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Causes of Dental Fear Among Adults and their Associations with Oral Hygiene Habits

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ABSTRACT: Dental fear and anxiety are common and may lead to avoidance of dental care and poorer oral health. This study aimed to identify the causes of dental fear among adults and their associations with sociodemographic characteristics and oral hygiene habits. An anonymous online questionnaire survey was conducted in February–March 2025 among 175 adults aged 18 years and over. The questionnaire covered sociodemographic data, oral hygiene and dietary habits, and items from modified MDAS and Corah scales. Data were analysed using SPSS 30.0 (descriptive statistics, chi-square test, correlation analysis). Most respondents brushed their teeth twice a day (71.4%), yet 30.3% did not use dental floss and 52.5% did not use interdental brushes. Mean anxiety scores across dental situations were low (2.02–2.32 on a 5-point scale), with the highest scores for local anaesthetic injection and tooth filling. The most frequently reported causes of fear were pain (53.2%) and treatment costs (48.0%). Women reported fear of pain (57.2% vs 32.4%; $p = 0.007$) and of a poor treatment outcome (26.1% vs 8.1%; $p = 0.020$) more often than men. Fear of medical instruments and of unpleasant sounds, smells and surroundings was significantly associated with age group ($p = 0.032$ and $p = 0.018$, respectively), being reported almost exclusively by respondents aged 18–50 years. Toothbrushing frequency was significantly associated only with anxiety during professional cleaning and polishing ($r = 0.173$; $p = 0.022$). Dental fear is driven largely by factors that can be managed in the clinic, and its pattern differs by sex and age; fear reduction strategies should therefore be tailored and address pain control, transparency of treatment costs and empathic communication.

KEYWORDS: dental fear, dental anxiety, oral hygiene, adults

I. INTRODUCTION

Dental anxiety is a strong fear or anxiety related to the dental setting. It is regarded as a public health concern because it is relatively common and adversely affects patients' oral health (Sukumaran et al., 2021). Anxiety is an adaptive emotional response to potentially threatening situations, regulated by the sympathetic nervous system; dental anxiety may occur before, during or after dental treatment (Hoffmann et al., 2022). Although the terms dental anxiety and dental phobia are often used interchangeably, they differ: dental anxiety is defined as a specific reaction to stress associated with dental treatment, whereas dental phobia is characterised by persistent fear that leads the person to avoid dental visits until the problem becomes unmanageable (Kassem El Hajj et al., 2021).

The reported prevalence of dental fear among adults varies widely, from 4.2% to more than 50%; these differences have been attributed to cultural, social and economic differences between populations and to differing assessment methods (Furgała et al., 2021). According to a systematic review and meta-analysis, 15.3% of adults experience dental fear and 12.4% experience high dental fear (Silveira et al., 2021). The literature indicates that dental fear is more common among women (Dadalti et al., 2021; Musalam et al., 2021) and younger individuals (Dhanapriyanka et al., 2024), whereas higher educational attainment is associated with a lower risk of dental phobia (Kassem El Hajj et al., 2021).

Dental fear is a multifactorial condition. Patient-related causes include previous dental experiences, pain, the experiences of family and peers, and personality traits, while provider-related causes include communication style and inappropriate behaviour (Musalam et al., 2021). Pain is reported as the most common fear associated with dental procedures (Saba & Katirci, 2023), and most individuals attribute their dental fear to previous negative experiences during dental visits (Furgała et al., 2021). Anxiety may also be triggered by injections, tooth extraction and the sound of the drill (Dhanapriyanka et al., 2024), as well as by unpleasant smells and surroundings (Musalam et al., 2021), while financial barriers to dental care are greater than those to other health care services (Vujicic et al., 2016).

The consequences of dental fear for oral health are described as a vicious cycle: anxious patients delay or avoid dental care, their oral health deteriorates, and this, together with feelings of guilt and shame, further increases their anxiety (Kassem El Hajj et al., 2021). Individuals with dental anxiety more often have untreated carious tooth surfaces and poorer oral health-related quality of life

(Sukumaran et al., 2021; Aardal et al., 2023). In a study of German adults, greater dental fear was significantly associated with less frequent preventive visits, poorer oral health and lower quality of life (Winkler et al., 2023). In addition, poor oral hygiene habits and visit frequency may influence fear of dental treatment (Akshaya et al., 2020).

Although dental fear has been widely studied internationally, data on the causes of dental fear among Lithuanian adults and their associations with everyday oral hygiene habits are lacking. The aim of this study was to identify the causes of dental fear among adults and their associations with sociodemographic characteristics and oral hygiene habits.

