

# Does Dental Insurance Make a Difference in Type of Service Received by Iranian Dentate Adults?

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## ABSTRACT

**Objectives:** To assess the relationship between insurance status and type of service received among dentate adults in a developing oral health care system.

**Methods:** A cross-sectional survey based on phone interviews in Tehran, Iran. Four trained interviewers collected data using a structured questionnaire. Of 1,531 subjects answering the phone call, 224 were <18 years; of the remaining 1,307, 221 (17%) refused to participate, and 85 (6%) were excluded as edentate or reporting no dental visit, leaving 1,001 eligible subjects in the sample. The questionnaire covered insurance status, socio-demographics, frequency of tooth brushing, dental attendance as reasons for, and time since last dental visit, and dental service received then. Data analysis included the chi-square test and logistic regression.

**Results:** Of the subjects, 71% had a dental insurance. Those with no insurance were more likely to report tooth extractions (OR=1.5) than those with an insurance coverage; for all other treatments no differences according to the insurance status appeared. Among the insured subjects, extractions were more likely for those reporting a problem-based dental visit (OR=6.0) or having a low level of education (OR=2.3).

**Conclusions:** In Iran, with its developing oral health care system, dental insurance had only a minor impact on dental services reported. (Eur J Dent 2011;5:68-76)

**Key words:** Adults' dental care; Dental services; Dental insurance.

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## INTRODUCTION

High cost for dental services is a common reason for adults' avoidance of dental visits.<sup>1,2</sup> Cost-sharing schemes as third-party payment, e.g., health insurance systems, have attempted to reduce or remove cost barriers and to ease access to and use of dental services.<sup>3,4</sup> In several studies, dental insurance has been addressed as one of the key factors affecting the use of dental services. In-

sured people have been shown to use preventive and restorative services more than do those with no insurance.<sup>5-9</sup>

Receiving dental services is mediated by a myriad of personal, cultural, and institutional factors,<sup>10</sup> being dependent on provider, receiver, and practice.<sup>11-13</sup> In addition to insurance status, other receiver-based factors should be taken into account. These include demographic factors,<sup>14</sup> socioeconomic status,<sup>11</sup> dental conditions,<sup>12</sup> reason for visit, and attitudes towards health care.<sup>13</sup>

The ultimate goal of dental insurance is just to improve the oral health of its beneficiaries.<sup>15</sup> Depending on the social and political system of a country, the health policy, dental services, and their funding differ.<sup>16,17</sup> Consequently, the service panorama will usually differ among systems.<sup>18</sup> In most developing countries dental services are provided mainly to relieve pain or harmful symptoms,<sup>19,20</sup> thus resulting in a service-mix different from those in developed countries.

The aim of the present study was to assess the relationship between insurance status of dentate adults and types of service they reported as receiving in Iran, a country with a developing oral health care system.

## MATERIALS AND METHODS

### Background

In Iran, dental service in both the public and private sector means responding to those who come to a dentist mostly for problem-related treatment.<sup>21,22</sup> Two dental insurance systems are available: public and commercial, their main function being to subsidize treatment costs. In public insurance, both the employer and employee pay compulsory premium, for employees it is deducted from their wages or income. In commercial insurance, the employer pays premium as fringe benefit. Public insurance covers examination, dental X-ray, tooth extractions, scaling, amalgam and composite fillings, and removable dentures with a subsidy of 100% at a clinic owned by and of 70% at a clinic contracted with the public insurance system. Commercial insurance, with a subsidy of 70%, covers all dental treatments. The dentist:population ratio in Tehran is 1:1,800, with about 4,500 practicing dentists serving the eight million inhabitants in the city. Details of the Ira-

nian health insurance system have been described previously.<sup>21,23</sup>

### Design and sampling

The target population included dentate adults (18 years or older) who were residents of Tehran and had access to a fixed telephone line. Of all Tehran residents, 90% have fixed telephone lines.<sup>24</sup> Based on the 3-digit prefix codes and the 4-digit running numbers from a list of four million computerized options resembling real phone numbers, a total of 3,200 seven-digit numbers were randomly selected. A pilot study was carried out on 100 adults in February 2005 to determine the feasibility of the sampling method and relevance of the questionnaire.

