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Reliability and validity of the Turkish version of the shorter form of the gagging problem assessment questionnaire

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SUMMARY The aim of this study was to evaluate the reliability and validity of the Turkish version of the shorter form of the gagging problem assessment questionnaire. Forty-three patients with gagging problems and 89 patients who showed no signs of gagging during dental examination were included in the study. The patients completed the patient portion of the gagging problem assessment questionnaire, as well as the modified dental anxiety scale, dental fear scale and Spielberger trait anxiety scale for comparison. Two experienced dentists subsequently completed the dentist portion of the gagging problem assessment questionnaire by performing clinical examinations with a dental mirror. The results indicate that patients with gagging problems had significantly higher mean scores than the control group ($P < 0{\cdot}001$). The internal consistency of the questionnaire was found to be adequate, and good intra- and inter-observer reliability was present. Patients with a gagging reflex had significantly higher anxiety scores, indicating the validity of the questionnaire. The Turkish translation of the shorter form of the gagging problem assessment questionnaire was found to be reliable and valid for distinguishing among patients with and without a gagging reflex.

KEYWORDS: gagging reflex, reliability, validity, questionnaire, dentistry

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Introduction

The gagging reflex is a protective reflex of the airway that acts to remove unwanted material from the oropharynx and upper gastrointestinal tract (1). Under normal circumstances this reflex does not cause significant problems, but it may become exaggerated and lead to serious limitations during oral health-related behaviours and dental procedures (2, 3). Dentists undoubtedly encounter patients with gagging problems, and must be familiar with management strategies to achieve adequate dental care (4). A wide range of techniques have been suggested for the management of gagging, including relaxation, distraction, desensitization, psychological and behavioural techniques, sedation, hypnosis(1, 5), acupuncture, acupressure(6), combined acupuncture and acupressure and hypnopuncture (7).

Clinical characterization of a patient's gagging reflex before diagnostic procedures and dental treatment could be helpful, allowing the clinician to be aware of unwanted conditions and to make strategies for the management of the reflex. The gagging problem assessment questionnaire (GPA), consisting of patient and dentist sections, has recently been introduced (8). The patient section consists of basic questions related to any gagging reflex during daily oral care routines and previous dental treatment. The dentist section includes the assessment of gagging reflex during examination, in which various sites in the oral cavity are touched with a dental mirror. The original version of this questionnaire is Dutch and has been found to be a reliable and valid instrument for the assessment of gagging problems (8). The patient part of the original GPA consisted of 14 questions, including items about the occurrence of the gagging reflex during eating and brushing teeth in the morning and evening. These items, however, were not correlated with the presence of the gagging reflex among patients. The authors thus suggested a shorter

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form of the questionnaire, excluding these items, for use in further research (8).

The translation of health questionnaires into local languages is required for their global utilization and cultural adoption. The translated version of the questionnaire must then be re-evaluated to ensure that it retains the properties of the original version (9). Therefore, the aim of the present study was to evaluate the reliability and validity of the Turkish version of the shorter form of the GPA.

Subjects and methods

A total of 134 patients agreed to participate in the study after its aims and methods were explained to them. The patient sample consisted of 44 patients with a gagging reflex and 90 patients who showed no signs of gagging reflex during the routine dental examination. This procedure was performed in the Oral Diagnosis clinic by dentists not participating in the present study. One female patient with gagging reflex and one male patient without reflex withdrew from the study, resulting in a final sample size of 43 patients with gagging reflex (26 females, 17 males; 32·7 ± 10·3 years) and 89 patients with no gagging reflex (47 females, 42 males; 32·6 ± 10·2 years). Ethical approval was acquired from the Medical Ethical Committee of the Gazi University Faculty of Dentistry, and written consent was obtained from the patients. Participants who presented gagging problems were placed in the 'patient group', and those who did not were treated as the 'control group'.

The short version of the GPA was translated into Turkish and then re-translated into English by a native Turkish- and fluent English-speaking dentist who did not make any observations in this study. All subjects were informed about the patient and dentist parts of the questionnaire and were asked to complete the patient portion, which included questions about any gagging reflex occurring during daily dental activities and dental examination or treatment. Patient responses estimated the degree of the gagging reflex on a four-point Likert scale, with answers ranging from 'no' to 'always'.

