

# Dental Fears, Health Status, and Quality of Life

Mats Mehrstedt, DMD,\* Sven Tönnies, Dipl.-Psych,† and Idis Eisentraut, Dipl.-Psych†

\*Dental Fears Clinic, and †Psychological Institute III, University of Hamburg, Hamburg, Germany

A total of 137 patients in a Hamburg dental fears clinic, a majority of them persons with dental phobia, were administered questionnaires regarding dental fears and health-related quality of life. Subjects also underwent a dental examination. Dental fears were shown to be associated with dental health problems. Women were more fearful than men, and younger persons were more fearful than older ones. Patients of lower social economic status had somewhat more dental health problems compared with more economically privileged persons. This study also shows, with the use of the SF-36, that dental fears are negatively related to quality of life, especially as measured in areas such as psychological well-being, vitality, and social functioning.

**Key Words:** Dental fears; Dental health; Quality of life.

In Germany, research on dental fears has been scarce. Epidemiological studies of dental fears in the general population do not exist. A few studies have polled the opinions of patients in the waiting rooms of German dental offices. Such studies, however, may not be representative for the general population because they omit those who never visit a dental office, and infrequent visitors are underrepresented. The German studies show that about 10% of patients surveyed suffer from strong dental fears.<sup>1,2</sup> This number is probably higher in the general population.

German as well as international studies show a clear connection between dental fears, avoidance behavior, and dental health problems.<sup>2-4</sup> These problems are unevenly distributed in society, like most other physical and mental health problems, with low-income persons suffering proportionally more health problems than more economically privileged persons. Roughly 25% of the German population is responsible for about 75% of all dental disease in the country.<sup>5,6</sup> Some studies have shown a connection between dental fears and low quality of life.<sup>7,8</sup> Recent socioepidemiological research indicates that psychological well-being and social functioning could be important causal factors in health inequalities.<sup>9,10</sup> Dental fears and dental health problems are associated with other physical and mental health problems

and therefore add to the financial burden of the health care system as the result of loss of working hours and growing treatment needs.<sup>4,11,12</sup>

The short form of the Nottingham Health Profile (SF-36) for health-related quality of life has been proven to be a valuable psychological measurement instrument in numerous international studies.<sup>13</sup> In this study the German translation of the SF-36 was used for the first time in a clinical sample of persons with dental phobia.

The aim of this study was to test the following hypotheses:

- According to previous studies, patients with dental fears generally are younger than nonfearful patients, women are more fearful than men, and persons with lower social status are more fearful than persons of higher status. This should also be the case in a sample of dental patients in Hamburg, Germany.
- Dental health should be worse in older patients than in younger ones, worse in men than in women, and worse in persons of lower social status.
- Dental health and quality of life of highly fearful persons should be worse than in those who are nonfearful. Quality of life may be lower in lower social status groups.

## MATERIALS AND METHODS

The data collection took place in a dental fears clinic in Hamburg, Germany, during a period of about 10

Received September 14, 2001; accepted for publication April 29, 2004.

Address correspondence to Mats Mehrstedt, DMD, Horner Landtstraße 173, 22111 Hamburg, Germany; mehrstedt@gmx.de.

Anesth Prog 51:90-94 2004  
© 2004 by the American Dental Society of Anesthesiology

ISSN 0003-3006/04/\$9.50  
SSDI 0003-3006(04)

months in 1998–1999. All new patients were asked to fill out 3 questionnaires prior to treatment. The patients' consent for the statistical, anonymous evaluation of data was obtained and the Ethics Commission of the Hamburg Medical Chamber approved of the procedure. A total of 137 patients took part in the study; 84 (61%) patients were women. The average age of the women was 35 years, and of the men 41 years. The youngest patient was 16, the oldest 72. Fifty percent of the patients were between 28 and 46 years old.

### Social Status

Social status was determined by occupation. The occupation of the patients was classified according to the major British surveys.<sup>14</sup> Fourteen percent were classified as managerial, 33% as skilled nonmanual, 23% as skilled manual, 7% as partly skilled manual, and 10% as unskilled manual (15% were classified either as "other" or had no data available). Although the top social status group was underrepresented, the sample could be said to correspond to the general population in Germany.<sup>15</sup>

### Dental Health Status

An oral examination was performed, during which teeth were classified according to the requirements of the German insurance system as decayed (which means decayed but still repairable), destroyed (decayed beyond repair), or missing. Third molars were not included.

