

The Methods and Use of Questionnaires for the Diagnosis of Dental Phobia by Japanese Dental Practitioners Specializing in Special Needs Dentistry and Dental Anesthesiology: A Cross-Sectional Study

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Abstract

Background

Dental phobia is covered by medical insurance; however, the diagnostic methods are not standardized in Japan. Therefore, the aim of this study was to investigate the methods and use of questionnaires for the diagnosis of dental phobia by Japanese dental practitioners specializing in special needs dentistry and dental anesthesiology.

Methods

We conducted an online survey to obtain information from the members of the Japanese Society for Disability and Oral Health (JSDH, $n = 5134$) and the Japanese Dental Society of Anesthesiology (JDSA, $n = 2759$). Response items included gender, qualification, affiliation type, methods of diagnosis and management of dental phobia, use of questionnaire, need for new evaluation methods for the diagnosis of dental phobia, and others. The chi-squared test was used to compare answers between the three groups (JSDH only, JDSA only, and both). Multiple logistic regression analysis was conducted to identify factors associated with the use of an assessment questionnaire.

Results

Data were obtained from 614 practitioners (only JSDH: $n = 329$, only JDSA: $n = 195$, both JSDH and JDSA: $n = 90$, response rate: 7.8% [614/7,893], men: $n = 364$ [58.5%]). Only 9.7% practitioners used questionnaires to quantify the level of dental anxiety. The members of both JSDH and JDSA used questionnaires more frequently than members only of the JSDH (19% and 7.1%, respectively; Bonferroni corrected $p < 0.01$). Most practitioners (89.1%) diagnosed dental phobia based on patient complaints of fear of treatment. Further, majority of the participants (73.3%) felt the need for a new diagnostic method for “dental phobia”. Multiple logistic regression analysis showed that membership of the JSDH only was negatively related (odds ratio [OR] = 0.32, 95% confidence interval [CI] : 0.15–0.68), and use of behavioral therapy was positively related (OR = 2.51, 95% CI : 1.27–5.20) to the use of a questionnaire.

Conclusions

The results of this study showed that the use of questionnaires was very low, patients’ subjective opinions were commonly used to diagnose dental phobia, and a new diagnostic criterion was needed among practitioners. Therefore, it is important to establish standardized methods for diagnosing dental phobia in Japan.

Background

Dental phobia is recognized as extremely high anxiety for dental treatment. In such cases, it is difficult to perform dental treatments using routine methods (1, 2). Therefore, dental treatments for patients with dental phobia can be performed using cognitive behavioral therapy or under sedation (2, 3). “Dental phobia” is covered by health insurance in Japan.

In Japan and other countries, patients with mild dental phobia can be treated in routine outpatient dental clinics, while those with moderate-to-severe dental phobia are treated at high-level hospitals with a provision of special care dentistry using behavioral therapy, sedation, or general anesthesia (2, 4, 5). Higher dental institutions are associated with experienced dentists, who are often the members of the Japanese Society for Disability and Oral Health (JSDH) and the Japanese Dental Society of Anesthesiology (JDSA). A clear definition or diagnostic criterion for dental phobia has not been established; therefore, the diagnosis of dental phobia depends on the experience of dentists in Japan.

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), dental phobia is a specific type of phobia (localized phobia) (6). Specific phobia is a condition in which a person feels fear or anxiety about a specific situation or subject. Diagnosis is based on interviews or self-administered questionnaires formulated according to the DSM-5 criteria. The incidence of dental phobia based on the DSM classification is 2.1% (Sweden) (7), 3.1% (USA) (8), and 3.7% (Netherlands) (9).

