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Assessment of demand for and utilization of dental services by insurance coverage in a developing oral health care system

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Objectives This study aimed to evaluate the relationship between demand for and utilization of dental services by insurance coverage among adults in Iran.
Methods A cross-sectional survey based on telephone interviews was done. A total of 6,029 adults participated in this study conducted in Iran. The interviews were carried out using a structured questionnaire and covered dental visits, demographics and socio-economic background.
Results Of 6,029 participants, 86% reported having health insurance, 58% had public, and 28% had both public and commercial insurance. Those with both public and commercial insurance coverage had higher odds for dental visits within the past 12 months [odds ratio (OR) = 1.5], and for dental check-ups (OR = 1.5). Receipt of restorative and expensive services (OR = 1.4) was more likely by those with both public and commercial insurance. Tooth extraction was more likely in subjects with no insurance coverage (OR = 1.6).
Conclusion This study revealed a positive relationship between insurance coverage and demand for and utilization of dental services in a country with a developing health care system.
Keywords composite resins, tooth discoloration, aging

Introduction

Patients and health care service providers can both have an influence on the demand for and utilization of oral health care (OHC).[1] As a financial factor, dental insurance is positively related to the patient's quest for utilization of OHC services.[2-5] Insurance systems can affect the demand for OHC services by (I) decreasing the costs of these services and (II) increasing the consumers' buying power.[6] Dental visit and the reason for the appointment are considered as measures of demand,[7,8] since it is the patients' motivation to seek dental care.[8] Although the differences in dental visit between patients with and without insurance coverage can be due to adverse selection (tendency of those with high dental problem to obtain insurance),[9] it is likely that insurance coverage serve as a dominant predictor of dental visits.[10-12] It has been proven that patients who are taking advantage of insurance coverage are more likely to report frequent dental visits[11] and frequent check-ups than the non-insured. Utilization of services is defined as the type and amount of OHC service that a patient receives after consultation with the dentist.[13] Dental insurance is a key factor affecting the patients' use of dental services;[14] the rate of receiving OHC in patients with insurance is much higher than non-insured individuals.[4] Insured patients also receive more preventive care, high cost treatments and less dental extraction.[15,16]

Several studies in the countries with developed health care system have reported details of dental insurance coverage and their impacts on OHC. Such studies are rare in developing countries, usually with treatment- oriented health care delivery systems which may discourage regular use of OHC services. The three different health care delivery sectors in Iran with a developing health care system are the state, the insurance system (public and commercial), and the private sector. In the state sector, the Ministry of Health and Medical Education (MOH) is the main provider of OHC services. In 2013, 1,942 public dental clinics (PDCs) provided patients with primary OHC services (extraction, fluoride varnish application, restorative treatments, scaling and root planing). All citizens can benefit from these services. Dentists are paid (via salary) monthly by the MOH to provide these services. The cost of services in PDCs for the target population (children under 12 years of age, pregnant and nursing women) is about 80 to 90% and for other people 50% less than the cost of the same service in private clinics.[17]

Private sector is the main service provider. In 2013, there were 26,000 registered dentists in Iran (the dentist-population ratio was 1:2,978); out of which, more than 90% were working in the private sector.[18]

The public insurance system covers basic dental services (extraction, restorative treatments, scaling and root planing). About more than 80% of the Iranian population enjoys this type of insurance coverage,[19] since all the employers under the labour law are required to provide health insurance for their employees and their family members.

The employees' compulsory premium is deducted from their wages or incomes, to contribute to health and social services. Oral health care benefits under the public insurance are free of charge in the clinics owned by the public insurance (400 dental clinics by salaried dentists) and those that have a contract with the public insurance system receive 10 to 20% cost of the services (2000 private dentists, or public dental clinics, via fee-for-service payment).[19]

Various institutions and companies offer commercial insurance to employees as a complementary insurance, with various types of dental services provided according to the contract between the commercial insurance companies and private dental clinics. The premium of complementary insurance is deducted from the employees' income and the benefits must be used annually. According to previous reports, about 17% of

insured Iranians are covered by both public and commercial health insurance.[19-21]

Behavioural patterns of adults for receiving health care in Iran with a treatment-oriented insurance system, may differ from those in developed countries with prevention-oriented health insurance schemes. The aim of this study was to examine the demand for dental visit and the reason for visit and utilization of services (amount and type of dental care rendered) among adults in Iran, and its relation to their health insurance status.