### Instruments

All patients filled out 2 questionnaires for dental fears and 1 for general health and quality of life.

Dental fears were measured with the Dental Anxiety Scale (DAS)<sup>16</sup> and the Dental Fear Survey (DFS)<sup>17</sup> in German translations. The validity and reliability of both instruments in the German translation have been confirmed.<sup>18</sup> The DAS registers general dental fear on a 4-item scale. The results lie between 4 (no fear) and 20 (extreme fear). Outcomes of 15 and above are generally classified as highly fearful.<sup>19</sup>

The DFS<sup>17</sup> consists of 20 detailed questions about physical, emotional, and behavioral aspects of dental fears. The results of the DFS go from 20 (no fear) to 100 (extreme fear). Outcomes of 60 and above have been classified as highly fearful.<sup>20</sup>

General health and quality of life were measured with the SF-36 in German translation by Bullinger and Kirchberger.<sup>13</sup> This is a frequently used measurement for different aspects of self-perceived physical and mental health. The SF-36 contains the following 8 subscales and a single item about change in health:

- Physical functioning (PHYFU): The extent to which health problems limit the ability to perform physical activities like walking, climbing stairs, or lifting heavier objects.
- Role limitations caused by physical health problems (PHYRO): The extent to which health problems may limit the ability to perform tasks at work or in daily life.
- Bodily pain (PAIN): How much pain is perceived and how much it influences daily life.
- General health perceptions (GENH): Personal perception of present health status, expectations for future health, and an estimate of the ability to resist infections.
- Vitality (VITA): Feelings of energy and decisiveness versus fatigue.
- Social functioning (SOFU): The extent to which the physical health status may limit normal social activities.
- Role limitations caused by emotional problems (EMRO): The extent to which emotional problems may limit performance at work or other daily activities.
- Mental health or psychological well-being (PSYC): Self-perception of general mental health status such as depression, anxiety, and feelings of emotional and behavioral control.
- Change in health: Estimate of the change in health compared with 1 year earlier.

### Data Analysis

All data were analyzed using the SPSS statistical package (version 8.0, SPSS Inc, Chicago, IL). Simple descriptive statistics were used together with the chi-square test, Pearson correlation coefficients, factor analysis, Student *t*-test, and the Mann-Whitney *U*-test to estimate significant differences. A  $P < .05$  was considered statistically significant.

## RESULTS

### Dental Fears

The first hypothesis was correct in stating that women would have stronger fears than men and younger persons stronger fears than older ones. Socioeconomic differences could not, however, be found.

According to the DAS, women have more ( $P < .01$ ) dental fear (mean = 14.8) than men (mean = 12.3). Age correlates significantly negatively ( $-.25$ ) with dental fears in such a way that patients with low or no fear were significantly older than persons with moderate or high fear (see Table 1). The results for the DFS are sim-

**Table 1.** Comparison of Patients From Different Fear Levels According to the Dental Anxiety Scale (DAS) in Relation to Age and Dental Health Status

DAS	No or Low Fear (n = 68)	Moder- ate or High Fear (n = 69)	P (Ho)	Signi- ficance Level (%)
	Mean	Mean		
Age	40.78	33.29	<.01	.001
Missing teeth	3.76	4.20	.60	NS
Destroyed teeth	0.54	1.85	.01	.01
Decayed teeth	1.81	4.70	<.01	.001

ilar: according to the DFS, women have significantly ( $P < .001$ ) more dental fears (mean = 62.2) than men (mean = 50.5). Age correlates significantly negatively ( $-.34$ ) with dental fears in such a way that patients with low or no fear were significantly older than persons with moderate or high fear (see Table 2).

### Dental Health Status

The second hypothesis was correct in stating that older persons should have poorer dental health than younger persons, men poorer dental health than women, and persons of lower social status poorer dental health than more privileged persons. The correlations were, however, not always as clear as expected.

