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The association between dental anxiety and oral health-related quality of life in Britain

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Abstract – *Objective:* The aim of this study was to identify associations between level of dental anxiety and the impact of oral health on quality of life (OHQOL) in Britain, controlling for sociodemographic and oral health status (self-reported) factors. *Methods:* The basic research design included a cross-sectional study involving a random probability sample of 3000 UK residents. The outcome measures were: levels of dental anxiety, which were measured on the Corah Dental Anxiety Scale (DAS), and the impact of OHQOL, which was assessed using UK oral health-related quality of life instrument (OHQoL-UK (*W*)©). *Results:* DAS was correlated with OHQoL-UK (*W*)© scores ($P < 0.01$). Having controlled for sociodemographic factors (age, gender and social class) and oral health status factors (self-reported number of teeth possessed and denture status), known confounding factors associated with OHQOL, those with high levels of dental anxiety (DAS ≥ 15) were approximately two times as likely to be among those experiencing the poorest OHQOL (below the population median OHQoL-UK (*W*)© score) in Britain ($P < 0.001$; OR = 1.93; 95% CI 1.41, 2.65). *Conclusion:* Dental anxiety is associated with the impact oral health has on life quality. Those experiencing high levels of dental anxiety are among those with the poorest oral health-related quality of life in Britain.

Key words: dental anxiety; psychosocial impact and oral health; quality of life

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Despite the technological advances in modern dentistry, anxiety about dental treatment and fear of pain associated with dentistry remains widespread (1). Studies of the prevalence of dental anxiety in general population samples have produced estimates that over 10% of the population are dentally anxious (2, 3). However, it is not clear whether reported high levels of dental anxiety reflect real differences among populations or whether they are the result of the use of different measures of anxiety and/or different cut-off points (4).

Dental anxiety is a major issue with respect to the provisions of and access to dental care (5). It can be a prime reason for missed or cancelled dental appointments in general practice (6). In addition, it can lead to irregular dental attendance, delay in seeking treatment or its avoidance all together (7). This can have detrimental consequences for the oral health of dentally anxious people.

Levels of dental anxiety have been shown to be associated with poor clinical oral health status. Dentally anxious people are reported to have more decayed teeth and surfaces, more missing teeth and fewer filled teeth than the nonanxious people (8–10). In addition, the periodontal status of dentally anxious patients is reported to be poor (11).

More recently, there is a growing interest in the psychosocial impact of dental anxiety, and five main impacts on daily living have been identified: physiological, cognitive, behavioural, health and social (12). Patients with high levels of dental anxiety are reported to experience high levels of psychological distress, suffer strong negative social consequences and, in some cases, can be psychologically handicapped (13). Dental anxiety too is reported to lead to increased time spent on sick leave compared with the nondentally anxious people (14).

There is a lack of information, however, on the impact of oral health on quality of life (OHQOL) of dentally anxious people compared to nonanxious people. Greater understanding of the differences in oral health that exist between dentally anxious and nonanxious people beyond clinical parameters is important because it will provide an insight into the consequences of dental anxiety to people's day-to-day life and quality of life, and the need to address such disparities. The aim of this study was to report on the prevalence of dental anxiety in Britain and to identify association between level of dental anxiety and the impact of OHQOL. In addition, it was also aimed to determine whether people with high dental anxiety levels had the poorest OHQOL in Britain controlling for sociodemographic and oral health status (self-reported) factors.

Method

Study population

The study was carried out with the assistance of the Office for National Statistics of Great Britain, employing their *omnibus* survey as a vehicle for data collection. The sampling frame was the *British Post-code Address File*, the most complete list of household addresses in Britain (covering England, Wales and Scotland). A random probability sample of 3000 addresses was selected in a multistage sampling process; one hundred postal sectors throughout Britain were selected and, within each sector, 30 addresses were randomly selected. Of the chosen addresses, 2667 were eligible addresses. Ineligible addresses included new and empty premises at which no private households were dwelling.

