IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Effect Of Stress And Anxiety On Post-Operative Wound Healing

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ABSTRACT:

INTRODUCTION:

The effect of stress and anxiety on post-operative wound healing, has not been well studied. Anxiety and stress have greater impact on wound healing. This correlated to the dental treatments. The negative experiences in the previous dental treatment can also affect the stress and anxiety levels. Stress and anxiety usually affect the daily routine, including dental treatments such as tooth extraction which induces anxiety level more when compared to other treatments.

KEY WORDS: “Stress”, “anxiety”, “wound”, “wound healing”, “post-operative”, “oral surgery”, “surgical difficulty”, “fear”, “dental anxiety”.

INTRODUCTION:

Anxiety is defined as a feeling of apprehension, worry or unease, typically about an unspecified or unknown future threat. The word "pain" refers to a physical or mental sensation that causes suffering or discomfort. It can be described as a sharp, sudden feeling or a dull, persistent ache. The anticipation of pain, unfamiliarity with the procedure, previous negative dental experience can contribute to dental anxiety (1). Anxiety is increased during extraction due to more dental work and post-operative pain. Based on reports, among all the dental treatments, extraction increases anxiety in patients (2). Dental anxiety is of two types internal and external. Internal anxiety deals with patient's own psychological status. External anxiety deals with patient's experience towards dental treatment.

Wound healing involves four stages such as haemostasis, inflammation, proliferation and remodelling (3). Psychological stress delays wound healing. Wisdom tooth extraction shows highest level of anxiety and fear (4). Wisdom tooth is either horizontal or vertical or fully impacted which causes pain, tooth decay, periodontal diseases and infection (5). To prevent above mentioned complication, complex surgery is needed for bone removal and tooth sectioning.

Fear and anxiety are increased due to difficult extraction, longer operative time, increased post-operative pain (6). Anxiety can be either state anxiety or trait anxiety (7). State anxiety is a short-term anxiety, when the circumstances that caused anxiety removed, it will resolve automatically. Trait anxiety persists long term, it involves experiences from the past (8). Dental anxiety and pain belong to trait anxiety. Scholars use state-trait anxiety inventory (STAI) as a survey instrument in the study of dental anxiety (9,10). Studies have shown 81% of patients experience distress and discomfort during extraction. Preoperative anxiety influences both intraoperative discomfort and postoperative pain (11).

Anxiety triggers autonomous nervous system leading to acute hemodynamic changes in systolic and diastolic BP and heart rate which increases discomfort and provokes stress (12). Dental anxiety on the outcome of surgery includes increased postoperative pain, increased risk of infection and prolonged healing time (13,14). Surgery associated with trauma to the bone and soft tissues have greater impact on stress levels (15,16). Dental anxiety on the outcome of the surgery comprise of increased postoperative pain and increased risk of infection and result in prolonged healing time (17,18).

Preoperative dental anxiety results in delay or avoidance of dental treatment leading to poor oral hygiene (19,20). Many studies show that preoperative dental anxiety is common in women. Patients with high dental anxiety experience greater trismus and pain (21,22).

MATERIALS AND METHODS:

The scoping review is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Databases searched for literature review included Scopus, Web of Science and PubMed. The search was accomplished using the keywords "stress", "anxiety", "wound healing", "preoperative pain", "dental anxiety". Only articles published in English were included.

SEARCH STRATEGY:

A literature search was conducted in Scopus, Web of Science and PubMed to identify articles that investigate the effect of stress and anxiety on postoperative wound healing. The following search lines were used for each database: (dental stress) OR (dental anxiety) OR (effect of stress on wound healing) OR (effect of anxiety on wound healing) OR (anxiety scale) OR (stress scale).

MECHANISM OF WOUND HEALING:

Wound healing is a complex biological process that restores the integrity of injured tissue. It occurs in distinct phases, each regulated by cells, growth factors and extracellular matrix interactions. There are four overlapping phases such as haemostasis (stopping bleeding by forming a platelet plug), inflammation (cleaning debris and preventing further infections), proliferation (formation of granulation tissue, reforming blood vessels and creating new skin) and remodelling (strengthening and reducing the scar) (23).

Haemostasis is the first step of wound healing. When a blood vessel is ruptured, it leading to vasoconstriction to reduce blood flow. Platelets migrate to the injured site, gets activated and release chemical mediators. This forms a temporary platelet plug. Coagulation is activated leads to the conversion of fibrinogen into fibrin strand which stabilizes the platelet plug forming blood clot and later releasing growth factors (24).

The goal of inflammation is to prevent infection and clear debris. Neutrophils migrate to kill bacteria and remove dead tissues. Later macrophages clear the debris and release growth factors. This stage causes redness, swelling and pain. Fibroblasts start to create new collagen over the injured site. Once the collagen fibres are laid on the fibrin framework, the wound starts to heal. The wound begins to contract by continuous deposition of fibroblasts and myofibroblasts. The remodelling phase begins when excess collagen disintegrates and the wound contracts leading to secondary healing (25).

TEST ANXIETY:

Test anxiety is defined as the reaction to stimuli that is associated with an individual's experience of testing or evaluating situations. Test anxiety is of two types namely trait and state anxiety. State trait anxiety inventory STAI is a self-report assessment device which includes separate measures of state and trait anxiety. It was discovered by Spielberger 1989.

DENTAL ANXIETY SCALE:

Anxiety can be measured through three methods such as self-report, physiological measures and overt measures (26). Compared to all the methods, self-reporting anxiety measurement is commonly used (27).

