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Dental Anxiety Among the Individuals Referred for Implant as an Option for Replacement of Missing Teeth

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Abstract

Background: Dental anxiety has been found to play a key role in avoidance and postponement of dental treatments. The purpose of this study was to assess the level of dental anxiety on patients referred for replacement of missing teeth with dental implants.

Methods: Two hundred ninety-nine patients (57.9% were males and 42.1% were females) referred to the Department of Prosthodontics were assessed for dental anxiety by using Corah's Dental Anxiety Scale. Mean, standard deviation, frequency, and percentage were calculated depending on the nature of the data. The chi-square test was used to determine the association between age and sex with anxiety level, whereas Fisher's exact test was used to determine the association between education level and level of anxiety.

Results: The mean Dental Anxiety Scale score was 7.67 (standard deviation = 3.664). Among them, 96 (32.1%) showed some level of dental anxiety, out of which 32 (10.7%) had a high level of anxiety. Younger age groups and those with formal education exhibited higher levels of anxiety compared to other groups.

Conclusion: The majority of the patients showed a normal level of anxiety, while others exhibited a higher level of anxiety while assessing the patients referred for dental implant as a prosthetic option. Younger age groups and those with formal education had higher levels of anxiety. Dental practitioners should consider the anxiety levels of patients before performing dental implants so that they can pursue better patient management strategies before treatment for improved outcomes.

Keywords: Anxiety, dental implant, patient, prosthesis

INTRODUCTION

People may lose part or all of their teeth in their lifetime owing to various reasons. The dental defects acquired during such processes may have serious physiological and psychological problems, such a as negative impact on their eating and speaking behaviors, and in some individuals, can even trigger depressive conditions.[1] There are various modalities present to overcome such defects, including conventional fixed and removable appliances, as well as dental implants. Dental implants are highly popular in clinical practice as a replacement for missing teeth. It is also considered the "gold standard" for replacing missing teeth.[2] Patients' choice of treatment depends on their level of information, capacity, physical health, and financial potential, and last but not least, on their level of dental anxiety.[1] Dental appointments may manifest as anxiety, fear, or phobia, leading to the avoidance of dental treatments.[3,4] Fear and anxiety are frequently used interchangeably because they share many similarities in terms of experience, physiological reactions, and conductions.[5]

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Dental anxiety is a crucial problem in dentistry, as it can pose a significant risk to oral health. Apart from the role of systemic factors in periodontal and peri-implant disease, chronic stress and depression may also affect the disease onset and progression, as well as treatment responsiveness.[6] Cognitive factors such as the patient's subjective perceptions and noncognitive factors like traumatic dental events may cause dental anxiety.[7] Moreover, there may be cognitive vulnerability patterns that contribute to dental anxiety. Women showed higher scores for unpredictability, uncontrollability, and general dangerousness compared to men, while older patients showed higher scores for some vulnerability cognitive patterns compared to younger patients.[8]

Anxiety is a subjective experience that is challenging to quantify due to variations in intensity, severity, and the way it is expressed by the individuals.[9] Dental anxiety can be quantified by various questionnaires, tests, and scales to evaluate it psychologically and psychometrically.[6] These scales measure several aspects of dental anxiety and provide a methodological foundation for studying its causes and remedies.[10] Modified Dental Anxiety Scale, Corah's Dental Anxiety Scale (DAS), Dental Fear Survey, and General Geer Fear Scale, are a few commonly used scales that can be used to evaluate the dental anxiety of the patients.[11] The DAS scale, which is not only short and simple but also has strong reliability and validity ratings, is the most often used dental anxiety scale for adults.

Dental implants are connected with a high expectancy of pain, which is a major source of anxiety, as shown in a study by Eli et al.[12] Thus, the dental professional must identify signs of anxiety and adopt a means of reducing stress caused by the dental implant treatment. In Nepal, there is a paucity of data regarding dental anxiety associated with dental implant therapy.

The aim of the present study was to assess the level of dental anxiety in patients referred for the replacement of missing teeth with dental implants.

MATERIAL AND METHODS

This is a cross-sectional study conducted on patients referred to the Department of Prosthodontics with single or multiple missing teeth for prosthetic rehabilitation. Ethical approval was obtained from the Institutional Review Committee of the Institute of Medicine, Kathmandu, Nepal (Approval No: 513 (6-11) E^2-079/80, Date: May 12, 2023).

