

**THE EFFECT OF PROGRESSIVE MUSCULAR RELAXATION AND PSYCHOLOGICAL COUNSELING ON PHYSIOLOGICAL PARAMETERS DURING SURGICAL STRESS**Avnish Dave<sup>1</sup>, Jayant Makwana<sup>2</sup>**HOW TO CITE THIS ARTICLE:**

Avnish Dave, Jayant Makwana. "The Effect of Progressive Muscular Relaxation and Psychological Counseling on Physiological Parameters during Surgical Stress". *Journal of Evidence based Medicine and Healthcare*; Volume 2, Issue 43, October 26, 2015; Page: 7709-7716, DOI: 10.18410/jebmh/2015/1041

**ABSTRACT:** Present study was carried out to study the effect of muscular relaxation technique and counseling on physiological parameters on subjects undergoing surgery. The study was conducted in 32 individuals between ages of 20 – 70 at Civil hospital, GMERS, Valsad and was compared with a control group (N=32) of the same age. The parameters recorded were arterial pulse, arterial blood pressure. The results show the significant differences in the recorded parameters in control (n=34) and study group (n=33). Pulse rate (75.54 to 80.17), systolic (121.49 to 126.29) and diastolic blood pressure (80.4 to 84.23) values increased in preoperative period than on admission in the control group while study group showed decrease in the preoperative value compared to that on admission Pulse rate (77.94 to 74.80), systolic (124.50 to 122.19) and diastolic blood pressure (82.88 to 81). The results obtained were analyzed for statistical significance. The results obtained were statistically significant.

**KEYWORDS:** Muscular relaxation, Counseling Surgical Stress Pulse rate Blood pressure.

**INTRODUCTION:** During his evolution from stone as to modern world a man has witnessed many changes and challenges. Some has allowed man to adjust while some has created a stressful situation. The word stress is a Latin word which means to draw tight or to stretch Cox 1978.<sup>1</sup> Stress is defined by Baum A<sup>2</sup> as a negative emotional experience accompanied by biochemical, physiological and behavioral changes directed towards adaptation either by manipulating the situation to alter the stressor or by accommodating to its effect. The term stress as used in biology has been defined as any change in the environment those changes or threatens to change an existing optimal steady state.<sup>3</sup> Stress is a wear and tear of a body and it arises from an interaction of a person with himself and the environment. According to Lazarus & Folkman 1984<sup>4</sup> every individual's reaction and perception to the environment is different. The stress puts load on physiological and psychological aspects of the body. These both if not controlled then subsequently leads to psychosomatic disorders Lazarus 1966.<sup>5</sup> All the situations or conditions that demand a change or adjustment in the function and behavior are termed stressors. As pointed earlier stressors for every individual is different. But in broadly stressors are classified as general and specific.

General stressors include physical, social, socioeconomic, emotional etc. a specific stressors is an event based or situational based phenomenon and the stress to such stressors reduces once the situation passes off or is brought under control. Few of such specific parameters are examination, interviews, public speaking, sports events, illness and surgeries, accident etc.

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Whether the stressors are general or specific it affects the physiological functions and parameters. Stress activates autonomic nervous system and thus its effect on body (physiology) can be assessed by recording the physiological parameters affected by ANS e.g. pulse, blood pressure, respiration, GSR etc. these changes manifest themselves as headache, tremors, muscular spasm and stiffness, sweating, insomnia. Surgical stress is a situation stressor and arises from the thought of hospitalization and of the surgery itself. The surgical stress starts once the patient is told of the surgery. It stays through pre admission, preoperative till post-operative period. Highest level of anxiety is experienced by patient a day prior to the admission Johnson 1977.<sup>6</sup> The main reason for surgical stress is financial and outcome of the surgery.