The dentist portion of the GPA consisted of clinical observation to confirm patient characterizations of the gagging reflex. This approximately 2-min procedure was conducted in a supine position with the aid of a standard dental mirror. The supine position, most frequently adopted by patients for dental examination, has been shown to produce the same results as examination in a sitting position and, therefore, was used for this study (8). The examination was started with the evaluation of any reflex when the patient opened the mouth and saw the dental mirror, and was finished by touching the alveolar process at the level of the third molars inside the oral cavity. The presence or absence of gagging reflex was noted in all situations. The dentist part of the GPA was completed by two dentists who were trained in the examination procedure, and were blind to the patients' answers to the questionnaire. Patients returned 2 weeks later, and the GPA was again conducted according to the same procedure used in the first session.

The English translation of the shorter version of the GPA is given in Table 1. To evaluate the validity of the shorter form of the GPA, the Turkish translations of the modified dental anxiety scale (MDAS) (10, 11), dental fear scale (DFS) (12) and Spielberger trait anxiety scale (STAI-T) (13), which have previously been found to be valid and reliable, were also completed twice.

Data were analysed with SPSS 11.5 for Windows software*. Age was shown as mean ± SD, and ordinal data were expressed as median (25th–75th) percentiles. Medians were compared with the Mann–Whitney U test. Nominal data were tested by Pearson chi-square tests. Cronbach's alpha was calculated for both the patient and the dentist parts of the GPA to evaluate the questionnaire's internal consistency. A value exceeding 0·70 is recommended for adequate internal consistency (14, 15). Intra- and inter-observer agreement levels were calculated with Cohen's kappa (κ) coefficient. Degrees of association between the GPA and the DFS, MDAS and STAI-T, respectively, were calculated by Spearman's rank correlation coefficients. P values of less than 0·05 were considered statistically significant.

Results

The means of the total scores for the shorter form of the GPA ranged from 2·40 ± 0·33 to 3·86 ± 0·38 in the patient group, and from 1·0 ± 0·0 to 1·29 ± 0·44 in the control group. A significant difference was found between the means of the patient and control group scores, demonstrating that the GPA was useful for distinguishing patients who presented gagging problems from those who did not ($P < 0·001$).

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Table 1. Items in English of the shorter version of the gagging problem assessment (GPA) questionnaire used in the study (8)

Patient part					
Instruction: Please estimate your degree of gagging in the following situations. Cases in which you avoid a situation because of your gagging problem, please encircle 'always'. Cases which are not applicable encircle 'NA'					
Brushing your teeth	No	Sometimes	Often	Always	NA
Wearing a removable prosthesis	No	Sometimes	Often	Always	NA
Laying backwards in dental chair	No	Sometimes	Often	Always	NA
Feeling the mirror in front of your mouth	No	Sometimes	Often	Always	NA
Feeling the mirror in your mouth near anterior teeth	No	Sometimes	Often	Always	NA
Feeling the mirror in your mouth	No	Sometimes	Often	Always	NA
Feeling the mirror between posterior teeth	No	Sometimes	Often	Always	NA
Taking an impression of the lower jaw	No	Sometimes	Often	Always	NA
Taking an impression of the upper jaw	No	Sometimes	Often	Always	NA
Dentist part					
Instruction: Please indicate the presence of gagging in the following situations when the back of the dental chair is not more than 30° in supine position. Encircle 'yes' for cases in which you have been unable to perform an action because of gagging reflex					
Holding the mirror					
Outside the mouth, in front of opened mouth	No	Yes			
In the mouth, at the level of second molars	No	Yes			
In the mouth, touching behind the upper incisors	No	Yes			
In the mouth, touching transition to soft palate	No	Yes			
On the inner side of the cheek, at the level of second molars	No	Yes			
Touching the maxillary process, at the level of molar 7/8	No	Yes			

Kappa values ranged from 0·855 to 1·000 and correlation coefficients ranged from 0·936 to 1·000 for the nine items in the patient part of the shorter form of the GPA, indicating a high degree of agreement ($P < 0·001$) (data not shown).