II. RESEARCH METHODS

A. Research Design

A quantitative cross-sectional study was conducted using an anonymous online questionnaire survey. Data were collected between 14 February and 20 March 2025.

B. Participants and Eligibility Criteria

Inclusion criteria were age 18 years or older and voluntary consent to participate. The exclusion criterion was being under 18 years of age.

C. Sampling Technique and Sample Size

Non-probability convenience sampling was used. The questionnaire was published on the apklausa.lt platform and distributed via the social media platforms Facebook and Instagram. Of the 180 questionnaires received, 5 were excluded for not meeting the eligibility criteria; the final analysis included 175 questionnaires.

D. Research Instrument

A 29-item questionnaire was used, adapted from a questionnaire applied in a 2022 study at Klaipėdos valstybinė kolegija. The first section (7 items) covered sociodemographic characteristics (age, sex, marital status, education, main occupation, income and place of residence); the second section (10 items) addressed oral hygiene, dietary and harmful habits, and the frequency of visits to a dentist and a dental hygienist. The third section (12 items) addressed emotions during dental procedures and causes of fear. Anxiety in six dental situations was assessed using a modified version of the Modified Dental Anxiety Scale (MDAS; Humphris et al., 1995) on a 5-point scale (1 – I would feel relaxed, 5 – I would feel extremely anxious). Emotions before and during the visit were assessed using modified items from Corah's Dental Anxiety Scale. Multiple-response items were used to identify causes of fear and anxiety-provoking circumstances.

E. Statistical Analysis

Data were analysed using IBM SPSS version 30.0; charts were prepared using MS Excel 2021 and Python. Descriptive statistics (frequencies, percentages, means and standard deviations) were calculated. Associations between categorical variables were assessed using cross-tabulations and the chi-square (χ^2) test. Associations between toothbrushing frequency and anxiety scores were assessed using correlation analysis. A p-value of < 0.05 was considered statistically significant.

F. Ethical Considerations

The study adhered to the principles of confidentiality, justice, honesty and respect for persons. At the beginning of the questionnaire, participants were informed about the purpose of the study and that participation was voluntary and anonymous; no personal data were collected, and the data obtained were used for research purposes only.

III. RESULTS

A. Participant Characteristics

A total of 175 adults participated in the study: 138 (78.9%) women and 37 (21.1%) men. The proportion of women increased with age: women accounted for 68.3% of participants aged 18–29 years, 80.7% of those aged 30–50 years, and 96.6% of those aged 51–70 years. Most participants lived in large cities (61.1%), 26.3% in small towns and 12.6% in rural areas. Most were employed (n = 114), 31 were students and 19 were self-employed. The most frequently reported monthly net incomes were €1,001–1,500 (28.6%) and €501–1,000 (26.3%). The distribution of participants by education and sex is presented in Table 1; no statistically significant difference between sexes was found (p = 0.085).

Table 1. Distribution of Participants by Education and Sex, n (%)

Sex	Secondary	Vocational	Higher (Bachelor's)	Higher (Master's, doctoral)	χ^2	p
Male	15 (27.3)	11 (30.6)	9 (12.3)	2 (18.2)	6.612	0.085
Female	40 (72.7)	25 (69.4)	64 (87.7)	9 (81.8)		

Sex	Secondary	Vocational	Higher (Bachelor's)	Higher (Master's, doctoral)	χ^2	p
Total	55	36	73	11		

Note. Percentages were calculated within each education group.

B. Oral Hygiene Habits and Frequency of Visits

Overall, 71.4% of participants brushed their teeth twice a day or more, 24.0% once a day, 3.5% several times a week and 1.1% less than once a week. Dental floss was used daily by 21.1% and interdental brushes by 12.6% of participants, whereas 30.3% and 52.5%, respectively, did not use these aids at all. Tobacco products were used daily by 28.0% of participants, while 61.1% did not use them. Sweets were consumed daily by 26.3% and at least once a week by 60.0% of participants. The frequency of visits to a dentist and a dental hygienist is shown in Table 2. A statistically significant association was found between the frequency of dentist visits and dental hygienist visits ($\chi^2 = 74.929$; df = 16; $p < 0.001$).

