Factors Associated with Undergoing Regular Dental Check-ups in Healthy Elderly Individuals

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Abstract

The purpose of this study was to determine the distribution of healthy elderly individuals undergoing regular dental check-ups and identify any environmental or associated oral factors. A cross-sectional questionnaire survey was used to interview 216 individuals attending 2 welfare facilities for the elderly, of whom 160 were included in the final analysis. Items comprised age, sex, number of residual teeth, frequency of teeth/denture cleaning, subjective chewing ability, denture use, oral status, regular dental check-ups, visitation of the same dentist, number of dental visits in the past year, General Oral Health Assessment Index (GOHAI) (Japanese version) score, living situation, and use of routine medication. Individuals undergoing regular dental check-ups were defined as those with a primary dentist whom they saw for dental check-ups at least once a year. The rate of individuals undergoing regular dental check-ups was 75.0% in men aged 60–74 years, 58.8% in women aged 60–74 years, 70.0% in men aged 75 years or over, and 45.3% in women aged 75 years or over. Logistic regression analysis revealed a higher number of residual teeth (odds ratio [OR] = 2.664 in comparison with those with fewer than 20 teeth, $p = 0.0427$); cleaning teeth/dentures 3 or more times per day (OR = 2.546 in comparison with cleaning them twice per day or less, $p = 0.0157$); and a higher GOHAI score (OR = 2.742 in comparison with those with a GOHAI score of less than 58, $p = 0.0263$) as factors significantly correlated with undergoing regular dental check-ups. In conclusion, the results revealed that individuals undergoing regular dental check-ups had 20 or more residual teeth, cleaned their teeth/denture 3 or more times per day, and had a higher GOHAI score. This indicates that the best predictive factor for undergoing regular dental check-ups in healthy elderly individuals is their GOHAI score.

Key words: Regular dental check-ups — Dental visit — Healthy elderly — General Oral Health Assessment Index (GOHAI) — Oral health-related quality of life (OHRQoL)

Introduction

The Japanese population is aging rapidly. The aging rate, estimated to be 27.3% in 2016, has been predicted to reach 38.4% in 2065⁷⁾. “Health Japan 21 (second term)”, the government’s basic health policy, which is based on the Health Promotion Act, was adopted in 2013 and will remain in effect until 2022¹⁰⁾. One of its goals is to extend healthy life expectancy, for which members of the community need to help prevent individuals from developing non-communicable diseases (NCDs) such as diabetes mellitus and cardiovascular disease. Recent studies have indicated a close relationship between oral health and NCDs^{3,5,6,9,13)}. Therefore, maintenance and improvement of oral health help extend healthy life expectancy^{8,18)}. Regular dental check-ups were important for maintenance and improvement of oral health^{2,25)}. One of the goals of oral health in Health Japan 21 (second term) is to increase the percentage of individuals undergoing dental check-ups during the previous year to 65% by 2022¹⁰⁾.

The purpose of the present study was to determine the distribution of healthy elderly individuals undergoing regular dental check-ups and identify any environmental or oral associated factors.

Materials and Methods

The study participants comprised 216 individuals attending 2 welfare facilities for the elderly in the city of Chiba, Japan. They were relatively healthy and did not need special care in their daily lives. A cross-sectional survey was conducted by means of questionnaires distributed to all participants. A total of 198 responses were collected. The collection rate was 91.7%. This survey was conducted between 1 August, 2012 and 31 August, 2012. Those who did not answer all the questions were excluded. Therefore, a total of 160 (22 men, 138 women; age, 60 to 86 years) were surveyed and included in the analysis.

The items of the questionnaire included

comprised age, sex, number of residual teeth, frequency of teeth/denture cleaning, subjective chewing ability, denture use, oral status, undergoing of regular dental check-ups, visitation of the same dentist, number of dental visits in the past year, General Oral Health Assessment Index (GOHAI) (Japanese version) score^{6,26)}, living situation, and routine use of medication.

Individuals undergoing regular dental check-ups were defined as those with a primary dentist whom they saw for dental check-ups at least once a year.

Informed consent was obtained from all participants prior to commencement of the study. Questionnaires were distributed by the institution staff and responses were anonymous. The study protocol was approved by the Ethics Committee of Tokyo Dental College (Approval number, 656).

The GOHAI was used as an index of oral health-related quality of life (OHRQoL)¹⁶⁾. It was originally developed for assessing self-reported oral health status in elderly individuals¹⁵⁾ and includes 3 subscales of OHRQoL: physical function, psychosocial function, and presence of pain or discomfort. The individual GOHAI score was computed from the responses to the 12 questions, with a maximum score of 60 and minimum of 12. A higher score indicated better perceived oral health status and QoL^{16,26)}. A score in the mid-75th percentile was considered to represent the standard (12–57); those scoring higher than this were classified into a high score group (58–60), while those with a lower score were classified into a low score group (12–57)²¹⁾. Differences in proportions were evaluated using the χ^2 test (two-tailed). Multiple logistic regression (forward selection) was used to determine any factors significantly associated with regular dental check-ups. This was defined by odds ratios (ORs) with 95% a confidence interval. Statistical significance was set at $p < 0.05$. The data were analyzed with SAS version 9.2 for Windows (SAS Institute, Cary, NC, USA).