A person must modify his outlook towards the situation/event to counter stress. Roskier and Lazarus<sup>7</sup> states that coping with stress depends upon the cognitive view of an individual towards situation. Counseling, Yoga, meditation & hypnosis<sup>8</sup> (Morse 1977) and various other relaxation techniques<sup>9</sup> (Wells J K 1986) are advocated or advised to combat stress or stressors. Starting from deep breathing to pranayama to various yoga asanas are known to reduce the stress and its ill effects on one's body. Johnson 1975<sup>10</sup> hypothesized that sensory information given to the patients preoperatively, reduced the intensity of emotional response to the surgery.

**AIMS AND OBJECTIVE:** The study was undertaken to;

- Study variations in physiological parameters such as pulse, blood pressure, in relation to surgical stress.
- Study the effect of progressive muscular relaxation techniques along with psychological counseling on physiological parameters.
- Observe the influence of progressive muscular relaxation on the perceptive modalities like, subjective feeling of anxiety, pain etc. related to the situational stressor surgery.

**MATERIALS AND METHODS:** The study was undertaken in 32 patients and 32 control subjects between the age group of 20-70 years to find out the effect of relaxation techniques on physiological parameter during surgical stress. Study was carried out at Civil Hospital attached to GMERS, Valsad between November 2014 to January 2015 after obtaining necessary ethical clearance and consent from the patients. The participants consisted 33 males and 34 females.

**Selection of Subjects:** Following criteria were used for selecting subjects for the present study;

1. Patients admitted for planned surgery scheduled at least one week after.
2. A patient undergoing surgical intervention for the first time.
3. A patient who were amenable, cooperative and willing to participate.

**Exclusion Criteria:**

1. Patient with prior experience of surgery or hospitalization.
2. Patient suffering from any medical ailments such as hypertension, hyperacidity, diabetes mellitus, psychiatric illness.
3. Patient on ant psychiatric treatment.

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The selected subject visited hospital on the day of admission 6-7 pm. Patients were interviewed in an isolated, quiet, semi special room of the ward. The patient's consent for the study and his/her personal, medical, and other relevant history was taken. A stress inventory designed by Voicer and Bohanon 1975 9 was used to assess the stress level of the participants. Physiological parameters included in this study were pulse rate, systolic blood pressure, and diastolic blood pressure.

To keep the standardization and avoiding diurnal variations all the parameters were recorded in fixed evening hours.

Arterial pulse was examined in right radial artery. Rate, force, volume, tension and condition of vessel wall were recorded. The rate was measured for two minutes and divided by 2 to get pulse rate per minute.

Blood pressure was recorded in right brachial artery using a mercury sphygmomanometer. Sphygmomanometer was kept at patient's heart level. Systolic and diastolic blood pressure was measured using auscultatory method.

Readings were taken on three occasions on the day of admission, a day before scheduled surgery and the first post-operative day.

Subjects were randomly divided in two groups, the study/experimental group and the control group keeping the age distribution equal. Preoperative preparation method was different for both the groups.

**Study Group:** After taking a consent and explaining the aim and the procedure of the study on the day of admission, patients were given a session of progressive muscular relaxation (Jacobson's technique) for twenty minutes on the evening of the second day in an isolated, comfortable room.

Following the first session on second day, two more personal sessions were conducted on third day, one in the afternoon (between 12 noon to 1 pm) and the other one in the evening (between 6-7 pm).

After each session a gentle enquiry was made with patients regarding the quality of relaxation, nature and thoughts/questions if any. Personal perception about surgical situation was asked to assess stress level. After three sessions of personalized training patients were made to practice twice a day till the day prior to surgery. To aid the subject a tape recorder with the cassette and the head phones were provided to them. The cassette had the prerecorded instructions (in Hindi and Gujarati) for relaxation. In addition to this, patients were encouraged to keep practicing relaxation in the rest of the time. Any assistance if needed by the patient's was provided as desired.

**Control Group:** This group was only assessed for the stress level due to surgical process using Jacobson's inventory but were not given any counseling or did not undergo any relaxation techniques. This group was also interviewed on three occasions on the day of admission, a day prior to surgery and the first post-operative day. Their physiological parameters viz. arterial pulse rate and systolic and diastolic blood pressure was recorded as in study group.

