

## A Study on the Effect of Relaxation Techniques and Shavasana on Stress and Pulse Rates of Medical Students

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### Abstract

Medical education is perceived as being stressful and a high level of stress may have a negative effect on cognitive functioning and learning of students in medical school. The present study was aimed at comparing the efficacy of two relaxation techniques on medical students and also to study the effects of the Jacobson's technique of relaxation and Shavasana on pulse rate & stress levels in Medical students. 90 medical students were selected and randomly assigned to three groups (N=30 each) Group A receiving Jacobson's Technique of relaxation, Group B receiving Shavasana and Group C control. The stress level was determined using Perceived Stress Scale. Pulse rate was measured before and after training of 1 month (sessions twice a week) and home programme of the same technique daily was asked to follow for one month. Results indicate that both the techniques are significantly effective in inducing relaxation but objectively, on comparison of both techniques, Shavasana brings better decrease in pulse rate & stress levels than Jacobson's technique of relaxation.

## Introduction

There are many possible stressors to which medical students may be exposed. The pressure of a rigorous academic curriculum coupled with frequent examination schedule is an obvious factor. Various other perceived sources of stress include personal factors such as staying away from family, adjustment to unfavourable hostel conditions, parental expectations etc (Barikani, 2008). Depression & anxiety are associated with concerns about mastering knowledge, personal endurance & ability, lack of time for other activities also feeling of loneliness, peer competition & loss of social time (Dahlin et al., 2005). Stress is often experienced to a range of physical, emotional and occupational stimuli. The body often reacts to stress and can affect the body physically affecting cardiovascular parameters as well as mentally. First year medical students have entered a new professional course where they are exposed to new environment, different syllabus & different methods of studying. Shavasana is one of the yoga asanas which is being used worldwide to reduce stress & induce relaxation. There have been a number of studies where it has been shown to reduce stress and induce relaxation (Bera et al., 1998; Gupta et al., 2006). Jacobson's technique of progressive relaxation is one of the widely used methods by physical therapist and psychologists. It is the mainstay of any treatment programme used in the management of anxiety, stress and

depressive disorders (Jacobson, 1974; Conrad & Roth, 2007). There is a dearth of literature on a direct comparison of the effects of Shavasana and Jacobson's technique of relaxation on stress and anxiety (Martha et al., 2006). The aim of this study was to study the effects of these two techniques on pulse rate & stress levels in first year medical students. This study was conducted during a period when these students were preparing for an upcoming exam and hence we assumed that they may have been facing anxiety, tension, worries & stress.

## Materials & Methods

The participants in the study were first year medical students studying in an urban tertiary general hospital at Mumbai which is a municipal medical college in Mumbai. Students who were medically and surgically disease free were recruited for the study after an initial brief interview. Students with ligament injuries, physical pain, fractures and trauma were excluded as well. The total number of subjects were 90 which were randomly allocated to 3 groups using a random selection method via a list which was computer generated. One group received Jacobson's Technique of relaxation and the second group received Shavasana while the third group was maintained as a control group. The materials used were recordings containing Jacobson's and Shavasana instructions while pulse rates were measured manually. Before commencement of the study, a subject information sheet was circulated to the subjects where the procedure of the test

and the need to conduct such a study was explained. Informed consent was taken in writing from all the participants. The institutional ethics committee had approved the study as well. Thirty subjects of one group were made to listen to the recording containing instructions of Jacobson's technique 30 subjects of the other group had been made to listen to the recording containing instructions of Shavasana technique. All subjects were administered a Perceived Stress Scale (PSS) at the beginning of the study. The groups which received either relaxation technique were given the respective relaxation technique sessions twice a week for one month and the subjects had been asked to follow a home programme of the same technique daily for one month. Pulse rate was noted before the study and at the end of 1 month. After the completion of one month of sessions, pulse rate was noted again and the Perceived Stress Scale (PSS) was re-administered to all the groups. The Perceived Stress Scale is a scale that asks the subjects about thoughts and feelings with regard to stress in the last one month. The scale is a lickert type scale from 0 to 4 with 10 questions and scores ranging from no stress to high stress (Cohen et al., 1983).