Table 2. Frequency of Visits to a Dentist and a Dental Hygienist, n (%)

Dentist visits	n (%)	Professional oral hygiene	n (%)
Several times a year	31 (17.7)	Once every six months	31 (17.7)
Once a year	80 (45.7)	Once every six months or more often	8 (4.6)
Less than once a year	28 (16.0)	Once a year	74 (42.3)
Only when problems occur	34 (19.4)	Once every few years	44 (25.1)
Never	2 (1.1)	Never	18 (10.3)

Note. Percentages were calculated from n = 175.

C. Anxiety in Dental Situations

Mean anxiety scores in all assessed situations were close to 2 points ("I would feel slightly anxious") (Table 3). The highest means were found for tooth filling (2.32 ± 1.41) and local anaesthetic injection (2.31 ± 1.45). During anaesthetic injection, 19.4% of participants felt relaxed, 40.0% felt slightly anxious and 18.9% felt fairly anxious. General anaesthesia had the lowest mean (2.02) but the greatest dispersion (SD = 1.52): 18.3% of participants reported that they would feel extremely anxious.

Table 3. Anxiety Scores in Different Dental Situations (n = 175)

Situation	Mean	SD	Min.	Max.
Going to the dentist	2.03	1.14	1	5
Dental examination	2.07	1.11	1	5
Scaling and polishing	2.13	1.14	1	5
Local anaesthetic injection	2.31	1.45	1	5
Tooth filling	2.32	1.41	1	5
General anaesthesia before treatment	2.02	1.52	1	5

Note. Scale: 1 – I would feel relaxed, 5 – I would feel extremely anxious.

When imagining a dental visit the next day, 54.8% of participants reported that they would feel calm or indifferent, 16.6% would look forward to it as a pleasant experience, and 28.6% stated that they would be very anxious. While waiting in the waiting room, 48.0% felt a little uneasy and 25.1% felt tense; while waiting in the dental chair, 50.3% felt a little uneasy and 28.0% felt tense. Fear had caused 9.1% of participants to cancel a dental appointment or fail to attend on time.

The most common reasons for the last dental visit were treatment of painful teeth (34.9%), preventive check-up (32.5%) and treatment of non-painful teeth (26.9%); 73.3% of participants attended private dental practices. Unpleasant memories were most often related to pain when the dentist probed the teeth with instruments (51.8%) and to tooth extraction (25.2%); 9.2% reported that the dentist had ignored their pain. During visits, participants were most often worried that more than one visit would be needed (54.6%), that they would be criticised for the condition of their teeth (13.8%), and that they would not feel free to ask questions (10.6%).

D. Causes of Dental Fear

The most frequently reported causes of fear were pain (53.2%) and treatment costs (48.0%), followed by previous negative experience (26.9%), possible complications or a poor treatment outcome (22.8%), and needles or medical instruments (21.6%) (Figure 1). Nausea was reported as an "other" cause.

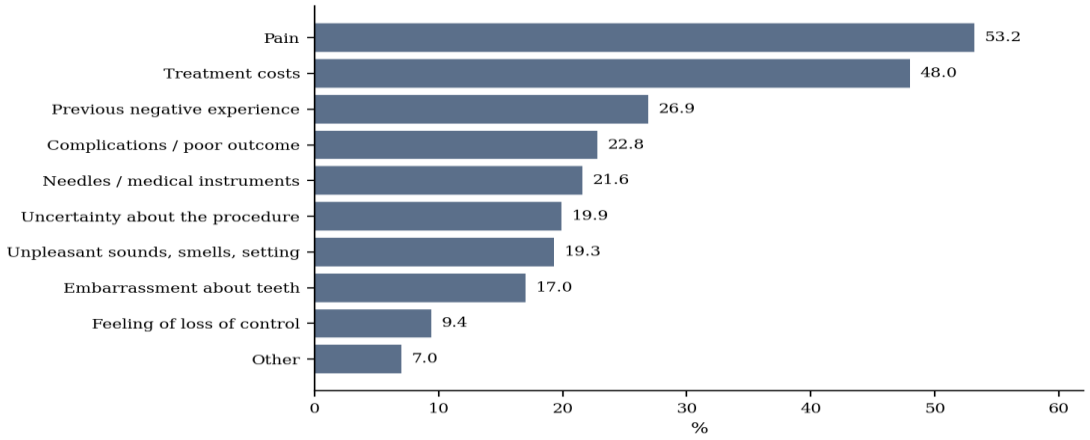


Figure 1. Causes of Dental Fear, %

Note. Multiple responses were allowed; percentages were calculated from participants who answered the question (n = 171).

