

## Original Research

### Association of Multimedia Information about Dental Implant Surgery and Anxiety in Patients- A Double-Blinded Randomized Controlled Trial

Bedabrata Barman<sup>1</sup>

<sup>1</sup>Second Year Student of Master in Dental Science, Implantology  
Universitat Jaume I, Castelló de la Plana, Valencia, Spain

#### ABSTRACT:

**Aim:** To assess the effects of different patient education techniques on patients' anxiety levels pre and post dental implant surgery. **Materials and Methods:** A sample of sixty patients were randomized into three groups; each comprising of twenty patients; [group 1, basic information given verbally, with details of operation and recovery; group 2 (study group), basic information given verbally with details of operative procedures and recovery, and by showing a video clip on single implant surgery]; and a control group [basic information given verbally "but without mentioning the details of the operative procedure and recovery"]. Anxiety levels were assessed using the Spielberger's State-Trait Anxiety Inventory (STAI) and Modified Dental Anxiety Scale (MDAS). Pain was assessed with a visual analog scale (VAS). **Results:** Statistically significant changes were seen in group 2 ( $p < 0.05$ ). More analgesics were being used by patients with higher anxiety. Linear regression analysis showed that female patients had higher levels of anxiety ( $P < 0.05$ ) as compared to males. **Conclusions:** Anxiety levels were increased by presence of preoperative media as opposed to lack of pre operative information.

**Key Words:** Dental Implant, Dental Anxiety, Preoperative Information, Pain

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**Corresponding Author:** Bedabrata Barman, Second Year Student of Master in Dental Science, Implantology, Universitat Jaume I, Castelló de la Plana, Valencia, Spain

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#### INTRODUCTION

Anxiety is an emotional reaction defined as stress, apprehension, nervousness and concerns caused by an intangible or diffuse advancing threat or approaching danger, accompanied by activation of the autonomous nervous system.<sup>1</sup> Medical procedures almost always elicit a sense of loss of control, fear, helplessness, and feelings of stress and anxiety.<sup>2</sup> Patients find it difficult to cooperate with dentists when they experience high anxiety during or before dental treatment, which may lead to an increase in the time needed for the procedure than normal and elevate difficulty level in performing of the procedure as well, thereby causing treatment with unsatisfactory outcomes. Previous studies have found that individuals with a high fear of dentistry visited the dentists less often and had more decayed and missing teeth.<sup>1,2</sup> Dental implant is a prosthesis called a root form that replaces a natural

tooth which is usually made from titanium and this treatment option is being utilized globally, and acknowledged as the most comfortable and widely accepted dental treatment procedure for replacing missing teeth. Placement of dental implants is a relatively simple surgical procedure for a surgeon; however, it is usually associated with a high level of anxiety and discomfort for the patient. On hearing terms such as "implant surgery" can lead to an increase in the level of anxiety for many patients.<sup>3</sup> Explaining the complications of operative procedures has an effect on dental anxiety levels of the patients as well. As an effective method for delivering knowledge to dental implant patients, informative sheets with written details about the procedures have been used. However, these information sheets are not easy to read and to be understood by the patients.<sup>4</sup> Some studies<sup>5,6</sup> have demonstrated that informing

patients by means of videos and showing the operative procedure to the patients can lead to a decrease in preoperative anxiety level and increase patient comprehension, although other studies have shown that these effects were relatively small<sup>7</sup> or sometimes, may increase anxiety level.<sup>8</sup> The purpose of this study was to evaluate the effects of different patient education techniques on patients' anxiety levels before and after dental implant surgery.

## MATERIALS & METHODS

The sample size of the study was sixty subjects selected by purposive sampling method. The inclusion criteria included patients who had been referred for dental implant placement. No distinctions were made based on race, gender, or socioeconomic status. Written voluntary informed consent was taken from every patient. The exclusion criteria involved patients who had a history of recent radiotherapy in the maxillofacial area and had a history of undergoing chemotherapy, history of bisphosphonate usage and presence of alcohol or drug addiction, chronic smokers, uncontrolled diabetes, rheumatoid arthritis and serious psychiatric and mental disorders. The study was designed according to the Declaration of Helsinki's medical protocol and ethical clearance was taken from the institutional review board. As negative experiences about the procedure could also contribute to higher anxiety levels, patients with traumatic dental treatment experiences were also excluded from the trial. The study comprised of three groups which contained 20 patients each randomly distributed; two study groups [group 1, basic information given verbally, with details of operation and recovery stages; group 2 (study group), basic information, with details of operative procedures and recovery, given verbally and by showing a video clip on single implant surgery]; and a control group [basic information given verbally "but it was devoid of the details of the operative procedures and recovery"]. The surgeon and patients were unaware of group allocations and baseline anxiety scoring (Double Blind Trial). Group 1 and 2 patients were informed that local anaesthesia would numb the operation area and they should not expect to feel pain. In addition, the surgeon would halt the procedure and provide further anaesthesia if they felt any pain to make it more comfortable for them. The informative video chosen for this study, explained how a single dental implant surgery procedure is completed. The video was about two minutes long, explaining the whole procedure briefly from the incision until suture. The movie started with an interview of the actual patient before the implant surgery. The discussion included a description of the surgical procedure and the risks. The next scenes showed the patient being moved into the operating theatre and the surgeons performing the implant surgery. During this study, two types of dental implant systems from different countries (Bredent GmbH & Co.KG, Senden, Germany;