In contrast, another concept of dental phobia has been proposed. In other countries, the concept of dental fear and anxiety is a continuum, rather than the dichotomy of scary/not scary. Multiple psychological scales have been developed to quantify the level of dental anxiety or fear (1, 2, 3). Quantification is essential for determining the methods to deal with dental fear or anxiety (10, 11). Therefore, multiple psychological scales with established reliability and validity have been developed and used worldwide (3). For example, the Modified Dental Anxiety Scale (MDAS) is a five-item questionnaire that quantifies the degree of anxiety in five dental situations (12). The total score ranges from 5 to 25. An MDAS score of 19 or higher indicates a high level of dental anxiety and specific phobia (13). The prevalence of high dental fear (MDAS score \geq 19) was 11.3% in Japan (14), 11.6% in the UK (12), 10.9% in Spain (15), and 8.7% in China (16). Dental fear/dental anxiety is also evaluated using single-question and non-MDAS questionnaires, such as Dental Anxiety Scale (17) and Dental Fear Survey (18), with high dental fear reported with an incidence of 4–30% (19). Most recently, the global estimated prevalence of dental fear and anxiety (DFA), high DFA, and severe DFA in adults has been reported as 15.3% (95% confidence interval [CI], 10.2–21.2), 12.4% (95% CI, 9.5–15.6), and 3.3% (95% CI, 0.9–7.1), respectively, based on 31 studies included in a systemic meta-analysis (20).

In a survey of 400 adults in Japan, 11.3% exhibited high dental anxiety based on MDAS scores; however, 44.0% answered that they “want to receive a little” or “very much want to receive” dental treatment under intravenous sedation (21). The prevalence of dental phobia according to the DSM classification has not been investigated in Japan, but it is estimated to be approximately 3–5% based on previous studies conducted overseas (7, 8, 9).

The term dental phobia is commonly used among general dentists and even patients in Japan; however, the incidence of high dental anxiety based on responses to questionnaires and of dental phobia based on the DSM classification and demands for intravenous sedation do not seem to correspond. Therefore, the aim of this study was to investigate the methods used to diagnose “dental phobia” by Japanese practitioners who specialize in special needs dentistry and/or anesthesiology.

Methods

Members of the JSDH (total number of members: 5,134) and the JDSA (total number of members: 2,759) were targeted for this study. All methods were carried out in accordance with the Declaration of Helsinki. All experimental protocols including the method of obtaining consent from the participants were approved by the respective boards of both academic societies (No. 1920-7 from the JDSA and No. 20029 from JSDH). We conducted an online questionnaire survey (total number of requests: 7,893) using Google Forms (California, Google LLC). The web address for the questionnaire survey was sent to all members via e-mail newsletters of both academic societies. Participation in the survey was totally voluntary and anonymous. The aim and other details of the study were explained in the first screen. Clicking on the button located at bottom of the first screen was taken as informed consent. Any anonymous responses between August 7, 2020 and August 22, 2020 were recorded on the internet form.

The questionnaire included the following items:

- 1) Gender (male, female)
- 2) Qualification (specialist, certified doctor, certified dental hygienist, other)
- 3) Affiliation type (individual clinic, university hospital, regional clinic, hospital dentistry)
- 4) Method for management (behavioral therapy, intravenous sedation, general anesthesia, conscious sedation, oral sedation, other)
- 5) Criteria for diagnosing dental phobia in new patients (patient complaints of anxiety, experience of feeling unwell during treatment, difficulty in keeping the patient's mouth open during treatment, body movement during treatment, cancelation of dental reception, other).
- 6) The use of a questionnaire or criteria to diagnose dental phobia (Yes/No)
- 7) Dental anxiety assessment indices used (seven specific questionnaires and original evaluation criteria)
- 8) Need for new evaluation methods for the diagnosis of dental phobia (Very needed, a little needed, either, not needed a little, no need at all) and
- 9) Percentage of patients with dental phobia treated every week.

Statistical analysis

Characteristics and questionnaires' answers are summarized in counts and percentages. The chi-squared test or Fisher's exact test were used to compare answers between the three groups (JSDH only, JDSA only, and both of JSDH and JDSA). Then, the comparison of the two groups was tested in the same test, and the P value was corrected for Bonferroni correction. Multiple logistic regression analysis was conducted

to identify factors associated with the use of a dental anxiety assessment questionnaire and estimated Odds ratios (ORs), 95% confidence intervals (95% CIs), and p-values. This model included gender, membership, facility type, and five types of management as independent factor. All tests were conducted at a significance level of 0.05. All statistical analyses were performed with R version 4.0.0 (R Foundation for Statistical Computing, Vienna, Austria).