The 137 patients had on average 3.2 decayed teeth (range from 1 to 14 decayed teeth; 79% showed between 0 and 5 decayed teeth); on average 1.2 destroyed teeth (range, 0-21; 79%, 0-1); and on average 4.0 missing teeth (range, 0-25; 76%, 0-5). A differential study of the relationship between dental health status and sociodemographic factors (sex, age, social status) came to the following results: the age of the patients was correlated to dental health status, and older patients had increasing numbers of missing and destroyed teeth (Table 3).

Slight sex differences in the number of missing teeth could be shown, but these were, considering the great variation, not statistically significant. The men had on average 4.8 missing teeth, the women 3.5.

Social status correlated significantly with dental health, but the correlations were minor. Patients with lower social status had more decayed, destroyed, and missing teeth (Table 3).

### Dental Fears, Health Status, and Quality of Life

The third hypothesis proved correct, although the differences were not strong; persons with dental phobia had poorer dental health and perceived, in some re-

**Table 2.** Comparison of Different Fear Levels According to the Dental Fear Scale (DFS) With Age and Dental Health Status

DFS	No or Low Fear (n = 71)	Moder- ate or High Fear (n = 65)	P (Ho)	Signi- ficance Level (%)
	Mean	Mean		
Age	40.58	32.72	<.001	.01
Missing teeth	4.13	3.74	.64	NS
Destroyed teeth	0.54	1.92	<.01	.01
Decayed teeth	2.01	4.65	<.001	.001

spects, a lower quality of life than others. Quality of life was not dependent on social status.

To explore these relationships, the results of the dental fear scales DAS and DFS were compared with data describing dental status (number of decayed, destroyed, and missing teeth). It was also explored if there were differences between the 3 fear-level groups according to DAS and DFS as to dental health or the scales of the SF-36.

The following results were found in connection with dental status: both scales for dental fears (DAS and DFS) showed a significant difference for phobic patients ( $P$  between .1% and .01%) with higher numbers of decayed and destroyed teeth. There was no difference in the number of missing teeth (see Tables 1 and 2). The results showed that patients with moderate or high fear according to DAS and DFS had significantly more destroyed and decayed teeth. There were, however, no differences as to the number of missing teeth.

The evaluation of the self-perceived general health status of the patients, as measured by the SF-36, showed that 2% perceived their physical health as excellent, 26% as very good, 57% as good, 12% as less than good, and 2% as bad. Two thirds reported that the state of their health had not changed in the last year, 26% declared that it was somewhat or very much better than a year earlier, and 9% said it had become worse.

Contrary to our assumptions, no connection between health status and socioeconomic status could be found.

Compared with factors of general health (SF-36), the following could be shown: dental fears as measured by

**Table 3.** Relationships Between Age and Socioeconomic Status (SES) With Dental Health Status

	Missing Teeth	Destroyed Teeth	Decayed Teeth
Age	.48***	.22**	-.39***
SES	.27***	.26**	.22*

\* PMcorr. sign. on the: 1% (\*\*\*) resp. 1% (\*\*) level (2-tailed).

**Table 4.** Relationships Between Different Fear Levels According to the Dental Anxiety Scale (DAS) and General Health Status

<i>SF-36 Factors</i>	<i>No or Low Fear (n = 68) Mean (SD)</i>	<i>Moderate or High Fear (n = 69) Mean (SD)</i>	<i>P (Ho)</i>	<i>Significance Level (%)</i>
Vitality	62.30 (14.85)	55.51 (19.12)	.022	0.05
Social functioning	82.54 (21.18)	76.81 (27.89)	.178	NS
Emotional role limitations	85.29 (36.14)	74.40 (40.88)	.101	NS
Psychological well-being	70.59 (14.72)	62.26 (18.72)	.004	0.01

the DAS and DFS correlated significantly negative with the VITA and PSYC scales ( $P$  between .1% and .01%; ie, patients with moderate or high dental fear showed less vitality and less psychological well-being than those with low or no fear). There were also significant ( $P < 5\%$ ) but less clear relationships between stronger fear and limited social functioning and limited emotional functioning.

The Student  $t$ -tests were performed between the 2 fear-level groups according to DAS and DFS, which led to the following results (Tables 4 and 5): on the VITA scale, persons with low or no fear had significantly ( $P < .05\%$ ) better results than persons with moderate or high fears when measured with DAS, and very significantly better results ( $P < .01\%$ ) when measured with the DFS.

