ORIGINAL ARTICLE

The disparities of dental anxiety in adult dental patients: a sociodemographic and dental visit experience analysis

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ABSTRACT

Introduction: Patient anxiety can impede dental treatment adherence. Several factors influence patient anxiety, including sociodemographic characteristics and prior dental visit experiences. This study aims to analyze the disparities of dental anxiety in adult dental patients from sociodemographic and dental visit experience analysis point of view. **Methods:** Type of research was cross-sectional study. The population was all dental patients during May 30th and June 16th, 2023 at the Cipondoh Public Health Center in Tangerang City. Sixty-one patients were purposely sampled from the dental clinic. Data were collected via a self-administered questionnaire containing five questions regarding sociodemographic factors and dental visit experiences. Each question offered respondents five response options, represented by scores. Anxiety was measured using the Modified Dental Anxiety Scale (MDAS), and statistical analysis was performed using SPSS version 26 with Mann-Whitney, ANOVA, Kruskal Wallis tests. **Results:** Among the 61 participants, 33.1% reported experiencing dental anxiety, with an average MDAS score of 8.92. Comparative analysis revealed significant differences in anxiety scores based on age ($p<0.05$), gender ($p<0.05$), education level ($p<0.05$), and dental visit experience ($p<0.05$). **Conclusion:** There are significant anxiety differences in adult patients based on sociodemographic factors, including gender, age, educational level, and dental experience factors.

KEYWORDS

dental anxiety, socioeconomic factors, dental visit, adult

INTRODUCTION

Anxiety, an individual's response to potentially threatening situations, can manifest in the domain of dentistry as dental anxiety.[1,2] The assessment of patient anxiety encompasses psychophysiological, behavioral, and emotional reactions, such as muscular tension, excessive apprehension, tremors, and others.[3] Despite the strides made in dental science and technology, patient's anxiety during dental visit remains a persistent challenge.[4] Dental anxiety holds the fourth position among common types of fears experienced by individuals.[5]

Anxiety is a matter of concern as it can impede dental visit.[6,7] While 70% of the general population experiences anxiety before dental check-ups, a further 20% of them feel extremely anxious and even 5% avoid dental treatments altogether.[8] Individuals affected by anxiety often anticipate something dreadful happening during dental procedures, leading to uncooperative behavior, procrastination, or even complete avoidance of dental visit, except in emergencies. These behaviors have consequences on oral health, exacerbating dental problems, necessitating more complex treatments, and further reinforcing the individual's anxiety.[3,9] Patients with anxiety often have strong associations with painful stimuli and an increased perception of pain.[10]

Dental anxiety affects both children and adults.[11] In adults, this anxiety can stem from childhood experiences and persist as they grow older, significantly influencing their tendency to avoid dental visits in adulthood.[12] Dental anxiety is still prevalent among adult individuals and should be considered a dental public health issue.[13] A systematic review and meta-analysis by Silveira et al.[7] found that dental anxiety affects approximately 4.2% to over 50% of adults globally. These ranges may reflect the broad cultural, social, and economic differences between populations, as well as design and instrument used to measure dental anxiety. In Indonesia, the prevalence of dental anxiety ranges from 20% to 30%.[14]

The causes of dental anxiety are multifactorial, complex, and can be provoked by patients, providers, or environmental factors.[5,15] Causes of anxiety originating from individuals include past experiences, pain, personality, the influence of family and peer experiences. Meanwhile, anxiety regarding service providers can be caused by poor communication techniques and behavior.[5] Anxiety can also be provoked by environmental triggers such as the sound of drills, the presence of other anxious patients in the clinic, the smell of the materials used, long waiting time, and the sight of blood.[3] Previous studies have indicated that factors such as age, gender, education, and socioeconomic

status are associated with dental anxiety.[14–17] Furthermore, individuals' experiences with dental visit, both direct and indirect, play a role in dental anxiety.[18] Unpleasant past experiences during dental treatment can lead to fear and anxiety, influencing their emotional responses to future dental visits.[19]

