

## The Impact of Insurance Coverage on The Use of Dental Services Types

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### Abstract

The basic insurance organizations have considered low coverage for dental services. Considering the high fees of dental services may result in deprivation of people from the necessary dental services. This study investigates the relationship between insurance coverage on the use of dental services types. In this cross-sectional study, four private dental clinics were selected randomly. Cluster sampling was performed and a certain quota was dedicated to each clinic, being evenly divided from April to September. Then using a data collection form, the required data were gathered from each sample's medical records. The insurance coverage level was examined for each individual in regards to insurance type and dental services. Data analysis was done by SPSS 20 software using descriptive statistics, correlation, Spearman, and Chi-square tests.

Based on the tests, the assumption of correlation between the type of insurance and basic services is strongly confirmed ( $p = 0.116$ ). It implies that as the insurance level increases, the number of basic services received increases. However, the assumption of a correlation between the type of insurance and advanced and luxury services is strongly rejected. It is probably due to the high cost and limited ceiling that insurance companies provide for this type of dental service. With increasing insurance coverage, the use of basic dental services increases, implying that adopting integrated policies in insurance coverage of dental services is the first step in this regard. It is important to distinguish between basic and advanced and luxury services in insurance coverage.

**Keywords:** insurance, insurance coverage, complimentary insurance, dentistry, dental services.

### Introduction

Health is one of the basic human rights and oral health is an integral part of public health; Because the mouth is the gateway to the body. The high cost of dental services is the main obstacle that deprives people of using these basic services<sup>1</sup>. Access to oral care is influenced by the decisions of health systems in providing services and the level of dental insurance coverage. This factor can affect oral health and the occurrence of inequality in the population<sup>2</sup>. Daily access to primary oral health care enables timely identification and management of oral diseases. And can reduce the negative effects of poor oral health on individuals and families and the potentially preventable costs to the health care system and society<sup>3</sup>. The World Health Organization also supports universal dental insurance coverage to ensure that everyone has access to essential health care<sup>4</sup>. Dental insurance coverage will prevent barriers to accessing dental services. A systematic review and meta-analysis study showed that dental insurance has a significant impact on increasing the use of oral care services<sup>5</sup>. On the other hand, according to the 2001 National Dental Health Survey, the need for dental care has greatly increased. For example, the average total decay-missing-filled teeth

(DMFT) for individuals aged 18, 35, and 44 were 4.3 and 11, respectively. Decayed and missing teeth had the largest share in this index. Also, 53% of people aged 35 to 44 had deep periodontal pockets<sup>6,7</sup>.

Health care in Iran is provided by three departments, including public organizations (providing all three levels of health care), private (mainly provided in the second and third levels), and non-profit organizations. Health services in Iran are provided through the general revenue of the government, health insurance organizations, and out-of-pocket payments of patients<sup>8,9</sup>. But dental services in Iran are mainly provided by the private sector. In the public sector, the Social Security Organization (SSO) in its hospitals and the Armed Forces Medical Services Insurance Fund (AFMSIF) provide some services to their staff. Other people are covered by Iran Health Insurance Organization (IHIO) through which an insured person can only receive preventive dental services from public health centers<sup>10</sup>. Meanwhile, more than 80% of the dental services in Iran are provided by the private sector and less than 20% of the total cost of dental care is provided by the public health system<sup>11</sup>. And due to limited services covered by insurance companies, more than 90% of dental expenses are

paid by the people<sup>12</sup>. While the public health sector in Iran provides some dental services to rural residents, the private sector mainly provides dental care services in urban areas. And now there are more than 28,000 active dentists and dental specialists in Iran (about 1 dentist out of every 3,000), only 10% of them work in the public sector and 79% of them provide private services<sup>13</sup>.

