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Pre-Operative Anxiety Patterns in Patients Undergoing Impacted Lower Third Molar Extraction

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ABSTRACT

Objective: This study aims to determine the correlation between the State-Trait Anxiety Inventory (STAI-S) and the Amsterdam Preoperative Anxiety and Information Scale (APAIS) before the extraction of impacted third molars.

Materials and Methods: Patients reported to the OMFS department for the extraction of impacted third molars were selected based on a thorough history, clinical examination, and radiographic evaluation. During their initial visit, patients completed the STAI-S and STAI-T scales to measure their anxiety levels. Following the completion of these scales, detailed information about the surgical and anesthetic procedures, as well as potential complications, was provided. Informed consent was obtained. Prior to the surgery, patients completed the APAIS to measure their dental anxiety.

Results: A total of 50 patients, comprising 13 males and 37 females, having a mean age of 28.86 ± 5.85 years. The average scores on the APAIS and STAI-S scales were 17.06 ± 2.49 and 23.48 ± 2.35, respectively. A positive correlation (r = 0.606) was observed between the APAIS and STAI-S scales before the removal of impacted third molars.

Conclusion: The study concludes that there is a positive correlation between the STAI-S and APAIS scales in patients before the extraction of impacted third molars.

Keywords: Anxiety, Oral Surgical Procedures, Impacted tooth

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INTRODUCTION

Globally, the extraction of impacted third molars stands as the most routine minor oral surgical procedure. Nearly all patients undergoing third molar extraction experience some degree of anxiety both before and during the procedure.[1] Anxiety, characterized by feelings of nervousness and apprehension, and is accompanied by autonomic nervous system activation. It is a pervasive issue in dental practice, affecting both simple and more invasive procedures.[2]Anxiety can be identified by an increase in sympathetic nervous system activity. Triggers include the use of needles for local anesthesia, high-frequency vibrations from dental drills, and the fear of the procedure itself.[3]

Apprehensive patients often exhibit uncooperative behavior during procedures, which can increase the stress levels of the operating surgeon and potentially reduce the efficiency and success of the operation.[4] Such patients typically require longer operation times, are less satisfied with their treatment, and are more prone to postoperative complications. To minimize anxiety, various strategies can be employed, including the use of hypnotic and sedative agents, scheduling early morning appointments, and ensuring effective local anesthesia.[5]

Anxiety is commonly examined in two distinct forms: trait anxiety and state anxiety. Trait anxiety is considered a stable aspect of personality, while state anxiety is a transient response to specific situations.[6] Beatriz et al. found that Patients exhibiting high levels of both trait and state anxiety demonstrated greater dental anxiety, with a notable pattern of dental fear observed more frequently in women. The study reported a correlation between the State-Trait Anxiety Inventory (STAI-S) and the Amsterdam Preoperative Anxiety and Information Scale (APAIS), with a correlation coefficient of r=0.509.[7]

Numerous studies have examined the relationship between state anxiety, trait anxiety, and dental anxiety, particularly in the context of lower third molar surgery. The findings indicate that higher anxiety levels are associated with female gender, younger age, lower socioeconomic status, and lower educational attainment. The APAIS scale is widely used to measure preoperative dental anxiety, and significant correlations have been found between state anxiety and dental anxiety.[8]

The aim of this study is to explore the correlation between the scales used to measure anxiety. Despite the widespread application of both the APAIS and STAI in clinical research, there is notable lack of research directly comparing these two tools within same patient population particularly among patients undergoing third molar surgery. Absence of comparative data limits our understanding of whether these instruments measure the same constructs or capture different aspects of anxiety This knowledge could lead to the development of targeted initiatives and sessions to address and mitigate anxiety and depression in these patients, which may guide the development of targeted interventions to reduce preoperative anxiety and enhance surgical outcomes.

MATERIALS AND METHODS

This cross-sectional study was conducted by the Department of Oral & Maxillofacial Surgery at a tertiary care hospital, over a period of six months. The sample size, determined using the WHO sample size calculator with a 95% confidence level, a 5% level of significance, and a correlation coefficient of 0.509[1] for the STAI-S and APAIS scales. A total of 50 patients were enrolled through non-probability consecutive sampling, with inclusion criteria covering both genders aged between 16 and 45 years., requiring extraction of impacted third molars, classified as ASA grade 1, non-smokers, non-alcoholics, not allergic to any medications, and without a history of third molar surgery. Exclusion criteria ruled out those on anxiolytic medication, with systemic diseases or compromised immune systems, drug allergies, unwillingness to participate, and pregnant females. Upon presenting to the OMFS department, eligible patients underwent history taking, clinical examination, and radiographic evaluation.

