Avoidance dental visit, the impact of predictor factors: A cross-sectional study in Kerman, Iran

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Original Article

Abstract

BACKGROUND AND AIM: In spite of different reforms and programs, the evidence indicates that Iran dental health sector has not been able to improve the dental situation and decrease the unmet needs. This study assessed the factors which affect the avoiding dental visit during one year ago because of its costs.

METHODS: This cross-sectional study was performed on 1158 household heads which were selected through multi-stage sampling in Kerman, Iran, and questioned house by house using trained interviewers. The association of dichotomous outcome variables of "have you avoided or postponed dental visit during 1 years ago in spite of need because of its costs?" with 3 types of predictor variables of household heads including sex as binary predictor, age as continuous predictor, and income and education as categorical variables studied using regression logistics.

RESULTS: The odds ratio (OR) of avoiding dental visit because of its costs in men was 1.4 times more than women (P = 0.035). The OR decreased by 0.01 with each year increase in age (P = 0.017). Furthermore, the OR is people with incomes 267-803, 803-1339 and > 1339 USD in comparison with the heads incomes under 267 USD was 0.31, 0.02, 0.01, respectively (P = 0.001), and in people with educational level < diploma, diploma, Bachelor of Science (BSc), Master of Science (MSc) and Doctor of Medicine (MD)/Doctor of Philosophy (PhD) in comparison with illiterate/elementary decreased by 0.51, 0.13, 0.04, 0.01 and 0.02, respectively (P < 0.001).

CONCLUSION: The factors of older ages, being a woman, increasing education and income level decrease the rate of avoiding a dental visit. In the absence of strong dental health insurance, these factors determine the utilization of the services which lead to horizontal inequality.

KEYWORDS: Odds Ratio; Utilization; Dental Care

Citation: Amiresmaili M, Amini S, Shahravan A, Goudarzi R, Saberi-Anari SH. **Avoidance dental visit, the impact of predictor factors: A cross-sectional study in Kerman, Iran.** J Oral Health Oral Epidemiol 2018; 7(1): 39-46.

Twenty-five percent of the difference in health situation of the poor and the rich is because of access to the healthcare system.[1] Access to dental care services may be more important than many other health services, because it leads to immediate recovery of pain, restore the people functions and prevent other diseases. Wamala et al. have stated that the access to dental care is the cause of 60% difference in people health, while their health style determines only 29% of it.[2]

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On the basis of a national dental health survey, there was a high level of unmet dental needs in Iran, so that mean decayed, missing, and filled teeth (DMFT) score for 18 and 35-44-year old people was 4.3 and 11.0, respectively. Also, more than half of 35-44-year old people had periodontal pockets.[3] Based on countries ranking by the World Health Organization (WHO), Iran is in a low DMFT situation in 12-year old children, but this index is in a medium situation at 35-year old people.[4] This indicates that DMFT index getting worse by increasing age. On the other hand, some unofficial estimates indicate that people pay more than 90% of dental costs directly through out-of-pocket and the share of other resources (mostly health insurances) is lower than 10%. Moreover, the share of dental payments of 2 main basic health insurances of Iran (Iran Health Insurance Organization and Social Security Organization), which cover more 80% of Iran population, is lower than 1%.[5]

The World Health Report 2000, which is a turning point about the financial goals and performance of health systems, has determined equitable financial protection against financial costs, meeting the non-therapeutic needs of people and improving health as the 3 goals of health systems.[6] On the basis of above paragraph and matching it with the World Health Report 2000, it can be inferred that Iran health system has not achieved the goals of health improvement and financial protection in the field of dental care.

