Assessment of a single-item dental anxiety question

Per Otto Neverlien
Vikersund, Norway

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This paper discusses issues related to the validity and usefulness of a single-item measure of dental anxiety: The Dental Anxiety Question (DAQ) 'Are you afraid of going to the dentist?'. A nationwide random sample of 1351 people aged 15–79 years answered the DAQ and Corah's Dental Anxiety Scale (CDAS). In addition, the respondents were categorized with regard to gender, age, geographic areas, and residential districts. The internal consistency reliability coefficient for CDAS was high ($\alpha = 0.91$), and DAQ correlated highly with all of the four items on the CDAS (mean, $r = 0.71$). The correlations between the DAQ and the CDAS were high for men, women, and between age groups ($r = 0.74$–0.86). Women had significantly higher mean values on the DAQ than men in all age groups, and for both genders the mean DAQ values decreased with increasing age. The DAQ mean values were insignificantly different across geographic areas and residential districts. The conclusion is drawn that the DAQ shows promising qualities as a reliable and valid measure of the overall dental anxiety in the Norwegian adult population. □ *Adults; psychometrics; questionnaire survey*

Per Otto Neverlien, P.O.B. 75, N-3371 Vikersund, Norway

Self-report measures of dental anxiety are useful for screening purposes and in research. Corah's Dental Anxiety Scale (CDAS) (1) is a widely used, valid, and reliable measure of the overall dental anxiety (2–5). Recent data for the CDAS for the Norwegian adult population showed that the mean score for women was significantly higher than for men and that both means differed significantly from the grand mean (5). In two child dental anxiety investigations in Norway the Dental Anxiety Question (DAQ) 'Are you afraid of going to the dentist?' and the CDAS were found to give reliable and valid measures of the overall dental anxiety (6–9). However, there were no statistically significant differences between means for boys and girls aged 10–12 years in any of the studies, a finding in agreement with results in a Swedish study of adults (10) but at variance with other results among both adults (1, 2) and children (11).

Some findings suggest that persons living in rural areas in general are more dentally anxious than persons living in cities and that residential area may also be a factor of some importance. However, the reported relationships were weak and uncertain both among children (12) and among adults (13). No significant changes of dental anxiety level across geographic areas and residential districts were found in the Norwegian adult population by means of the CDAS (5).

Answers to the question 'Generally, how fearful are you of dentistry?' are reported to correlate highly ($r = 0.79$–0.89) with answers to a 22-item dental anxiety questionnaire among adults (14, 15). Results from a Finnish study of child dental anxiety indicated that asking the children directly how afraid they were of going to the dentist provided the best predictor for clinical anxiety (16). A series of investigations have demonstrated that CDAS results in child dental anxiety studies in many respects are comparable to results in the studies of adults (6–9, 11, 16).

The purpose of this article was to present and discuss data on the relationships between the DAQ and CDAS in the Norwegian adult population as part of an endeavor to explore the reliability, validity, and possible usefulness of the DAQ as a dental anxiety inventory.

Materials and methods

A nationwide random sample covering the total Norwegian population aged 15–79 years was extracted by Norges Markedsdata A/S. The distribution of respondents in relation to gender, geographic areas, and residential districts was in agreement with population data provided by the Norwegian Central Bureau of Statistics but varied slightly between age groups (17).

Altogether 1351 persons (670 men and 681 women) of the population of 3.36 million were interviewed in their homes in September 1989 by trained interviewers using a structured questionnaire. In addition to data for gender, age, geographic areas (Oslo/Akershus, the rest of eastern Norway, southern/western Norway, and Trøndelag/northern Norway), and residential districts (the city of Oslo, other cities, densely populated areas, and the countryside), the respondents were presented with and answered in writing two questionnaires: 1) the Dental Anxiety Question (DAQ): 'Are you afraid of going to the dentist?', with four alternative answers (No; A little; Yes, quite; Yes, very), DAQ scores 1–4 in the direction of increasing dental anxiety (6), and 2) Corah's Dental Anxiety Scale (CDAS) (1), consisting of four questions, and with five alternative answers with scale scores of 4–20 in the direction of increasing dental anxiety. The Norwegian translation of the CDAS (6) was in agreement with the original scale (1) and with a Swedish translation (10), except that an addition had to be made to the second item, to accommodate the common procedure of having schoolchildren go directly from the classroom to the dentist's office and not wait in the waiting room, as is described in the original item 2 of the CDAS (1). The DAQ was given as the first questionnaire, followed by the CDAS after some (in this connection) indifferent questions, to provide, to some extent at least, a distraction interval. The order in which the two scales are answered apparently does not have any influence on the results (6).