Data collection

Thirty professional interviewers were trained and calibrated by the Office for National Statistics in the use of data collection instruments with assistance from the principal investigators. Letters in advance were sent to all addresses prior to interview, and then the trained interviewers sought to carry out face-to-face interviews with an adult respondent (aged 16 years or older) at households selected over a 1-month period. During the study, a quality check of the field work was conducted to determine validity of the data collection process.

Instruments employed in data collection

Dental anxiety was measured using the popular Corah Dental Anxiety Scale (DAS), a four-itemised instrument with a five-point Likert response for each question (score 1–5; 15). These questions relate to how respondents would feel 'if they had to go to the dentist tomorrow', 'waiting in the dentist's office', 'in the dentist's chair, 'waiting while s/he gets the drill ready' and 'in the dentist's chair to have teeth cleaned'. Dental anxiety scores can range from 4 to 20.

The impact of OHQOL was assessed using the UK oral health-related quality of life measure, the weighted version, OHQoL-UK (*W*)©. This measure was developed based on the public's perception in the UK of how oral health affects life quality (16). OHQoL-UK (*W*)© consists of 16 key questions relating to oral health-related quality of life; respondents were first asked what 'effect' their oral health had on these key areas (bad/good) and then asked to rate the 'impact' of these effects on their overall quality of life (none/extreme). Summing up responses from individual questions can produce overall OHQoL-UK (*W*)© scores ranging from 16 (all bad effects of extreme impact) to 144 (all good effects of extreme impact). The psychometric properties of the instruments were reported to be good, demonstrating acceptable validity and reliability in a local survey (17).

In addition, participants were interviewed about their oral health, i.e. number of teeth possessed and denture status. Some sociodemographic information was also collected: age, gender and social class (based on the Registrar's general classification of occupation).

Data analysis

Dental anxiety scores and oral health-related quality of life scores (OHQoL-UK (*W*)©) were computed, and the distributions of responses relating to the dental anxiety questions were examined. A summary variable of dental anxiety was produced based on high dental anxiety (DAS $\geq$ 15) as suggested by the literature (18). Correlation between DAS and OHQoL-UK (*W*)© scores was explored employing Pearson's correlation test, and association between high levels of dental anxiety and OHQoL-UK (*W*)© scores were examined employing *t*-tests. A summary variable of oral health-related quality of life was also produced: 'poor oral health-related quality of life' based on median national OHQoL-UK (*W*)© values (1 = below median value, 0 = median value or above). Then, following on, the combined effects of sociodemographic factors (age, gender and social class), oral health status (based on self-reported number of teeth possessed and denture status)

and dental anxiety on 'poor oral health-related quality of life' were examined in stepwise logistic regression analysis (forward:wald).

Results

Response rate

The overall response rate for the omnibus surveys was 68%, with 1800 people participating in the study. Of the 2667 eligible addresses selected, 21% (558) declined to take part in the survey and 8% (224) of households could not be contacted during the study period. A further 2% (85) of interviews were discarded because of incomplete quality of life and/or dental anxiety sections. The profile of the group is presented in Table 1.

Dental anxiety

Overall, dental anxiety scores ranged from 4 to 20, with a mean of 9.3 and a SD of 3.7. Seventeen per cent (293) claimed they would be 'afraid that it would be unpleasant and painful' or 'very frightened' if they had to go to the dentist tomorrow. Six per cent (100) claimed they are so anxious when they are waiting in the dentist's office for their turn that they 'sometimes break out in a sweat or almost feel physically sick' and, likewise, 5% (93) when they are 'in the dentist's chair waiting to have their teeth cleaned'. Nine per cent (155) claimed that when they are 'in the dentist's chair, waiting while s/he gets the drill ready' that they 'sometimes break out in a sweat or almost feel physically sick' (Table 2). Eleven per cent (196) had high levels of dental anxiety with DAS scores greater or equal to 15.