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### **Before patients were discharged they were asked;**

- For The most stressful period (from the knowledge of surgery to admission to operation to post op to discharge).
- Regarding the effectiveness of relaxation techniques.
- Whether they would rely on the used relaxation technique to cope any other stressors?

The results obtained were compared between both the groups and were statistically analyzed using unpaired T test.

**RESULT AND DISCUSSION:** Results of the present study are shown in table no 2, 3, and 4. The result shows significant inter group as well as intra group changes in pulse rate, systolic and diastolic blood pressure. Table 2 shows the comparison of effect of surgical stress on physiological parameters and also the effect of relaxation technique on parameters affected by stress. We can see that in control group the preoperative value is higher than the value on admission while the values in study group goes on decreasing from admission to preoperative to postoperative period. Also we can see that that base line values (on admission) were higher in study group than the control group. These findings suggest that the relaxation techniques and counseling had a significant stress and anxiety lowering effect on study group. Prospective surveys have found out that majority of the surgical patients experience moderate to high grade anxiety. Hospitalized patients find themselves in a threatening situation. The anxiety occurs in an anticipation of the bodily harm during surgical procedure and postoperative pain. Various coping measures have been developed to prepare the patients during preoperative period for a better post-operative recovery. Preoperative anxiety stimulates sympathetic and endocrine system and thus increasing physiological parameters such as heart rate, blood pressure. Panda et al<sup>11</sup> have observed a 40% increase in plasma adrenaline during stress. Masani 1982,<sup>12</sup> Malathi 1992,<sup>13</sup> Saha et al 1996<sup>14</sup> have observed increase in arterial pulse rate and blood pressure in their study. Our study also found the same result. In our study we also found that if a person uses relaxation techniques during the stressful period then the effect of stress on body is significantly kept under check (table 2). The possible mechanism could be the decreased arousability of cerebral cortex in response to relaxation manoeuvres which reduces the output from hypothalamus and thus keeping autonomic nervous system (sympathetic) excitation under check Benson & Clipper 1976.<sup>15</sup> The effectiveness of relaxation techniques have also been proved by Miller & Perry 1990.<sup>16</sup> Miller and Perry observed that relaxation techniques in 29 cardiac surgery patients reduced their post-operative blood pressure, heart rate and post-operative pain. Manyande et al 1992<sup>17</sup> in their study on effect of anxiety and endocrine response to surgical stress found a paradoxical effect of pre-operative relaxation. According to Borkovek 1978 relaxation can reduce irrational anxiety AND situational stress of non-habitual nature.

A study to see the effect of relaxation & music on pain after gynaecologic surgery by Marion Good et al<sup>18</sup> found that patients who had relaxation & music therapy experienced much lesser pain. They observed that the pain was related to amount of activity (ambulation or rest), mastery of the use of the intervention, and decreased pulse and respiration. It was also noticed by them that those who slept well had less pain the following day. Saadat et al2006<sup>19</sup> in their studied the effect of hypnosis, attention listening and no and control group on level of

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preoperative anxiety observed that Hypnosis Reduced Preoperative Anxiety in Adult Patients. Hypnosis alleviates the anxiety by calming the brain and reducing autonomic output. They also found reduction in arterial pulse and respiration rate in patient who had undergone preoperative hypnotic therapy. Friesner SA, Curry DM, Moddeman GR. 2006<sup>20</sup> at the end of their study 'Comparison of two pain-management strategies during chest tube removal: relaxation exercise with opioids and opioids alone' supported the use of a slow deep-breathing relaxation exercise as an adjunct to the use of opioids for pain management during CTR among patients who have undergone coronary bypass surgery.

**CONCLUSION:** Stress manifests itself by varied psychological and physiological responses and the cognitive –affective response to the stress can alter the functioning of the vital cortico limbic hypothalamic pituitary pathway, that modulate the endocrine, autonomic and immune processes. Lobb et al 1984<sup>21</sup> observed that seating of pre-operative relaxation techniques in patients undergoing hysterectomy resulted in decreased blood pressure, heart rate & reduced post-operative discomfort.