*Jacobson's Technique:* It is systematic technique developed by Edmund Jacobson used for achieving a deep state of relaxation. Jacobson's training procedures involve the alternation of tensing muscles and relaxing muscles, with the specific

intention of developing an acute awareness of the difference (Manzoni et al., 2008).

*Shavasana Technique:* The technique of Shavasana is simple enough to describe but not quite easy to practice. The technique involves lying on the back, the legs are spread and a comfortable distance is maintained between them. The arms are placed on the side of the trunk. The head may be turned on one side or may be kept facing up. The back and shoulders remain in touch with floor. The eyes are kept close. All the muscles of the body are then relaxed, there being no stretch or pull anywhere in the body. By paying attention to each part of body one by one starting from the toes upward, one should see if any tension or uneasiness is felt anywhere and if so, one should try to give it up. Care should be taken to avoid sleep (Subramanya & Telles, 2009).

Statistical analysis was done using computerized software using descriptive measures and the paired t test and unpaired t test where appropriate.

## Results & Discussion

All the groups were well matched with regard to socio-demographic parameters. Scores on the pulse rates and stress scale were assessed pre-test and post-test in each group as well as pre-test and post-test across groups. Both Jacobson's progressive muscle relaxation and Shavasana showed a significant ( $p < 0.0001$ ) decrease in pulse rates and scores on the stress scale after a month of treatment (Table 1). The control group

showed no improvement but rather a slight increase in stress levels were noted.

**Table 1 – Pulse Rates and Stress scores across all the groups – pre and post study**

| Jacobson's Muscle Relaxation Technique |       |             |         |            |
|--|-------|-------------|---------|------------|
| Pulse Rate Scores                      | Mean  | Difference  | t value | p value    |
| Pre-Study                              | 83.17 | 2.84        | 23.96   | < 0.0001** |
| Post Study                             | 80.33 | SD = ±0.648 |         |            |
| Stress Rate Scores                     | Mean  | Difference  | t value | p value    |
| Pre-Study                              | 21.5  | 2.4         | 23.34   | < 0.0001** |
| Post-Study                             | 19.1  | SD = ±0.543 |         |            |
| Shavasana group                        |       |             |         |            |
| Pulse Rate Scores                      | Mean  | Difference  | t value | p value    |
| Pre-Study                              | 83.22 | 5.13        | 32.68   | < 0.0001** |
| Post-Study                             | 77.87 | SD = ±0.86  |         |            |
| Stress Rate Scores                     | Mean  | Difference  | t value | p value    |
| Pre-Study                              | 22.33 | 4.36        | 20.12   | < 0.0001** |
| Post-Study                             | 17.97 | SD = ±1.189 |         |            |
| Control Group                          |       |             |         |            |
| Stress Rate Scores                     | Mean  | Difference  | t value | p value    |
| Pre-Study                              | 79.33 | - 0.27      | 1.975   | 0.0543 NS  |
| Post-Study                             | 79.57 | SD = ±0.74  |         |            |
| Stress Rate Scores                     | Mean  | Difference  | t value | p value    |
| Pre-Study                              | 17.47 | - 0.4       | 2.112   | 0.043*     |
| Post-Study                             | 17.87 | SD = ±1.037 |         |            |

All statistics done using one sample t test. \*\* extremely significant, \*significant NS – non significant. SD = standard deviation.