The results of the study show significant differences in the dental anxiety and trait anxiety scores between the patient and control groups (Table 2). Evaluation of intra-observer agreement produced Kappa values between 0·884 and 1·000 for the first observer and between 0·840 and 1·000 for the second observer (Table 3). Kappa values evaluating inter-observer agreement ranged from 0·850 and 1·000 for the first evaluation session, and from 0·876 to 1·000 for the second session (Table 4). These results indicate high intra- and inter-observer agreement for the dentist part of the questionnaire.

Cronbach's alpha values exceeding 0·70 indicated adequate reliability for the GPA; these values ranged from 0·884 to 0·896 for the total questionnaire (Table 5). Correlation coefficients comparing the GPA patient part to the DFS, MDAS and STAI-T scales showed significant relationships for all items ($P < 0·05$)

Table 2. Age, gender and anxiety scores of individuals according to dental fear scale (DFS), modified dental anxiety scale (MDAS) and Spielberger trait anxiety (STAI-T) scales

Items	Control group (n = 89)	Patient group (n = 43)	P
Age	32·6 ± 10·2	32·7 ± 10·3	0·943
Females	47 (% 52·8)	26 (% 60·5)	0·407
DFS	39 (28–73)	73 (68–76)	<0·001
High anxiety-DFS*	39 (% 43·8)	36 (% 83·7)	<0·001
MDAS	10 (7–19)	19 (17–21)	<0·001
High anxiety-MDAS*	39 (% 43·8)	32 (% 74·4)	<0·001
STAI-T	38 (29–42)	45 (40–53)	<0·001

Note: *Describes subjects having high anxiety levels according to DFS and MDAS, respectively.

Table 3. Intra-observer agreement levels of dentists

	First dentist			Second dentist		
Items	Kappa coefficient	s.e.	P	Kappa coefficient	s.e.	P
Item 1	1·000	0·000	<0·001	1·000	0·000	<0·001
Item 2	1·000	0·000	<0·001	0·981	0·019	<0·001
Item 3	0·884	0·066	<0·001	0·840	0·078	<0·001
Item 4	0·951	0·035	<0·001	0·931	0·039	<0·001
Item 5	0·916	0·037	<0·001	0·949	0·029	<0·001
Item 6	0·983	0·017	<0·001	0·983	0·017	<0·001

Table 4. Inter-observer agreement levels of dentists

	First evaluation			Second evaluation		
Items	Kappa coefficient	s.e.	*P*	Kappa coefficient	s.e.	*P*
Item 1	1·000	0·000	<0·001	1·000	0·000	<0·001
Item 2	0·981	0·019	<0·001	1·000	0·000	<0·001
Item 3	0·850	0·073	<0·001	0·876	0·070	<0·001
Item 4	0·882	0·051	<0·001	1·000	0·000	<0·001
Item 5	0·949	0·029	<0·001	0·916	0·037	<0·001
Item 6	0·983	0·017	<0·001	0·983	0·017	<0·001

Table 5. Reliability of the shorter version of the gagging problem assessment (GPA)

	Cronbach's α			No. of items		
Groups	Patient	D1	D2	Patient	D1	D2
Control group	*	*	*	*	*	*
Patient group	0·720	0·761	0·718	5	5	5
Total	0·884	0·895	0·896	5	5	5

*Too many items removed. Each variable with zero variance was removed.

(Table 6). These results demonstrate that the GPA is a valid instrument.

The GPA scores of subjects with high dental anxiety scores were significantly different than those who did not have dental anxiety ($P < 0·05$) (Table 7).

Table 6. Correlation coefficients (ρ) and significance between gagging problem assessment (GPA), dental fear scale (DFS), modified dental anxiety scale (MDAS) and Spielberger trait anxiety scale (STAI-T)

	DFS		MDAS		STAI-T	
Items	ρ	*P*	ρ	*P*	ρ	*P*
Item 1	0·354	<0·001	0·381	<0·001	0·434	<0·001
Item 2	0·331	<0·001	0·352	<0·001	0·415	<0·001
Item 3	0·196	0·025	0·187	0·032	0·254	0·003
Item 4	0·253	0·003	0·267	0·002	0·333	<0·001
Item 5	0·376	<0·001	0·399	<0·001	0·458	<0·001
Item 6	0·332	<0·001	0·353	<0·001	0·415	<0·001
Item 7	0·329	<0·001	0·355	<0·001	0·445	<0·001
Item 8	0·250	0·034	0·263	0·026	0·317	0·007
Item 9	0·217	0·068	0·225	0·058	0·275	0·019