Results

A total of 7.8% (622/7,893) participants responded to the survey. Eight responses had missing data; therefore, 614 responses were analyzed. Fifty-eight participants were male (356/614). Table 1 shows the qualifications of the participants. Thirteen percent members of the JSDH were specialists (53/419), whereas 38.2% members of JDSA were specialists (109/285). Almost 10% participants (66/614) calculated that the proportion of patients with dental phobia treated every working week was 25%.

Table 1
Qualification of the participants

	JSDH n (%)	JDSA n (%)
Specialist	53 (12.6)	109 (38.2)
Certified doctors	192 (45.8)	132 (46.3)
Certified dental hygienist	33 (7.9)	7 (2.5)
Others	141 (33.7)	37 (13.0)
Total	419 (100)	285 (100)
JSDH = Japanese Society for Disability and Oral Health, JDSA = Japanese Dental Society of Anesthesiology		

The common answers and differences among members are shown in Table 2. The percentages of affiliated facility type, use of questionnaires, practical diagnostic criteria, need for new evaluation methods, and methods of management were significantly different between the groups. Approximately one-third of the respondents worked at an individual clinic, and one-third worked at a university hospital. Behavioral therapy was significantly used more frequently among members of the JSDH only (JSDH group, 264/329 [80%]) than among members of the JDSA only (JDSA group, 66/195 [34%], corrected $p < 0.01$). Intravenous sedation was significantly used more commonly in the JDSA group than in the JSDH group (170/195 [87%] and 162/329 [49%] respectively; corrected $p < 0.01$).

Table 2
The difference on the answer between memberships

	Overall	JSDH only	JDSA only	Both of JSDH and JDSA	p-value*
	N = 614	N = 329	N = 195	N = 90	
	n (%)	n (%)	n (%)	n (%)	
Gender					0.074
Male	356 (58)	197 (61)	101 (52)	58 (64)	
Female	253 (42)	128 (39)	93 (48)	32 (36)	
(Missing)	5	4	1	0	
Affiliation type					0.041
Individual clinic	223 (36)	122 (37)	73 (37)	28 (31)	
University hospital	194 (32)	88 (27)	71 (36)	35 (39)	
Regional clinic	99 (16)	64 (19)	20 (10)	15 (17)	
Hospital dentistry	98 (16)	55 (17)	31 (16)	12 (13)	
The use of a questionnaire					0.004
Yes	60 (9.8)	23 (7.1)	20 (10)	17 (19)	
No	550 (90)	302 (93)	175 (90)	73 (81)	
(Missing)	4	4	0	0	
Criteria for diagnosing dental phobia in new patients					
Patient's complaining of anxiety	546 (89)	287 (87)	177 (91)	82 (91)	0.400
Experience of feeling unwell during treatment	397 (65)	206 (63)	131 (67)	60 (67)	0.500
Difficulty in keeping the patient's mouth open during treatment	174 (28)	101 (31)	38 (19)	35 (39)	0.001

	Overall	JSDH only	JDSA only	Both of JSDH and JDSA	p-value*
Body movement during treatment	391 (64)	229 (70)	108 (55)	54 (60)	0.003
Cancellation of dental reception	149 (24)	80 (24)	46 (24)	23 (26)	> 0.9
Need for a new evaluation method					0.004
Very needed/ a little needed	446 (73)	257 (78)	127 (65)	62 (69)	
Either/ not needed a little/ no need at all	168 (27)	72 (22)	68 (35)	28 (31)	
Method for management					
Behavioral therapy	384 (63)	264 (80)	66 (34)	54 (60)	< 0.001
Intravenous sedation	412 (67)	162 (49)	170 (87)	80 (89)	< 0.001
General anesthesia	283 (46)	125 (38)	98 (50)	60 (67)	< 0.001
Laughing inhalation sedation	296 (48)	165 (50)	80 (41)	51 (57)	0.028
Oral sedation	55 (9.0)	17 (5.2)	23 (12)	15 (17)	< 0.001
Others	25 (4.1)	17 (5.2)	6 (3.1)	2 (2.2)	0.400
(Missing)	1	0	1	0	
*Pearson's Chi-squared test					
JSDH = Japanese Society for Disability and Oral Health, JDSA = Japanese Dental Society of Anesthesiology					