Patients completed the STAI-S (Y-1) and STAI-T (Y-2) scales to assess state and trait anxiety before receiving procedural information. After this, the surgical and anesthetic procedures and potential complications were explained, and informed consent were taken as well as ethical approval was obtained (FF/FUMC/215-515/PHY/24). General patient data, including age and gender, were recorded. Prior to surgery, patients also completed the APAIS to measure dental anxiety. Statistical analysis was conducted using SPSS version 22.0, calculating means and standard deviations for quantitative variables, including age, STAI-S, and APAIS scores, and frequency

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and percentage for qualitative variables such as gender, socioeconomic status, and education. Pearson correlation was used to determine the relationship between STAI-S and APAIS scales before the extraction. Stratification by age, gender, socioeconomic status, and education was conducted, followed by post-stratification Pearson correlation analysis, with a p-value of < 0.05 considered statistically significant.

RESULTS

Of the 50 patients included in the study, 13 (26%) were male and 37 (74%) were female, as illustrated in Figure 1. The mean age was 28.86 ± 5.85 years, with a range of 20 to 40 years. Educational status was categorized as educated or non-educated, with 37 patients (74%) classified as educated. Socioeconomic status was assessed based on monthly income, categorized as low (<20,000 PKR), middle (20,000–50,000 PKR), and high (>50,000 PKR). The majority of participants, 33 (66%), belonged to either the low or middle-income groups, as detailed in Table 1

The objective of the study is to determine the correlation between STAI-S and APAIS scales before extraction of impacted third molar. Correlation (r) value between APAIS and STAI-S scale was r=0.606 which statistically significant (p-value 0.000) showing that there is a positive correlation found between state anxiety and dental anxiety, as shown in Table 2.

Effect modifier like age was stratified and compared with the correlation between STAI-S and APAIS scales before extraction of impacted third molar. Among patients with age 31-40 years, average APAIS and STAI-S was 17.00+2.81 and 22.69+2.43 Effect modifier like gender was stratified and compared with the correlation between STAI-S and APAIS scales before extraction of impacted third molar. Among female patients, average APAIS and STAI-S was 18.10+0.93 and 24.62+1.

Effect modifier like education level was stratified and compared with the correlation between STAI-S and APAIS scales before extraction of impacted third molar. Among educated patients, average APAIS and STAI-S was 17.16+2.16 and 23.56+2.24. Effect modifier like socio economic status was stratified and compared with the correlation between STAI-S and APAIS scales before extraction of impacted third molar. Among patients who belonged to low socio economic status, average APAIS and STAI-S was 17.12±2.54 and 23.54±2.51, as shown in Table 3.

Table No.1: Descriptive statistics of Demographic data.

Variable		Frequency	Percentage	Mean age
Education level	educated	37	74.0	
	non educated	13	26.0	
	Total	50	100.0	28.86+5.85
Socio-economic status	low	33	66.0	
	middle	15	30.0	
	upper	2	4.0	
	Total	50	100.0	
Education level	educated	37	74.0	
	non educated	13	26.0	
	Total	50	100.0	

Table No 2: Descriptive Statistics of APAIS And STAI-S Scale

	n	Minimum	Maximum	Mean	Std. Deviation
APAIS scale	50	12.00	23.00	17.06	2.49
STAI-S scale	50	19.00	28.00	23.48	2.35

Correlation of APAIS and STAI-Scale

		STAI-S scale
APAIS scale	Pearson Correlation	.606
	Sig. (2-tailed)	.000
	n	50

Table No 3: Data Stratification with Comparison of Mean Change in Anxiety of A Patient Undergoing 3rd Molar Surgery Before & After Disclosure of Information Regarding Procedure

variable		N	APAIS scale	STAI-S scale
AGE	20–30 years	27	17.11±2.24	24.14 ±2.10
	31–40 years	23	17.00 ±2.81	22.69 ±2.438
	CORELATION(R)		0.877	0.028
GENDER	MALE	13	14.07 ±3.12	20.23 ±0.59
	FEMALE	37	18.10 ±0.93	24.62 ±1.51
	CORELATION(R)		0.000	0.000

