Alanen, P. and Uutela, A. (2000): Trends in self-reported use of dental services among Finnish adults during two decades. *Community Dental Health* **17**, 31-37.

Van der Heyden, J.H.A., Demarest, S., Tafforeau, J. and Van Oyen, H. (2003): Socio-economic differences in the utilisation of health services in Belgium. *Health Policy* **65**, 153-165.

Whelton, H., Crowley, E., O' Mullane, D., Woods, N., McGrath, C., Kelleher, V., Guiney, H. and Byrtek, M. (2007): *Oral Health of Irish Adults 2000-2002*. Dublin: Department of Health and Children.