Fig. 1 Distribution of elderly individuals undergoing regular dental check-ups according to sex and age group

Results

Figure 1 shows the distribution and rate of elderly individuals undergoing regular dental check-ups by sex and age group. The rates were 75.0% in men aged 60–74 years, 58.8% in women aged 60–74 years, 70.0% in men aged 75 years or over, and 45.3% in women aged 75 years or over. More men underwent regular dental check-ups than women in both age groups; and more individuals aged 60–74 than those aged 75 or over among both men and women. No significant differences were observed in percentage of individuals undergoing regular dental check-ups by sex or age group.

Table 1 shows participant characteristics, oral conditions, and GOHAI scores. In terms of living situation, 56 (35.0%) lived alone, while 104 (65.0%) lived with others, such as spouse, children, or grandchildren. Routine use of medication was reported in 83 (51.9%), and none in 77 (48.1%). With regard to number of residual teeth, 9 (5.6%) had none, 16 (10.0%) had 1–9, 18 (11.3%) had 10–19, and 117 (73.1%) had 20–32. A total of 66 (41.2%) wore dentures, while 94 (58.8%) did not. In terms of frequency of teeth/dentures cleaning, 1 (0.6%) cleaned 0 times per day, 10 (6.2%) cleaned 1 time per day, 55 (34.4%) cleaned 2 times per day, and 94 (58.8%)

cleaned 3 or more times per day. With regard to subjective chewing ability, 85 (53.1%) answered “bad”, while 75 (46.9%) answered “good”. In terms of GOHAI scores, 37 scored 26–44 points, 37 scored 45–52 points, 49 scored 53–57 points, and 37 scored 58–60 points.

Table 2 lists factors associated with undergoing regular dental check-ups, which were evaluated using the χ^2 test. Here, a total of 123 individuals were classified into the low score group and 37 into the high score group. Significant differences were indicated in GOHAI scores among the different groups ($p < 0.05$).

The results of the logistic regression analysis of regular dental check-ups are shown in Table 3. The dependent variable was undergoing regular dental check-ups; the independent variables were the 9 factors shown in Table 2. The following factors were identified as being significantly related to undergoing regular dental check-ups: a high number of residual teeth (OR = 2.664 in comparison with those with fewer than 20 teeth, $p = 0.0427$); cleaning teeth/dentures 3 or more times per day (OR = 2.546 in comparison with cleaning them twice per day or less, $p = 0.0157$); and a high GOHAI score (OR = 2.742 in comparison with those with a GOHAI score of lower than 58, $p = 0.0263$).

Table 1 Participant characteristics, oral condition, and GOHAI score (n = 160)

	Frequency	%
Sex		
Men	22	13.8
Women	138	86.2
Age (in years)		
60–74	97	60.6
75 and over	63	39.4
Living situation		
Alone	56	35.0
With others	104	65.0
Medication		
No	77	48.1
Yes	83	51.9
Number of teeth		
no teeth	9	5.6
1–9 teeth	16	10.0
10–19 teeth	18	11.3
20–32 teeth	117	73.1
Dentures wearer		
No	94	58.8
Yes	66	41.2
Cleaning teeth/dentures		
0 times per day	1	0.6
1 time per day	10	6.2
2 times per day	55	34.4
3 or more times per day	94	58.8
Subjective chewing ability		
Bad	85	53.1
Good	75	46.9
GOHAI score		
26–44	37	23.1
45–52	37	23.1
53–57	49	30.7
58–60	37	23.1

Discussion

1. Percentage of individuals undergoing regular dental check-ups

Rate of dental visits varies by region and country. In the 27 member states of the European Union (EU), the rate of dental visits in

the previous year was 49% in individuals aged 55 years or over, with the highest rate at 79% in the Netherlands and the lowest at 20% in Belgium²³⁾. In the United States, the rate of individuals aged 65 years or over who had visited the dentist in the past year was 62.8% in the Northeast, 64.8% in the Midwest, 60.1% in the South, and 65.4% in the Western region²⁴⁾. The National Health and Nutrition Survey (2012) in Japan reported that 53.9% of men aged 60–69 years, 56.6% of women aged 60–69 years, 52.2% of men aged 70 years or over, and 50.8% of women aged 70 years or over had made dental visits in the past year¹²⁾. In a survey on participation in dental services in communities of individuals aged 70 years or over, the rate of regular dental check-ups was 19.3% in men and 7.3% in women¹⁷⁾. Another study found that age, sex, race, nation, academic background, income, health insurance, and ADL were important determinants of whether dental health services would be utilized¹⁹⁾. Therefore, it is important to understand a country's national dental care system when considering differences in rate of dental visits between Japan and other countries.