Understanding the effects of dental insurance on oral health outcomes as well as oral diseases is crucial. The Relationship Between Dental Insurance and Oral Health highlights the importance of dental insurance coverage, especially for people who want to reduce insurance costs through dental insurance programs. This reduction in costs can affect the demand for dental care as well as oral health, as many studies have shown that dental insurance coverage is positively related to the demand for dental care services<sup>14</sup>. Studies in Canada, the United States, and Australia have shown that people with dental insurance are more likely to use dental care services and report lower rates of unmet oral care needs<sup>15,16</sup>. In several other studies, dental insurance has been considered as one of the main factors influencing the use of dental services and has shown that insured people use preventive and restorative services more than uninsured people<sup>17-19</sup>. But in Iran, less study has been done to examine the impact of insurance coverage on the use of dental services.

In general, insurance coverage for dental services is not provided for a significant part of the people in Iran and most of the dental expenses are paid by the people. Although there are several insurance companies, each covering a different share of dental services; it still seems that dental insurance in Iran is not in a good condition. In this regard, the present study was conducted to investigate the effect of insurance coverage on the use of dental services in selected dental clinics in Isfahan in 2019.

## Methods

The main assumption in this study was: that any Increase in the benefits of insurance coverage increases the use of dental services types.

In this cross-sectional study, the study population was those who referred to private dental clinics in Isfahan. Four dental clinics were selected by random sampling. First, according to the Cochran formula, the total number of samples was determined as 480. Cluster sampling was performed and a certain quota was dedicated to each clinic, being evenly divided from April to September 2019. Then for each month, a random number was selected from the client list and the necessary samples were extracted from each clinic every single month. Therefore, 30 patients per month were extracted from Table 1. Number of basic services provided by the type of insurance

“Azadegan” and “Soroush” clinics, and 10 patients per month from “Ghadir” and “Mohtasham” clinics were randomly selected.

Then, with the data collection form, the necessary information about each sample was extracted from the clients' files, Inclusion criteria were patients whose medical records were complete and had the ability to extract information This form consisted of two parts: The first section included demographic information of patients including age, sex, and type of insurance. The second part included the type and number of dental services used.

To classify the level of dental services type, two specialist dentists were used, separately. Finally, dental services were classified into three categories: basic services, advanced services, and luxury services.

The following are the functional definitions of these three categories:

- ✓ **Basic Services:** Services that are usually provided in most dental clinics. They are not technically sophisticated and do not require expensive devices or materials. They are relatively inexpensive and people need them too much (sometimes urgency).
- ✓ **Advanced Services:** Services that are more specialized than basic services and available only in specialized clinics. They are relatively expensive and, of course, effective in the health of the patients (but usually with no urgency).
- ✓ **Luxury Services:** Services that are more cosmetic than health services. They are very expensive and can only be found in specialized beauty clinics.

Data analysis was done by SPSS 20 software using descriptive statistics methods, including Spearman Correlation, Pearson, and Chi-square tests.

## Results

According to the data collected, 52% of the sample used in this study are male and 48% are female. It is also observed that 5.63% of patients are under 12 years old, 15.83% are 13 to 25 years old, 42.1% of patients are 26 to 38 years old and 22.9% of patients are 39 to 50 years old and 13.54% are over 50 years old.

Patients were covered by 15 different types of dental insurance and uninsured individuals. Under all three of the aforementioned categories of insurance services are provided. The number of patients receiving basic services by type of insurance is presented in Table 1. According to the findings, patients received 381 basic services in the study period from our selected clinics.

Insurance Type	Number of Basic Services	Total
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	0	1	2	3	4	5	6	7	
Armed Forces	3	24	26	1	0	0	0	0	54
Veterans of Armed Forces	1	15	4	1	0	0	0	0	21
Uninsured	8	49	14	1	1	0	1	0	74
Mobarakeh Steel Company	7	18	23	4	0	1	1	1	55
Worker House	5	27	16	7	0	0	0	0	55
Employees of Zob Ahan (Social Insurance)	2	16	6	2	1	0	0	0	27
Employees of Zob Ahan (Health Insurance)	0	0	1	0	0	0	0	0	1
Melli Bank (employed)	0	1	0	0	0	0	0	0	1
Melli Bank (retired)	0	5	10	0	0	0	0	0	15
Saderat Bank	0	1	0	0	0	0	0	0	1
Mellat Bank	0	1	1	0	0	0	0	0	2
Tejarat Bank	0	2	3	0	0	0	0	0	5
Keshavarzi Bank	0	7	0	0	0	0	0	0	7
Sepah Bank	3	2	0	3	0	0	0	0	8
Sina Insurance	2	0	0	6	3	0	0	0	11
Others (different complementary insurances)	3	14	26	1	0	0	0	0	44
Total	34	182	130	26	5	1	2	1	381