Methods

Design and sampling

The present study was carried out based on cross-sectional data obtained through phone interviews. The target population included adults who were residents of Iran, and had access to a fixed telephone line (more than 95% of the Iranian households have a land line).[19] The study was conducted in full accordance with the World Medical Association Declaration of Helsinki. Verbal consent was obtained from all participants. The ethics committee of Shahid Beheshti University of Medical Sciences granted ethical approval for the present study.

Considering absolute error of $d = 0.01$, confidence level of $1 - \alpha = 0.95$, and based on 80% prevalence for "insurance coverage" within the target population, sample size was determined to be 6,400 subjects in the entire nation. A two-stage stratified random sampling technique was used to achieve sample size. A pervious study[20] revealed that only one out of three calls reached a person belonging to the target group. Based on this, 18,000 phone numbers were drawn: 8,230 were unavailable (busy, no answer, fax, line blocked). For each successful call, the duration of the interview was recorded. Missed calls (busy, no answer, fax, and nonexistent lines) were excluded. After five attempts, a busy or non-answering line was omitted from the list. Of the 9,770 subjects answering the phone call, 1999 were excluded (aged <18 years) and 2,113 refused to participate, leaving 6,029 subjects (74%) in the final sample.

Interviewing and Questions

The phone interviews were carried out using a structured questionnaire with fixed and open-ended questions. Calibration of interviewers aimed at ensuring uniform understanding, and reliable selection of the options by all interviewers, and ensuring that each interviewer could perform the interview consistently. Finally, eight interviewers were selected according to how they adopted the interviewing and recording methods. The questions were based on related relevant recent studies.[21-23] The validity of the questionnaire was confirmed in previous studies[24,25] (using the same questions as the ones used in our study and also conducted in Tehran). The reliability of the questionnaire was ensured by the test-retest reliability method on 50 subjects. The kappa statistic was calculated for the qualitative variables (mean of 0.75 and range of 0.71–0.88) and the intra-class correlation coefficient (ICC) (mean of 0.87 and range of 0.89–0.94) was calculated for the quantitative variables. Both values confirmed the reliability of the questionnaire.

Demographics and socio-economic background including gender, age, level of education, socio-economic status (SES), insurance status, marital status, place of residence, and access to health service indicators (AHSI) were assessed.

Date of birth, calculated as the respondent's age to the nearest year, was later categorized as 18–24, 25–34, 35–44, 45–54, 55–64, and 65+. Level of education was recorded with eight levels, later categorized into four levels: (I) illiterate, (II) low (primary or secondary school), (III) medium (high school education or high school diploma), and (IV) high (university education).

According to a previous study in Iran,[25] SES was evaluated using 10 questions assessing the place of residence (rural/urban), education (years), family size, house area per capita (m^2), house ownership (own/rent), and yes/no questions about having a car, computer, dishwasher, microwave, or Internet access. The first component factor scores from principal component analysis (PCA) were then applied to classify the sample into five SES classes, the first representing the poorest.

Insurance status was recorded as (I) no insurance, (II) public insurance, (III) having both public and commercial insurance (complementary insurance). Marital status was recorded as (I) single, (II) married and (III) divorced. Place of residence was recorded as (I) urban area or (II) rural area. Provinces were categorized into three categories: (I) developed, (II) semi-developed, and (III) underdeveloped, according to AHSI.[26]

Characteristics of Dental Visits

Demand for dental services was inquired as "dental visit" and "reason for the most recent visit". Based on the respondent's answer to the question "when was your most recent dental visit?" The interviewer marked one option out of four options (within the past 12 months, 1–2 years ago, more than 2 years ago and never visited a dentist) and later dichotomized it into visited a dentist within the past 12 months and no visit within the past 12 months. For those who had visited a dentist, the answer choices to the question "what was the reason for your dental visit?" were check-up and trouble with the teeth or gums.

