MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1, Jan-June 2026, Pages: 1033-1036

Effect of Preoperative Patient Education Intervention on Dental Anxiety in Adult Patients Undergoing Surgical Removal of Mandibular third Molar under Local Anesthesia

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Declarations
Funding: **The study was funded by Krishna Vishwa Vidyapeeth (Deemed to be University), Karad, Maharashtra for funding this study.**
Conflict of interest: None

Ethics approval: The study was approved by the Institutional Ethics Committee of the Krishna Institute of Medical sciences (KIMS), Krishna Vishwa Vidyapeetha, Karad, Maharashtra (KIMSDU/IEC/03/2018). The written informed consent was taken from all participants prior to data collection.

Data availability: The data will be available from the corresponding authors on reasonable request.

Authors' contribution statements: NM contributed to the conceptualization, supervision, writing as well as revising the manuscript. SM, AB and AV were involved for methodology, data accusation and writeup. All the authors have read and approved the final manuscript.

Abstract:
The study evaluated the role of different forms of preoperative patient education intervention (PPEI) on dental anxiety of patients undergoing surgical removal of mandibular third molar tooth. Ninety patients were randomly divided into three groups and received PPEI verbally (Group A), in written format (Group B) and through video demonstration (Group C). A pre-validated questionnaire was used to evaluate anxiety before and after PPEI. Intergroup comparison by Tukey's post-hoc test showed that the mean difference in change in the anxiety scores between group A (1.1±0.305) and group B (1.033±0.183) was 0.067 (p=0.667). The difference of change in anxiety scores for group A (1.1±0.305) and group C (-1.167±0.379) was 2.267 (p<0.001). The difference in anxiety scores for group B (1.033±0.183) and group C (-1.167±0.379) was 2.200 (p<0.001). **PPEI given verbally and in written form reduced the dental anxiety in patients undergoing molar third molar surgery. However, PPEI with video demonstration increased the anxiety levels.**

Keywords: Apprehension, Dental anxiety, Patient education, Third **molar surgery**

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Introduction:

The preoperative anxiety is one of the most common psychological state that can negatively impact both a patient's physical health and the outcome of a surgery. More than 60% of patients who are candidates for surgery are anxious about anesthesia and surgery [1]. This anxiety is mainly due to expectation of intra-operative pain or discomfort and fear of postoperative complications [2]. A greater degree of apprehension is associated with surgical extraction of tooth as compared to routine non-surgical extraction, with surgical removal of mandibular 3rd molar is one of the most invasive procedures and a common cause of extraction related anxiety [3, 4].

Prior to any surgery, it is mandatory to provide information to the patient regarding the preoperative preparations, intraoperative steps, expected postoperative sequelae and possible complications. The preoperative patient education intervention (PPEI) can be given verbally, through written literature, video demonstration or combination of the above [5]. PPEI has been shown to reduce patient anxiety and reduce surgical complication in cancer patients, patients undergoing cardiac and orthopedic surgeries, cholecystectomy and radical prostatectomy. However, the impact of PPEI on dental anxiety in patients undergoing third molar surgery has not been adequately studied. Properly administered PPEI is known to reduce patient anxiety and improve treatment outcome [6]. However, there is uncertainty regarding the effectiveness of various modes of delivering PPEI. In view of this, the present study was designed to evaluate role of modality of administration of PPIE on dental anxiety in adult patients undergoing surgical removal of mandibular third molars under local anesthesia.

Methods:

This study was conducted on 90 patients who required surgical extraction of mandibular third molar under local anesthesia in Oral and Maxillofacial Surgery Clinic. Both male and female patients in the age group of 18 to 50 years, who were willing to participate and give written consent were enrolled. The patients without significant systemic diseases, classified as ASA I or ASA II according to the American Society of Anesthesiologists were included. Patients were excluded if they had previously undergone surgical tooth extraction or were diagnosed with mental retardation or were on antipsychotic medications. Individuals with known dental phobia, pregnant or lactating mothers, and those with a history of anxiety episodes or currently receiving anxiolytic treatment were also excluded from the study.