Several studies reported that activities of daily living (ADL) were associated with regular dental check-ups in the elderly^{14,19,20)}. The individuals surveyed in the present study were relatively healthy and did not require special care in their daily lives. Therefore they were able to undergo regular dental check-ups, which may explain the high rates of such individuals observed here in comparison with in other recent studies^{12,14,19,20)}.

2. Relationship between regular dental check-ups and associated factors

Previous studies suggested that factors related to the use of dental services for the elderly comprised age, sex, race, nation, academic background, income, health insurance, ADL, number of residual teeth, subjective chewing ability, and frequency of cleaning teeth^{14,17,20,24)}. In the present study, data pertaining to the factors shown in Table 1 were analyzed. Logistic regression analysis revealed

Table 2 Factors associated with undergoing regular dental check-ups

	Regular dental check-ups (%)		p-value
	Yes	No	
Sex			
Men	72.7	27.3	0.0934
Women	53.6	46.4	
Age (in years)			
60–74	60.8	39.2	0.1478
75 and over	49.2	50.8	
Living situation			
Alone	46.4	53.6	0.0661
With others	61.5	38.5	
Medication			
No	52.0	48.0	0.2907
Yes	60.2	39.8	
Number of teeth			
less than 20 teeth	44.2	55.8	0.0622
more than 20 teeth and over	60.7	39.3	
Dentures wearer			
No	55.3	44.7	0.777
Yes	57.6	42.4	
Cleaning teeth/dentures			
1–2 times per day	50.0	50.0	0.1818
3 or more times per day	60.6	39.4	
Subjective chewing ability			
Bad	54.1	45.9	0.5627
Good	58.7	41.3	
GOHAI score			
12–57	52.0	48.0	0.0499
58–60	70.3	29.7	

a higher number of residual teeth, cleaning teeth/dentures 3 or more times per day, and a higher GOHAI score (see Table 3) as factors significantly correlated with undergoing regular dental check-ups. In one earlier study analyzing predictive factors of regular dental check-ups, multiple logistic regression analysis revealed systemic illness, high education, and a high number of residual teeth as factors significantly associated with a high rate of regular dental check-ups¹⁷⁾. The percentage of individuals with more than 20 remaining teeth was 73.1% in the present study, whereas

this value was 58.5% in a national survey conducted in 2011¹¹⁾. Another study reported that adults visiting their dental office for regular check-ups experienced less tooth loss than those who had never attended check-ups²²⁾. Regular dental check-ups reduce the risk of tooth loss. The present study also revealed a statistically significant relationship between regular dental check-ups and frequency of cleaning teeth/dentures. This suggests that frequency of cleaning increases as a result of recommendations to undergo regular dental check-ups given as part of oral health

Table 3 Multiple logistic regression analysis for undergoing regular dental check-ups

	odds ratio	95%CI ^a	p-value
Sex			
Men	1		
Women	0.334	0.106–1.052	0.0611
Age (in years)			
60–74	1		
75 and over	0.748	0.360–1.557	0.4383
Living situation			
Alone	1		
With others	1.832	0.897–3.741	0.0966
Medication			
No	1		
Yes	1.064	0.528–2.145	0.8628
Number of teeth			
less than 20 teeth	1		
more than 20 teeth and over	2.664	1.033–6.871	0.0427
Dentures wearer			
No	1		
Yes	1.716	0.737–3.994	0.2105
Cleaning teeth/dentures			
1–2 times per day	1		
3 or more times per day	2.546	1.192–5.434	0.0157
Subjective chewing ability			
Bad	1		
Good	0.813	0.375–1.761	0.5995
GOHAI score			
12–57	1		
58–60	2.742	1.126–6.675	0.0263

Dependent variable was presence or absence of regular dental check-ups.

^a: CI: Confidence interval

guidance.

In one earlier study, logistic regression analysis revealed an association between a higher GOHAI score and a higher number of residual teeth, a higher frequency of regular dental check-ups, and better subjective chewing ability²¹⁾. Factors significantly related to the Oral Health Impact Profile-14 (OHIP-14) were reported to comprise frequency of regular dental check-ups, number of teeth, age, and sex⁴⁾. In another study investigating the relationship between regular dental check-

ups and the OHIP-14 score, logistic regression analysis revealed that the OR of the OHIP-14 score was 2.21, which was the highest among the other factors addressed¹⁾. In the present study, the OR of regular dental check-ups and the GOHAI score was the highest among all factors at 2.742. This indicates a significant correlation between regular dental check-ups and OHRQoL.

As this was a cross-sectional survey study, no clear causality between regular dental check-ups and associated factors could be identified.

This study had some limitations. For example, no adjustment was made for socioeconomic status, which is associated with regular dental attendance.

Conclusion

The undergoing of regular dental check-ups and associated factors were investigated in healthy individuals aged over 60 years at 2 welfare facilities. Those undergoing regular dental check-ups had 20 or more teeth, cleaned their teeth/dentures 3 or more times a day, and had a higher GOHAI score. The best predictive factor for undergoing regular dental check-ups in elderly individuals was the GOHAI score. Individuals with a higher OHRQoL visited the dental office regularly for check-ups.

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