Only 9.8% (60/614) participants used a questionnaire to diagnose dental phobia. The members of both JSDH and JDSA used questionnaires more frequently than members only of the JSDH (17/90 [19%] and 23/329 [7.1%] respectively; corrected $p < 0.01$). Eighty-nine percent (546/614) participants diagnosed dental phobia based on patient complaints of anxiety, and 65% (393/614) by experience of feeling unwell during treatment. Difficulty in keeping the patient's mouth open during treatment was significantly used more frequently as a diagnostic criterion among JSDH members than among JDSA members (101/329 [31%] and 38/195 [19%], respectively; corrected $p = 0.02$). Body movement during treatment was also

significantly used more common as a diagnostic criterion among JSDH members than among JD SA members (229/329 [70%] and 108/195 [55%], respectively; corrected $p < 0.01$).

Table 3 shows the various dental anxiety assessment questionnaires used by practitioners. Sixty-four percent of the respondents (39/60) who used questionnaires used original evaluation criteria for the diagnosis of dental anxiety. Seventy-three percent respondents (446/612) felt that an established diagnostic method for dental phobia was needed (Table 2). More number of members of the JSDH felt the need for new diagnostic methods than of those of the JD SA (257/329 [78%] and 127/195 [65%], respectively; corrected $p < 0.01$).

Table 3
Questionnaires used by respondents

Questionnaires	n (%)
Modified Dental Anxiety Scale	9 (15.1)
Dental Fear Survey	6 (10.3)
The short version of the Dental Anxiety Inventory	2 (2.4)
Dental Subscale of Children's Fear Survey Schedule	1 (1.6)
Visual Analog Scale	12 (19.8)
State-Trait Anxiety Inventory	4 (6.3)
State-Trait Anxiety Inventory for Children	1 (1.6)
Original evaluation criteria	39 (64.3)
respondents were able to choose more than one	

Multiple Regression Analysis

Table 4 showed the associations between the use of the dental anxiety assessment questionnaires and participants' characteristics. The factors that found a statistically significant association with the use of dental anxiety assessment questionnaires were membership of the JSDH (OR = 0.32, 95% CI: 0.15–0.68, $p = 0.003$) and use of behavioral therapy (OR = 2.51, 95% CI: 1.27–5.20, $p = 0.01$).

Table 4

Results of a logistic regression analysis for the usage of questionnaire to diagnose dental phobia

Variables	OR	95% CI	p value
Gender			
Female	—	—	—
Male	1.66	0.93, 3.07	0.095
Memberships			
JSDH only/ both	—	—	—
JDSA only	0.67	0.32, 1.42	0.29
JDSA only/ both	—	—	—
JSDH only	0.32	0.15, 0.68	0.003
Affiliated facility type	1.29	0.65, 2.62	0.47
Behavioral therapy	2.51	1.27, 5.20	0.01
Intravenous sedation	1.39	0.65, 3.08	0.41
General anesthesia	1.16	0.60, 2.30	0.66
Laughing inhalation sedation	0.91	0.50, 1.65	0.76
Oral sedation	0.87	0.33, 2.05	0.77
OR = Odds Ratio, CI = Confidence Interval, JSDH = Japanese Society for Disability and Oral Health, JDSA = Japanese Dental Society of Anesthesiology			

Discussion

This study investigated the methods of diagnosis of dental phobia using an online survey among Japanese dental practitioners who specialized in special needs dentistry and dental anesthesiology. The results showed that the use of questionnaires was very low, patients' subjective opinions were mostly used to diagnose dental phobia, and a new diagnostic criterion was needed among practitioners.

Only 9.7% of the practitioners included in the analysis who specialized in special needs dentistry and dental anesthesiology used questionnaires to quantify the level of dental anxiety. These findings can be compared with those of UK- and Australia-based studies. Among practitioners interested in behavioral sciences in the UK, 20% used questionnaires (22) and 3.4% of general dentists in Australia used published scales (23). The difference between the results of our study and these studies could be explained by the difference in the composition of the study population. Nonetheless, use of questionnaires for the diagnosis of dental anxiety was uncommon among dentists.

