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Research Article

Prevalence of Edentulism and Evaluation of the Relevant Risk Factors in Individuals 60≥ Years of Age In Tehran, Iran

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ABSTRACT

Objective: The final result ofdental cariesand periodontal diseaseisedentulous.Being edentulous is a threat to the health system in terms of function and beauty rodent and often undesirable results.

Material and Methods:A total of 3000 subjects (1476 women and 1524 men), aged ≥60 years, were evaluated in the present cross-sectional study in Tehran in 2013. The interviews consisted of questions on demographic data, socioeconomic factors and the general systemic health status. The subjects' oral cavities were examined in relation to the presence of teeth or partial and total edentulism and oral hygiene status by an oral hygienist.

Results: 3000 subjects were included in the study, of which 49.2% and 50.8% were female and male, respectively. 51% of the subjects exhibited total edentulism (maxilla and mandible), 46.6% were dentate and 2.5% were edentulous in the maxilla or mandible.

Conclusion: the prevalence of edentulism is high in Iran. It is also under the influence of a number of variables, including systemic diseases such as diabetes, hypertension, cardiovascular diseases, and factors like gender, educational level, occupation, smoking and tooth brushing.

Keywords: edentulous, diabetes, smoking, cardiovascular diseases, tooth brushing, occupation, educational level.

INTRUDUCTION

Edentulism(total edentulism) can be considered a parameter to determine the health status of members of a community. It is believed to be a threat to the masticatory apparatus and leads to unfavorable functional and esthetic outcomes.

The prevalence of partial and edentulism is high all over the world. Its prevalence is high in Iran, too, with the prevalence being reported to be 3% in 35□44-year-old individuals in 2008 in Iran, with 22% of this population having less than 20 teeth (1, 2).

The diet, enjoyment of food and the amount food absorbed are under the influence of the number of teeth and their status (3). Individuals with edentulism run a higher risk of nutritional deficiencies. Based on the standards of WHO,

adults should have at least 21 functional teeth to meet their nutritional needs without any need for dentures (4).A study by Slate et al showed that edentulism decreases the quality of life significantly. The study showed more favorable psychological and social feelings in the dentate group compared to the edentulous group; in contrast, the edentulous group complained of pain, discomfort and various problems during mastication and food intake (5).

Social factors such as low educational level, old age, gender, marital status and low income can affect the incidence of edentulism. Burt et al concluded that the role of social factors in the incidence of edentulism is more important than that in partial edentulism (6).

Dental caries, periodontal problems and smoking are also considered some of the main factors leading to tooth loss. However, the tooth loss pattern is different in terms of age and the population (7).It has been estimated that the population over 60 years of age will comprise almost one billion people of the world population by 2020, two-thirds of which will live in developing countries.

The aim of the present study was to determine the prevalence of edentulism in individuals ≥60 years of age in Tehran, Iran, and evaluate the risk indicators associated with edentulism. Such a study in Tehran might pave the way for determining the prevalence of edentulism all over Iran.

MATERIALS AND METHODS

1-Pations

A total of 3000 subjects (1476 women and 1524 men), aged ≥60 years, were evaluated in the present cross-sectional study in Tehran in 2013. To this end, the 22 districts of Tehran were considered clusters and divided into 5 groups of north, south, east, west and central. In each group, one district was randomly selected as a cluster. Based on Tehran's geographical map and latest population census, one house was considered as the index house in each district.

Then evaluations were carried out clockwise in every 10 houses. The sample size was determined in each district proportional to the population of that district. To achieve equilibrium in relation to gender, a man and a woman were examined in a row.

2-Parameters

The interviews consisted of questions on demographic data, socioeconomic factors and the general systemic health status(to be under periodic care of a physician and drug users was indicator for affecting systemic disease). The subjects' oral cavities were examined in relation to the presence of teeth or partial and edentulism and oral hygiene status by an oral hygienist. A hygienic package was donated to each subject as an incentive to participate in the study.

3-Statistical analysis

Data were statistically analyzed in relation to the relationship between edentulism and other variables, including gender, educational level, etc using chi-squared test, t-test and one-way ANOVA or a parametric alternative test.