A simple randomization was used to equally divide the patients into three groups (group A, B and C) using computer-based software (Clinstat, MS-DOS program, Bland M). Patients in group A received PPEI verbally. The information provided in PPEI included; preoperative preparation, appointment timing, expected duration of the procedure, intra-operative surgical steps (consisting of intraoral nerve block for local anesthesia, reflection of gingival flap, need of bone and/or tooth sectioning and suturing of the extraction site), expected post-operative sequelae (facial swelling, trismus and limited mouth opening), dietary changes, post-operative medications and follow-up visits. In group B, patients received the same information in written format. In group C (audio-visual group) PPEI was administered through a video of the procedure along with voiceover providing the same information. The same surgeon administered all the information in the three groups. However, a different surgeon who was not aware of the group assigned, recorded the case history and evaluated the dental anxiety scores.

All the patients were administered pre-intervention questionnaire for assessment of dental anxiety. The pre-validated questionnaire was based on modification of Corah's dental anxiety scale (DAS) [7]. The pre-validation was done using pilot study on 30 individuals. DAS consisted of four multiple choice questions with five possible answers. The answers were scored in an ascending scale from one (relaxed) to five (most anxious). The total score from the four-questions ranged from minimum of 4 to maximum of 20. Patients with total score below 12 were considered non-anxious, between 12 to 15 were considered anxious and above 15 were considered as very anxious (potentially dental phobic).

Statistical analysis:

All the data were entered into Microsoft Excel 2010. Frequency distribution and percentage were used to elaborate results of gender, marital status and occupation, and association was checked with Chi-square test. Difference between mean age among the three groups were compared by analysis of variance (ANOVA). The Pre and Post intervention anxiety scores within the groups were compared by *Paired t-test*. The three groups were compared for change in anxiety score (pre and post intervention) by analysis of variance (ANOVA) and Tukey's Post-hoc test for pairwise comparison. The 'p' value less than 0.05 was considered statistically significant. The software used for analysis was SPSS (version 19).

Results:

Mean age of the patients in group A, B and C was 30.13 ± 7.829, 31.23 ± 8.476 and 31.70 ± 9.214 (mean ± standard deviation) years respectively. No statistically significant difference was seen among the three groups with relation to gender, marital status and occupation (with *p* value of 0.875, 0.837 and 0.830 respectively).

The Pre and Post intervention anxiety scores within each group were compared using *Paired t-test*. The mean difference for anxiety score in group A at pre-intervention (13.37±2.109) and post-intervention (12.27±2.180) was 1.100 ($p<0.001$). The mean difference for anxiety score in group B at pre-intervention (13.60±2.044) and post-intervention (12.57±2.029) was 1.033 ($p<0.001$). The mean difference for anxiety score in group B at Pre-intervention (14.00±2.533) and post-intervention (15.17±2.394) was -1.167 ($p<0.001$). (**Fig.1**)

The comparison of mean difference of pre-Intervention and post-Intervention scores among the three groups was evaluated by *ANOVA*. There was statistically significant of change in the anxiety scores among three groups (group A= 1.1±0.305, group B= 1.033±0.183 and group C= -1.167±0.379.) with p value <0.001. Intergroup comparison by *Tukey's post-hoc test* showed

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the mean difference in change in the anxiety scores for group A and group B was 0.067 which was not significant. The mean difference of change in anxiety scores for group A and group C was 2.267 ($p < 0.001$). The mean difference in anxiety scores for group B and group C was 2.200 ($p<0.001$). (**Table 1**)

Discussion:

The three groups in this study received the pre, intra and postoperative information regarding the surgical procedure in form of verbal communication, written document and video demonstration of the procedure with voiceover. We found that providing information about preoperative preparations, surgical steps and postsurgical recovery, verbally or in written form helps to reduce patients' anxiety before mandibular third molar surgery. The reduction in anxiety between the verbal and written group was similar and was statistically insignificant, while the mean difference in anxiety scores for verbal and written group, compared to audiovisual group was statistically significant. Studies suggest that the reduction of the noxious stimuli precipitating pain and establishing a friendly environment with patient can greatly reduce anxiety [8].