Utilization of dental services was inquired as the number of dental visits within the past 12 months and type of service received during the most recent visit. Number of dental visits was recorded as: no visit, one, two, three, four and more. For the cross tabulation, number of dental visits was categorized as: (I) no visit, (II) one, (III) two and more. Type of dental treatment received during the most recent visit was classified into (I) diagnostics (examination, prescription, or radiographs), (II) prevention (scaling or dental prophylaxis), (III) restoration (amalgam or composite filling), (IV) extraction, (V) high-cost treatments (surgical procedures, orthodontics, endodontics, crown and bridges, full denture and dental implant).

Statistical Analysis

In order to develop a SES measure, using STATA software, version 11.1 principal component analysis (PCA) was used. Because of including both binary and continuous variables, polychoric, polyserial and Pearson's correlations were used in the correlation matrix. Afterwards, SES classified into five classes from the poorest (I) to the richest (V).

Data were analyzed using SPSS software, version 15 (SPSS Inc., IL, USA). Descriptive statistics included the proportion/frequencies, means, standard deviations (SD), and 95% confidence intervals. Differences between the subgroups were evaluated by the Chi-square and Mann-Whitney tests. The strength of the factors related to dental visit, dental check-up and factors related to each type of service were evaluated by fitting a logistic regression model to the data and by calculating the corresponding odds

ratios (OR) and their 95% confidence intervals. Goodness of fit was assessed by means of the Hosmer-Lemeshow test.

Results

Description of Respondents

Of 6,029 subjects who answered the phone calls and participated in the study, 64% were women, and were under the age of 44; the mean age was 41.4 years (SD = 15.2; median 39.0: 95% CI = 38.0–41.1). The mean age was 42.4 years in men and 41.0 years in women. Table 1 shows, the distribution of respondents by their characteristics. Of all, 38% had a medium level of education, and 27% were in level 5 of the SES ranking. The majority reported having health insurance (86%), 58% by the public, and 28% by both public and commercial insurance; 75% were married and 79% lived in urban areas. With regard to AHSI, 49% lived in developed regions. High and medium level of education ($P < 0.001$) and high level of SES ($P < 0.001$) were more frequent among men. Having public insurance and being married had a higher frequency among women than men (55% vs. 60% and 67% vs. 80%, respectively; $P < 0.001$).

Table 1. **Distribution (%) of respondents by their characteristics, separately for males and females, in Iran in 2013**

Characteristics	All respondents	Males	Females
	***n* = 6,029 %**	***n* = 2,166 %**	***n* = 3,863 %**
Age			
18–24	12	12	11
25–34	26	25	27
35–44	26	26	27
45–54	15	13	16
55–64	8	8	8
65+	13	16	11
	P-values		<0.001*
Level of education			
Illiterate	11	9	12
Low	29	26	30
Medium	38	39	37
High	22	26	21
	P-values		<0.001*
Socio-economic status			
1	5	3	7
2	17	13	20
3	26	24	26
4	25	27	24
5	27	33	23
	P-values		<0.001*
Insurance status			
No insurance	14	17	12
Public	58	55	60
Public + commercial	28	28	28
	P-values		<0.001**
Marital status			
Single	23	32	17
Married	75	67	80
Divorced	2	1	3
	P-values		<0.001**
Place of residence			
Urban	79	78	79
Rural	21	22	21
	P-values		0.17
	Access to health sector indicators		
Developed	49	47	50
Semi-developed	40	41	39
Underdeveloped	11	12	11
	P-values		0.06*

Statistical analysis for differences between the genders: **Chi square test, *Mann-Whitney test. $P < 0.05$ was considered significant.