Biohorizons®) Implant Systems Inc., Birmingham, AL, USA) were used. All implants were made from titanium, a biocompatible material for patients. One or two implants were placed in the mandible under local anaesthesia by a single surgeon according to implant system recommendations. Anxiety and pain related anxiety levels were assessed using the Spielberger's State-Trait Anxiety Inventory (STAI) and Modified Dental Anxiety Scale (MDAS). The STAI has 40 items, 20 items allocated to each of the S-Anxiety and T-Anxiety subscales.<sup>9</sup> The State Anxiety Scale (STAI-S) evaluates the current state of anxiety, and the Trait Anxiety Scale (STAI-T) evaluates relatively stable aspects of "anxiety proneness," including general states of calmness, confidence, and security.<sup>10</sup> Modified dental anxiety scale (MDAS) includes a questions about a local anaesthetic injection. Each question has five scores ranging from 'not anxious', to 'extremely anxious', in an ascending order from 1 to 5.<sup>11</sup> Pain was assessed with a visual analog scale (VAS). Statistical analysis was performed using SPSS 23.0.

## RESULTS

Sixty patients (33 females and 27 males; mean age 44.63±8.22 years) fulfilled the inclusion criteria and gave written informed consent to participate in the study. The groups were matched for gender distribution, age, and surgery time ( $P > 0.05$ ). Demographic information that might affect anxiety and pain perception are shown in table 1. There was no significant difference in the mean surgery time (starting from the first incision to the last suture) between the groups ( $p > 0.05$ ). MDAS scores showed that immediately postoperative and one week later the surgery was significantly lower than the scores before the surgical procedure in all groups ( $p < 0.05$ ). When the groups were compared according to MDAS scores, movie group patients' significantly higher MDAS scores compared the Group 1 and control group patients ( $p < 0.05$ ). No differences in STAI-T scores were found among the groups ( $p > 0.05$ ). In Group 2, the STAI-S scores immediately and one week after the surgical procedure were significantly lower than the scores before the surgical procedure ( $P < 0.05$ ). In control group, immediately after the surgical procedure STAI-S scores were significantly higher than preoperative scores ( $p < 0.05$ ). The most significant changes were observed in the movie group. This group's patients were significantly more anxious before the dental implant surgery compared with those in group 1 and the control group ( $p < 0.05$ ). Immediately after the surgical procedure, there was a significant decrease in anxiety compared with baseline in all groups; the patients in the movie group again displayed more anxiety compared with those in group 1 and the control group. Although the scores reported one week after the surgical procedure were slightly higher than those reported immediately after the surgical procedure, the difference was not

significant. Linear regression analysis showed that age, surgery time, and education level had no correlation with anxiety or pain levels; however, female patients had higher levels of anxiety ( $P < 0.05$ )

(Table 2). Table 3 shows that patients with high anxiety had higher pain scores on visual analog scale ( $P < 0.001$ ). Patients who were more anxious also used more analgesic medication.

**Table 1: PATIENTS' CHARACTERISTICS (n = 60)**

	Group 1 (N: 20)	Group 2 (N: 20)	Control Group (N: 20)
<b>Gender</b>			
Female	10	11	12
Male	10	9	8
<b>Age (yr)</b>	45.22±1.05	39.15±2.61	42.15±6.87
<b>Education</b>			
Primary School	3	4	5
High School	12	13	11
University	5	3	4

**Table 2: LINEAR MULTIPLE REGRESSION MODEL OF POST-TREATMENT STAI-S SCORES, ADJUSTED FOR PRETREATMENT ANXIETY QUESTIONNAIRE SCORES, GENDER, AGE, AND EDUCATION LEVEL (n = 60)**

Model	Adjusted R2	SE	P-value
Summarya	0.221	13.12	0.0001
<b>Variable</b>	<b>Parameter estimate</b>		
Before treatment STAI-S	0.291	0.111	0.0002
After treatment STAI-S	-7.401	3.003	0.0179
Gender	0.199	0.301	0.0013
Non-significant factors excluded from the final model: age ( $P = 0.121$ ), operation time ( $P = 0.401$ ), educational status ( $P = 0.697$ )			