RESULTS

1- General health status

Since no similar study is available, the subject size was estimated at 2401 by considering a 50% prevalence rate for edentulism at a confidence interval of 95% and an acceptable error level of 2%; however, by considering the pilot study with 106 subjects the sample size was estimated at 2882 subjects for the main study, but finally 3000 subjects were included in the study, of which 49.2% and 50.8% were female and male, respectively. 51% of the subjects exhibited edentulism (maxilla and mandible), 46.6% were dentate and 2.5% were edentulous in the maxilla or mandible. The prevalence of edentulism in males was significantly higher than that in females, with 54.3% and 47.6% of males and females, respectively

Table 1 presents the descriptive analyses of the general health status of subjects in the present study.

Table 1. The descriptive analysis of general health status of the subjects

parameters	n	%
Diabetes		
No	2623	87.4
yes	377	12.6
Hypertension		
No	2656	88.5
yes	344	11.5
Hyperlipidemia		
No	2790	93
yes	210	7
Cancer		
No	2979	99.3
yes	21	0.7
Cardio vascular diseases		
No	2697	89.9
yes	303	10.1
Renal disease		
No	2945	98.2
yes	55	1.8
Onomy		
No	2979	99.3
yes	21	0.7
Neurovascular diseases		
No	2936	97.9
yes	62	2.1
Thyroid's diseases		
No	2992	99.7
yes	8	0.3
Gastric diseases		
No	2919	97.3
yes	81	2.7

2-Disease and edentulous

65% of the diabetic and 61% of the hypertensive subjects in the present study were edentulous. Furthermore, 60.5% of the subjects with hyperlipidemia and 50.3% of the subjects with normal blood lipid levels were edentulous ($P \leq 0.05$). Subjects with cancer were not significantly different from healthy subjects in the prevalence of edentulism. Of 303 subjects with cardiac diseases, 63% were edentulous, while of 2697 subjects who had no cardiac disease; only 49.6% were edentulous, indicating a statistically significant difference between the two groups.

A total of 56% of subjects with renal diseases were edentulous and 50.9% of subjects who had no renal diseases were edentulous, with no significant differences between the two groups. In addition, 66.7% of anemic subjects were edentulous and 50.9% of non-anemic subjects were edentulous. The prevalence of edentulism in subjects with and without psychological problems was almost the same (51% vs. 50%).

The difference in the prevalence of edentulism in patients with and without gastrointestinal problems was not statistically significant (61.7% in patients with GI problems and 50.7% in healthy subjects).

There were significant relationships between edentulism and factors such as age, diabetes, hypertension, hyperlipidemia and cardiovascular diseases.

Tables 2 present the frequencies of the subject in the present study in terms of smoking, oral hygienic, educational level and occupation.

Table 2. The frequencies of smoking, brushing, education and occupation in the present study			
smoking		n	Percent
	no	2222	74.1
	quit	492	16.4
	less than 10	187	6.2
	more than 10	99	3.3
	Total	3000	100.0
rushing			
	never	551	18.4
	sometimes	1150	38.3
	once a day	1299	43.3
	Total	3000	100.0
education			
	illiterate	649	21.6
	primary	1220	40.7
	semi	548	18.3
	diploma	424	14.1
	bs	130	4.3
	higher	29	1.0
	Total	3000	100.0
occupation			
	employee	32	1.1
	worker	93	3.1
	other	476	15.9
	housewife	1283	42.8
	retired	1115	37.2
	Total	2999	100.0
	System	1	.0
Total		3000	100.0

3. Smoking, brushing, education, occupation and edentulous

As the table shows, subjects who observed oral hygiene outnumbered those who did not pay attention to their oral hygiene. In addition, there was a significant relationship between tooth loss and oral hygiene. In this context, the prevalence of edentulism decreased with an increase in oral hygiene.

The relationship between educational status and tooth loss shows that 21.5% of the subjects were illiterate, which is significant; 47% had elementary school education, 15% had guidance school education, 4.3% were high school graduates and 0.9% had academic education.