To counter with the problems of health system performance, the Iran 11th government has started reforms Health Sector Evolution Plan (HSEP) in 2014. One of the main objectives of the HSEP was providing universal health coverage to all Iranians.[7] Unfortunately, HSEP has neglected the coverage of dental services and people still pay the entire dental costs through out-of-pocket. So, HSEP has not any effect on access to dental services. In one hand, public dental centers usually present preventive care, not specialized and restorative services. On the other hand, there are too many private dental offices and clinics which present all dental services but because of their costs, access to them is very low. These problems have had negative effects on the regular visit of dentists and receiving dental care.[8]

There is no new study in Iran to explore the situation of avoidance dental visit because of its costs among households' heads. We do not know how the sex, age, income and education of households' heads have effects on visiting and utilization of dental services. To answer these questions, Kerman, Iran, was selected. Dental indices of adults in Kerman such as dental decay, edentulous and unmet dental needs have the mean frequency among different cities of Iran,[9] so its results can be generalized to the country. Moreover, the dental health system, in both the private and public sectors, has a similar structure throughout Iran in terms of administrative, regulatory, tariffs and out-of-pocket issues.[10]

Methods

The data of this population-based, cross-sectional survey were collected in the first quarter of 2017. The participants were head of households with each type of socio-economic situation in Kerman. In the last national census performed, the total population of this city was 534441 people.[11] Through Cochran's sample size formula and by adding 20% for design effect and 15% for peoples who present incomplete or imperfect information, the sample size was estimated 1158 people. If one household head did not respond to the interviewer, the next household head was entered into the study to obtain exactly 1158 completed questionnaires. The samples were selected through multi-stage random sampling. All of the households in Kerman are covered by 35 health centers. So, proportional to the population covered by each center, the number of samples for each center was determined. For each health center, one house was selected randomly on the basis of municipality plaque. After completing the first

questionnaire for the first house, by moving to the right of the first house door, the other questionnaires were completed. This process was performed for other health centers. Households' heads were questioned by trained interviewers, house by house.

Logistic regression was used to model dichotomous outcome variables. In the logit model, the log odds of the outcome was modeled as a linear combination of the predictor variables. The dichotomous outcome variable of this study is as follows: Have you avoided or postponed dental visit during 1 year ago in spite of need because of its costs? (yes/no). Households incomes were categorized as < 267, 267-803, 803-1339 and > 1339 USA dollars (USD).

There are 3 types of predictor variables in this study including binary predictors, continuous predictors, and factor (categorical) predictors. In this study, the variable of household head sex was binary (man and woman), the variable of household head age was continuous, and household head income and education were factors (or categorical) variables. We used the logit command in STATA 13.1 (StataCorp, College Station, TX, USA) to estimate a logistic regression model. In the following, in order to better understanding the logistic model, we calculated predicted probabilities using margins command. In other words, we calculated the predicted probabilities of avoiding dental visit at different levels of income and education using the margins command (holding all other variables in the model at their means). All analyses were performed using STATA 13.1.

This study is part of the corresponding author Doctor of Philosophy (PhD) thesis. Thus, the full questionnaire content validity was confirmed by a panel of faculty members of the Department of Health Management, Policy and Economic. Also, a sample of 10 household heads was asked to complete the questionnaire on two separate occasions to confirm test-retest instrument reliability.

Before collecting the data, the written permission was obtained from Ethical Committee of Kerman University of Medical Sciences (Ethical code number: IR.KMU.REC.1395.363). Also, before completing the questionnaires, the written consent of participants was obtained. This study was performed on the basis of Helsinki Declaration.

Results

Descriptive characteristics of the participants are presented in table 1. Accordingly, 82.56% of household heads were men. The most number of household heads were from 40-49 age-groups (26.94%). In terms of income level, 25.04% of the household heads had under 267, 24.18% between 267-803, 46.80% between 803-1339 and 3.97% higher than 1339 USD income. On the basis of household heads education, 20.21% were illiterate/elementary, 15.54% under diploma, 29.88% Bachelor of Science (BSc), 19.34% Master of Science (MSc), and 1.55% Doctor of Medicine (MD)/PhD (Table 1).