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Socio-economic status	low	33	17.12 ± 2.54	23.54 ± 2.51
	middle	15	16.86 ± 2.61	23.20 ± 2.17
	upper	2	17.50 ± 0.70	24.50± 0.70
	Total	50	17.06 ± 2.49	23.48± 2.35
	CORRELATION (R)		0.623	0.628
Education level	educated	37	17.16 ± 2.16	23.56 ± 2.24
	non educated	13	16.76 ± 3.34	23.23 ± 2.74
	CORRELATION (R)		0.630	0.662

DISCUSSION

Everyone experiences fear and anxiety, albeit in different forms. Fear is an emotional, physiological, and behavioral response to a recognized external threat, while anxiety is an unpleasant emotional state with less clear causes, often accompanied by physiological changes and behaviors similar to those caused by fear. Emotional and psychological factors can significantly influence hormonal, vascular, and muscular functions, potentially leading to issues such as pain, jaw movement disturbances, xerostomia, and ulcerations.[9]

Emotional factors profoundly affect both the oral cavity and the body. Many oro-mucosal diseases may arise directly from emotional stress or indirectly from psychological changes. Dental treatments frequently induce fear and anxiety among patients. Despite the pain-relieving benefits of anesthetics, the prospect of undergoing dental procedures often triggers significant anxiety.[10] anxious reactions to specific stimuli can be seen as adaptive physiological mechanisms in unfamiliar situations. However, numerous studies over the past 50 years have consistently shown that such anxiety negatively impacts surgical outcomes. Patients with moderate to high anxiety levels experience more intense postoperative pain, greater psychological comorbidity, and higher incidence of post-traumatic stress reactions.[11]

One of the most common sources of preoperative dental anxiety is tooth extraction surgery. Anxiety not only causes emotional distress but can also provoke behaviors that complicate procedures, prolong interventions, and hinder postoperative recovery. Studies indicate that dental anxiety is more severe in certain population groups, with younger individuals, those with lower socioeconomic status, and those with lower education levels experiencing greater anxiety compared to older, more affluent, or better-educated individuals.[12]

Various scales have been developed to measure dental anxiety, including Corah's Dental Anxiety Scale (DAS), Kleinknecht's Dental Fear Survey (DFS), Spielberger's State-Trait Anxiety Inventory (STAI), Litt's Oral Surgery Confidence Questionnaire (OSCQ), Gale's Ranking Questionnaire (RQ), Stouthard's Dental Anxiety Inventory (DAI), Weiner's Fear Questionnaire (FQ), Morin's Adolescents Fear of Dental Treatment Cognitive Inventory (AFDTCI), the Visual Analog Scale (VAS), and the Original Questionnaire.[13]

Hermes et al.[14] conducted a study involving a large group of patients from different medical departments undergoing general anesthesia, sedation, and local anesthesia. They concluded that anxiety is a personal issue unaffected by the surgical field. However, their study excluded patients undergoing more invasive procedures due to trauma and tumors, whose psychological states might differ. In contrast, our study included all voluntary patients awaiting surgery, revealing that the nature of the surgical intervention does not significantly influence anxiety and fear levels. Including a general anesthesia group might have shown differences in anxiety levels, as general anesthesia and sedation can alleviate anxiety by allowing patients to undergo treatment unconsciously.

Patients with prior unfavorable experiences are likely to experience higher anxiety levels in subsequent procedures. Conversely, a painless, stress-free procedure with no postoperative issues can reduce anxiety for future treatments. López-Jornet et al.[15] found significantly lower anxiety levels over a 7-day follow-up in patients who had undergone tooth extraction without complications. However, negative treatment experiences can overshadow the anxiolytic effect and patient expectations. Additionally, informing patients about the procedure can sometimes trigger additional stress. Literature offers mixed conclusions on whether explaining procedures or previous experiences affect anxiety levels.[16]

Fear and anxiety in dentistry are often linked to poor oral hygiene resulting from low socioeconomic status, lack of self-confidence, psychological issues, and low morale. Other contributing factors include age, gender, education

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level, and personality. McGrath and Bedi reported higher anxiety levels among individuals with a low standard of living. Low education levels and socioeconomic status were also associated with poor anxiety outcomes. However, some authors argue that dental anxiety is higher among well-educated individuals.[17]

In our study, 26% of the participants were male and 74% were female, similar to Liu et al.'s study[18], which included 36.24% males and 63.76% females. The mean age of participants was 28.86 ± 5.85 years, compared to 24.2 ± 4.5 years in another study. Our findings showed a correlation of r=0.606 between the STAI-S and APAIS scales before the extraction of impacted third molars, aligning with a previous study that reported a correlation of r=0.509.[1]