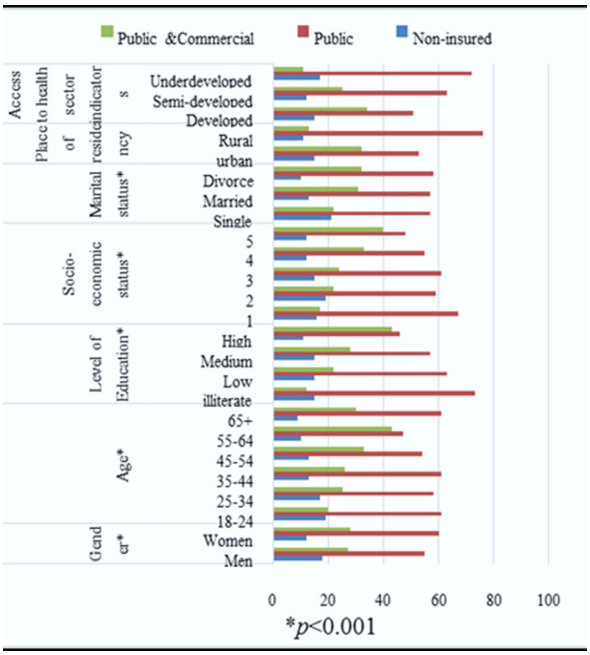

Fig 1. **Distribution of respondents (*n* = 6029) according insurance status by subjects' demographic and socio-economic background in Iran 2013.**

Distribution of respondents ($n = 6029$) according insurance status by subjects' demographic and socio-economic background is shown in Fig. 1. Having both public and commercial insurance was more frequent among women, those in older age groups, i.e. 45- to 64-year-olds, those with a high level of education, those with the highest level[5] of SES, married subjects and those who lived in urban areas and developed regions with regard to AHSI ($P < 0.001$ for all variables).

Table 2. **Percentages of adults ($n = 6,029$) reporting a dental visit, and a check-up as the reason for their most recent dental visit and having had at least three visits within the past 12 months and type of service received during the most recent dental visit according to their characteristics in Iran in 2013**

		DA[1]	Check up[2]	VF[3]	Examination[4]	Prevention[4]	Restorative[4]	Extraction[4]	HCT[4,5]
		%	%	%	%	%	%	%	%
All respondents		50	13	23	6	5	35	20	36
Gender	Men	47	11	22	6	4	33	20	34
	Women	52	14	24	7	5	37	19	36
P-value		<0.001	<0.001	0.12	0.06	0.12	<0.001	0.17	0.06
	18–24	47	19	22	9	4	40	14	21
	25–34	56	19	25	8	5	45	16	33
Age group	35–44	55	12	26	6	5	35	26	32
	45–54	51	10	22	5	6	38	19	43
	55–64	45	8	22	4	4	30	19	44
	65+	30	5	15	5	2	11	20	58
P-value		<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001
Level of education	Illiterate	26	4	12	4	1	12	28	40
	Low	42	8	17	5	4	26	29	32
	Medium	54	15	25	6	5	43	16	36
	High	65	21	32	10	7	46	9	37
P-value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01
	1	26	3	8	4	1	20	29	37
	2	39	10	13	4	4	29	28	32
SES[6]	3	50	13	21	5	5	41	19	35
	5	65	23	33	10	8	46	9	37
P-value	*P*-values	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.02
	Non-insured	44	12	20	6	4	31	21	30
Insurance status	Public	48	12	22	6	5	33	23	34
	Public + Commercial	58	15	27	6	5	32	13	41
P-value		<0.001	<0.001	<0.001	0.98	0.74	<0.001	<0.001	<0.001
	Single	50	19	25	9	5	40	14	32
Marital status	Married	53	14	22	5	6	41	18	37
	Divorce	30	6	9	3	1	27	15	45
P-value		<0.001	<0.001	<0.001	0.001	0.19	0.02	0.001	<0.001
Place of residence	Urban	52	14	24	7	4	38	16	48
	Rural	41	10	17	5	3	23	32	27
P-value		<0.001	<0.001	<0.001	0.02	<0.001	<0.001	<0.001	<0.001
	Developed	57	16	28	7	5	41	13	39
AHS[17]	Semi-developed	46	11	18	6	4	31	25	32
	Underdeveloped	34	8	17	5	2	27	29	32
P-value		<0.001	<0.001	<0.001	0.17	<0.001	<0.001	<0.001	<0.001

[1]Dental visit (Those who visited a dentist in the past 12 months). [2]Those who reported check-up as the reason for their most recent dental visit. [3]Visit frequencies (those who visited a dentist, 3 or more times in the past 12 months). [4]Those who reported the receipt of this service in their most recent dental visit. [5]High cost dental treatments. [6]Socio-economic status. [7]Access to health sector indicators. Statistical analysis of the frequencies by means of the Chi square test.

