Original

Correlation between patient satisfaction and dental clinic credibility in regular dental check-ups in Japan

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Abstract : The aim of this study was to investigate the relationship between dental clinic credibility and patient satisfaction with regular dental check-ups, to compare the level of satisfaction of patients who had regular check-ups with those who did not, and to identify factors associated with regular dental check-ups. Thirty-nine private dental clinics in 17 prefectures throughout Japan participated in this study. A total of 9024 questionnaires were distributed to the patients at these clinics, and patients returned the questionnaires using a pre-paid envelope (response rate 56.8%). The questionnaires consisted of items related to patient demographics and 11 items concerning the level of patient satisfaction with the dental clinic. Using multiple logistic regression analysis, the strongest correlation was found between dental clinic credibility in regular check-ups and the technical competence of the dentist. The responses to those items concerning making an appointment, and the cleanliness and neatness of the waiting room were different between patients who had regular check-ups and those who did not. To investigate the factors that encourage regular dental check-ups, correlation of factors with regular check up experience were analyzed. Multivariate-adjusted odds ratios indicated a strong association between regular dental check ups and both the technical competence of the dental hygienist and the cost of treatment. (J. Oral Sci. 47, 97-103, 2005)

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Introduction

The decline in prevalence of dental caries is a worldwide trend, but is particularly evident in industrialized countries (1). In Japan, results of the national survey for oral diseases, conducted every six years, have shown a tendency towards a decrease in dental caries incidence in both the deciduous and permanent teeth of the young adult population (2). As a result, the dental services in Japan have gradually shifted from treatment of dental caries to professional preventive programs.

Unlike dental caries, the prevalence of periodontal disease appears to have increased (3,4). According to the 1999 national survey in Japan, the prevalence of periodontal disease increases with age, and in this survey, 88% of individuals aged 45-54 years had periodontal disease (2). A further survey showed that only 54% of patients visit clinics for the treatment of periodontal disease (5).

Consequently, there is still a need for regular check-ups and dental care to prevent oral disease (6,7).

In Japan, national insurance for dental treatment was introduced in 1961 and all the residents participate in this national insurance scheme (8). This system covers almost all dental treatments, but covers regular check-ups only for patients found to have periodontal disease upon check-up (9). In addition, dental check-ups for post-adolescents are not commonly provided by the public health service. Patients must therefore receive these services at private dental clinics. As a result, only 14% of patients have been reported to have regular dental check ups (10). This is likely in part the result of patient dissatisfaction with their dental clinic experience.

Although a number of studies focusing on patient satisfaction were conducted from the 1960s to the 1980s (11-13), the social, commercial and professional environments have changed markedly since then, and various dental satisfaction scales have been developed during the last 20 years (14-17). Thus, little is known about the current situation in terms of patients' view of dental clinic credibility and regular dental check-ups.

The purpose of this study was to investigate patient satisfaction and dental clinic credibility with regards regular dental check-ups at private dental clinics in 17 prefectures in Japan, and to compare the levels of satisfaction with oral preventive measures in patients receiving regular check-ups and those who do not. The study also aimed to identify factors that promote regular check-ups coupled with professional preventive programs.

Materials and Methods

Characteristics of the dental clinics and study population

In this study, we selected dental clinics throughout Japan that routinely performed regular check-ups and provided professional preventive care. Japan is politically divided into 8 regions and 47 prefectures. Thirty-nine private dental clinics in 7 regions (13 in Kanto, 11 in Tohoku, 8 in Kansai, 3 in Kyushu, 2 in Chugoku, 1 in Chubu, and 1 in Shikoku) and 17 prefectures participated in the study. All the directors of the private dental clinics participating in this study were committee members of study groups of the Japan Health Care Dental Association, whose aim it is to study preventive dental measures and routinely provide professional preventive care.

The following characteristics of each dental clinic were evaluated - the number of dentists and dental hygienists working in the dental clinic, the mean number of patients attending the dental clinic per day, the number of patients seen by each dentist per day, the number of years the dental clinic had been open, and the percentage of patients visiting for regular check-ups.

Questionnaire

The questionnaires were distributed over a set period of time to all visiting patients in the waiting room of the dental clinics. Patients returned the questionnaires to the study group center using a pre-paid envelope.