Estimation of sample size was calculated from the following formula, using the prevalence of the extremely severe levels of anxiety among patients visiting dental hospitals for replacement of missing teeth[1]:

$$n = Z^2 pq/d^2$$

where Z = 1.96, n = minimum desired sample size, p = prevalence of severe anxiety in the desired population=25%=0.25, q = 1–p=0.75, and d = least estimated difference of prevalence=0.05.

From the above formula, the minimum desired sample size was estimated to be 289. Hence, a total of 299 samples were selected.

Individuals aged 18 years and above with at least one missing tooth were included in the study. Patients not willing to participate in this study were excluded from the study.

Informed consent was obtained from the study participants before data collection. During their first visit, oral examinations were done in the dental chair using a mouth mirror and explorer. The clinical examination was done by the principal investigator himself to avoid any examiner bias. Patients were informed about the surgical and prosthetic phases of the implant treatment procedure. They were also informed about the cost of the treatment, the estimated time for the procedure, and advantages and disadvantages of the dental implants.

The questionnaire was prepared based on Norman Corah's DAS.[13] It was translated into the Nepali language using the standard back-translation method. Two linguistics experts in Nepali and English language were involved in this process. The discrepancies between these translated versions were resolved by the consensus of the investigators. The research team and translators then finalized the final questionnaire.

The questionnaire consists of 4 items, and each item has 5 possible answers/options for a participant to select (Table 1). For each item, options "a"-"e" scored as 1-5. The total score ranges from 4 to 20, where the minimum score was 4 and the maximum score was 20 for each participant.

The anxiety assessment score is as follows[1]:

- ≤8 points: Normal level of anxiety.
- 9-12 points: Moderate anxiety.
- 13-14 points: Severe anxiety.
- 15-20 points: Extremely severe anxiety bordering on phobia.

Anxiety scores above 13 indicate participants with severe or extremely severe anxiety, which are collectively known as high-level anxiety.[14]

The questionnaire was distributed by the principal investigator to the study participants after obtaining the informed consent. Participants were asked to fill out the questionnaire at the time of counseling for the implant as the prosthetic option. During subsequent dental visit, patients either decided to undergo prosthetic rehabilitation with dental implants or denied the implant treatment option due of anxiety or other reasons like time constraints, high cost of

Table 1. Questionnaire Used in this Study

S. No./Items	Questionnaire	Score
1.	If you had to go to the dentist tomorrow for a check-up, how would you feel about it?	
	a. I would look forward to it as a reasonably enjoyable experience	1
	b. I wouldn't care one way or the other	2
	c. I would be a little uneasy about it	3
	d. I would be afraid that it would be unpleasant and painful	4
	e. I would be very frightened of what the dentist would do.	5
2.	When you are waiting in the dentist's office for your turn in the chair, how do you feel?	
	a. Relaxed	1
	b. A little uneasy	2
	c. Tense	3
	d. Anxious	4
	e. So anxious that I sometimes break out in a sweat or almost feel physically sick.	5
3.	When you are in the dentist's chair waiting while the dentist gets the drill ready to begin working on your teeth, how do you feel?	
	a. Relaxed	1
	b. A little uneasy	2
	c. Tense	3
	d. Anxious	4
	f. So anxious that I sometimes break out in a sweat or almost feel physically sick.	5
4.	Imagine you are in the dentist's chair to have your teeth cleaned. While you are waiting and the dentist is getting out the instruments which will be used to scrape your teeth around the gums, how do you feel?	
	a. Relaxed	1
	b. A little uneasy	2
	c. Tense	3
	d. Anxious	4
	f. So anxious that I sometimes break out in a sweat or almost feel physically sick	5

treatment, existing medical comorbidities, etc. The collected information was summarized, organized, and accordingly tabulated for clear demonstration.

The data were collected and transferred into an MS Excel sheet. The dataset was verified and statistically analyzed using the Statistical Package for Social Sciences, version 16.0 software (SPSS Inc.; Chicago, IL, USA). The significance level was set at $P < .05$. Chi-square test was used to determine the association between age and sex with anxiety level, whereas Fisher's exact test was used to determine the association between education level and the level of anxiety.

RESULTS

The study included 299 patients, out of which 173 (57.9%) were males and 126 (42.1%) were females, with a mean age range of 38.92 ± 15.38 years (Figure 1). The mean DAS score was found to be 7.67 (SD: 3.664). Among them, 96 (32.1%) reported experiencing some level of dental anxiety, with 32 (10.7%) exhibiting a high level of anxiety (Figure 2).