The development and provision of easily accessible and effective dental anxiety care should be a priority in oral healthcare.[20] Typically, dental anxiety care is offered in specialized clinics by interdisciplinary teams. However, if effective methods for managing dental anxiety are accessible to general dentists, patients can receive primary-line treatment within general or primary dental care practices. Cipondoh sub-district has many public health centers among other sub-districts in Tangerang City, one of the five health facilities is Cipondoh Health Center whose task is to provide proper and good health services by optimizing the promotion and preventive services. Cipondoh Public Health Center has the highest number of tooth extraction and tooth filling patients among other public health centers in Tangerang City. Recognizing dental anxiety and its background on patients such as sociodemographic factors and dental visit experiences can assist dentists in predicting patient's emotional reactions and devising appropriate treatment plans, although this is not a widespread practice among dentists prior to treatment, especially in Public Health Center.[7,17] Various studies have been conducted in exploring patient's dental anxiety in Indonesia, but the availability of data on anxiety in terms of sociodemographic factors and dental experience remains sparse.[2,14,21-24] Hence, this study was conducted to analyze differences in dental anxiety among adult patients based on sociodemographic factors and past dental visit experiences at dental clinic of Cipondoh Public Health Center in Tangerang City. This study aims to analyze the disparities of dental anxiety in adult dental patients from sociodemographic and dental visit experience analysis

METHODS

This research followed an analytic approach, utilizing a cross-sectional study design to explore variations in anxiety levels among early and middle adulthood aged patients at a single point in time. The study's target population comprises all adult patients who sought dental services at the Cipondoh Public Health Center. Subsequently, research data were subjected to analysis using SPSS version 26.

Inclusion criteria are those who visited the dental clinic between May 30th and June 16th 2023, expressed willingness to participate, and whose ages were between 20 and 65 years old.[25] Exclusion criterion is patients did not complete the questionnaire. The sample size was determined using purposive sampling based on specific considerations to obtain representative samples and appropriate results, guided by the Lemeshow formula. The Lemeshow formula is used to calculate samples in an unknown population.[26] Written informed consent was obtained from all samples. Assessment tools consisted of the Modified Dental Anxiety Scale (MDAS) questionnaires and general information containing history regarding previous visits to the dentist, reason for present dental visit (tooth filling, tooth extraction, dental check-up), past dental visit experience, and sociodemographic features. The samples were categorized based on their characteristics. The gender was divided into two groups (female and male). The age of the patients was dichotomized into two groups (20-40 years and 41-60 years) referred to Papalia and Martorell[25] age classification. The education level was divided into three groups (primary, secondary, and tertiary). The income level was grouped into three groups (those with no income, below the Banten regional minimum wage, and above the Banten minimum regional wage).[27] Previous dental visit experience was further divided into three groups (positive, negative, and no experience yet).

MDAS, a Likert scale-based questionnaire, was used to assess patients' anxiety levels. Previous studies have confirmed the validity and reliability of Modified Dental Anxiety Scale in assessing dental anxiety.[4,28] The reliability of the questionnaire was tested by Cronbach's alpha while Pearson product moment correlation method was used to test the validity. The results showed that MDAS in the Indonesian version of this research has a valid value and is considered to be reliable (0.833). This self-administered questionnaire encompassed five questions, which were as follows 1) How would you feel if you were to go to your dentist tomorrow? 2) How would you feel if you were sitting in the waiting room for treatment? 3) How would you feel if you were about to get your teeth drilled? 4) How would you feel if you were about to get your teeth scaled and polished? 5) How would you feel if you were about to have local anesthetic injected in your gums? Each question offered respondents five response options, represented by scores:1=not anxious, 2=slightly anxious, 3=fairly anxious, 4= very anxious, and 5=extremely anxious. Anxiety levels were categorized based on the total scores as follows: 5-10 indicated low anxiety, 11-14 indicated moderate anxiety, 15-19 indicated high anxiety ≥ 19 signified extreme anxiety.

Individuals were considered anxious about dental treatment if their total MDAS score was ≥ 11.[4] To explore differences in dental anxiety, statistical tests were applied based on the average MDAS total score. Mann-Whitney was used to study the difference between the mean total anxiety scores of two variable groups with normal data (gender, age). A one-way ANOVA test with Bonferroni post-hoc was used to evaluate the differences between the mean total anxiety scores for three variable groups on normally distributed data (education level, dental visit experience). Due to the non-normal data distribution, Kruskal-Wallis test was used to evaluate the differences between the mean total anxiety scores for three variable groups with non-normal data (income level).

RESULTS

The findings from this investigation, which examined anxiety levels among 61 adult dental patients at the Cipondoh Health Center in Tangerang City, revealed that 86.9% of the study participants had prior experience with dental treatments. The major reason given by 41% of the patients for dental visit was tooth filling.