The questionnaire consisted of items relating to patient demographics and 11 items concerning patient satisfaction with the dental clinic. The patients were asked to express how satisfied they were with each statement by circling their responses on a four-point Likert scale: "Very satisfied", "Fairly satisfied", "Not very satisfied" and "Dissatisfied". All questionnaires were presented in a forced-choice format in Japanese. For those patients aged 12 and below, questionnaires were completed by parents or guardians. We defined the term "regular dental check-ups" as attendance at the dental office more than once a year for the purpose of maintaining a healthy oral condition despite the absence of an apparent dental problem.

To estimate the reliability of the questionnaire used in this study, the coefficient of reliability were calculated using Cronbach's alpha and re-test method. Cronbach's alpha was 0.852. Spearman rank correlation coefficient using the re-test method was 0.786-0.981 (n =15, interval: two weeks).

Statistical analysis

Correlations between patient demographics and each item of patient satisfaction were analyzed using a Mann-Whitney test for gender and a Kruskal-Wallis test for patient age, occupation, and household income per month. Factors contributing to the dental clinic credibility were assessed using logistic regression analysis. A multiple logistic regression analysis was simultaneously carried out to calculate the adjusted odds ratio. The analyses were performed using SPSS ver12.0 (SPSS, Japan).

Results

The number of dentists working in each dental clinic ranged from 1 to 5 (mean +/- standard deviation: 1.64 +/- 0.93). The numbers of patients attending the dental clinics per day ranged from 18 to 140 (43.1 +/- 23.0). The numbers of patients seen per dentist per day ranged from 10.0 to 60.0 (28.9 +/-12.4), and the numbers of patients seen per dental hygienists ranged from 4.50 to 45.0 (13.2 +/- 7.5). The time since the dental clinic opened ranged from 1 to 27 (13.9 +/- 6.9) years. The number of dental hygienists working in each dental clinic ranged from 1 to 11 (2.41 +/- 3.90). The mean percentage of patients reporting

regular check-ups was 46%, and ranged from 10% to 56%.

A total of 9,024 questionnaires were distributed, and 5,132 were returned (response rate 56.8 %). The sample population comprised 1,901 men (37.0%), 3,044 women (59.3%) and 187 respondents of unknown gender (3.6%). The demographics of sampled population are shown in Table 1.

Table 2 shows the results of the assessment of patient satisfaction in this study. Since most of the responses were "Very satisfied" or "Fairly satisfied", for a subsequent analyses, the patients were stratified into two categories; those "Very satisfied" and those "Fairly satisfied", "Not very satisfied" or "Dissatisfied".

Women reported a higher satisfaction rate for the item concerning cleanliness and neatness of the waiting room ($P < 0.001$), and significant differences among age groups were observed in all items of patient satisfaction ($P <$ 0.001). Significant differences among the patient's household income brackets were found for the items pertaining to making an appointment ($P < 0.001$) and cost of treatment ($P < 0.005$). Patients with high income were less satisfied in terms of making appointments than those with lower income. Significant differences were observed based on occupations in all items except communication with dental staff.

To investigate the factors related to dental clinic credibility in regular check-ups, a logistic regression analysis was performed. Table 3 shows the associations between dental clinic credibility in regular check-ups and other items contributing to patient satisfaction. Crude odds ratios showed statistically significant associations between all items and patient satisfaction ($P < 0.001$ in all cases). In the multivariate-adjusted odds model, three factors were no longer associated with dental clinic credibility in regular check-ups - communication with dental staff ($P =$

Table 1 Demographics of questionnaire respondents

Gender			Age			Occupation			Household income per month (yen)			Regular check-up experience		
	n	%		n	%		n	%		n	%		n	%
Male	1901	37.0	-19	335	6.5	Clinic worker	1066	20.8	less than 200000	402	7.8	Yes	2382	46.4
Female	3044	59.3	20 - 29	364	7.1	Civil servant	251	4.9	200000 - 300000	866	16.9	No	2660	51.8
No Answer	187	3.6	30 - 39	697	13.6	Self-employed	453	8.8	300000 - 400000	1122	21.9	No answer	90	1.8
			40 - 49	783	15.3	Housewife	1248	24.3	400000 - 500000	688	13.4			
			50 - 59	973	19.0	Student	582	11.3	500000 - 600000	498	9.7			
			60 - 69	909	17.7	Part time Job	399	7.8	600000 - 800000	353	6.9			
			70 -	568	11.1	No occupation	644	12.5	800000 - 1000000	117	2.3			
			No Answer	503	9.8	Others	249	4.9	more than 1000000	241	4.7			
						No answer	240	4.7	No answer	845	16.5			