Table 1. Descriptive characteristics of the study sample

Variable		n (%)
Age (year)	19-29	292 (25.22)
	30-39	186 (16.06)
	40-49	312 (26.94)
	50-59	238 (20.55)
	60-69	96 (8.29)
	> 70	34 (2.94)
Sex	Woman	202 (17.44)
	Man	956 (82.56)
Income (USD)	< 267	290 (25.04)
	267-803	280 (24.18)
	803-1339	542 (46.80)
	> 1339	46 (3.97)
Education	Illiterate/elementary	234 (20.21)
	Under diploma	180 (15.54)
	Diploma	156 (13.47)
	BSc	346 (29.88)
	MSc	224 (19.34)
	MD/PhD	18 (1.55)

USD: USA dollar; BSc: Bachelor of Science; MSc: Master of Science; MD: Doctor of Medicine; PhD: Doctor of Philosophy

According to table 2, the likelihood ratio chi-square of 612.99 with P = 0.001 indicates that the model was significant and was better than a model with no predictor.

Table 2. Odds ratio (OR) of avoiding dental visit because of its costs during 1 year ago in relation to demographic characteristics of the household heads

Avoid dental visit		OR	SE	Z	P* > |z|	95% CI
Sex	Woman			Reference		
	Man	1.388967	0.216072	20.11	0.035	1.023945-1.884114
Age		0.989737	0.004278	-20.39	0.017	0.981387-0.998158
Income (USD)	< 267			Reference		
	267-803	0.313094	0.077878	-40.67	0.001	0.192287-0.509799
	803-1339	0.026817	0.006186	-150.69	0.001	0.017063-0.042148
	> 1339	0.017677	0.008115	-80.79	0.001	0.007188-0.043468
Education	Illiterate/elementary			Reference		
	Under diploma	0.507343	0.157983	-20.18	0.029	0.275577-0.934030
	Diploma	0.134346	0.038270	-70.05	0.001	0.076863-0.234818
	BSc	0.040718	0.010640	-120.24	0.001	0.024393-0.067970
	MSc	0.016147	0.004850	-130.74	0.001	0.008963-0.029091
	MD/PhD	0.026702	0.016376	-50.91	0.001	0.008027-0.088831

Woman sex, incomes < 267 USD and education level of illiterate/elementary considered as the reference; *Logistic regression; number of observations = 1158; likelihood ratio chi-square = 612.99; probability > chi2 = 0.001; log likelihood = -495.40955; pseudo R^2 = 0.3822
OR: Odds ratio; SE: Standard error; CI: Confidence interval; USD: USA dollar; BSc: Bachelor of Science; MSc: Master of Science; MD: Doctor of Medicine; PhD: Doctor of Philosophy

The odds ratio (OR) of avoiding dental visit because of dental care costs in men was 1.4 times more than women, this association was significant statistically (P = 0.035).

For every unit increase in age, the OR of avoiding dental visit because of its costs decreased by 0.01 (P = 0.017). Figure 1 indicates adjusted predictions for avoiding dental visit because of its costs with an increase in age.
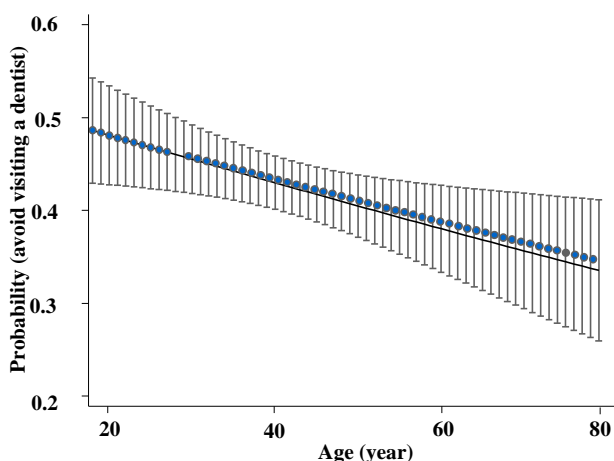