Surgery is physically stressful and anxiety provoking situational stressor. Its anticipation and hospitalization generates fear and concern to most of the individuals. The present study was aimed at reducing these stress manifestations on body to improve the post-operative outcome and assist early recovery. At the end of the study we conclude that;

1. Hospitalization and surgery is a known situational stressor.
2. Relaxation techniques help in calming down the sympathetic nervous system and thus help to maintain the psychological & physiological balance in body at the time of stress.
3. The study group showed remarkable and significant lowering of stress induced physiological parameters such as arterial pulse rate and blood pressure.
4. Relaxation should be introduced for the patients undergoing surgical intervention.

| Parameter              | Mean age |
|------------------------|----------|
| Study group (N = 32)   | 45       |
| Control group (N = 32) | 46       |

**Table 1: Mean age of the Study and the Control Group**

| Parameters                        | On admission                 |                            | Preoperative                 |                            | Postoperative                |                            |
|-----------------------------------|------------------------------|----------------------------|------------------------------|----------------------------|------------------------------|----------------------------|
|                                   | Control group<br>(Mean + SD) | study group<br>(Mean + SD) | Control group<br>(Mean + SD) | study group<br>(Mean + SD) | Control group<br>(Mean + SD) | study group<br>(Mean + SD) |
| Pulse rate/min                    | 75.54± 3.07                  | 77.94+2.00***              | 80.17+3.12                   | 74.80+1.68***              | 72.86+2.71                   | 70.63+1.39***              |
| Systolic blood pressure mm of Hg  | 121.49+3.37                  | 124.50+3.25***             | 126.29+2.33                  | 122.19+2.24***             | 120.91+2.02                  | 120.44+1.88***             |
| Diastolic blood pressure mm of Hg | 80.4+2.32                    | 82.88+2.92***              | 84.23+2.51                   | 81+1.90***                 | 80.51+2.02                   | 78.69+2.36**               |

**Table 2: Comparison of Physiological Parameters in Study Group & Control Group**

\* = p < 0.05, \*\* = p < 0.01, \*\*\* = p < 0.001.

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| Parameters                        | On admission   |                | preoperative   |                | Postoperative  |                         |
|-----------------------------------|----------------|----------------|----------------|----------------|----------------|-------------------------|
|                                   | On admission   | Preoperative   | On admission   | postoperative  | Preoperative   | study group (Mean + SD) |
| Pulse rate/min                    | 77.94+2.00     | 74.80+1.68***  | 77.94+2.00***  | 70.63+1.39***  | 74.80+1.68***  | 70.63+1.39***           |
| Systolic blood pressure mm of Hg  | 124.50+3.25*** | 122.19+2.24*** | 124.50+3.25*** | 120.44+1.88*** | 122.19+2.24*** | 120.44+1.88***          |
| Diastolic blood pressure mm of Hg | 82.88+2.92***  | 81+1.90***     | 82.88+2.92***  | 78.69+2.36***  | 81+1.90***     | 78.69+2.36***           |

Table 3: Comparison of Parameters in Study Group

\*= p <0.05, \*\*\*= p<0.001.

| Parameters                        | On admission | Pre-operative | On admission | Post-operative | Pre-operative | Post-operative |
|-----------------------------------|--------------|---------------|--------------|----------------|---------------|----------------|
| Pulse rate/min                    | 75.54±3.07   | 80.17+3.12    | 75.54±3.07   | 70.63+1.39***  | 80.17+3.12    | 70.63+1.39***  |
| Systolic blood pressure mm of Hg  | 121.49+3.37  | 126.29+2.33   | 121.49+3.37  | 120.44+1.88*** | 126.29+2.33   | 120.44+1.88*** |
| Diastolic blood pressure mm of Hg | 80.4+2.32    | 84.23+2.51    | 80.4+2.32    | 78.69+2.36***  | 84.23+2.51    | 72.86+2.71     |

Table 4: Comparison in Control Group

\*\*\*- highly significant.

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