Table 1. Mean and standard deviation based on anxiety score (MDAS)

	n	Mean	SD
Anxiety score	61	8.92	2.91

Based on table 1, it can be seen that the mean total anxiety score using the Modified Dental Anxiety Scale (MDAS) is 8.92 with a standard deviation of 2.917. The highest score observed is 16 (high anxiety), while the lowest is 5 (low anxiety).

Table 2. Frequency distribution based on anxiety level

	Frequency (n)	Percentage (%)
Anxiety score		
Low anxiety	42	68.9
Moderate anxiety	17	27.9
High anxiety	2	3.3
Extreme anxiety	0	0
Total	**61**	**100**

The prevalence of dental anxiety was determined to be 33.1%. As indicated in Table 2, the outcomes of the Modified Dental Anxiety Scale (MDAS) questionnaire concerning dental anxiety revealed that 42 respondents (68.9%) experienced low anxiety, 17 respondents (27.9%) reported moderate anxiety, and 2 respondents (3.3%) indicated high anxiety levels. Notably, there were no respondents categorized as experiencing extreme anxiety in this study.

Table 3. Dental anxiety variation based on sociodemographic factors and dental visit experience

Variable	Number of Sample	Percentage	MDAS Score (mean±SD)	p-value
Gender				0.000*
Female	38	62.3	10.03 ± 2.68	
Male	23	37.7	7.09 ± 2.33	
Age				0.049*
20-40	35	57.4	9.60 ± 3.10	
41-65	26	42.6	8.00 ± 2.40	
Education level				0.04**
Primary	13	21.3	10.00 ± 2.61	
Secondary	26	42.6	9.54 ± 3.07	
Tertiary	22	36.1	7.55 ± 2.44	
Income level				0.141***
No income	26	29.5	9.00 ± 2.49	
< Rp2.661.280,11	27	45.9	9.50 ± 3.12	
≥ Rp2.661.280,11	8	24.6	7.73 ± 2.81	
Dental visit experience				0.000**
Positive	26	42.6	7.38 ± 2.11	
Negative	27	44.3	10.52 ± 2.99	
No experience yet	8	13.1	8.50 ± 2.20	

*Mann Whitney, p≤0.05, CI = 95%
**ANOVA, p≤0.05, CI = 95%. Post-hoc Bonferroni test: primary vs tertiary p=0.042; secondary vs tertiary p=0.047; positive vs negative p=0.000
***Kruskal-Wallis, p>0.05, CI = 95%

Table 3 presents variations in dental anxiety among respondents, considering socio-demographic factors and dental visit experience. Mean total Modified Dental Anxiety Scale (MDAS) score was higher in females (10.03±2.68), 20-40 years old group (9.60±3.10), primary education (10.00±2.61), and had negative dental visit experience (10.52±2.99). In this study, there were statistically significant differences between the mean total MDAS score within gender, age, education levels, dental visit experience (p≤0.05). Considering income levels, the group with the highest average score was those earning less than minimum wage. Nevertheless, the statistical test demonstrated no significant difference between the mean dental anxiety score of the three income level groups (p>0.05).

DISCUSSION

Based on the research carried out at Cipondoh Health Center, Tangerang City from May 30th to June 16th 2023, it was observed that the respondents had an average anxiety score of 8.92±2.917, categorizing them as experiencing low anxiety (Table 1). This finding aligns with the results of a study conducted by White et al.,[9] which reported a similar average anxiety score of 10.19 among 308 respondents from three different types of dental clinics. Likewise, a study by Appukuttan et al.,[17] in India found an average anxiety score of 10.29 ± 3.767 among respondents, mirroring the findings of this study.[17] In contrast, Riksavianti and Samad's investigation of patients at Hasanuddin University Hospital in 2014 yielded different results, with respondents displaying a mean anxiety score of 11.96 ± 3.062, categorizing them as having moderate anxiety. It had a different result from our result that most of the respondents had a moderate anxiety category.[28]