Table 7. Distribution of answers given to items present in the shorter version of the gagging problem assessment (GPA) questionnaire between subjects having high dental anxiety and not according to modified dental anxiety scale (MDAS)* and dental fear scale (DFS)*

	MDAS			DFS		
Items	Anxiety (−)	Anxiety (+)	*P*	Anxiety (−)	Anxiety (+)	*P*
Item 1	1 (1–1)	1 (1–3)	<0·001	1 (1–1)	2 (1–3)	<0·001
Item 2	1 (1–2)	1 (1–4)	0·060	1 (1–1)	1 (1–4)	0·003
Item 3	1 (1–1)	1 (1–1)	0·091	1 (1–1)	1 (1–1)	0·028
Item 4	1 (1–1)	1 (1–2)	0·012	1 (1–1)	1 (1–2)	0·008
Item 5	1 (1–1)	1 (1–3)	<0·001	1 (1–1)	1 (1–3)	<0·001
Item 6	1 (1–1)	1 (1–2)	<0·001	1 (1–1)	1 (1–2)	<0·001
Item 7	1 (1–2)	1 (1–4)	0·004	1 (1–1)	1 (1–4)	<0·001
Item 8	1 (1–2)	1 (1–4)	0·060	1 (1–1)	1 (1–4)	0·003
Item 9	1 (1–2)	2 (1–3)	0·026	1 (1–2)	2 (1–4)	0·009

*Cut of point of high dental anxiety for MDAS was 19≥, and 55≥ for DFS.

Discussion

Patient cooperation and compliance are essential to successful diagnostic procedures and treatment in dentistry. The gagging reflex may serve as a limitation in achieving this goal, and determination of its presence before starting examination or treatment is beneficial for both patient and dentist. For this reason, the GPA was developed to assess the gagging reflex (8). The structure of the questionnaire allows the dentist to be aware of unwanted conditions and make strategies for management of the gagging reflex, both through patient responses and direct examination. In addition, treatment outcomes of the gagging reflex could be evaluated with the dentist part of the GPA.

Significant differences were found between the mean scores of the patient and control groups for both the patient and dentist sections of the GPA, indicating that the questionnaire was successful in distinguishing patients with and without gagging reflex. These results are consistent with those obtained during evaluation of the original GPA (8). The reliability of the GPA is thus preserved in its shorter form and translated into Turkish.

Patients with a gagging reflex were found to be more dentally anxious in this study, in contrast to results obtained during evaluation of the original GPA (8). The previous study reported no significant difference between the anxiety levels of patients with and without the gagging reflex, although patients with the gagging

reflex had higher dental anxiety scores. The difference in our results may be attributed to variations in patient number, gender or population. Our study included more participants and a higher ratio of females to males with the gagging reflex. Studies have reported that females show more anxiety reactions to dental treatment (16–18). These factors may have contributed to the high correlation we found between the gagging reflex and dental anxiety in this study.

Patients with gagging problems were also found to have higher trait anxiety levels. While we could not directly compare our results to similar studies, patients with high dental anxiety have been shown to also have high trait anxiety, although the latter was not a determining factor for the former (19). With further translation and cultural adaptation of the shorter form of the GPA, this instrument could be used to assess the relationships among gagging reflex, dental anxiety and trait anxiety worldwide.

This study only evaluated the ability of the GPA to distinguish presence or absence of the gagging reflex, and did not attempt to determine the GPA's ability to distinguish among patients with different levels of the gagging reflex. Further research could be conducted on this topic and might result in subsequent modifications to the questionnaire.

Our results indicate that internal consistency, intra- and inter-observer agreement, validity and reliability of the GPA were consistently high. All participants completed the questionnaire without difficulty. The statistical results supported the observations of the participating dentists that the Turkish translation of the shorter version of the GPA was easily understood and appropriate for the Turkish population.

In conclusion, the Turkish translation of the shorter version of the GPA was found to be reliable and valid, indicating its usefulness for the assessment of gagging problems in dental practice among Turkish patients.

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