There was a significant relationship between educational level and tooth loss, i.e. there was a significant decrease in the prevalence of edentulism with an increase in educational level.

The relationship between occupation and edentulism shows that employees had the minimum prevalence of edentulism. In this context, one-fourth of the employees were edentulous, with higher prevalence in other groups; 62.4% of workers were edentulous, but the prevalence rate was approximately 50% in other groups. However, although there was a relationship between edentulism and occupation, the relationship was not statistically significant**Table 3** shows the relationship between smoking, brushing, education ,occupation and edentulism.

Table 3. The relationship between smoking, brushing, education, occupation and edentulous

smoking		Edentulous				total
		Max-man	max	man	none	
no	% within smoking	47.3%	1.4%	1.2%	50.1%	100%
quit	% within smoking	66.3%	1.2%	0.6%	31.9%	100%
Less than 10	% within smoking	48.1%	1.6%	1.1%	49.2%	100%
More than 10	% within smoking	64.6%	0.0%	1.0%	34.3%	100%
total	% within smoking	51%	1.4%	1.1%	46.6%	100%
brushing		Edentulous				total
		max-man	max	man	none	
never	% within brushing	69.7%	2.2%	0.5%	27.6%	100%
sometimes	% within brushing	58.5%	1.4%	1.5%	38.6%	100%
Once a day	% within brushing	36.4%	1.0%	0.9%	61.7%	100%
total	% within brushing	51%	1.4%	1.1%	46.6%	100%
education		edentulous				total
		max-man	max	man	none	
illiterate	% within education	66.4%	2.3%	0.6%	30.7%	100%
primary	% within education	59.4%	1.2%	1.3%	38%	100%
semi	% within education	41.2%	0.9%	1.5%	56.4%	100%
diploma	% within education	25.9%	1.4%	0.9%	71.7%	100%
BS	% within education	23.8%	0.0%	0.0%	76.2%	100%
higher	% within education	24.1%	0.0%	0.0%	75.9%	100%
total	% within education	51%	1.4%	1.1%	46.6%	100%
occupation		Edentulous				total
		max-man	max	man	none	
employee	% within occupation	25%	0.0%	0.0%	75%	100%
worker	% within occupation	62.4%	2.2%	3.2%	32.3%	100%
other	% within occupation	51.3%	1.9%	0.8%	46%	100%
housewife	% within occupation	50%	1.6%	1.3%	47.1%	100%
retired	% within occupation	51.7%	0.9%	0.7%	46.6%	100%
total	% within occupation	51%	1.4%	1.1	46.6%	100%

DISCUSSION

Based on the results of the present cross-sectional study, the prevalence of edentulism is high in Iran, with 53.5% of the subjects in the present study exhibiting total or partial edentulism.

A systematic study in Iran in 2012 showed a prevalence rate of 70.7% for edentulism in Iran in individuals over 65 years of age, which is higher than that in the present study (7). It should be pointed out that in the present study edentulism was reported in each jaw but in the study above only loss of tooth was reported.

A study by Buhlin et al in 2004 showed that a larger proportion of dialysis patients had oral health problems. For example 46% and 35% of the patients had gingivitis and severe periodontitis, respectively (8).It is well-established that inflammation resulting from oral infections, especially periodontal infections, is not confirmed to the oral environment and might have systemic complications, too (9).

There is a hypothesis that periodontal infections exert their systemic effect through CRP. A study by Offenbacher in 2000 showed a relationship between CRP levels and advanced periodontitis (10).A study by Yazdi et al in 2013 showed that periodontitis is an important source for systemic inflammation in patients with severe renal disease (11). In the present study, the majority of patients with renal disease were edentulous, which might indicate the relationship between renal disease and oral hygiene. In the present study, gender, diabetes, hypertension, hyperlipidemia, cardiovascular diseases, smoking, tooth brushing, educational status and occupation were variables with significant relationships with edentulism.