### Phone calls

Four trained interviewers made the calls. For each missed call, the reason for failure was recorded as busy, no answer, fax, or a non-existent line. After five attempts, a busy or non-answering line was omitted from the list. In total, 1,669 numbers were unavailable, most because of being a non-existent line or a fax. Of the 1,531 subjects who answered the calls, 224 were outside the target age (under 18), leaving 1,307 subjects to be interviewed. Of these, 1,086 (83%) responded. The present study excluded those who said they were edentulous (n=18) or had never visited a dentist (n=67); the final sample thus comprised 1,001 subjects. Sampling details have been published earlier.<sup>21</sup>

### Interviewing and questions

The questions in this interview were based on related studies,<sup>14,18,25,26</sup> and after the pilot study were slightly modified. The questionnaire covered respondents' insurance status, characteristics of dental attendance, and socio-demographic information.

Answers to the question about respondents' dental insurance status were recorded as: no insurance, public insurance, or commercial insurance. In the present analyses, these were treated as a dichotomy: Insured and Non-insured subjects.

Characteristics of dental attendance covered time elapsed since and reason for the most recent dental visit and items of service received. Based

on the respondent's answer to the question "When was your most recent dental visit?" the interviewer marked one option on a list of seven options, later dichotomized into Within the past 12 months and More than one year ago.

Answers to the question "What was the reason for your last dental visit?" were recorded as: check-up, problem with teeth or gums, or continuing treatment. In the analyses, those (n=17) who said that they were continuing their treatment were combined with the group having a problem with their teeth or gums. Consequently, the reason for the dental visit was dichotomized as Check-up or Problem.

Oral health care behavior was assessed according to the frequency of tooth brushing and was categorized as: less than daily, once daily, and twice daily.

Respondents answered in their own words, the question "What dental services did you receive during your most recent visit?", and the interviewer marked each reason named from a list of 13 options. These were later classified into five types of services:<sup>27</sup> 1) Diagnostics (examination, prescription, and radiographs), 2) Prevention (scaling and dental prophylaxis), 3) Restorations (amalgam and resins fillings), 4) Extractions, 5) High technique services (surgical procedures, orthodontics, endodontics, crowns or bridges).

Socio-demographic information covered age, gender, level of education, and income. The respondent's date of birth was calculated to the nearest year. The respondent's education attained was recorded with eight options, later combined into three levels of education: Low (illiterate, primary or secondary school), Medium (high school or diploma), and High (associate degree, bachelor's degree, master's degree). Information about family income came from the open question "How much is your monthly household income?" The answers were recorded in Rials and then categorized as Low (under the poverty line), Medium, and High.

### Statistical analysis

Differences in all frequencies were evaluated by Chi-square test. The strength of the factors related to each type of service was evaluated by fitting logistic regression models to the data and by calculating the corresponding odds ratios (OR)

and their 95% confidence intervals (95% CI). Goodness of fit was evaluated by means of the Hosmer and Lemeshow test.

## RESULTS

Of the subjects (n=1,001), 58% were women and 61% were under age 35. Age distribution was similar for men and women (P=0.22). Subjects' mean age was 32.9 years (SD=10.7; median 32.0: 95% CI=32.2–33.5), with no gender differences (P=0.18). Level of education was high for 36%, medium for 47% and low for 17%, more women than men reporting a high level of education (P=0.02). Regarding to household income; 30% fell into the high-income, 31% into the medium, and 13% into the low category, and 26% refused to disclose their income being categorized as no answer. Of those who responded to this question, more men than women reported a high household income (P<.001). Of all, 56%, more women than men reported having had a dental visit within the past 12 months. The great majority (84%) reported problems with their teeth as the reason for their most recent visit; 16% had visited a dentist for a check-up. Of all respondents, 43% reported twice daily, 50% once daily, and 7% less than daily tooth brushing.

Of the respondents, 71% reported having dental insurance (65% public, 6%, commercial insurance), 29% had no insurance. Having dental insurance coverage was more likely for women (OR=1.5), for those in oldest age group (OR=2.1), and those with a high level of education (OR=2.5). Those respondents who did not disclose their income were less likely to have insurance coverage (Table 1).