The association of demographic characteristics with the level of dental anxiety is shown in Table 2. Age and education level were found to be significantly associated with the level of dental anxiety ($P = .001$ and $P = .029$, respectively), while there was no significant difference observed between the level of anxiety among genders ($P = .782$).

DISCUSSION

The most prevalent psychiatric issue in the general population is anxiety disorder.[15] Dental anxiety indicates a condition of trepidation that something awful will occur corresponding

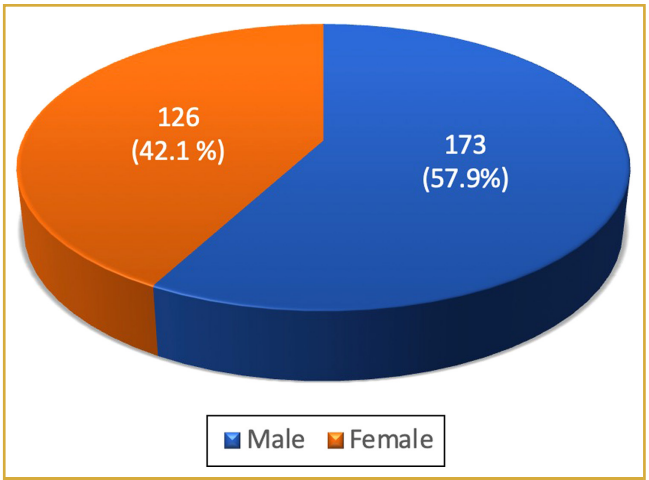

Figure 1. Gender distribution of the samples.

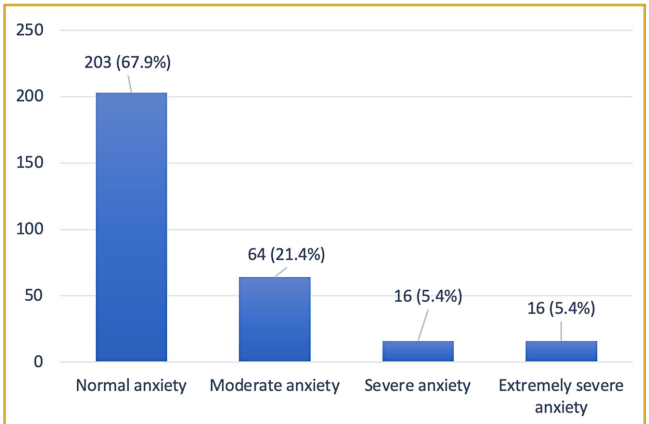

Figure 2. Level of anxiety in study participants.

to dental treatment, combined with a feeling of losing control.[16]

Risal et al. in Nepal reported a prevalence of anxiety and depression of 22.7% in adults, which is considerably higher compared to global findings.[17,18] Several studies have been done to assess the level of anxiety in dental patients undergoing various dental procedures using DAS developed by Corah.[13] The present study aimed to determine the level of dental anxiety associated with dental implant treatment, as it is considered one of the most stress-provoking dental procedures.[12]

The literature shows various scales for assessing dental anxiety; however, each scale has certain limitations. There are many differences between these scales. Some scales focus on the pain experienced during dental procedures, while others focus on the relationship between patients and dentists, and most scales focus on the clinical situation that can be experienced in dentistry.[9]

Norman Corah's DAS was used in this study because of its ease of application, as it consists of only 4 questions which made it simple. Disadvantages of DAS scales include their lack of content related to local anesthesia injection, failure to measure dental anxiety along a single consistent dimension, and lastly inability to detect the effect of dentist–patient relations on dental anxiety.[19,20] Despite these limitations, this scale is still considered standard and widely cited for dental anxiety assessment.[21]

In the present study, 96 (32.1%) individuals reported having dental anxiety, out of which 32 (10.7%) experienced severe anxiety. The mean anxiety score among the study participants was 7.67 ± 3.66. An anxiety score higher than 13 is considered as a high-level anxiety.[1] In our study, 32 (10.7%) patients showed high-level anxiety. A study conducted in Bulgaria to determine the impact of dental anxiety on the decision to undergo dental implant treatment for missing teeth found that 33% of participants reported high-level anxiety, which was considerably higher than that of our study.[1] Another Bulgarian study conducted to investigate dental anxiety in the general population showed that 29.9% of population exhibited high levels of dental anxiety.[10]