In our study, a video demonstration of the surgical procedure increased patient apprehension. Previous studies have reported mixed effects of audiovisual PPEI on dental anxiety. AlSwayyed A. et. al. in 2017 demonstrated a greater reduction in anxiety with audio-visual education compared to written information in patients undergoing non-surgical endodontic procedures [9]. Similar finding was presented by Choi et. al. in patients undergoing impacted mandibular 3rd molar removal wherein the patients receiving audiovisual information remembered significantly more information regarding postoperative complications than the control group. The audiovisual group also reported lower anxiety scores than the control group 1 week after the surgery [10]. In contrast, Kazancioglu et. al. reported an increase in anxiety of patients after watching video of third molar surgery [11]. The result of this study also supports the finding, with the patients receiving audio-visual PPEI showing an increase in dental anxiety score. Although PPEI provides the patient knowledge regarding the procedure and is documented to reduce patient anxiety, video demonstration of surgical steps such as placement of incision, bone removal, tooth sectioning and suturing can be fear provoking and offset the anxiety-reducing effect of PPEI.

The limited number of randomized trials and conflicting findings on this topic suggests a need for further investigation to draw firm conclusion. Also, instead of video demonstration of the actual surgery, role of animated steps of the surgery as part of PPEI can be evaluated in future prospective study designs.

Conclusion:

The present study showed that providing information about the preoperative preparations, steps of surgical procedure and postsurgical recovery in either verbal or written forms before the mandibular 3rd molar surgery improves patient's anxiety. However, video demonstration of the surgery resulted in increase in patient apprehension.

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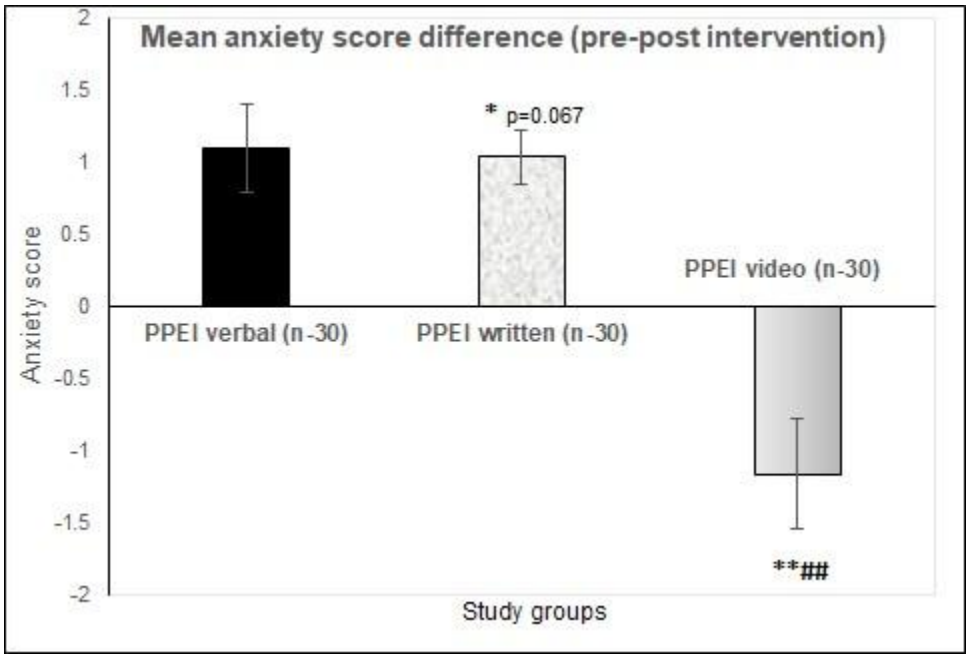
Table 1: Comparison of mean difference of pre and post-intervention scores among the three groups

Sr. No.	Group (n)	Mean difference of anxiety score (Mean± SD)	p value ANOVA (F)	Tukeys' Post Hoc Test Mean difference (p value)		
				Group A versus B	Group A versus C	Group B versus C
1	**Group A (30)**	1.1±0.305	<0.001* (554.332)	0.067 (0.667)	2.267 (<0.001*)	2.200 (<0.001*)
2	**Group B (30)**	1.033±0.183				
3	**Group C (30)**	-1.167±0.379				

*Statistically Significant

Figure Legend:

Figure 1: Comparison of mean difference in pre-intervention and post-intervention anxiety scores among the three groups.



PPEI : preoperative patient education intervention