Restorative treatments were the most frequently and preventive care the least frequently reported type of services, regardless of subjects' insurance status. The non-insured respondents reported tooth extractions almost twice as frequently as did the insured ones (P<.001) (Figure 1).

Tables 2 and 3 show distribution of the respondents according to the type of treatment reported by insurance status as well as to socio-demographic and dental attendance characteristics and the frequency of brushing. No gender or age differences emerged. Among the insured subjects, diagnostic was most frequently reported by those with a high level of education, those

who gave check-up as the reason for their most recent dental visit and those who reported twice daily tooth brushing. Except for level of education these trends were similar among the non-insured respondents.

Among the insured subjects, preventive care was less frequently reported by those with medium or high household income, and those who reported less than daily brushing. A trend appeared among those non-insured subjects with a low level of education or income, those who visited a dentist more than last 12 months, and those who reported less than daily tooth brushing.

Tooth extractions were most frequently reported by those with a low level of education or income, by those who reported a problem-based visit to a dentist and those who reported never brushing. Among the non-insured subjects, half of those with a low household income reported tooth extraction as their most recent treatment. The highest rate of extractions appeared among those with a low level of education, those who visited a dentist more than 12 months ago for problem-based reason, and those who reported less than daily tooth brushing.

Table 4 shows odds ratios for each type of service reported, as explained by subjects' insurance status and socio-demographic and dental attendance characteristics. Subjects' insurance status made a difference only as regards tooth extractions received. Those non-insured were more likely to report these (OR=1.6). In addition, reporting tooth extractions was more likely for those with a low level of education (OR=2.4), or income (OR=2.2), and for those who visited a dentist more than one year ago (OR=1.5).

Diagnosis (OR=10.0) and preventive care (OR=5.0) were definitely more likely for those reporting check-up as their reason for the most recent dental visit. Those reporting problem as their reason for the most recent dental visit were more likely to report restorative (OR=3.0), extraction (OR=6.0), and high technique services (OR=4.3). Reporting restorative service as received at their most recent visit was more likely for those subjects with medium (OR=1.8) or high (OR=1.7) level of education and those with medium income (OR=1.8). Subjects' tooth brushing frequency made a difference only for diagnostic; those who reported once daily tooth brushing (OR=1.6) were more likely to