Cronbach's internal consistency reliability coefficient, alpha (18), was used as the internal reliability measure for the CDAS, and in addition we used analyses of variance (F statistics). The chi-square test was used to test for differences between frequencies. In the tables the number of respondents may be at variance with the total number in the category. This is because the samples have been weighted in accordance with the official distribution of age (17).

Table 1. Product-moment correlations between scores on the Dental Anxiety Question and items 1–4 on Corah's Dental Anxiety Scale for a sample of the Norwegian adult population in relation to gender

	Item				
	1	2	3	4	1–4 mean
Men (n = 670)	0.69	0.75	0.70	0.62	0.69
Women (n = 681)	0.77	0.76	0.72	0.60	0.71
All (n = 1351)	0.74	0.76	0.71	0.61	0.71

All values in the table are significant ($p < 0.001$)

Results

Cronbach's alpha for the CDAS was 0.91 (n = 1351). The DAQ correlated significantly for both men and women with each of the four items on the CDAS (Table 1). The main change across age was the increase in the correlational strength between the DAQ and CDAS item 4 (that is, the item related to the situation of sitting in the dental chair and waiting to have the teeth scaled and polished); for both genders there were marked increases from r = 0.50 among the 15- to 24-year-olds to r = 0.85 for those 60 years and older, with minor gender variations.

Eight to 9% of the respondents, relatively more women than men, reported high levels of dental anxiety (Table 2). The chosen scores for the four CDAS categories gave, together with the four scores on the DAQ, a highly similar distribution of respondents on the two scales (Table 2). This pattern of equality of distribution was found also in relation to age, but relatively fewer of the respondents above 40 years (6%) reported high levels of anxiety (DAQ = 4, CDAS = 14–20) compared with those younger (10%),

Table 2. Relative distribution of a sample of the Norwegian adult population in four categories on two dental anxiety scales in relation to gender

	DAQ*		CDAS†	
	Scores	%	%	Scores
Men (n = 670)	1	72	73	4–8
	2	15	15	9–10
	3	7	7	11–13
	4	5	4	14–20
Women (n = 681)	1	57	55	4–8
	2	19	20	9–10
	3	11	15	11–13
	4	13	10	14–20
All (n = 1351)	1	65	64	4–8
	2	17	17	9–10
	3	9	11	11–13
	4	9	8	14–20

* Dental Anxiety Question: 'Are you afraid of going to the dentist?'

† Corah's Dental Anxiety Scale.

the difference being significant (chi-square = 6.7, df = 1, $p < 0.01$).

The highest correlations between the DAQ and the CDAS were found among men and women 60 years and older, but the variations between the sexes and between the age groups were small (Table 3). There were no significant two-way interactions of gender and age in relation to any of the scales ($F(3) = 0.635$, and $F(3) = 0.039$ for the DAQ and the CDAS, respectively).

There were decreasing mean scores on the DAQ with increasing age for both men and women, and women had significantly higher mean scores than men in all age groups

Table 3. Correlations between scores on the Dental Anxiety Question and Corah's Dental Anxiety Scale for a sample of the Norwegian adult population in relation to gender and age

	Age (years)				
	15–24	25–39	40–59	60–79	All
Men, n	124	224	172	150	670
	0.74	0.77	0.78	0.86	0.79
Women, n	152	221	167	141	681
	0.79	0.80	0.78	0.84	0.80
All, n	276	445	339	291	1351
	0.78	0.79	0.78	0.85	0.80

All values are significant ($p < 0.001$).