The distribution of causes of fear by age group is presented in Table 4. Statistically significant associations with age were found in two cases. Of the participants who reported fear of medical instruments, 45.9% were aged 18–29 years and 51.4% were aged 30–50 years, while only one participant in the 51–70 age group reported this cause ($\chi^2 = 6.887$; $p = 0.032$). Unpleasant sounds, smells or surroundings were reported only by participants aged 18–29 years (42.4%) and 30–50 years (57.6%) ($\chi^2 = 8.089$; $p = 0.018$). Associations between the other causes and age were not statistically significant.

Table 4. Distribution of Causes of Dental Fear by Age Group, n (%)

Cause of fear	18–29 y	30–50 y	51–70 y	Total	χ^2	p
Previous negative experience	13 (28.3)	25 (54.3)	8 (17.4)	46	1.693	0.429
Pain	28 (30.8)	48 (52.7)	15 (16.5)	91	2.579	0.276
Needles, medical instruments	17 (45.9)	19 (51.4)	1 (2.7)	37	6.887	0.032
Complications, poor outcome	12 (30.8)	20 (51.3)	7 (17.9)	39	0.596	0.742
Treatment costs	25 (30.5)	45 (54.9)	12 (14.6)	82	3.457	0.178
Unpleasant sounds, smells, setting	14 (42.4)	19 (57.6)	0 (0.0)	33	8.089	0.018
Uncertainty about the procedure	14 (41.2)	16 (47.1)	4 (11.7)	34	0.904	0.636
Feeling of loss of control	9 (56.2)	7 (43.8)	0 (0.0)	16	4.974	0.083
Embarrassment about teeth	8 (27.6)	14 (48.3)	7 (24.1)	29	1.890	0.389

Note. Percentages were calculated from the number of participants reporting each cause (row percentages).

Women reported fear of pain (57.2% vs 32.4%; $\chi^2 = 7.198$; $p = 0.007$) and fear of complications or a poor treatment outcome (26.1% vs 8.1%; $\chi^2 = 5.446$; $p = 0.020$) significantly more often than men (Table 5).

Table 5. Fear of Pain and of a Poor Treatment Outcome by Sex, n (%)

Cause of fear	Sex	Not reported	Reported	χ^2	p
Pain	Male (n = 37)	25 (67.6)	12 (32.4)	7.198	0.007
	Female (n = 138)	59 (42.8)	79 (57.2)		
Complications, poor outcome	Male (n = 37)	34 (91.9)	3 (8.1)	5.446	0.020
	Female (n = 138)	102 (73.9)	36 (26.1)		

E. Associations Between Toothbrushing Frequency and Anxiety

No statistically significant associations were found between toothbrushing frequency and anxiety when going to the dentist, during examination, anaesthetic injection, tooth filling or general anaesthesia ($p > 0.05$ in all cases). A weak but statistically significant association was found between toothbrushing frequency and anxiety during scaling and polishing ($r = 0.173$; $p = 0.022$).

IV. DISCUSSION

In this study, pain was the most common cause of dental fear, reported by more than half of the participants.

This is consistent with the literature, in which pain is identified as the most common fear associated with dental procedures (Saba & Katirci, 2023) and as the main reason for avoiding dental visits (Furgała et al., 2021). The finding that anaesthetic injection and tooth filling caused the most anxiety is in line with reports that injections, tooth extraction and the sound of the drill evoke the greatest fear (Dhanapriyanka et al., 2024). In a Saudi Arabian study, the most frequently reported cause of fear was drilling and instrument sounds (37.7%), followed by pain (25%) (Alenezi & Aldokhayel, 2022). Participants in the present study reported pain more often and unpleasant sounds, smells and surroundings less often; such differences may reflect differences both between populations and in item wording.

The second most common cause, treatment costs, was reported by almost half of the participants. This agrees with evidence that financial barriers to dental care are greater than those to other health care services across all age groups (Vujicic et al., 2016). As 73.3% of participants attended private dental practices, treatment costs may be an important factor in visit-related anxiety. This finding should be interpreted with caution, as treatment costs are likely to reflect not only emotional fear but also a practical barrier to accessing care.

Women reported fear of pain and of a poor treatment outcome more often than men. This is consistent with the literature: in a Brazilian study, the prevalence of dental fear was 18% among women and 13.1% among men (Dadalti et al., 2021), and in a Tanzanian study, women were four times more likely to be anxious than men (Musalam et al., 2021). These differences have been explained by women's greater readiness to express emotions and by genetic and hormonal factors (Musalam et al., 2021), as well as by women's more expressive experience of pain (Muneer et al., 2022). However, men accounted for only one fifth of the present sample, so the results of the sex comparison should be interpreted with caution.