Dental Visits and Treatment Received by Insurance Status

Percentage of dental visits made by adults is shown in Table 2; 50% of all respondents reported having had a dental visit within the past 12 months. These subjects were often those with both public and commercial insurance in comparison with non-insured or public insured people (58% vs. 44% or 48% $P < 0.001$).

Of those who had visited a dentist (n = 5,608), only 13% reported check-up as the reason for their most recent dental visit. The highest rates of check-ups were reported by subjects with both public and commercial insurance (15%) compared to those with public insurance only or the non-insured (12%, $P < 0.001$).

Irrespective of gender, 23% of the respondents reported having had two or more dental visits within the past 12 months with the highest frequency among both publicly and commercially insured respondents, when compared with the non-insured or the publicly-insured (27% vs. 22% or 20% $P < 0.001$).

Restorative treatments and high cost services had the highest frequency (38% and 31%, respectively) among subjects who had visited a dentist. Preventive care was the least

Table 3. **Factors related to dental visits, dental check-ups, number of dental visits, and types of oral health care services received, separately for each variable, as explained by means of logistic regression models fitted to data on adults in Iran in 2013**

	Dental visit1	Dental check-up2	2 and more visit3	Restorative	Extraction	High cost treatment
	OR (95% CI)	OR(95% CI)	OR(95% CI)	OR(95% CI)	OR(95% CI)	OR (95% CI)
Gender						
Men	Ref	Ref	Ref	Ref	1.1 (0.9–1.4)	Ref
Women	1.3 (1.1–1.5)**	1.4 (1.0–1.5)*	1.2 (1.0–1.4)	1.0 (0.9–1.2)	Ref	1.1 (0.9–1.2)
Age	1.1 (1.0–0.9)*	1.5 (0.9–0.7)**	1.0 (0.9–1.1)*	1.3 (0.9–0.7)***	1.1 (1.0–1.0)*	1.2 (1.1–1.3)**
Level of education						
Illiterate	Ref	Ref	Ref	Ref	1.9 (1.0–3.5)*	1.1 (0.7–1.9)
Low	1.4 (1.0–2.0)	1.7 (0.7 – 4.1)	1.2 (0.7–2.4)	1.5 (1.0–2.2)	2.1 (1.4–3.2)**	1.0 (1.3–0.7)
Medium	1.5 (1.0–2.4)	1.6 (0.6 – 4.0)	1.8 (1.0–2.7)	2.2 (1.3–3.1)**	1.4 (1.1–2.0)*	1.1 (0.9–1.4)
High	1.7 (1.0–2.7)*	1.7 (0.6 – 5.0)	1.9 (1.0–4.2)	2.2 (1.3–3.8)**	Ref	Ref
Socio-economic status	1.4 (1.2–1.5)***	1.4 (1.2–1.6)**	1.3 (1.0–1.4)***	1.0 (0.9–1.1)	1.2 (0.9–0.7)**	1.0 (1.0–1.2)
Type of insurance						
Non-insured	Ref	Ref	Ref	Ref	1.6 (1.2–2.2)**	Ref
Public insurance	1.2 (1.0–1.5)*	1.1 (0.8–1.5)	1.1 (0.8–1.4)	1.3 (1.0–1.6)*	1.4 (1.1–1.8)**	1.2 (1.0–1.5)*
Public & commercial insurance	1.5 (1.2–1.8)**	1.5 (1.0–2.7)*	1.2 (0.9–1.7)	1.4 (1.1–1.8)**	Ref	1.4 (1.2–1.8)**
Marital status						
Single	Ref	Ref	2.4 (1.0–5.7)*	Ref	1.3 (0.6–2.6)	1.2 (0.7–1.9)
Married	1.6 (1.3–1.9)***	1.3 (1.0–1.6)	2.4 (1.0–5.4)*	1.3 (1.0–1.6)*	1.4 (0.7–2.7)	1.1 (0.7–1.7)
Divorced	1.1 (1.9–1.5)	1.0 (2.3–0.4)	Ref	1.1 (0.7–1.9)	Ref	Ref
Place of residence						
Urban	1.0 (0.9–1.3)	1.3 (1.0–1.7)*	1.0 (0.7–1.2)	1.3 (1.0–1.6)*	Ref	1.3 (1.0–1.6)**
Rural	Ref	Ref	Ref	Ref	1.5 (1.2–1.9)	Ref
Access to health sector indicators						
Developed	1.7 (1.2–2.5)**	1.3 (0.7–2.0)	1.6 (1.0 – 2.5)*	1.0 (0.9–1.2)	Ref	1.7 (1.2–2.6)**
Semi-developed	1.4 (1.0–2.0)	1.1 (1.5–0.6)	1.3 (1.2 – 0.4)	1.1 (0.8–1.7)	1.4 (1.2–1.7)***	1.6 (1.1–2.4)*
Underdeveloped	Ref	Ref	Ref	Ref	1.9 (1.3–2.8)**	Ref
Goodness of fit[4]	0.35	0.07	0.65	0.25	0.29	0.31
Pseudo-R squared[5]	0.1	0.06	0.07	0.06	0.1	0.06