Table 1. Profile of the study group

	Number (%)
Sociodemographic profile	
Age group	
16–64-year-olds	1384 (77)
Aged 65 years and older	416 (23)
Gender	
Male	813 (45)
Female	987 (55)
Social class	
Higher (I, II, IIINM)	998 (57)
Lower (IIIM, IV, V)	739 (42)
Uncategorised	63 (03)
Oral health status (self reported)	
Number of teeth	
20 or more	1255 (70)
10–19	218 (12)
Less than 10	327 (18)
Denture status	
I wear full/partial dentures	557 (31)
I do not wear dentures	1243 (69)
WHO goal	
More than 20 teeth without a removable prosthesis	1141 (63)
Less than 20 teeth or more than 20 teeth with recourse to a denture	659 (37)
	Mean (SD)
Dental Anxiety Scale (DAS)	9.3 (3.7)
Oral health-related quality of life (OHQoL-UK (*W*)©) score	90.0 (16.5)

Oral health-related quality of life

Most (73%, 1307) perceived the oral health as affecting their life quality in one way or the other, either enhancing or detracting from their quality of life. Scores ranged from 16 to 144, with a mean score of 90.0 and an SD of 16.5.

Dental anxiety and quality of life

Dental anxiety scores were correlated with oral health-related quality of life scores ($r = 0.14$; $P < 0.001$). Those with high levels of dental anxiety had lower mean overall scores, 84 (SD 13.7) versus 90 (SD 16.7; $P < 0.001$), and fewer mean positive experiences, 3 (SD 4.3) versus 5 (SD 5.4; $P < 0.001$).

In regression analysis, dental anxiety remained associated with oral health-related quality of life, having accounted for sociodemographic (age, gender and social class) and oral health (self-reported) factors. Those with high levels of dental anxiety were approximately two times as likely to be among those experiencing the poorest OHQOL (below the population median OHQoL-UK (*W*)© score) in Britain ($P < 0.001$; OR = 1.93; 95% CI 1.41, 2.65; Table 3).

Discussion

This study represents one of the first attempts to explore the association between dental anxiety and oral health-related quality of life. Large sample size, the sampling process and the national sampling frame all provide a major strength to this research in enabling to assess the association in Britain. The response rate was relatively high and comparable with other UK national studies (19).

Even when one of the more stringent assessments of dental anxiety was used (DAS $\geq$ 15), over 1 in 10 British people were classified as experiencing high levels of dental anxiety. Although information about

Table 2. Prevalence of dental anxiety: How would you feel ...

	Number	Per cent
If you had to go to dentist tomorrow		
I would look forward to it as a reasonably enjoyable experience	93	05.2
I wouldn't care one way or another	890	49.4
I would be a little uneasy about it	524	29.1
I would be afraid it would be unpleasant and painful	225	12.5
I would be very frightened of what the dentist might do	68	03.8
Waiting at the dentist for your turn		
Relaxed	730	40.6
A little uneasy	583	32.4
Tense	236	13.1
Anxious	151	08.4
So anxious that I sometimes break out in a sweat or almost feel physically sick	100	05.6
In the dentist chair waiting for the drill to be used		
Relaxed	369	20.5
A little uneasy	661	36.7
Tense	359	19.9
Anxious	256	14.2
So anxious that I sometimes break out in a sweat or almost feel physically sick	155	08.6
In the dentist chair waiting to have your teeth cleaned		
Relaxed	606	33.7
A little uneasy	657	36.5
Tense	277	15.4
Anxious	167	09.3
So anxious that I sometimes break out in a sweat or almost feel physically sick	93	05.2

levels of dental anxiety from a national perspective in Britain is sparse, the prevalence of dental anxiety observed concurs with estimates from the most recent UK oral health survey (19). Furthermore, these findings concur with some local studies which have employed similar measures of dental anxiety and, thus, suggest that dental anxiety remains widespread in Britain (20, 21). In addition, the prevalence of dental anxiety is somewhat similar to findings in other countries (2, 3). However, the lack of national data sets covering a wide range of age groups and differences in measurement and categorisation of dental anxiety makes it difficult to make direct comparisons.