Several studies showed that female patients had more dental anxiety compared to male counterparts.[22,23] However, this study did not find statistically significant anxiety levels between male and female patients. This fact is in agreement with the studies of Acharya et al.,[11] Giri et al.,[24] and Udoye et al.[25] But the study by Kim et al. showed that gender affected anxiety with females having higher anxiety scores compared to males.[26] This study also found that younger patients (<30 years) had higher anxiety levels compared to older age groups. This is in agreement with Kirova et al. who also found that anxiety was higher in the younger age groups. In the younger age group, there is diverse and intensive psychological impacts of various factors that may generate dental fear and anxiety.[10]

In this study, education level was also assessed, which showed a significant association with the level of dental anxiety. Patients with formal education showed a higher levels of anxiety compared to illiterate and literate patients.

Table 2. Association of Demographic Variables with the Level of Anxiety

		Level of Anxiety n (%)			
Variables	Category	Normal Anxiety	Moderate	Severe and Extremely Severe Anxiety (High Level Anxiety)	*P*
Age	<30 years	66 (56.9)	29 (25.0)	21 (18.1)	0.001*[a]
	31-50 years	73 (69.5)	25 (23.8)	7 (6.7)	
	>50 years	64 (82.1)	10 (12.8)	4 (5.1)	
Sex	Male	120 (69.4)	36 (20.8)	17 (9.8)	0.782[a]
	Female	83 (65.9)	28 (22.2)	15 (11.9)	
Education level	Illiterate	26 (76.5)	8 (23.5)	–	0.029*[b]
	Literate	30 (81.1)	3 (8.1)	4 (10.8)	
	Formal education	147 (64.5)	53 (23.2)	28 (12.8)	

[a]Chi-square test
[b]Fisher's exact test
*$P < .05$=statistically significant

In this study, we evaluated the level of anxiety among patients referred for implant consultation as a prosthetic option at a specific point in time. Some patients have chosen the implant option, while others did not by the end period of this study. We could not follow up the whole samples because of the limited timeframe of this study. Some patients might not choose the implant option because of various factors like anxiety, lengthy procedure, invasiveness of the surgical treatment, and the higher cost of the implant, or some wanted to have an implant in the days to come.

Dental anxiety can generate a variety of negative consequences for both the dentist and the patient. Dental professionals should be trained to recognize and manage dental anxiety. Standard practices, along with a good amount of empathy, help to break the anxiety barrier. Taking care of relaxed patients saves both the practitioner and the patient treatment time and unnecessary stress during a procedure.

Dental anxiety can be managed by psychotherapeutic interventions (behavioral or cognitive approach), pharmacological interventions (sedation or general anesthesia), or a combination of both, based on the level of dental anxiety, patient characteristics, and clinical situations.[4]

Patients who came to us for an implant and showed high levels of anxiety had opted for various anxiety reduction protocols, such as utilizing the tell-show-do method, muscle relaxation, guided imagery, hypnosis, acupuncture, distraction, and desensitization.[27] Some needed pharmacological intervention as well, such as the use of antianxiety medication just before the procedure, relative analgesia with nitrous oxide, and conscious intravenous sedation.

Distraction with different technological interventions, such as music, virtual reality, and hypnosis, diverts attention away from negative stimuli by masking the fear-generating noises that create an unpleasant experience.[28]

The present study has some limitations. This study was carried out on patients referred to the Department of Prosthodontics of a tertiary-level hospital in Kathmandu for the replacement of missing tooth or teeth. Hence, the results of this study may not be truly interpreted for the general population. Additionally, the influence of demographic factors such as ethnicity, race, economic status was not considered in this study. A multi-center study with a large and randomized sample is recommended for future studies.

CONCLUSION

The findings of this study concluded that the majority of the patients showed normal level of anxiety while others had a higher level of anxiety when assessing the patients referred for dental implants as a prosthetic option. Younger age groups and those with formal education had a high level of anxiety. Dental practitioners should consider the anxiety level of patients before performing dental implants so that they can pursue better patient management strategies before the treatment for a better outcome.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Institute of Medicine (Approval no: 513 (6-11)E²-079/80; Date: May 12, 2023).

Informed Consent: Written informed consent was obtained from the participants who participated in this study.

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