Figure 1. Adjusted predictions of avoiding dental visit because of its costs during 1 year ago in different age groups with 95% confident intervals (95% CI)

About the association between household income and avoiding dental visit during 1 year ago, the income under 267 USD considered as the reference and the OR of avoiding dental visit in participants with incomes 267-803, 803-1339 and higher than 1339 USD was compared with it. As table 2 indicates, by increasing in income, the OR of avoiding dental visit because of its costs has decreased. In this way, the OR of avoiding dental visit in household heads with incomes 267-803, 803-1339 and higher than 1339 USD in comparison with the household heads with incomes under 267 USD were 0.31, 0.02, 0.01, respectively (P = 0.001).

Regarding the association between the educational levels of household heads with avoiding dental visit during 1 year ago, illiterate/elementary level of education was considered as reference and other levels were compared with it. Accordingly, increasing education level decreased the OR of avoiding a dental visit. In this way, the OR of avoiding dental visit in participants with education level lower than under diploma, diploma, BSc, MSc and MD/PhD in comparison with participants with illiterate/elementary education level decreased 0.51, 0.13, 0.04, 0.01 and 0.02, respectively (P < 0.001).

Table 3 indicates the predicted probabilities of avoiding dental visit because

Table 3. Predicted probabilities of avoiding dental visit because of its costs during 1 year ago in relation to income and education of the household heads

Avoid dental visit		Margin	Delta-method SE	Z	P* > |z|	95% CI
Income	< 267	0.910345	0.016776	54.26	< 0.001	0.877464-0.943225
(USD)	267-803	0.760714	0.025497	29.84	< 0.001	0.710741-0.810688
	803-1339	0.214022	0.017617	12.15	< 0.001	0.179493-0.248551
	> 1339	0.152174	0.052960	2.87	0.004	0.048375-0.255973
Education	Illiterate/elementary	0.914530	0.018277	50.04	< 0.001	0.878708-0.950352
	> High school	0.844444	0.027014	31.26	< 0.001	0.791498-0.897391
	High school	0.589744	0.039382	14.97	< 0.001	0.512557-0.666931
	BSc	0.303468	0.024717	12.28	< 0.001	0.255024-0.351912
	MSc	0.147321	0.023681	6.22	< 0.001	0.100907-0.193735
	> Doctoral	0.222222	0.097991	2.27	0.023	0.030164-0.414281

*Logistic regression
SE: Standard error; CI: Confidence interval; USD: USA dollar; BSc: Bachelor of Science; MSc: Master of Science

of its costs during 1 year ago in participants with different incomes and education groups. Accordingly, the predicted probability of avoiding dental visit because of its costs during 1 year ago for incomes under 267, 267-803, 803-1339 and higher than 1339 was 0.91, 0.76, 0.21 and 0.15, respectively. In other words, the predicted probabilities of avoiding dental visit because of its costs during 1 year ago in participants with lower incomes were more than the higher incomes.

The predicted probability of avoiding dental visit because of its costs during 1 year ago for education levels of under diploma, diploma, BSc, MSc and MD/PhD was 0.84, 0.59, 0.30, 0.15, 0.22, respectively. In other words, the predicted probabilities of avoiding dental visit because of its costs during 1 year ago in participants with lower education levels were more than the higher education levels.

Discussion

According to the results, the OR of avoiding dental visit because of its costs in men was more than women and decreased with each year increase in age. A study on university students of 5 Association of Southeast Asian Nations (ASEAN) countries indicated that men in comparison with women rarely or never have visited a dentist.[12] The association between income and utilization of dental services in men is more severe than women. The reason would be the more sensitivity and stress to income decrease in men and more

interest and follow-up among women in seeking dental care.[13,14] Other studies have indicated that women have higher information seeking behavior than men. The probable cause is more satisfactory levels of respect from their physicians.[15,16]

According to the results, the OR of avoiding dental visit because of its costs was decreased with each year increase in age. One of the reasons that younger people less likely seek healthcare may be in lack of coverage by insurance benefits.[15] Also, suffering from dental problems is low in lower age groups of household heads. By attention to cumulative nature of dental diseases, these problems increase with aging.