Pearson's R= .116

Spearman Correlation= .128

The Chi-square statistic value (213.018) and the likelihood ratio test with freedom degree of 105 of the concordance table at the 5% error level, the assumption of a correlation between the type of insurance and basic services is strongly confirmed,

Table 2. Pearson Chi-Square correlation coefficients for the type of insurance and basic services

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	213.018 <sup>a</sup>	105	.000
Likelihood Ratio	156.219	105	.001
Linear-by-Linear Association	5.153	1	.023
N of Valid Cases	381		

<sup>a</sup> 109 cells (85.2%) have an expected count of less than 5. The minimum expected count is .00.

Also, findings in Table 3, showed that they received 382 advanced services in the study period from our selected clinics.

Table 3. Number of advanced services provided by the type of insurance

Insurance Type	Number of Advanced Services							Total
	0	1	2	3	4	5	6	
Armed Forces	11	19	22	14	1	0	0	67
Veterans of Armed Forces	0	16	2	2	0	0	0	20
Uninsured	42	19	11	0	0	1	0	73
Mobarakeh Steel Company	13	23	6	7	0	1	1	51
Worker House	8	35	6	1	1	0	0	51
Employees of Zob Ahan (Social Insurance)	5	14	3	2	0	0	0	24

Employees of Zob Ahan (Health Insurance)	0	1	0	1	0	0	0	2
Melli Bank (retired)	0	1	0	0	0	0	0	1
Melli Bank (employed)	12	1	0	0	0	0	0	13
Saderat Bank	1	0	0	0	0	0	0	1
Mellat Bank	1	1	0	0	0	0	0	2
Tejarat Bank	3	2	0	0	0	0	0	5
Keshavarzi Bank	5	2	0	0	0	0	0	7
Sepah Bank	1	7	0	0	0	0	0	8
Sina Insurance	10	1	0	0	0	0	0	11
Others (different complementary insurances)	6	26	7	7	0	0	0	46
Total	118	168	57	34	2	2	1	382

Pearson's R=-.119

Spearman Correlation=-.153

Based on the results of Table 4, the Chi-square statistic value (181.479), and the likelihood ratio test with a freedom degree of 90 of the concordance table at the 5% error level, the assumption of a correlation between the type of insurance and

advanced services is strongly rejected. That means the increase in the level of insurance coverage does not increase the use of advanced services.

Table 4. Pearson Chi-Square correlation coefficients for a type of insurance and advanced services

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	181.479 <sup>a</sup>	90	.000
Likelihood Ratio	187.039	90	.000
Linear-by-Linear Association	5.396	1	.020
N of Valid Cases	382		

<sup>a</sup> 90 cells (80.4%) have an expected count of less than 5. The minimum expected count is .00.

The five services provided to the patients were in the category of luxury dental services. Besides, they received 266 luxury

services in the study period from our selected clinics that showed in Table 5.

Table 5. Number of luxury Services Provided by Type of Insurance

Insurance Type	Number of luxury Services						Total
	0	1	2	3	4	5	
Armed Forces	21	0	0	0	0	0	21
Veterans of Armed Forces	14	0	0	0	0	0	14
Azad (without Governmental Subsidiaries)	53	13	7	1	1	1	76
Mobarakeh Steel Company	37	0	0	0	0	0	37
Worker House	32	2	0	0	0	0	34
Employees of Zob Ahan (Social Insurance)	14	0	0	0	0	0	14
Employees of Zob Ahan (Health Insurance)	0	0	0	0	0	0	0
Melli Bank (retired)	0	0	0	0	0	0	0
Melli Bank (employed)	12	0	0	0	0	0	12
Saderat Bank	1	0	0	0	0	0	1
Mellat Bank	2	0	0	0	0	0	2
Tejarat Bank	4	0	0	0	0	0	4
Keshavarzi Bank	7	0	0	0	0	0	7