Assessing the impact of OHQOL is an emerging and important research area, and a plethora of measures have been developed to assess such impact (22). Details about the perceived influences of OHQOL in Britain – effects and impacts from this national study – have been reported elsewhere (23).

Bivariate analysis identified associations between levels of dental anxiety. Although dental anxiety scores were significantly correlated with oral health-related quality of life scores, the correlation was weak (0.14). However, there was a substantial difference in oral health-related quality of life between those categorised as dentally anxious and not anxious, and this remained evident having

Table 3. Findings from the logistic regression analysis

	Regression coefficient	Standard error	Odds ratio	95% Confidence interval	*P*-value
Poor OHQOL (1 = below median value, 0 = median value or above)					
Dental anxiety					
Dentally anxious (0 = no, 1 = yes)	0.66	0.16	1.93	1.41, 2.65	<0.001
Sociodemographic					
Social class (0 = higher, 1 = lower)	0.33	0.10	1.39	1.14, 1.69	<0.001
Gender (0 = male, 1 = female)	−0.28	0.10	0.76	0.62, 0.92	<0.01
Age group (0 ≤ 65, 1 = 65+)					>0.05
Oral health (reported)					
WHO goal (0 = no, 1 = yes)	−0.67	0.10	0.51	0.41, 0.61	<0.001

accounted for known cofounders of oral health-related quality of life. As expected, social class background and reports of retaining 20 or more teeth without the use of a denture (World Health Organisation goal) were key factors of oral health-related quality of life (23, 24).

There could be a number of reasons why dental anxiety and poor oral health-related quality of life coexist in the same subgroup of the population. One reason is that both dental anxiety and perceived poor oral health-related quality of life reflect the underling psychological characteristics of the group and thus their related negative affectivity. Both oral health-related quality of life and dental anxiety are reported to be associated with psychological states (25, 26). It may also relate to general patterns of psychiatric morbidity, particularly, neurotic disorders, which are reported to affect 1 in 10 British people (27). However, as no measures of psychiatric or psychological status were collected in this study, it cannot be verified.

Another reason why dental anxiety and poor oral health-related quality of life coexist in the same subgroup of the population may be that dentally anxious people neglect their oral health to such an extent that they probably have high levels of untreated disease, and this detracts from their day-to-day living and life quality to a considerable degree. This is plausible given the evidence that dentally anxious people have poor oral health, delay in treatment until emergency situations and are less likely to opt for conservative or restorative care than nonanxious people (8–11). If this is the case, it is important to target resources to overcome barriers to care for dentally anxious people in Britain to enable them to utilise oral health care services appropriately and enjoy the benefits of oral health.

The study concludes that dental anxiety is prevalent in Britain, with 1 in 10 being highly dentally anxious. Dental anxiety is associated with the impact oral health has on life quality. Those experiencing high levels of dental anxiety are among those with the poorest oral health-related quality of life in Britain controlling for sociodemographic and self-reported oral health status factors.