Fear and anxiety are common emotional responses in dental settings, particularly in relation to surgical interventions. While fear typically arises from identifiable external stimuli, anxiety tends to be a more diffuse emotional state, often without a clear source. Both responses can affect the physiological, hormonal, vascular, and muscular systems—manifesting as pain, disturbances in jaw function, xerostomia, and ulcerative lesions.[9]

In dentistry, tooth extraction—especially of impacted third molars—is frequently associated with heightened preoperative anxiety. This anxiety may not only cause emotional distress but also complicate the procedure itself, prolong recovery time, and negatively impact postoperative outcomes. Numerous studies have demonstrated that individuals with moderate to high levels of anxiety report more intense postoperative pain, increased psychological comorbidities, and are at greater risk for post-traumatic stress reactions.[10]

Socio demographic variables such as age, education level, and socioeconomic status appear to significantly influence dental anxiety. Multiple studies have shown that younger individuals, patients with lower educational attainment, and those from disadvantaged socioeconomic backgrounds report higher levels of anxiety[11]. However, this is not universally agreed upon. Some research suggests that more highly educated individuals may exhibit increased dental anxiety, potentially due to heightened health awareness or greater exposure to negative information.[12]

To assess anxiety, various validated instruments have been employed, including the State-Trait Anxiety Inventory (STAI), Corah's Dental Anxiety Scale (DAS), the Dental Fear Survey (DFS), and the Amsterdam Preoperative Anxiety and Information Scale (APAIS), among others. These scales help clinicians quantify the subjective experience of anxiety, guiding management strategies and improving patient care.[13]

In our study, we found a significant correlation (r = 0.606) between the STAI-S and APAIS scores prior to third molar extraction. This finding is consistent with previous literature, such as a study that reported a correlation coefficient of r = 0.509 between these scales[12]. The mean participant age was 28.86 ± 5.85 years, slightly higher than reported in similar studies (e.g., 24.2 ± 4.5 years) [Ref]. Additionally, our sample consisted of 26% males and 74% females, a distribution similar to Liu et al.'s cohort, which included 36.24% males and 63.76% females.[6]

Interestingly, our findings support previous work by Hermes et al.[14], who reported that anxiety levels were independent of the surgical specialty. However, unlike their study which excluded patients undergoing more invasive or oncological procedures our study included all voluntary patients scheduled for oral surgery. This broader inclusion criterion supports the hypothesis that anxiety levels are more strongly associated with individual psychological profiles than with the type of procedure alone.

Moreover, patient experience plays a pivotal role. A positive, pain-free procedure can reduce future anxiety, while a traumatic experience may exacerbate it. López-Jornet et al.[15] found reduced anxiety over a 7-day follow-up in patients who had uncomplicated extractions. However, our data suggest that the benefits of a smooth procedure may be overshadowed if patients have had prior negative experiences or are predisposed to anxiety. The literature remains divided on whether pre-procedure information helps alleviate or exacerbate anxiety, with some studies advocating transparency and others suggesting it may intensify patient stress.[16]

Our results reinforce the complex interplay between

emotional, psychological, and demographic factors in dental anxiety. They align with much of the existing literature while adding depth by including a broader surgical sample and using multiple validated anxiety measurement tools. This study has several limitations that may affect the generalizability of its findings. The use of non-probability sampling introduces potential selection bias, limiting the representativeness of the sample. Additionally, being a single-center study, the results may not be applicable to broader populations or different clinical settings. The reliance on self-reported questionnaires, while based on validated scales, may be subject to response bias. Furthermore, factors such as psychological comorbidities and detailed prior dental experiences were not fully explored, which may have influenced anxiety levels.

CONCLUSION

The study concludes a positive correlation between STAI-S and APAIS scales before extraction of impacted third molar. Further studies at multiple setups must be conduct in order to know the correlation of APAIS and STAI scales in cases before extraction of lower third molar impaction so that initiatives and sessions will be done to rule out the anxiety level of such patients for better management in the future.

DISCLAIMER

None to declare.

CONFLICT OF INTEREST

There is no conflict of interest among the authors.

ETHICAL STATEMENT

An ethical clearance letter was obtained from the Ethical Review committee of Foundation University School of Health Sciences, Ref No: FF/FUMC/215-515/phy/24

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AUTHORS CONTRIBUTION

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