According to the results, the OR of avoiding dental visit because of its costs decreased with increase in income and education level, and the predicted probabilities of avoiding dental visit because of its costs during 1 year ago in participants with lower incomes and education levels were higher than the participants with lower income and education levels.

The results confirmed that the lower income groups use less dental services because of paying directly through out-of-pocket. A study in Canada showed that two-thirds of low-income groups pay the cost of services through out-of-pocket. Despite the underprivileged citizens are covered by public programs, these programs cover only emergency services; therefore, they cannot improve their dental health. In contrast, the

rich people have private insurance and usually do not pay the costs through out-of-pocket.[17] Likewise in Iran, public health insurances are not powerful adequately and do not cover dental services which prevent the access of poor people to the services. This is called inverse care law which means higher access to the services among people who need lower need to them.[18] There is no doubt about the necessity of insurance coverage in the low-income families. Two different studies in Canada indicated that dental coverage significantly increased dental visits and utilization, especially in the lowest income groups.[19,20]

Such as current study, other studies also have confirmed the positive relationship between educational level and utilization of dental care.[21-25] According to the researchers, people with high education level seek health services more than others, because of better recognition of health needs and more knowledge about the deteriorating effects of dental problems on health. Also, they can register for dental programs better than illiterate people and better diagnose the services they need.

There is no problem about the ratio of the dentists to the population in Iran. Indeed, the number of dentists in Iran is about or more than most developed countries. In 2014, Iran had more than 28000 active dentists in private and public sectors (1 dentist to each 3000 population).[8] This ratio was 1 dentist to 1408 population in European countries in 2014.[26] Annually more than 1300 dentist students are accepted to Iran universities.[27] So, in the near future, Iran can take the first rank of dentist/population ratio in the world. In spite of the quantitative growth of the dentists' numbers, the qualitative growth in the field of dental care has not a good situation. DMFT index in different age groups is high, there are high unmet dental needs and other dental health problems.[4,28]

There are only 150 dental health workers (other than dentist) in Iran public health centers who are allowed only to present limited predictive services such as scaling, radiography, dental health education and extracting (Ministry of Health and Medical Education, personal communication, September 2012). That is while people need dentistry services which impose a large cost on them. An unofficial report estimated that about 90% of the dental costs are paid through out-of-pocket, while other sources especially insurance funds pay lower than 10% of the costs.[5] Supportive financial mechanisms such as insurance can improve utilization of dentistry services by lower and middle-income groups which need more than others to the services.[29] Finally, because of failure in determination of a basic package of dental health services on the basis of credible evidences such as cost-effectiveness, the effect analysis of economic burden of the services on families, situation of demand rate for the services in the health market and socio-economic situation of the potential population of the services, the current package of services has no legitimacy and need redefinition.

This study has some limitations. Although Kerman has the mean frequency of dental indices among different cities of Iran, using data from only one city and also performing a cross-sectional study make it difficult to generalize the results to the country. Also, future studies should consider a broader range of predicting variables. Cross-sectional studies are prone to non-response bias and are unable to determine causality. To deal with this problem, the sample size was increased. The most important strength point of the study is large sample size which allowed adjustment for numerous social, demographic, biological, and nutritional variables. We also used family-level reported income as a measure of socioeconomic position.

Conclusion

The public sector of dental care in Iran has scarce resources and by attention to the unsuitable situation of dental diseases, it is necessary to more strengthen preventive and restorative dental programs. The formation of

health policies to reduce disparities in access and utilization of dental care services is necessary. These policies should pay an especial attention to the horizontal equity in order to improve the access of different income groups to the dental services.

Conflict of Interests

Authors have no conflict of interest.

Acknowledgments

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