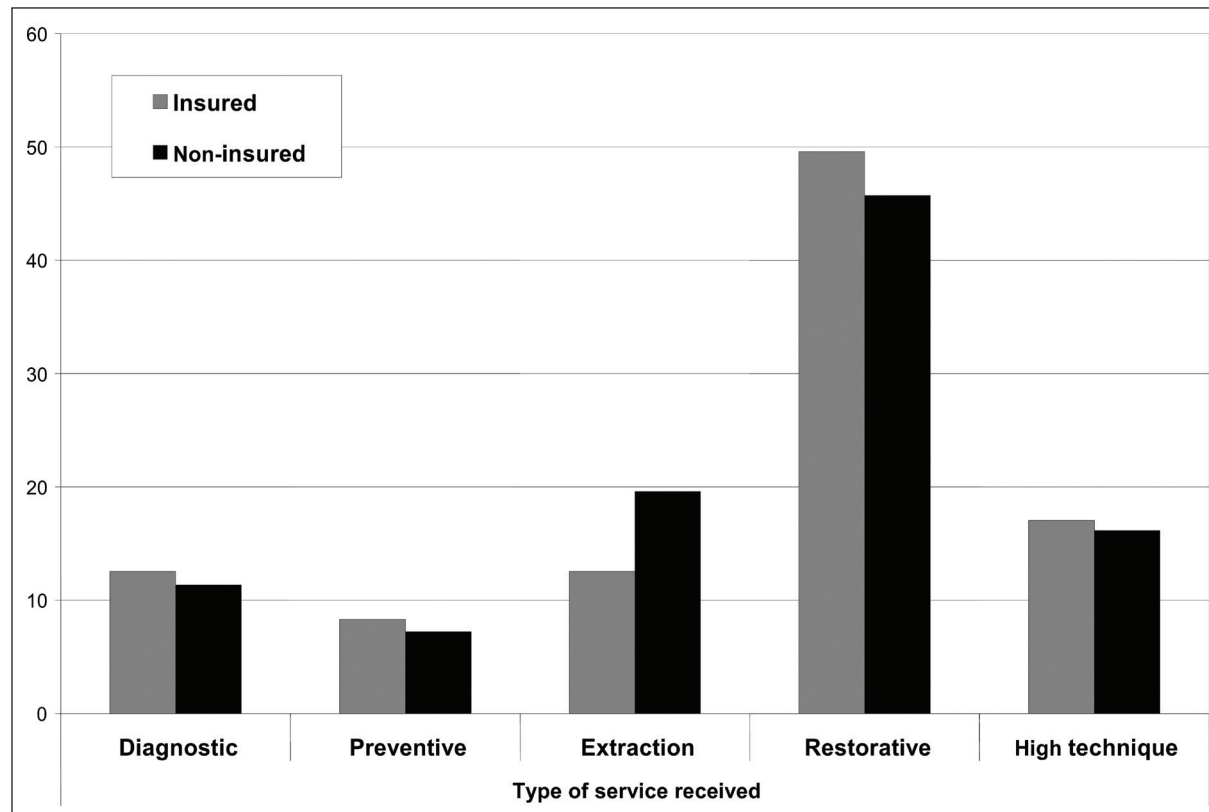


Figure 1. Percentages of dentate adults (n=1001) according to the type of service they reported as received during their most recent dental visit, separately for insured (n=710) and non-insured (n=291).

receive diagnostic service than those with less than daily brushing.

Preventive service was less likely for those with a medium income (OR=0.4) compared with those who did not answer to the question on income.

Table 5 shows odds ratios for each type of service reported as received by the insured sub-

jects (n=710). Tooth extractions were more likely for those reporting a problem-based dental visit (OR=6.0) or having a low level of education (OR=2.5). Receiving diagnostics (OR=8.0) or preventive care (OR=5.6) was more likely for those reporting a check-up visit.

**Table 1.** Factors related to reporting having dental insurance, as explained by means of a logistic regression model fitted to the data of dentate adults (n=1001) in Tehran, Iran.

Parameters		Results from logistic regression						
		n	(%)*	β	SE	P	OR	CI 95 %
Gender	Men	420	68	0.37	0.15	0.01	1.5	1.1-1.9
	Women	581	73					
Age	18-24	265	67	0.01	0.18	0.95	1.0	0.7-1.5
	25-34	351	70					
	35-44	276	72					
	45+	109	81					
Level of education	Low	175	65	0.03	0.20	0.90	1.0	0.7-1.5
	Medium	469	65					
	High	357	82					
Household income	Low	131	69	0.26	0.24	0.27	1.3	0.8-2.1
	Medium	312	76					
	High	298	77					
	No answer	260	58					

Goodness-of-fit by Hosmer and Lemeshow test=0.33.

Pseudo-R squared by Nagelkerke R Square=0.10.

\*: Percentages of having insurance.

**Table 2.** Distributions (%) of insured dentate adults (n=710) in Tehran, Iran, by the type of dental treatment they reported as received at their most recent dental visit.

	Insured														
	n	Level of education			Household income				Time since last visit		Reason for visit		Frequency of brushing		
			Low	Medium	High	Low	Medium	High	No answer	Last 12 months	> last 12 months	Problem	Check-up	Twice daily	Once daily
Type of service	n	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Diagnostic	89	9	11	16	14	11	13	15	15	10	7	41	17	9	13
Preventive	59	9	10	8	11	5	6	15	8	8	5	24	9	8	5
Extraction	89	24	10	10	18	12	14	9	11	15	15	2	11	14	21
Restorative	352	42	52	49	46	56	50	41	48	51	54	28	47	51	48
High technique	121	16	17	17	11	16	17	20	18	16	19	5	16	18	13
P value			.01			.02			.27		<.001			.05	

## DISCUSSION

The present results reveal that insurance status made no difference regarding type of dental treatment received except for tooth extractions, which were more frequently reported by the non-

insured subjects. These findings remained similar after controlling for subjects' socio-demographic and dental attendance characteristics. Further, reason for dental visit seemed to be a strong determinant for receiving each type of treatment, regardless of insurance status.