**Table 2 – Pre Test pulse rates and stress scores across the treatment groups**

| Group                        | Pulse Rate         | Stress scores |
|------------------------------|--------------------|---------------|
|                              | Mean ± SD (n = 30) |               |
| Jacobson's muscle relaxation | 83.17 ± 0.648      | 21.5 ± 0.543  |
| Shavasana group              | 83.12 ± 0.86       | 22.33 ± 1.189 |
| t value                      | 0.2543             | 3.4779        |
| p value                      | 0.8001 NS          | 0.001*        |

Unpaired t test used in the assessment. NS = not significant, \* significant (p < 0.05)

**Table 3 – Post Test pulse rates and stress scores across the treatment groups**

| Group                        | Pulse Rate         | Stress scores |
|------------------------------|--------------------|---------------|
|                              | Mean ± SD (n = 30) |               |
| Jacobson's muscle relaxation | 80.33 ± 0.648      | 19.87 ± 0.543 |
| Shavasana group              | 77.87 ± 0.86       | 17.1 ± 1.189  |

|         |         |         |
|---------|---------|---------|
| t value | 12.51   | 11.6071 |
| p value | 0.0001* | 0.0001* |

Unpaired t test used in the assessment  
NS = not significant, \* significant (p < 0.05)

On assessing the groups prior to the start of the study, the groups were well matched, though the Shavasana group showed a significantly greater stress score. This was not clinically relevant as the groups were not manually selected and were randomized (Table 2). At the end of the study, it was noted that pulse rates reduced to a significantly greater extent (p < 0.0001) in the Shavasana group, while the stress scores were also significantly lower in the Shavasana group (p < 0.0001). We cannot however claim superiority of

one modality of relaxation over the other due to a small sample size (Table 3).

Excessive amount of stress in medical training predisposes students to have difficulties in solving interpersonal conflicts, sleeping disorders, decreased attention, reduced concentration, temptation to cheat on exams, depression, loss of objectivity, increased incidence of errors and improper behavior such as negligence. Furthermore, stress in medical students can break the stability (homeostasis) and move from being healthy to being sick (*Spielberger & Sarason, 2013*). The term 'Relaxation Response' was coined by Benson to describe a physiological reaction i.e. opposite to stress response (*Benson & Klipper, 1992*). The response is defined as your personal ability to encourage your body to release chemicals and brain signals that make your muscles and organs slow down and increase blood flow to the brain. Shavasana provides the most natural position of the body which helps in complete physical and mental rest. Anatomically, there can be no better position than this for complete relaxation in which no imbalance is left in the muscles of the limbs (*Shankar et al., 2013*). Horizontal position of the body on ground helps in normal flow of blood in the body. No system of body is required to work against the gravity. There is no question of balancing the body against gravity of the earth. No extra energy is required for any one of the various systems of the body and therefore, metabolic rates

come down (*Shankar et al., 2013*). Even heart rate and blood pressure reduce because there is no need to apply greater force to circulate the blood. Heart doesn't require to beat fast to supply oxygen out to tense muscles. As every system of the body is relaxed or working at optimal level which leads to conservation of energy both body and mind are relaxed, become calm and refresh.

Stress and anxiety is strongly associated with muscle tension. When you are mentally stressed, you unconsciously tense your muscles. Tension held in your muscles adds physical discomfort or pain which is commonly show up as a headache, backache, stomachache, or concentrate in your face, neck and shoulders - making the mental stress even worse. Progressive muscle relaxation technique (Jacobson's technique) break this recurring stressed-mind/tense-muscle cycle that is the fight & flight stress response (*McCann et al., 2013*). It is effective in reducing blood pressure, pulse rate, respiratory rate by decreasing the amount of cortisol which typically increases during the body's response to stress. It reduces the level of acetylcholine which leads to the reduction in sympathetic nervous system activity and increase in vagal activity. Thus both the techniques reduce pulse rates and stress by different mechanisms & causes relaxation. There are no studies that compare the two techniques in stress management. The present study is limited

by a small sample size and short duration of 1 month. We cannot call it a large comparative study though in a short duration it does speak in favor of Shavasana over progressive muscle relaxation. There is need for further larger studies and a need to minimize stress in medical curriculums by integration of relaxation training and holistic health. Large randomized controlled studies in this area are further warranted.

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Conflict of Interest None Declared