The results of this study showed that membership of the JSDH only was negatively related to the use of a questionnaire. This could be because the ratio of certified doctors or specialists was lower among the members of the JSDH than among those of the JDSA. In contrast, these results also revealed that the use of behavioral therapy was positively related to the use of a questionnaire. Behavioral therapy is a psychological approach for the management of dental phobia (2); therefore, analysis of dental anxiety using published tools would be common among dentists who use behavioral therapy.

The previous study has reported that female dentists and dentists who used the sedation method tend to use questionnaires more frequently (22). However, these tendencies were not observed in our study. Further research with different samples is required.

In this study, we observed that almost 90% participants diagnosed dental phobia based on patient complaints of fear of dental treatment; this result is similar to that of a previous study conducted in Australia, which showed that almost one-half of dentists directly asked their patients about dental anxiety (23). Several standardized methods for the objective and quantitative evaluation of dental phobia are clinically applied; however, dentists diagnose dental phobia or a high level dental anxiety based on subjective and original methods.

Our study showed that 64% respondents who use a questionnaire diagnosed dental anxiety based on original evaluation methods. The validity and reliability of unpublished scales is often not analyzed; therefore, such scales are rarely used in research to provide evidence for dental phobia.

Our study showed that 73.3% participants felt the need for a new evaluation method for “dental phobia. We found a difference between the views of the members of the two societies; members of the JSDH responded “considerable need or limited need” (79%) more frequently than those of the JDSA (65%). This difference may be due to the differences in their roles. The members of the JDSA mainly provide general management using sedation or general anesthesia, while the members of the JSDH mainly provide dental treatment using behavioral therapy, such as systematic desensitization. To distinguish between patients who can undergo dental treatment under psychological approaches and patients who need pharmacological approaches, the members of the JSDH more strongly need a new diagnostic method than the members of the JDSA.

The results of this study showed that behavioral therapy, intravenous sedation, general anesthesia, and conscious sedation were commonly used by participants of our study. These methods can be used for dental patients covered by national health insurance in Japan; however, the most effective management method is not known. Behavioral treatment for dental phobia in Sweden is provided by psychologists and dentists with the national health insurance, and it has shown a positive effect over ten years (24). To establish guidelines for the diagnosis and management of dental phobia, randomized controlled trials and cohort studies using standardized evaluation questionnaires through extensive epidemiological surveys are warranted in Japan.

The main limitation of this study is the low response proportion (7.8%); therefore, our results may not be generalized to all members of the JDSA and JSDH. It is possible that the members who participated in the study were more likely to have an interest in dental phobia than those who did not participate. The target population may have used fewer questionnaires and have a lesser need for a new diagnostic method for dental phobia. However, this is the first study to assess the methods of diagnosis for dental phobia used by dentists who specialize in special needs dentistry and dental anesthesiology.

Conclusions

In our study population, the use of questionnaires was very low, patients' subjective opinions were commonly used to diagnose dental phobia, and new diagnostic criteria were needed among the practitioners. Japanese dentists need to establish a standard method in clinical settings for the diagnosis of dental phobia.

Abbreviations

Japanese Society for Disability and Oral Health; JSDH

Japanese Dental Society of Anesthesiology; JDSA

Declarations

Ethics approval and consent to participate

The research project was approved by the respective Research Ethics Committees (No. 1920-7 from the Japanese Dental Society of Anesthesiology and No. 20029 from the Japanese Society for Disability and Oral Health). The study was carried out in accordance with the Declaration of Helsinki. Participation in the study was voluntary and anonymous. Participating members gave their informed consent by voluntarily responding to the survey.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

MG conceptualized, investigated, interpreted the data, prepared the original draft, and wrote the manuscript. TA conceptualized, investigated, and prepared the original draft and wrote the manuscript. TF conceptualized, reviewed, and edited the draft. SS performed the interpretation of the data and statistical analysis. TA arranged the research grant, conceptualized, investigated, interpreted the data, prepared the original draft, and wrote the manuscript. All authors read and approved the final manuscript.

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