In this study, the prevalence of dental anxiety was found to be 33.1%, with varying degrees of anxiety severity (Table 2). Notably, there were no cases of extreme anxiety identified among the respondents. These results align with a study conducted in Kepulauan Seribu, where 85% of respondents reported low anxiety, 10% experienced moderate anxiety, and 5% had high anxiety levels.[29] Conversely, a higher prevalence of anxiety was found in outpatients in a study conducted at Saudi Arabia University, with a rate of 51.6%.[4] According to Silveira et al., variations in these prevalence results across different studies may be attributed to cultural factors, socioeconomic influences, unique sample characteristics, and variations in research methodologies.[7,30] Additionally, the relatively low anxiety levels observed in this study could be linked to respondents' previous exposure to dental treatment, as individuals tend to feel more at ease when they are familiar with their surroundings.[31] It's worth noting that individual attitudes towards dental visit and the societal importance placed on dental health can also contribute to these differences.[32]

The findings of this study revealed a statistically significant difference ($p \leq 0.05$) in anxiety levels between younger and older age groups, with older patients exhibiting lower levels of anxiety (Table 3). This aligns with the research conducted by Fayad et al.[4] in Saudi Arabia, which reported a higher prevalence of dental anxiety among young adults compared to older individuals, showing a significant age-related difference. Several previous studies have consistently suggested that as individuals age, they tend to accumulate more experience with disease and treatment, including regular visits to the dentist. Older individuals also tend to have a higher pain tolerance, contributing to their reduced anxiety levels.[4,30,33,34] These findings corroborate the results of this study. Additionally, the research by Egbor et al.[35] supports the notion that anxiety is more pronounced in younger age groups, often attributed to challenges in adapting to the dental environment and accepting treatment. High anxiety levels among young patients may stem from their limited exposure to dental equipment, such as needles and handpieces, which can evoke fear. Furthermore, young adults may be more susceptible to environmental influences, including negative experiences recounted by others, thus shaping their apprehensive perspective of dental procedures.[34,35]

The study's findings revealed significant gender-based differences in dental anxiety ($p \leq 0.05$), which align with previous research findings. In this study, female patients exhibited higher levels of anxiety compared to their male counterparts (Table 3). This observation is consistent with the findings of previous studies.[4,30,36] Hussain et al.,[37] suggested that women tend to be more open about their emotions, including anxiety. This inclination might be attributed to prevalent social stereotypes related to gender roles that encourage women to express their feelings more freely, while men may be influenced to a greater extent by societal expectations regarding emotional expression. Another contributing factor could be the difference in pain tolerance thresholds and levels of neuroticism between women and men. Research has shown that women generally have a lower pain tolerance and a higher degree of neuroticism than men.[5] Additionally, biological factors, including genetic influences and reproductive hormones, play a significant role in the development of conditions such as stress, panic, phobias, depression, fear, and anxiety in women.[5] This perspective is supported by a study conducted by Wabnegger et al.,[38] which found that women exhibited a greater volume of gray matter in cognitive areas associated with emotional regulation. These structural differences in brain compartments are thought to be influenced by sex-specific biological factors that, in turn, impact behavior.

Education plays a pivotal role in shaping dental anxiety. The findings of this study underscore a significant association between educational levels and dental anxiety ($p \leq 0.05$), with individuals at the elementary education level exhibiting the highest average anxiety levels. This aligns with the outcomes of prior research.[29] Several studies have consistently demonstrated that higher educational attainment correlates with decreased dental anxiety.[21,35] It has been elucidated that lower education levels are often associated with increased anxiety, primarily due to limited awareness and knowledge.[21] Patients are generally placed in a reclined position; insufficient knowledge about different instruments filling patient's mouth, being unable to see into their own mouth, being unaware about the outcome of procedure are possible risk factors for feelings of lack of control and dental anxiety.[3,11,39] In contrast, adults with higher education tend to exhibit lower anxiety levels because they possess a better understanding of dental procedures and the importance of oral health. Moreover, they have greater access to information and possess more effective coping mechanisms for handling stressful situations.[17] However, it is worth noting that the results of this study differ from those reported dental anxiety which is higher in higher level of education group in Pakistan, Tanzania, United Arab Emirates due to a lack of cultural habit of frequent dental visits, greater knowledge of the treatment modalities that causes more anxiety.[5,15,32] Bonferroni post-hoc analysis indicated significant differences between tertiary and primary education groups ($p \leq 0.05$) and between higher and secondary education groups ($p \leq 0.05$). However, no significant difference was observed between the primary and secondary

education groups (p>0.05) (Table 3). This could be attributed to the relatively similar knowledge backgrounds between primary and secondary education levels compared to the more distinct knowledge base associated with tertiary education.