Persons with low or no fear as measured by the DFS had significantly ( $P < .05\%$ ) better results than persons with moderate or high fears on SOFU scale, and they showed a tendency ( $P < .1\%$ ) toward better results for the factor EMRO (see Table 5).

The dental fear groups as measured by the DAS showed that persons with no or low fear levels had very significantly ( $P < .01\%$ ) better results on the scale for PSYC than those with moderate or high fear. When the fears were measured by the DFS, these differences were highly significant ( $P < .001\%$ ).

In order to describe the differences between the groups on the scale level, additional comparisons were performed based on the SF-36 items with the Mann-Whitney  $U$ -test: the patient groups according to DFS then showed significant differences on all items of the VITA scale, and according to DAS they showed signifi-

cant differences in the first 2 items only ( $P$  between .001% and 5.0%). Highly fearful patients were rarely full of energy, and they were more often exhausted and tired. In the PSYC scale the patients grouped according to the DFS differed significantly in 5 of the 6 items ( $P$  between .001% and 5.0%), and according to the DAS in the first 2 items only: the highly fearful patients were more often very nervous, more rarely calm and relaxed, more often discouraged and sad, and less happy. Additionally, the physical health or mental health of the highly fearful patients according to DFS had more often a negative influence on their contacts with family members (the SOFU scale), and according to DAS the highly fearful patients more often expected a declining health (the GENH scale).

## DISCUSSION

The present study confirms earlier research findings that younger persons show more dental fears than older ones<sup>21,22</sup> and that women are more fearful than men.<sup>2-4</sup> No difference in dental fears could be found between social status groups. Persons with lower social status did, however, have more dental health problems, as measured in decayed and missing teeth. The connection between dental phobia and deteriorating dental health was clearly shown, as persons with dental phobia had significantly more decayed teeth than nonfearful patients.

Highly fearful dental patients were shown to have much lower scores for psychological well-being, vitality, and social functioning than nonfearful patients. These are factors that can lead to additional physical and men-

**Table 5.** Relationships Between Different Fear Levels According to the Dental Fear Scale (DFS) and General Health Status

<i>SF-36 Factors</i>	<i>No or Low Fear (n = 71) Mean (SD)</i>	<i>Moderate or High Fear (n = 65) Mean (SD)</i>	<i>P (Ho)</i>	<i>Significance Level (%)</i>
Vitality	62.75 (14.66)	54.00 (18.48)	.003	.01
Social functioning	83.63 (21.09)	75.00 (27.95)	.046	.05
Emotional role limitations	85.92 (35.93)	72.82 (41.20)	.051	.1
Psychological well-being	72.00 (14.64)	60.31 (18.14)	<.001	.001

tal health problems.<sup>10,23,24</sup> There was also a slight connection between general health status (according to SF-36) and dental health status, because patients with impaired physical health also had worse dental health.

The differences found in the quality of life items psychological well-being, vitality, and social functioning between fearful and nonfearful patients could be interpreted either as a cause or as a result of dental fears or deteriorating dental health. Recent research on public health is, however, increasingly supporting the view that health must be understood as an outcome of interactions between humans and the social circumstances and physical environment in which living takes place.<sup>25,26</sup> Quality of life may thus play an important role in dental health, and further research in this area may yield insights into how a number of psychological, psychosomatic, and dental problems may be interrelated. The promotion of preventive dental health strategies for the high risk groups that are responsible for most of the dental disease may not be very successful without this knowledge. It also seems likely that the results of the preventive efforts of the dentists may be very limited as long as the necessary political decisions to improve conditions for low-income persons are absent.<sup>27,28</sup> It is obviously of special importance to find ways to focus resources on this high risk group.