References

1. Freeman R. Barriers to accessing and accepting dental care. Br Dent J 1999;187:81–4.
2. Locker D, Poulton R, Thomson WM. Psychological disorders and dental anxiety in a young adult population. Community Dent Oral Epidemiol 2001;29:456–63.
3. Hagglin C, Hakeberg M, Ahlqwist M, Sullivan M, Berggren U. Factors associated with dental anxiety and attendance in middle-aged and elderly women. Community Dent Oral Epidemiol 2000;28:451–60.
4. Locker D, Shapiro D, Liddell A. Who is dentally anxious? Concordance between measures of dental anxiety. Community Dent Oral Epidemiol 1996;24: 346–50.
5. Nuttall NM, Bradnock G, White D, Morris J, Nunn J. Dental attendance in 1998 and implications for the future. Br Dent J 2001;190:177–82.
6. Skaret E, Raadal M, Kvale G, Berg E. Factors related to missed and cancelled dental appointments among adolescents in Norway. Eur J Oral Sci 2000;108: 175–83.
7. Skaret E, Raadal M, Berg E, Kvale G. Dental anxiety and dental avoidance among 12–18-year-olds in Norway. Eur J Oral Sci 1999;107:422–8.
8. Bedi R, Sutcliffe P, Donnan P, Barrett N, McConnachie J. Dental caries experience and prevalence of children afraid of dental treatment. Community Dent Oral Epidemiol 1992;20:368–71.
9. Hakeberg M, Berggren U, Grondahl HG. A radiographic study of dental health in adult patients with dental anxiety. Community Dent Oral Epidemiol 1993;21:27–30.
10. Carson P, Freeman R. Dental caries, age and anxiety: factors influencing sedation choice for children attending for emergency dental care. Commun Dent Oral Epidemiol 2001;29:30–6.
11. Locker D, Liddell A. Clinical correlates of dental anxiety among older adults. Commun Dent Oral Epidemiol 1992;20:372–5.
12. Cohen SM, Fiske J, Newton JT. The impact of dental anxiety on daily living. Br Dent J 2000;189:385–90.
13. Abrahamsson KH, Berggren U, Carlsson SG. Psychosocial aspects of dental and general fears in dental phobic patients. Acta Odontol Scand 2000;58:37–43.
14. Hakeberg M, Berggren U. Changes in sick leave among Swedish dental patients after treatment for dental fear. Community Dent Health 1993;10:23–9.
15. Corah NL. Development of a dental anxiety scale. J Dent Res 1969;48:596.
16. McGrath C, Bedi R, Gilthorpe MS. Oral health-related quality of life – views of the public in the United Kingdom. Community Dent Health 2000;17:3–7.
17. McGrath C, Bedi R. An evaluation of a new measure of oral health-related quality of life – OHQoL-UK©. Community Dent Health 2001;18:138–43.
18. Moore R, Brodsgaard I. Differential diagnosis of odontophobic patients using the DSM-IV. Eur J Oral Sci 1995;103:121–6.
19. Kelly M, Steele J, Nutall N, Bradnock J, Morris J, Nunn J, et al. Adult dental health survey – oral health in the United Kingdom 1988. London: The Stationery Office; 2000.
20. Adams T, Freeman R, Gelbier S, Gibson B. Accessing primary dental care in three London boroughs. Community Dent Health 1997;14:108–12.
21. Mellor AC. Dental anxiety and attendance in the north-west of England. J Dent 1992;20:207–10.
22. Buck D, Newton JT. Non-clinical outcome measures in dentistry: publishing trends 1988–98. Community Dent Oral Epidemiol 2001;29:2–8.

23. McGrath C, Bedi R. Measuring the impact of oral health on quality of life in Britain: using OHQoL-UK (*W*)©. J Public Health Dent 2003;63:73–7.
24. Nuttall NM, Steele JG, Pine CM, White D, Pitts NB. The impact of oral health on people in the UK in 1998. Br Dent J 2001;190:121–6.
25. Hagglin C, Hakeberg M, Hallstrom T, Berggren U, Larsson L, Waern M, et al. Dental anxiety in relation to mental health and personality factors. A longitudinal study of middle-aged and elderly women. Eur J Oral Sci 2001;109:27–33.
26. Kressin NR, Spiro A, III, Skinner KM. Negative affectivity and health-related quality of life. Med Care 2000;38:858–67.
27. OPCS. Survey of psychiatric morbidity in Great Britain, 2000. London: Stationary Office; 2001.