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

frequently (4%) reported type of service received. The non-insured respondents reported tooth extraction almost twice as frequently as did the subjects with both public and commercial insurance ($P < 0.001$). Factors related to dental visit characteristics were analyzed by means of logistic regression analysis controlling for age, sex, education and SES (Table 3). Those with both public and commercial insurance coverage had higher odds for dental visit within the past 12 months (OR = 1.5), and for reporting a dental check-up (OR = 1.5) as the reason for their most recent dental visit. Regarding each type of treatment, logistic regression models revealed that subjects' insurance status made a difference in receiving services; receipt of restorative and high cost services (OR = 1.4) was more likely by those with both public and commercial insurance. Tooth extraction was more likely for subjects with no insurance coverage (OR = 1.6) and also for those with public insurance (OR = 1.4).

Discussion

The results of the present study showed a positive correlation between the respondents' demand for and utilization of OHC services and their insurance coverage. Those who were insured, particularly with both public and commercial insurance, reported higher frequency of dental visits and check-ups, higher use of restorative and high cost services, and less extractions. However, the effect of insurance status on the frequency of dental visits was not significant.

The high rates of dental visit among the publicly and commercially insured respondents are in line with reports from countries with private insurance systems.[12,27,28] As mentioned earlier, OHC services are significantly more interested in cost-sharing systems.[2] Decreasing the level of patient's cost-sharing has significantly raised the demand for OHC.[29] In Iran, the necessity for annual usage of dental insurance benefits, acts as a motivating factor for both publicly and commercially insured people to visit a dentist. Moreover, both publicly and commercially insured patients are free to choose any contracted dentist. That means easy access to OHC, which by itself influences the demand among those individuals with both public and commercial insurance coverage.

It is surprising that only 13% of respondents mentioned check-ups as the reason for their most recent dental visit, which is far from the recommended protocol to use OHC services in developed countries.[30] Higher rates of dental visits for a check-up have been reported from the Netherlands, Finland, Germany, Australia and the United States.[27,31,32] One important

and effective approach to promote check-ups as a preventive behavior is school-based OHC. Several studies have shown that this type of behavior seems to continue into adulthood.[33] Countries that have higher rates of frequent check-ups have used a scheduled program for school-based OHC for a long time.[34] In Iran, the public health centers have been offering OHC services for school children since 1979.[20] Public OHC system does not support regular check-ups; this type of behavior during childhood is reflected in the rate of check-ups among adults in the present study. Consequently, providing school-based OHC and oral health promotion programs focusing on developing regular dental check-ups has been recommended.[35]

Regarding the type of services received, the results showed that using restorative and other high cost treatments was more frequent among the patients who had insurance coverage; while tooth extraction was more frequently reported by the non-insured respondents. However, the insurance status did not have an impact on the frequency of dental visits among respondents.