Sepah Bank	8	0	0	0	0	0	8
Sina Insurance	10	1	0	0	0	0	11
Others (different complementary insurances)	23	1	0	1	0	0	25
Total	238	17	7	2	1	1	266

Pearson's R=-.098

Spearman Correlation=-.158

Based on the results of Table 6, the Chi-square statistic value (54.151), and the likelihood ratio test with a freedom degree of 65 of the concordance table at the 5% error level, the assumption of a correlation between the level of insurance and

luxury services is strongly rejected. That means the increase in the level of insurance coverage does not increase the number of luxury services.

Table 6. Pearson Chi-Square correlation coefficients for the type of insurance and luxury services

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	54.151 <sup>a</sup>	65	.829
Likelihood Ratio	57.160	65	.745
Linear-by-Linear Association	2.568	1	.109
N of Valid Cases	266		

<sup>a</sup> 73 cells (86.9%) have an expected count of less than 5. The minimum expected count is .00.

According to Table 7, it can be seen that about the main assumption, with respect to the obtained Spearman correlation coefficients (0.128) at a significance level of 5%, there is a correlation between the type of insurance and basic, advanced, and luxury services with a 95 percent confidence. But there is only a direct relationship between the type of insurance and

basic services. Direct relation means that the increase in insurance level can increase the level of services. As well, with respect to the Pearson correlation coefficients (0.116) at a significance level of 5%, there is only direct relation between insurance coverage and basic services with 95 percent confidence.

Table 7. Spearman and Pearson correlation coefficients for the type of insurance and insurance services

Spearman correlation coefficients			
Insurance type	Basic Services	Advanced Services	Luxury Services
correlation coefficient	0.128	-0.153	-0.158
Significance Level	0.012	0.003	0.01
Number	381	382	266
Pearson correlation coefficients			
Insurance type	Basic Services	Advanced Services	Luxury Services
correlation coefficient	0.116	-0.119	-0.098
Significance Level	0.023	0.02	0.109
Number	381	382	266

**Discussion**

Generally speaking, the use of dental services is relatively low in Iran (considering the needs), and a major reason for that is the high costs of these services<sup>20</sup>. The high cost of dental services is a major reason for avoiding visiting a dentist<sup>21</sup>. There are a few dental services included in the basic health insurance package of Iran. Social Security Org. -as one of two big insurance companies in Iran- just offers some basic

services such as examination, radiography, tooth extraction, oral health education, teeth massaging, and simple dental repairs for children in their clinics<sup>21</sup>. Strengthening insurance resources to cover dental services is a necessity, and the introduction of supplementary insurance in this area will greatly help to promote oral health.

One of the basic things that need to be done in the field of dentistry is the serious involvement of insurance companies to

cover dental services because the majority of people cannot afford to pay for dentistry and go to medical centers when they have no choice but to have their teeth extracted. The findings of various studies in Iran over the past decade indicate that patients have had to pay for a large share of dental costs. Emamgholipour et al. Showed that low-income households used dental services less than higher-income households<sup>22</sup>. Gharibi et al. showed that the average expenses for households using dental services were 484380 Rials and the average out-of-pocket payment was 434070 Rials, which was about 90% of the household dental expenses<sup>23</sup>. According to the Iranian Dental Association, in 2011 only 11% of dental expenses were covered by insurance mechanisms and the share of out-of-pocket payments was about 89%<sup>24</sup>. The World Health Organization supports global dental coverage with special attention to ensure that the most vulnerable populations are able to access the care they need<sup>25</sup>. According to the results, there is a significant relationship between insurance coverage and received basic dental services. But there was no significant relationship between insurance coverage and receiving advanced and luxury dental services. The discrepancy between the receiving advanced and luxury dental services and the type of insurance is probably due to the high cost and limited ceiling that insurance companies provide for this type of dental service.