1. Corah Dental Anxiety Scale (DAS):

It is developed by Corah in 1969 and is the first dental anxiety scale. DAS consists of 4 questions (28). The first questions enquire about "how would you feel if you had to visit a dentist tomorrow?". The second, third and fourth questions enquire about the respondents feeling related to dental visits. Higher the score higher the dental anxiety. By summing up the scores from the four questions, the dental anxiety score is evaluated. The scores range from 4 to 20. Total score of 4 shows "no fear", a score between 5 and 8 indicates "low fear", a score between 9 and 14 corresponds to "moderate fear" and a score ranging between 15 and 20 leads to "high fear" (29). DAS is considered the gold standard for evaluating dental anxiety

2. Modified Dental Anxiety Scale (MDAS):

MDAS is created by Humphris et al. from United Kingdom. It has got additional questions when compared to DAS. The scores are calculated in the same manner as of DAS. Scores ranging from 5 to 25 points. Higher scores indicate higher levels of anxiety (28).

3. Dental Fear Survey (DFS):

It was developed in 1973, comprises of 27 items. The DFS consists of totally 4 parts. First part comprises of two questions that target the avoidance behaviour of patients with dental phobia. Second part comprises of six questions regarding somatic reactions to anxiety. Third part enquires about the level of anxiety and consists of 15 questions. The last part of DFS shows the anxiety level of the patient's parents, friends and people around them (29).

4. Dental State Anxiety Scale (DSAS):

It was developed in 1982 and is a modification of State-Trait Anxiety Inventory (STAI). It is widely used to assess the general anxiety levels (30). It consists of 20 questions. It provides answers on a scale of 1 (not at all), 2 (somewhat), 3 (moderately so), or 4 (very much so) (30).

5. Hierarchical Anxiety Questionnaire (HAQ):

HAQ was developed in Germany in 1999. It consists of a total of 11 questions, especially six situations commonly known to increase anxiety in dental setup. The main purpose is to diagnose and differentiate between anxiety and phobia. Participants scores ranging from 30 or below are considered having low

anxiety, scores between 31 and 38 have moderate level of anxiety, scores of 38 or above are described having high anxiety. The individuals with scores ranging 38 or above have avoided dental treatments and are considered to have dental phobia (31).

6. Index of dental Anxiety and Fear (IDAF-4C+):

This questionnaire consists of three main parts namely: the dental anxiety and fear evaluation part (IDAF-4C), dental phobia part (IDAF-P), and dental stimulus part (IDAF-S). The IDAF-4C consists of 0f eight items, IDAF-P has five items making it a total of 23 questions. IDAF-4C has scale ranging disagree (32) to strongly agree. IDAF-P uses yes or no as responses. It assess emotional, behavioural, physical and cognitive anxiety-related reactions.

DISCUSSION:

Dental anxiety is common in patients undergoing dental treatment. While comparing the stress and anxiety levels expected postoperative pain was found to be immensely higher than actual postoperative pain. Young females had greater anxiety level when compared to males. Previous history of negative experience in dental treatment shows higher anxiety levels (21,22). There is an increase in anxiety and stress level in subjects with previous history of tooth extraction (33). Compared to actual pain, anticipated pain is higher (34). High anxiety levels before any surgery increased the postoperative pain on the first day. Increased postoperative pain prolongs the healing time and result in poor prognosis. Preoperative anxiety and stress alter the release of serotonin which leads to increased inflammatory response.

Several studies have shown an increase in the mean scores of anxiety and stress scales and increased postoperative pain levels in patients undergoing wisdom teeth extraction (4). An increase in anxiety levels in patients increases the complexity of dental procedures and decreases the patient's mentality of understanding of the undergoing procedure. Dental anxiety also reduces seeking of medical help. Patients with higher trait anxiety are motivated to seek treatment and have better prognosis. The 8 questions from IDAF-4C can effectively assess the dental anxiety and stress levels (32).

Many studies have reported that patients with trait anxiety have twice the dental anxiety of patients with no trait anxiety (9,10). An increase in the dental anxiety scale tends to have greater impact on pain and influence the physiological recovery after the dental procedure. The frequency of negative experience in dental treatment correlates with the dental anxiety during 4-week postoperative period (1). Many studies show that patients with high level of state anxiety increased the levels of surgical pain. It is evident that high level transforms the surgical treatment into chaos and interferes the healing phase. The longer the duration of the treatment, the longer the postoperative pain and healing happens. DFS is said to a well-designed scale to assess the both the trait and state dental anxiety effectively (29). Stress can alter physiological changes which is seen as "stress syndromes" or "sterile inflammation".

To address the anxiety scales, dental healthcare professionals should provide follow stress reduction protocol. Clear communication and patient education are the main objective to be mastered to reduce stress and anxiety and promote good wound healing (2). Creating a good and peaceful environment for the patients help calm the patients mind and ease the situation. Deep breathing exercises, distraction and positive talk can help to reduce the levels of anxiety and stress. Seeking help from professionals and counsellors can help with anxiety and stress and help with treatment procedure and induce good wound healing.

CONCLUSION:

Within the limitations of the present study, this study demonstrates a significant relationship between stress and anxiety in postoperative wound healing. The more anxious the individual, the more severe the pain, swelling and trismus which leads to delayed wound healing. The complication in the dental procedures play an important role for predicting postoperative wound healing irrespective of preoperative dental anxiety.

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