Studies show that dental problems, SES and insurance coverage affect receiving OHC services.[25,36] Patients with dental insurance receive more preventive, diagnostic, and technique-sensitive treatments and less extraction.[36-38] The type of services differs based on the policy of the health insurance system; in Nordic countries, dental insurance pays up to 100% of the diagnostic and preventive costs to promote preventive care.[38] In Denmark, diagnostic/preventive care services have replaced restorative/extraction treatments.[39]

Being insured and having fewer tooth extractions are in line with reports from developed countries.[15,16,37] Fewer tooth extraction may reflect the better and free choice of treatment options. In Iran, the commercially-insured individuals receive their dental treatments with a 50–100% subsidy. Since most insured people in our study had a medium or high level of education, these characteristics may have also influenced their attitude toward better oral health through avoidance of tooth extractions. On the other hand, the suppliers may have also influenced patients' decision to receive services with higher fees, resulting in higher reimbursement for contracted private dentists with fee-for-service payment. The results of the current study showed that restorative treatments were the dominant and preventive care was the rather-infrequent service received. This leading role for restorative care is consistent with data from many developed countries.[39,40] Although some of these countries have placed higher emphasis on preventive care.[31,36] The reportedly received restorative and high-cost services may be related to the greater prevalence of caries among adults in the current study. Findings from national surveys.[35,41,42] Indicate a high need for OHC services among adults in Iran. Young and middle-aged Iranians have a high prevalence of dental plaque and calculus;[41] this is also in line with the infrequent preventive care and indicates the inadequacy of the preventive programs in the Iranian OHC system. Reorientation of oral health services towards prevention is one of the priority actions of the World Health Organization for continuous improvement of oral health care.[43] The insurance providers should also align themselves with this approach.

Providing preventive services may translate to lower fees as income and thus affect dentists' clinical decision-making. In Iran, according to a study,[44] dentists have positive attitude towards preventive care, but at the same time, they consider preventive treatments not economically beneficial. Such an attitude may negatively influence the dentists' willingness to provide preventive care to patients and this might have been the case in the current study.

In the present study, there were a few differences between non-insured and publicly-insured respondents and their dental visit characteristics. This may reflect the insufficiency of the public health care system. According to the model presented by Andersen and Newman,[45] use of OHC services as a part of health behavior is related to an individual's characteristics as well as the characteristics of the health care delivery system such as the accessibility of services. The dentist-population ratio serves as a criterion for evaluation of availability and accessibility of services.[46] A positive correlation exists between the utilization of OHC services and the dentist-population ratio. In the Iranian public insurance system, this ratio (0.04:1000)[19] is lower compared to countries with a developed health insurance system (1.3:1000 in Finland and 0.8:1000 in Germany).[47] The low number of public insurance clinics (n = 350) and the contracted clinics (n = 2000), the population increase in the suburbs as well as the inadequate public transportation system explain the low access of the publicly insured individuals to OHC services. In Finland, national health insurance (NHI) partially covers the transportation fees. In addition, half of all Finish dentists have contracts with the NHI.[48] Also, 85% of dentists in Germany work for the Universal Sickness insurance. In Iran more than 90% of all dentists (n = 26,000) are private practitioners with very low contribution to insurance fund, which probably stems from the low fees supported by the insurance companies. In the United States, studies have shown that finding a dentist willing to provide care for those with public insurance (Medicaid) is a major problem because of the low reimbursement rate.[38,49] The fee for dental procedures supported by the public insurance in Iran is almost less than half of the private sector.

Although the Iranian Telecommunication Company provides 95% of the 22 million households with a land line, the requirements for getting a land line raise the possibility that those not having a land line (and therefore out of the scope of the present data collection) might have had different characteristics with respect to dental visits compared to the respondents. The present results should be seen as a somewhat optimistic picture; the situation might be an overestimate rather than an underestimate of oral health care.

Conclusion

The present results revealed a positive relationship between the insurance status and demand for and utilization of dental services. Regarding to low rate of dental check-ups, health insurance policies should therefore include mandatory regular dental check-ups to popularize preventive-oriented dental care.

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Conflict of Interest

None. ■

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