A study by Khazaei et al, showed a higher prevalence rate of edentulism in males, consistent with the present study (12). A study by Danilo, too, showed a significantly higher rate of dental problems and untreated periodontal diseases in men (13).Several studies have shown a relationship between periodontal and cardiovascular diseases. In addition, studies have shown that tooth loss is associated with increased risk of coronary heart disease and stroke (14). Asai et al (2015) reported a gender-dependent relationship between cardio-ankle vascular index (CVAI) and tooth loss, i.e. the relationship was positive only in men, indicating a linear gender-dependent relationship between tooth loss and arteriosclerosis (15).A direct relationship has been reported between oral hygiene disturbances and hypertension risk (16). Friedeuald et al (2009) reported that chronic gingivitis is associated with an increased risk of vascular complications (17). Auluk et al (2005) reported that limited access to oral healthcare and lack of knowledge about the effects of poor oral hygiene on systemic health might have contributed to systemic problems, including an increased risk of CVA and ischemic cardiac diseases in rural areas of Latin America (18). A large number of studies, similar to the present study, have shown that smokers suffer from edentulism at a higher rate than non-smokers, which might be attributed to a higher rate of dental caries and periodontal diseases in smokers, resulting in tooth loss. In addition, changes in the quality of saliva in smokers, including a decrease in its buffering capacity, has an important role in tooth loss in such individuals because saliva has as important self-cleansing and immunologic role in oral and dental health. Consistent with the results of the present study, a study by Dietrich showed that the incidence of tooth loss increases in smokers with an increase in the number of cigarettes smoked (19).

Patients with systemic conditions run a higher risk of edentulism. For example, diabetic patients in the present study had lost more teeth than non-diabetic subjects. The relationship between edentulism and tooth loss and diabetes can be explained by the fact that diabetes is one of the most important risk indicators for periodontitis.

In a study by Damilo, working employees had more dental problems compared to the retired, which is not consistent with the results of the present study.

Classification of occupations as used in the present study, is too broad considering the social

conditions in Iran and a large number of variables affect it. For example, workers had the highest rate of edentulism, which might be explained by the fact that they are the lowest-income group and usually have a low educational level. Therefore, they do not have easy access to dental facilities and cannot pay the costs of dental procedures. In addition, they have not been adequately justified in relation to the oral hygiene.

The unemployed group consisted of individuals who worked in the past but were retired at the time of the study, in addition to those who suffered from various medical conditions and disabilities due to old age and were not able to engage in independent physical activities.

In the study carried out by Danilo et al, the subjects who were engaged in a job ran a higher risk of edentulism, which was attributed to occupational stresses and having no time to pay attention to hygienic problems; however, in the present study, the employed had the least prevalence of edentulism. Employees in Iran are usually educated individuals, which might have influenced the minimum prevalence of edentulism in this group. In addition, considering the conditions of the Iranian society, women have been unevenly distributed among different occupational groups; therefore, the prevalence of edentulism in the occupation table has been greatly affected by gender.

Unfortunately, 62.3% of the subjects in the present study were illiterate or had elementary school education and the prevalence of edentulism had a direct relationship with educational level. Undoubtedly, educated subjects were more knowledgeable about the role of oral hygiene in their life and took better care of their teeth. On the other hand, educated people had better occupational status, with higher income in most cases, facilitating access to dental facilities and professional care.

The present study had a number of limitations, including a small sample size. If the sample size had been had been larger, statistical analyses would have become more reliable. In addition, the study design was cross-sectional, which deals with a specific period of time. However, this study provided useful data about the Iranian community, which are consistent with the results of similar previous studies in Iran.

The data collected in the present study can be effectively used for healthcare programming for the whole country. In addition, the results showed some deficiencies in the Iranian community, which should be overcome by increasing the general knowledge of the members of the community about the orodental health and hygiene, providing more access to dental care by reimbursement of dental care costs, prevention of orodental diseases, increasing the educational level of the community members and by improving the general health status of the community.

CONCLUSION

Based on the results of the present study, the prevalence of edentulism is high in Iran. It is also under the influence of a number of variables, including systemic diseases such as diabetes, hypertension, cardiovascular diseases, and factors like gender, educational level, occupation, smoking and tooth brushing.

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Conflicts of interest

There are no conflicts of interest

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