According to a study by Preyas Joshi and others, In India, dental insurance is mostly clubbed with health insurance and available under the general health insurance plans. These plans do not cover dental ailments exclusively and mainly the hospitalization and medicinal costs arising due to a dental emergency are covered. There are two kinds of dental insurance plans available in India: exclusive dental health insurance plans and dental coverage under various policies of general, health, and life insurance companies. Apart from these, there are some employers, namely, the Indian Army and Public Sector Undertakings banks which provide reimbursement for dental treatments<sup>26</sup>. Dental insurance has been found to be associated with higher rates of visiting for a checkup and regular dental visiting and was correlated with patient acceptance of prescribed dental treatment, which suggests that insured individuals may face fewer financial barriers to comprehensive dental care.

The insurance companies should focus more on factors such as cheaper plans, cashless treatment facilities, coverage of all illnesses, and coverage of all services, which the dentists perceive as the most important factors<sup>27</sup>. The results of our study also add to the extensive literature that supports the role of dental insurance in the use of dental services. A series of studies based on the RAND health insurance experiments in the USA highlighted the role of insurance in dental service utilization<sup>28</sup>. In particular, they showed that utilization of

dental services increased significantly as cost-sharing declined, particularly as deductibles fell towards zero; enrollees in the free plan had 34% more visits than enrollees in the 95% coinsurance plan. Mueller and Monheit (1988) studied the effects of insurance on demand by a standard population of White adults aged 16 to 64 years using the US National Medical Care Expenditure Survey; they found that imposing a generous first-dollar coverage – insurance with no deductible and coinsurance not exceeding 10% – increased dental visits by 29%<sup>29</sup>. And a study in the United States found that when low-income families were covered by a Medicare service over 12 months, their use of dental services increased from 16.4 percent to 22 percent<sup>21</sup>. These studies confirm the direct impact of insurance coverage on dental services, too.

According to the results of the Nevena Zivkovic article in Ontario, Access to dental care is affected by systems-level decisions in the provision of services and the degree of dental insurance coverage<sup>31</sup>. These factors can have far-reaching consequences on oral health outcomes and inequalities on a population level. Overall, dental insurance has had a positive impact on visiting a dentist in the past 12 months and Dental insurance had a negative impact on visiting a dentist only for emergencies or experiencing tooth loss due to decay and gum disease. In this sample, approximately two-thirds of people report having dental insurance and the majority have at least one or more of their teeth. Also, the proportion of individuals with dental insurance varies significantly amongst all socio-demographic characteristics reported, except for sex<sup>2</sup>. Findings from a study by Zivkovic et al. Showed that public or private dental insurance increases the rate of dental visits from 25.0 to 29.3 percent among those with the lowest 5 percent income<sup>31</sup>. Conversely, another Oregon study shows that eliminating Medicaid dental benefits from partial enrollment leads to higher unmet needs and a lower likelihood of annual dental examinations among people who have lost benefits<sup>32</sup>. These results are also consistent with ours.

### **Conclusion**

Despite the expanding coverage of insurance companies and the growth of complimentary insurances, much of the dental service costs are not still covered. The high cost of dental services is a major obstacle to individual access, especially in low-income groups. This makes dental health a major concern in the country. According to the results, with increasing insurance coverage, the use of basic dental services increases, implying that adopting integrated policies in insurance coverage of dental services is the first step in this regard. It is important to distinguish between basic and advanced services and luxury services in the insurance coverage; because the lack of luxury services is not at least as effective in terms of physical health and it also requires high costs. In general, it seems that increasing insurance coverage in Iran, both

privately and publicly, up to the level of basic services at least will have a significant impact on increasing the level of oral health in the community. Our findings show that the implementation of a public dental insurance program in Iran can improve access to dental care and outcomes related to oral health. Improving access through universal dental coverage can reduce the use of emergency departments in hospitals and clinics for non-traumatic dental problems (e.g. toothache).

Many high-income organizations (including banks, steel companies, etc.) are seeking to compensate for this deficiency (the gap between their employees' needs and their insurance benefits for dental services) usually through complementary insurance companies.

### Conflict of interest statement

In this study, there were no conflicts of interest affecting the results or their interpretation.

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### Ethical statements

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