Table 2 Results of the questionnaire concerning patient satisfaction

Item	Very satisfied		Fairly satisfied		Not very satisfied		Dissatisfied		No Answer	
	n	%	n	%	n	%	n	%	n	%
Technical competence of the dentist	3314	64.6	1536	29.9	92	1.8	9	0.2	181	3.5
Technical competence of the hygienist	2484	48.4	2183	42.5	181	3.5	13	0.3	271	5.3
Reasonable treatment time	2523	49.2	1860	36.2	410	8.0	74	1.4	265	5.2
Explanation of the content of treatment	3563	69.4	1182	23.0	155	3.0	26	0.5	206	4.0
Cost of the treatment	2100	40.9	2045	39.8	573	11.2	97	1.9	317	6.2
Communication with dentist	3928	76.5	916	17.8	69	1.3	14	0.3	205	4.0
Communication with hygienist	3753	73.1	1040	20.3	105	2.0	21	0.4	213	4.2
Obtaining appointment on a desirable day	2397	46.7	1639	31.9	654	12.7	228	4.4	214	4.2
Reasonable waiting time	2156	42.0	1548	30.2	747	14.6	388	7.6	293	5.7
The cleanliness and neatness of the treatment room	3560	69.4	1239	24.1	99	1.9	7.0	0.1	227	4.4
The cleanliness and neatness of the waiting room	2848	55.5	1695	33.0	318	6.2	28	0.5	243	4.7
The dental clinic credibility in regular check-ups	3667	71.5	1183	23.1	67	1.3	9.0	0.2	206	4.0

0.077), obtaining appointment on desirable day (P = 0.068), and waiting time (P = 0.428). Among those eight factors that remained significant in the multivariate model, the strongest association was found with the technical competence of the dentist.

To investigate the difference between patients who had regular check-ups and those who did not, patients were divided into two groups according to the response ("Yes" or "No") to the question of regular check-up experience. Table 4 shows the crude and multivariate-adjusted odds ratios of each item of patient satisfaction with respect to dental clinic credibility in patients who had regular check-ups, and Table 5 shows the equivalent data in patients who did not. The results of two groups of patients differed in the items of obtaining appointment on desirable day, and cleanliness and neatness of the waiting room. Obtaining appointment on a desirable day was significantly associated

with dental clinic credibility (P < 0.029) only in patients who had regular check-ups. Conversely, cleanliness and neatness of the waiting room was significantly associated with dental clinic credibility (P < 0.001) only in patients who did not have regular check-ups.

To investigate factors that encourage regular check-ups, a logistic regression analysis was conducted using the variable of regular check-up experience ("Yes" or "No") as the outcome variable and each item of patient satisfaction. Table 6 shows the crude and multivariate-adjusted odds ratios of each factor of patient satisfaction with respect to regular check up experience. Crude odds ratios showed that satisfaction with items such as the technical competence of the hygienist, reasonable waiting time, and explanation of the content to treatment was significantly associated with having regular check-ups (P < 0.001). Multivariate-adjusted odds ratios indicated that satisfaction with the technical

Table 3 Crude and multivariate-adjusted odds ratios for each factor of patient satisfaction with respect to dental clinic credibility in regular check-ups

Item	Crude odds ratio	95% CI	P-value	Adjusted odds ratio	95% CI	P-value
Technical competence of the dentist	19.3	16.4 - 22.8	< 0.001	7.40	5.99-9.14	< 0.001
Technical competence of the hygienist	9.07	7.76 - 10.6	< 0.001	1.86	1.50-2.31	< 0.001
Reasonable treatment time	3.54	3.20 - 3.93	< 0.001	1.36	1.16-1.58	< 0.001
Cost of the treatment	3.43	3.11 - 3.79	< 0.001	1.34	1.11-1.61	0.002
Explanation of the content of treatment	5.27	4.63 - 5.98	< 0.001	1.51	1.30-1.75	< 0.001
Communication with dentist	9.19	7.87 - 10.7	< 0.001	2.28	1.80-2.87	< 0.001
Communication with hygienist	5.22	4.56 - 5.97	< 0.001	1.21	0.98-1.50	0.077
Obtaining appointment on a desirable day	1.92	1.78 - 2.07	< 0.001	1.12	0.99-1.26	0.068
Reasonable waiting time	1.86	1.73 - 1.99	< 0.001	1.05	0.93-1.17	0.428
Cleanliness and neatness of the waiting room	7.22	6.28 - 8.29	< 0.001	1.80	1.47-2.20	< 0.001
Cleanliness and neatness of the treatment room	4.18	3.74 - 4.67	< 0.001	2.04	1.72-2.40	< 0.001