## REFERENCES

1. Kunzelmann K-H, Dünninger P. Dental fear and pain: effect on patient's perception of the dentist. *Comm Dent Oral Epidemiol.* 1990;18:264-266.
2. Micheelis W, Bauch J. *Mundgesundheitszustand und Verhalten in der Bundesrepublik Deutschland.* Köln, Germany: Deutscher Ärzte-Verlag; 1991.
3. Berggren U. *Dental fear and avoidance* [dissertation]. Göteborg, Sweden: University of Göteborg; 1984.
4. Hakeberg M. *Dental Anxiety and Health* [dissertation]. Göteborg, Sweden: University of von Göteborg; 1992.
5. Zimmermann MM, Willershausen-Zönnchen B, Ernst C-P. Soziindividuelle Prädisposition und Oral morbidity. *Prophylaxe Impuls.* 1998;4:196-205.
6. Micheelis W, Reich E. *Dritte deutsche Mundgesundheitsstudie (DMS III).* Köln, Germany: Deutscher Ärzte-Verlag; 1999.
7. Reisine ST, Fertig J, Weber J, Leder S. Impact of dental conditions on patients' quality of life. *Comm Dent Oral Epidemiol.* 1989;17:7-10.
8. Hakeberg M, Berggren U. Changes in sick leave among Swedish dental patients after treatment for dental fear. *Comm Dent Health.* 1993;10:23-29.
9. Wilkinson RG. *Unhealthy Societies: The Afflictions of Inequality.* London: Routledge; 1996.
10. Mielck A. *Soziale Ungleichheit und Gesundheit.* Bern, Switzerland: Hans Huber; 2000.
11. Reisine S, Miller J. A longitudinal study of work loss related to dental diseases. *Soc Sci Med.* 1985;21:1309-1314.
12. Hollister MC, Weintraub JA. The association of oral status with systemic health, quality of life, and economic productivity. *J Dent Educ.* 1993;57:901-912.
13. Bullinger M, Kirchberger I. *Fragebogen zum Gesundheitszustand SF-36.* Göttingen, Germany: Hogrefe; 1998.
14. Townsend P, Davidson N, Whitehead M. *Inequalities in Health: The Black Report and the Health Divide.* London: Penguin; 1992.
15. Schäfers B. *Sozialstruktur und Sozialer Wandel in Deutschland.* 7th ed. Stuttgart, Germany: Lucius & Lucius; 2001.
16. Corah NL. Development of a Dental Anxiety Scale. *J Dent Res.* 1969;48:596.
17. Kleinknecht RA, Klepac RK, Alexander LD. Origins and characteristics of fear of dentistry. *J Am Dent Assoc.* 1973;86:842-848.
18. Tönnies S, Mehrstedt M, Eisentraut I. Die Dental Anxiety Scale und das Dental Fear Survey: Zwei Messinstrumente für Zahnbehandlungsängste. *Z Med Psych.* 2002;11:63-72.
19. Corah NL, Gale EN, Illig SJ. Assessment of a dental anxiety scale. *J Am Dent Assoc.* 1978;97:816-819.
20. Milgrom P, Weinstein P, Roy-Byrne P, Tay K-M. Dental fear treatment outcomes for substance use disorder patients. *Spec Care Dent.* 1993;13:139-142.
21. Doerr PA, Lang WP, Nyquist LV, Ronis DL. Factors associated with dental anxiety. *J Am Dent Assoc.* 1998;129:1111-1119.
22. Willershausen B, Azrak B, Wilms S. Fear of dental treatment and its possible effect on oral health. *Eur J Med Res.* 1999;4:72-77.
23. Marmot MG, Wilkinson RG, eds. *Social Determinants of Health.* Oxford, England: Oxford University Press; 1999.
24. Kawachi I, Kennedy BP, Wilkinson RG. The society and population health reader: income inequality and health. New York: New Press; 1999.
25. Tarlov AR. Social determinants of health: the sociobiological translation. In: Blane D, Brunner E, Wilkinson R, eds. *Health and Social Organization: Towards a Health Policy for the 21st Century.* London: Routledge; 1996.
26. Elstad JI. The psycho-social perspective on social inequalities in health. In: Bartley M, Blane D, Davey Smith G, eds. *The Sociology of Health Inequalities.* Oxford, England: Blackwell; 1998.
27. World Health Organization. *The World Health Report 1998.* Geneva, Switzerland: World Health Organization; 1998.
28. United Nations. *Human Development Report 1999: United Nations Development Programme.* Oxford, England: Oxford University Press; 1999.