**Table 3.** Distributions (%) of non-insured dentate adults (n=291) in Tehran, Iran, by the type of dental treatment they reported as received at their most recent dental visit.

	Non-insured														
	n	Level of education			Household income				Time since last visit		Reason for visit		Frequency of brushing		
		%	Low	Medium	High	Low	Medium	High	No answer	Last 12 months	> last 12 months	Problem	Check-up	Twice daily	Once daily
Type of service	291	62	166	63	40	75	68	108	150	141	253	38	129	136	26
Diagnostic	33	19	11	8	10	12	10	14	15	9	6	47	16	10	8
Preventive	21	3	8	10	0	7	12	8	9	6	5	24	7	9	0
Extraction	57	39	16	11	53	13	7	19	14	26	23	0	12	26	19
Restorative	133	29	48	54	22	57	56	39	45	45	48	26	43	46	54
High technique	47	10	17	17	15	11	15	20	17	14	18	3	22	9	19
P value			.001			<.001			.08		<.001		.01		

**Table 4.** Factors related to types of dental treatment received, as explained by means of logistic regression models fitted to the data on dentate adults (n=1,001) in Tehran, Iran, separately for each type of treatment.

Parameters	Diagnostic OR (95% CI)	Preventive OR (95% CI)	Restorative OR (95% CI)	Extraction OR (95% CI)	High technique OR (95% CI)
Level of education					
Low	1.6 [0.8–3.0]	1.3 [0.6–3.0]	Ref	2.4 [1.5–4.0]**	Ref
Medium	0.9 [0.5–1.4]	1.2 [0.7–2.0]	1.8 [1.3–2.7]**	1.0 [0.7–1.6]	1.2 [0.8–2.0]
High	Ref	Ref	1.7 [1.2–2.7]**	Ref	1.4 [0.8–2.3]
Insurance status					
Non-insured	1.0 [0.6–1.6]	Ref	1.2 [0.9–1.6]	1.6 [1.0–2.3]*	1.0 [0.7–1.5]
Insured	Ref	1.1 [0.6–1.9]	Ref	Ref	Ref
Time since of last dental visit					
Within last 12 months	1.1 [0.7–1.7]	Ref	1.0 [0.8–1.3]	Ref	1.3 [0.9–1.8]
More than one year ago	Ref	1.0 [0.6–1.6]	Ref	1.5 [1.0–2.0]*	Ref
Reason for last visit					
Check-up	10.0 [6.3–15.0]**	5.0 [3.6–10.0]**	Ref	Ref	Ref
Problem	Ref	Ref	3.0 [2.1–4.5]**	6.0 [2.3–18.0]**	4.3 [2.1–8.6]**
Frequency of tooth brushing					
From never to >Once a day	1.6 [1.0–1.9]*				1.0 [0.8–1.3]
From >Once a day to never		1.0 [0.7–1.4]	0.9 [0.8–1.0]	1.0 [0.8–1.2]	
Goodness of fit <sup>1</sup>	0.81	0.31	0.75	0.99	0.88

<sup>1</sup>: Goodness-of-fit by Hosmer and Lemeshow test.

\*: P<.05, \*\*: P<.001

The relationship between being insured and undergoing fewer tooth extractions is in line with recent reports from developed countries. In the US, only 7% of those with private insurance, but 27% with Medicaid insurance have undergone tooth extractions.<sup>9</sup> Reports from Australia have shown that 4% to 13% of the insured undergo tooth extractions compared with 10% to 31% of those receiving publicly funded support or being without insurance coverage.<sup>5,6,14,28</sup> Generally, fewer tooth extractions among those insured may reflect their better options for choice of treatment. In Iran, those who are insured receive their dental treatments with a 70% to 100% subsidy, which may facilitate their choices as to maintaining dental health.

The present results show that regardless of insurance status, restorative treatments dominated, and preventive care was rather infrequent. This leading role for restorative care is common in many developed and developing countries,<sup>6,7,26,31,32</sup> even that some developed countries have placed higher emphasis upon preventive care.<sup>33,34</sup> Reorientation of oral health services towards prevention is one of the WHO's priority action areas for continuous improvement of oral health.<sup>35</sup> Insurance schemes should also support this emphasis on preventive care, especially in countries with a developing oral health service system, such as Iran.