Low economic status can contribute to heightened dental anxiety.[15] As noted by Andayani et al.,[2] a low income level is one of the potential barriers preventing communities from accessing dental and oral health services. This reduced frequency of dental visits, often due to concerns about associated costs, can lead to increased individual dental anxiety. In this study, individuals with lower incomes exhibited higher average MDAS total scores compared to those with higher incomes.[2,15] While the majority of patients at the Cipondoh Health Center are members of the Badan Penyelenggara Jaminan Sosial (BPJS), which can help alleviate treatment costs, it's important to note that health insurance coverage, especially for certain dental procedures, remains limited. Additionally, the ability to afford dental treatment or insurance premiums is directly linked to employment status and income, further contributing to these concerns.[29,40] Statistically, no significant difference in anxiety based on income was observed (p>0.05) (Table 3). These results align with previous research, which also found no significant difference in anxiety based on income.[15,29] However, it is worth considering that the unequal distribution of subjects across different socioeconomic classes, as shown in the research by Muneer et al.,[15] may have influenced these findings. In contrast, Yildirim et al.,[41] reported significant differences in anxiety based on economic status, with the upper social class exhibiting higher levels of anxiety.

Patients who have visited the dentist before generally exhibit lower levels of anxiety compared to those without prior experience.[5,23] However, it is important to note that even patients with prior experience can still experience anxiety, as supported by existing literature. Based on the data obtained, a significant number of patients had undergone dental visits, and some had reported negative experiences. Notably, those with previous bad experiences appeared to be the most anxious among the groups studied. This research established a statistically significant difference in anxiety based on dental visit experience (p≤0.05) (Table 3). This finding is consistent with several earlier studies, indicating that patients who have had negative experiences related to dental treatments tend to be more anxious than those without such experiences, and this difference is significant.[42,43] Research by Lin et al.,[43] underscored the strong link between dental anxiety and past negative experiences. Such experiences can result from various factors, including pain during treatment, a lack of empathy from dentists, and poor communication between dentists and patients.[3,10] However, it's worth noting that these findings diverge from research conducted among outpatients at Bahria University Hospital, Pakistan which revealed that anxiety was more common among respondents with positive experiences than those with negative experiences.[31] Furthermore, individuals with no prior dental experience exhibited no anxiety.[32,44]

Negative past experiences can contribute to anxiety through the spontaneous emergence of memories that influence expectations and behaviour toward future dental visits.[11] Conversely, individuals who have never undergone dental treatment may experience anxiety due to the unfamiliarity of the situation. This aligns with other studies suggesting that anxiety can stem from concerns about potential pain during dental visits, the influence of others' descriptions of their dental experiences, and the impact of mass media (e.g., television, films), all of which can contribute to negative perceptions of dental visit.[11,19,45,46] There were no significant differences observed between patients with good experiences and those with no prior experience (p>0.05), as well as between patients with bad experiences and those with no prior experience (p>0.05).[47] Experience with past dental treatments is a notable factor influencing patient anxiety toward upcoming dental procedures. Therefore, establishing a positive patient experience, particularly during their initial dental visit, should be a paramount consideration for dentists in their daily practice. Building a positive patient-dentist relationship, characterized by a friendly, empathetic, and non-judgmental approach, is crucial in this regard.[3] Several technology options can be effectively used for visual and auditory distractions such as music, television, computer games, virtual reality.[3,11,39]

The present cross-sectional study has been conducted on a limited population. Therefore, there is a need to undertake a wider study on larger populations to assess the prevalence of dental anxiety and associated factors among the various communities in Indonesia. Further studies with different designs should be accomplished to investigate the relationship between dental anxiety and behaviors related to oral health, dentist and patient relationship, role of digital platforms in shaping perceptions of dental visits, and others. Health care providers can improve communication and better services such as a comfortable waiting and treatment room atmosphere for patients, and set books and television in the waiting room to reduce anxiety. Dentists need to pay attention to anxious patients, explain all the necessary information regarding the patient's oral health problem and treatment options. Further socialization needs to be given to BPJS insurance users regarding the type of treatment covered by the government. The dentist can inform about the cost of services at all stages of treatment so that patients do not need to worry about costs that affect their anxiety.

CONCLUSION

The findings indicate that most of adult dental patients experienced mild dental anxiety. Significant disparities in dental anxiety were observed concerning sociodemographic factors such as gender, age, educational level, and prior dental visit experience.

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