Table 4 Crude and multivariate-adjusted odds ratios for each factor relating to patient satisfaction with respect to dental clinic credibility in regular check-ups in patients who reported having regular check-ups

Item	Crude odds ratio	95% CI	P-value	Adjusted odds ratio	95% CI	P-value
Technical competence of the dentist	21.9	17.0 - 28.2	< 0.001	9.93	7.13-13.8	< 0.001
Technical competence of the hygienist	10.6	8.31 - 13.5	< 0.001	1.88	1.35-2.61	< 0.001
Reasonable treatment time	4.08	3.47 - 4.81	< 0.001	1.44	1.13-1.84	0.003
Cost of the treatment	6.66	5.44 - 8.16	< 0.001	1.41	1.05-1.89	0.023
Explanation of the content of treatment	3.68	3.16 - 4.29	< 0.001	1.47	1.17-1.84	< 0.001
Communication with dentist	8.87	7.07 - 11.1	< 0.001	2.33	1.67-3.27	< 0.001
Communication with hygienist	5.11	4.20 - 6.22	< 0.001	1.29	0.94-1.76	0.116
Obtaining appointment on a desirable day	2.00	1.78 - 2.24	< 0.001	1.23	1.02-1.50	0.029
Reasonable waiting time	1.94	1.75 - 2.15	< 0.001	1.09	0.91-1.30	0.33
Cleanness and neatness of the waiting room	6.03	4.93 - 7.37	< 0.001	1.27	0.94-1.73	0.12
Cleanness and neatness of the treatment room	4.30	3.63 - 5.09	< 0.001	2.26	1.74-2.94	< 0.001

competence of the hygienist ($P < 0.001$), cost of the treatment ($P < 0.001$), reasonable treatment time ($P = 0.003$) and explanation of the content of treatment ($P = 0.006$) was associated with having regular check-ups.

Discussion

The effectiveness of regular check-ups for the prevention of dental caries and periodontal diseases has been previously studied (18-20). In some national guidelines for the prevention of dental caries, regular check-ups together with a preventive program, including tooth cleaning and fluoride application, have been recommended (21,22). However, little is known about the relation between the attitude toward regular dental check-ups and patient satisfaction with current practice. Patient satisfaction is an important factor for the promotion of regular dental check-ups.

In this study, the technical competence of the dentist was the most important factor in dental clinic credibility (Tables 3-5). However, regarding patients' regular check-up experience, the techniques of the dental hygienist had the strongest association (Table 6). These results suggest that the role of dental hygienists is more important than previously assumed in promoting regular dental check-up. Yet, this should not be surprising. The dental hygienist plays a central role in the prevention of dental caries and periodontal diseases, not only through dental scaling, professional mechanical tooth cleaning and root planing, but also through routine professional preventive programs.

The cost of regular dental check-ups is recognized as an important consideration for patients. In the present study, the cost of treatment was significantly associated with dental clinic credibility (Tables 3-5) and the regular check up experience (Table 6). The latter result (adjusted

Table 5 Crude and multivariate-adjusted odds ratios for each factor relating to patient satisfaction with respect to dental clinic credibility in regular check-ups in patients who reported not having regular dental check ups

Item	Crude odds ratio	95% CI	P-value	Adjusted odds ratio	95% CI	P-value
Technical competence of the dentist	19.3	16.4 - 22.8	< 0.001	7.40	5.99 - 9.14	< 0.001
Technical competence of the hygienist	9.07	7.76 - 10.6	< 0.001	1.86	1.50 - 2.31	< 0.001
Reasonable treatment time	3.54	3.20 - 3.93	< 0.001	1.36	1.16 - 1.58	< 0.001
Cost of the treatment	3.43	3.11 - 3.79	< 0.001	1.34	1.11 - 1.61	0.002
Explanation of the content of treatment	5.27	4.63 - 5.98	< 0.001	1.51	1.30 - 1.75	< 0.001
Communication with dentist	9.19	7.87 - 10.7	< 0.001	2.28	1.80 - 2.87	< 0.001
Communication with hygienist	5.22	4.56 - 5.97	< 0.001	1.21	0.98 - 1.50	0.077
Obtaining appointment on a desirable day	1.92	1.78 - 2.07	< 0.001	1.12	0.99 - 1.26	0.068
Reasonable waiting time	1.86	1.73 - 1.99	< 0.001	1.05	0.93 - 1.17	0.428
Cleanliness and neatness of the waiting room	7.22	6.28 - 8.29	< 0.001	1.80	1.47 - 2.20	< 0.001
Cleanliness and neatness of the treatment room	4.18	3.74 - 4.67	< 0.001	2.04	1.72 - 2.40	< 0.001