Table 4. Means and standard deviations for the Dental Anxiety Question for a sample of the Norwegian adult population in relation to gender and age

Age (years)		Men	Women	All
15–24	n	124	152	276
	$\bar{x}$ (SD)	1.61 (0.96)	2.07 (1.09)	1.86 (1.05)
25–39	n	224	221	445
	$\bar{x}$ (SD)	1.55 (0.87)	1.94 (1.14)	1.74 (1.03)
40–59	n	172	167	339
	$\bar{x}$ (SD)	1.38 (0.78)	1.63 (1.02)	1.51 (0.92)
60–79	n	150	141	291
	$\bar{x}$ (SD)	1.23 (0.67)	1.50 (0.92)	1.36 (0.81)
15–79	n	670	681	1351
	$\bar{x}$ (SD)	1.45 (0.84)	1.80 (1.07)	1.63 (0.98)

All differences between men and women are significant ($p < 0.01$).

(Table 4). The mean scores for men and women (all) were significantly ($p < 0.01$) different from the grand mean. In terms of correlation there were significant negative correlations between age and the DAQ ($r = -0.19$, $p < 0.001$, $n = 1315$) and age and the CDAS ($r = -0.23, p < 0.001, n = 1351$). There were negligible, statistically insignificant, variations in mean scores across the different geographic areas and residential districts.

Discussion

The internal consistency of the CDAS was exceptionally high for a four-item scale, and the correlations between the DAQ and single items on the CDAS strongly indicate that the DAQ equally well represented all of the four situations that constitute the basis for the CDAS. The age-related increase in correlational strength between the DAQ and CDAS item 4 is reasonable in view of the tendency among elderly patients to be more troubled by periodontal problems than younger people, bearing in mind that CDAS item 4 describes a pre-scaling situation.

It has been pointed out that CDAS scores of 13–14 or higher indicate dental anxiety and that a score of 15 almost always indicates a highly anxious person (2). Looking at the distributions on the scales (Table 2), the best fit emerges with score 4 on the DAQ and

scores 14–20 on the CDAS. Persons with dental phobia are commonly reported to have a CDAS score of 15 or higher (2, 10). It may be that five instead of four alternative answers on the DAQ would have resulted in a distributional pattern in which a new DAQ score of 5 corresponded to CDAS scores 15–20. However, a CDAS score of 14 as the lower limit for anxious people seems, in the light of previous studies, to be acceptable (2, 11).

It has been demonstrated that trichotomized anxiety levels based on CDAS scores are valuable in separating regular from irregular dental patients (19), and it remains to be studied whether three categories of anxiety levels with DAQ scores of 1, 2–3, and 4 would be equally suitable. Problems related to covariation between intermediate items and extreme items in linear correlations and findings that an increase of categories beyond four may have only minimal effect, as discussed by Sjøberg et al. (20) in relation to mood adjectives, were among the decisive factors when the DAQ was originally developed (6).

The consistent high correlations between the DAQ and the CDAS are in agreement with previous findings among children, in which the DAQ and the CDAS were administered in different ways to reduce a possible effect of memorizing answers between tests (6). The consistency also adds support to earlier findings of high correlations between a single-item inventory and a more elaborate dental anxiety scale (15).

The highly significant difference in mean values for men and women was surprising in view of findings in Sweden (10), although the difference is in agreement with several other reported results (1, 2). It is not possible to decide whether men and women in the present study generally differed in their ways of expressing dental anxiety. The DAQ results certainly are in agreement with CDAS results in the Norwegian adult population (5). The finding of decreasing mean values with increasing age is in agreement with the commonest findings of a general reduction in dental fear with age (13, 21). The greatest reduction in levels of self-reported dental anxiety generally appeared around the age of 40 years for both men and women (Table 4). This also was the case with the CDAS (5). The equal levels of reported dental anxiety for different geographic areas and residential districts are in agreement with the CDAS results (5).

On the basis of the presented results it seems warranted to conclude that the DAQ, also in comparison with the CDAS, shows promising qualities as a measure of the overall dental anxiety. It may be used for screening purposes in ordinary dental practice and otherwise and probably also in epidemiologic research, which seeks to relate, for example, dental anxiety to sociocultural background variables. Whether four categories are sufficient for dental anxiety treatment research or for research related to the etiology of dental anxiety remains to be investigated. The substantial decrease in reported CDAS level in response to successful treatment (10) should probably also be registered by the DAQ in a reliable and valid manner. Further studies related to the psychometric properties of the DAQ seem worthwhile.

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