**Table 3: MEAN ±SD PAIN SCORES ON VAS (n = 60)**

	During Surgery	1 day	3 day	7 day
<b>Group 1</b>	2.01±0.12	5.01±1.01	2.11±0.87	0.41±0.43
<b>Group 2</b>	5.05±1.12	8.30±1.04	4.03±1.06	3.23±0.91
<b>Control Group</b>	3.32±0.02	5.03±2.12	2.66±0.54	0.32±0.32
<b>p-value</b>	<b>0.025</b>	<b>0.016</b>	<b>0.034</b>	<b>0.040</b>

## DISCUSSION

The World Wide Web has a plethora of information available at the click of the button. It is easily accessible and available to everyone. However, this information is sometimes misleading, biased and inaccurate. Our clinical experience mostly showed that there were higher levels of anxiety seen in patients who had watched videos or read about their surgeries on the internet before the procedure. However, research evaluating the effect on anxiety levels and pain related anxiety in patients before and after giving them accurate and well described information as well as showing informative videos before the procedure is scarce and rare. Therefore, the current study was designed to assess the level of anxiety and pain in patients after watching a video of their procedure of dental implant placement before the actual surgical procedure took place. Dental

treatments are a common cause of fear and anxiety in most people, it is not surprising to find most of the participants of the study having high STAI-T scores, which is consistent with the results of other studies.<sup>12,13</sup> Dental implant surgery is a relatively simple procedure for the dentist; however, it is a complex procedure for the patients. Any form of invasive treatment involving local anaesthesia and incisions is fearsome and worrying for patients. Therefore, most of the implant patients have a high-state of anxiety prior to undergoing implant surgery. The current study found that females have a higher anxiety level than males. These findings are concurrent with findings of previous clinical studies that showed higher levels of anxiety among females.<sup>14,15</sup> However, some studies have shown no significant differences between the genders.<sup>16,17</sup> The possible explanation could be the fact that females are

usually more expressive of their feelings and emotions as compared to males. The main finding of the current study is that patients who received information about the operative procedures and postoperative recovery, anxiety reduction would outweigh the fear provoked by the procedural details. However, watching a movie about surgery is a stressful event for patients. This finding is concurrent with previous findings that distressing experiences are likely to make patients sensitive and increase the risk of developing psychological distress following a later traumatic event.<sup>18</sup> In another study, Kesari et al. compared the anxiety levels of patients who watched their own cystoscopy and those who did not, however; they found no significant difference between groups.<sup>19</sup> Tanaka et al. reported high postoperative patient satisfaction after presenting live video on a monitor during arthroscopy.<sup>20</sup> In the present study, watching a movie about implant surgery caused a significant increase in patient STAI-S scores compared with two groups. The pain and anxiety relationship has been researched in many articles.<sup>21,22</sup> Vallerand et al. laid emphasis on their study findings that increasing the quantity of preparatory information about the postoperative period significantly increases pain relief with the result of satisfaction with pain control without higher analgesic consumption.<sup>23</sup> Information about the surgical procedure was intended to help patients obtain attentive, early interventions for controlling pain.<sup>24</sup> Positive correlations were found between anxiety level and postoperative pain. However, as the articles depend on survey research, this subject is still debatable and future research should be considered using standardized procedures. The results of the present study demonstrated that the perception of pain related to implant surgery may have been influenced positively by written information provided preoperatively and that pain relief and satisfaction with pain control increased without an increase in the consumption of analgesics. There are studies that aim to decrease anxiety level via different techniques.<sup>25</sup> Thoma et al. investigated the effectiveness of listening to music as an intervention in managing anxiety during dental treatments by integrating results from 16 different studies.<sup>25</sup> They found the difference of effect was statistically significant. For instance, decreasing anxiety can reduce the amount of discomfort and pain experienced by patients, leading to lower dosages of required analgesics. In our study, patients who were more anxious also needed more analgesic medication. In dental practice, it is difficult to determine the anxiety level in patients. Therefore, some anxiety scales may be used to assess anxiety levels. However, scoring and interpretation of the scale are based on self-report, and also patients who perceive themselves as being exposed to a potential risk factor may have higher scores. It must be acknowledged that exposure to risk factors was measured subjectively rather than on the basis of an objective evaluation. Additionally,

some surgeons or dentists referring the patients for the dental implant placement may not provide them with proper, well structured information leading to mistrust and development of fear in the patients.

## CONCLUSION

The present study helped us to draw various meaningful conclusions which include the increase in anxiety in patients who received information via multimedia pre operatively while a decrease was seen in dental anxiety in patients who were explained about their procedure in a written basic format. In addition, the study results demonstrated that anxious patients need to use more analgesics for relief of their pain. Clinicians must always take care of their patient's mental status before the start of any surgical procedure and ensure that their patients are informed correctly in simplest of words about their treatment and they should try to make the patients comfortable and help in pain relief by using the right amount of counselling, information sharing and use of analgesics.

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