Fear of medical instruments and of unpleasant sounds, smells and surroundings was reported almost exclusively by participants aged 18–50 years. This is consistent with evidence that dental anxiety is more common among younger individuals (Dhanapriyanka et al., 2024) and that fear decreases in older age because positive treatment experiences accumulated over a lifetime outweigh negative ones (Alenezi & Aldokhayel, 2022). Nevertheless, the percentages in Table 4 show how participants reporting a given cause were distributed across age groups rather than the prevalence of fear within each group; moreover, the oldest group was the smallest. Therefore, this finding indicates differences in the structure of causes but does not allow the conclusion that older participants are less fearful overall.

More than a quarter of participants attributed their fear to previous negative experiences, and unpleasant memories were most often related to pain during treatment and tooth extraction. This supports the view that dental fear is multifactorial and that painful and traumatic previous experiences play a particularly important role (Saba & Katirci, 2023). A considerable proportion of participants were worried about being criticised for the condition of their teeth and did not feel free to ask questions. The literature emphasises that a provider showing little empathy is a common trigger of anxiety, whereas patients relax when the dentist is supportive and caring (Musalam et al., 2021); identifying the factors underlying fear enables the dentist to plan treatment more effectively and reduce patient anxiety (Murad et al., 2020).

Toothbrushing frequency was significantly associated only with anxiety during professional cleaning and polishing, and the association was weak. No associations were found in other situations. This does not support a direct relationship between toothbrushing frequency and overall dental anxiety. One possible explanation is the small proportion of participants who brushed less frequently (less than 5% brushed less than once a day), which reduces statistical power. The literature indicates that greater fear is associated with fewer preventive visits and poorer oral health-related quality of life (Winkler et al., 2023), and that anxious individuals more often have untreated teeth and poorer oral health (Sukumaran et al., 2021). In the present study, fear-related cancellation of visits was relatively rare (9.1%); however, almost one fifth of participants visited a dentist only when problems occurred, and more than a third had last attended for treatment of painful teeth.

This study has several limitations. First, non-probability convenience sampling via social media was used, and the sample was dominated by women and individuals with higher education; therefore, the results cannot be generalised to the entire adult population of Lithuania. Second, oral health was assessed only through self-reported habits, and clinical oral status was not examined. Third, a modified version of the MDAS was used, so standard cut-off values for high anxiety (e.g., MDAS ≥ 19) could not be applied, and prevalence could not be directly compared with other studies. Fourth, the cross-sectional design does not allow causal inferences. Future studies should use standardised and validated Lithuanian versions of the scales, representative samples and clinical oral health indicators.

V. CONCLUSIONS

In this study, adults' dental fear was driven mainly by anticipated pain and treatment costs rather than by the dental environment itself: pain was reported by more than half and costs by almost half of the participants. Although mean anxiety levels were low, they were highest during invasive procedures – local anaesthetic injection and tooth filling – and more than a quarter of participants linked their fear to previous negative experiences. This indicates that a substantial part of dental fear is related to specific clinical circumstances that can be managed by oral health professionals.

The structure of causes of fear differs by sex and age. Women more often reported fear related to the course and outcome of treatment – pain and a poor treatment outcome – whereas sensory and instrument-related stimuli (medical instruments, sounds, smells, surroundings) were reported almost exclusively by participants aged 18–50 years. Therefore, dental fear assessment and fear reduction measures should be tailored to patient characteristics rather than applied uniformly.

Everyday oral hygiene habits were only weakly associated with dental anxiety, and only in one situation – professional cleaning and polishing. Thus, toothbrushing frequency is not a reliable indicator of a patient's dental anxiety, and anxiety should be assessed separately using a standardised scale. At the same time, the low use of interdental cleaning aids indicates an independent need for preventive education unrelated to fear.

In practical terms, the identified causes of fear are largely modifiable at the provider level. In oral care practice, it is recommended to discuss pain control options before the procedure, present the treatment plan and its cost clearly in advance, use empathic and non-judgemental communication, and assess patient anxiety with a structured instrument at the first visit.

As non-probability sampling was used, women predominated in the sample, and anxiety was assessed with a modified scale, the results should be regarded as exploratory. Future research should employ representative samples, a validated Lithuanian version of the MDAS, clinical oral health indicators and a longitudinal design to examine causal relationships between dental fear, avoidance of dental visits and oral health.

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