Providing a lesser amount of preventive care may mean lower fees income and thus affect dentists' clinical decision-making. In Iran, dentists have reported positive attitudes towards preven-

tive care,<sup>36</sup> which is a good starting point. However, the same dentists considered performing preventive measures not economically beneficial.<sup>36,37</sup> This may have influenced on dentists' willingness to provide such treatments for the present respondents as well.

Tehran has a population just over 8,000,000, of which about 60% have health insurance. Around 1,300 of all Tehranian dentists work under insurance scheme, yielding a dentist:population ratio of 1:3,700 for the insured people. In respect to access to dental services this might not provide sufficient opportunity for dental care.

On the other hand, remuneration for salaried dentists (who are hired in insurance owned dental clinics), and for contracted dentists, which insurance paid them according to a fee-for-service payment, might lead to a lack of financial incentive and might influence their practice. In Iran, the fee for each treatment item in insurance scheme is much lower than the one for the same treatment in the private sector.

Dental insurance has been reported to be associated with higher percentages visiting within the last year,<sup>23</sup> and visiting for a check-up.<sup>21</sup> Such associations of insurance status with access to services may be expected to have an impact on the pattern of service received. In present study reason for dental visit had a strong impact on treatment-mix, a check-up indicating greater odds for receiving diagnostics and preventive care, in line with reports from Australia.<sup>6,38</sup> Generally, people going for regular dental check-ups also have

**Table 5.** Factors related to the types of dental treatment received, as explained by means of logistic regression models fitted to the data on insured dentate adults (n=710) in Tehran, Iran, separately for each type of treatment.

	Diagnostic	Preventive	Restorative	Extraction	High technique
Parameters	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
Level of education					
Low	0.8 [0.4–1.8]	1.9 [0.8–4.6]	Ref	2.5 [1.2–4.0]**	Ref
Medium	0.7 [0.5–1.3]	1.2 [0.7–2.4]	1.6 [1.0–2.5]*	1.0 [0.6–1.8]	1.1 [0.6–1.9]
High	Ref	Ref	1.4 [0.9–2.3]	Ref	1.2 [0.7–2.2]
Reason for last dental visit					
Check-up	8.0 [5.4–14.6]**	5.6 [3.5–11.2]**	Ref	Ref	Ref
Problem	Ref	Ref	3.0 [2.0–4.8]**	6.0 [1.6–12.3]**	4.1 [1.8–9.0]**
Goodness of fit <sup>1</sup>	0.74	0.86	0.83	0.87	0.96

<sup>1</sup>: Goodness-of-fit by Hosmer and Lemeshow test.

\*: P<.05, \*\*: P<.001

regular medical check-ups,<sup>9,39</sup> have high levels of education or income,<sup>18,40</sup> and usually have a good job, all of which may reflect their higher expectations of having a healthy dentition and, consequently lead them to avoid services resulting in loss of teeth.

The present study revealed that tooth extraction was more likely for subjects with a low level of education or income, those with a longer time since the previous visit and reporting problem as a reason for it. This finding may reflect the variation in the attitudes or behaviour of insured and non-insured persons.<sup>32</sup> Several studies have shown that people with low income or education have higher rates of poor oral health and treatment need and also have less understanding of health value.<sup>42</sup>

The present data were based on interviews among adults living in Tehran, Iran, and with access to a fixed telephone line, representing more than 90% of the population. To increase the reliability of the data, the interviewers were carefully instructed and a structured questionnaire was used. Each interview lasted on average of 15 minutes, which appeared to be sufficient for presenting the questions and answering to them. Further, the population-based data and high response rate speaks for the generalisability of the present findings.

## CONCLUSIONS

In the present study, dental insurance showed a minor, if any impact, on receiving different types of dental treatment. This indicates a serious deficiency in the insurance system in Iran. The present findings indicate a need to modify insurance systems to encourage the preventive approach in oral health service provision, in particular in countries with a developing oral health care system.

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