Table 6 Crude and multivariate-adjusted odds ratios for each factor relating to patient satisfaction with respect to regular check-up experience

Item	Crude odds ratio	95% CI	P-value	Adjusted odds ratio	95% CI	P-value
Technical competence of the dentist	1.18	1.06 - 132	< 0.002	0.95	0.81 - 1.12	0.558
Technical competence of the hygienist	1.31	1.19 - 1.44	< 0.001	1.29	1.12 - 1.48	<0.001
Reasonable treatment time	1.21	1.11 - 1.31	< 0.001	1.17	1.06 - 1.30	0.003
Cost for the treatment	1.01	0.94 - 1.09	0.724	0.85	0.78 - 0.94	<0.001
Explanation of the content of treatment	1.23	1.16 - 1.37	< 0.001	1.21	1.06 - 1.38	0.006
Communication with dentist	1.08	0.96 - 1.22	0.217	0.90	0.76 - 1.07	0.229
Communication with hygienist	1.05	0.94 - 1.17	0.394	0.92	0.80 - 1.07	0.295
Obtaining appointment on a desirable day	1.04	0.97 - 1.11	0.263	1.01	0.93 - 1.10	0.800
Reasonable waiting time	1.03	0.97 - 1.10	0.392	0.95	0.88 - 1.02	0.151
The cleanness and neatness of the waiting room	1.11	1.00 - 1.24	0.0058	0.944	0.81 - 1.10	0.449
The cleanness and neatness of the treatment room	1.11	1.02 - 1.21	0.018	1.05	0.94 - 1.18	0.402
The dental clinic credibility in regular check-ups	1.27	1.13 - 1.42	< 0.001	1.17	0.98 - 1.40	0.086

odds ratio 0.85, *P* < 0.001) suggests that patients who have regular check-ups are more dissatisfied with the cost of treatment than patients who do not. In previous reports of attitude to dental health and care, patient satisfaction was influenced considerably by the cost of dental treatment (23-25). The Dental Satisfaction Survey 1995 (24) published by the Australian Institute of Health & Welfare reported that dissatisfied comments were found significantly more frequently among younger age groups who had avoided or delayed making a dental visit because of the cost, whereas satisfied comments were made more frequently by financially secure older persons and those with dental insurance. In the 1999 survey (25), it was reported that over 30% of the respondents had some level of financial difficulty accessing dental care, 20% stated that they had avoided visits because of cost, and 17% reported that cost had prevented recommended treatment. In our previous report (26), 73% of the patients who participated in regular dental check-ups responded that they were willing to pay for regular check-ups for a cost of less than 2,000 yen (about US$20). However, the national average of hourly fees for a dental hygienist in Japan is 1,938 yen (about US$19) (27), and the treatment included in professional preventive programs takes approximately 20-30 minutes. Thus, professional preventive programs at a cost of less 2,000 yen might not feasible with the current health insurance system in Japan that does not fully provide for dental health maintenance. The system has, however, improved a little since 2002 and now covers regular check-ups for patients with periodontal disease upon check-up.

Several reports have described methods for evaluating patient satisfaction using questionnaires or psychometric tests (13-16), such as the Dental Visit Satisfaction Scale (DVSS) (14). In Japan, no established psychometric tests have been used to measure patients' satisfaction with dental care, but such a test could be useful for further investigation.

In conclusion, the results of this study support a correlation between dental clinic credibility in regular dental check-ups and patient satisfaction, and between regular check-up experience and patient satisfaction. Almost half the patients questioned were fully satisfied with the regular check-up at their dental clinics, but there were some factors that could be improved to promote wider utilization of the regular dental check-up system. To encourage regular dental check-ups coupled with professional preventive programs, further investigation is needed to examine patient satisfaction with regular dental check-ups and dental clinic credibility.

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