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EFFECT OF AEROBIC TRAINING & JACOBSON'S RELAXATION TECHNIQUE ON STRESS AMONG COLLEGE STUDENTS

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ABSTRACT

Background: The world is home to 1.2 billion individuals aged 10–19. According to the World Health Organization, stress especially relating to work, is the second most frequent health problem. Stress is the body's way of responding to any kind of demand or threat.¹⁷ Stress is generally defined as the body's nonspecific response or reaction to demands made on it, or to disturbing events in the environment.¹⁸ Perceived Stress Scale was used to assess the stress levels in participants.²⁰

Methodology: Thirty participants from Dr. APJ Abdul Kalam College of Physiotherapy were screened for inclusion & exclusion criteria. 15 participants were given Aerobic Training while other 15 were given Jacobson's Relaxation Technique. The results were compared & effects on vital parameters were checked.

Result: Comparison between pre and post readings of both the groups were done & their effects on vital parameters was also assessed.

Conclusion: The present study concluded that both the groups were effective in reducing the stress level in college students but Jacobson's Relaxation Technique was more effective than Aerobic Training.

KEY WORDS: Stress, Aerobic Training, Jacobson's Relaxation Technique, Perceived Stress Scale

INTRODUCTION

1.2 billion Individuals aged from 10–19 years belongs to the Adolescents Worldwide. Adolescents aged between 10 to 19 years account for more than one-fifth of the world's population. India has the largest national population of adolescents about 243 million. In India, adolescent's age group forms 21.4% of the total population¹. According to the World Health Organization, stress especially relating to work, is the second most frequent health problem, depression is

among the leading causes of disability worldwide & 1 in every 5 persons (20% of the population) in India are said to be suffering from some form of mental unrest. The lifetime prevalence of depression, anxiety, and stress among adolescents and young adults around the world is currently estimated to range from 5% to 70%, with an Indian study². The World Health Report has quoted India as having a substantial prevalence of childhood and adolescent mental health disorders.³ Due to globalization and work load, people in countries have to deal with work-related stress. Worldwide work

stress has been recognized as a major challenge to workers health and in turn healthiness of their organization. Good organizations and management of work to decrease the work place stress. Medical education is inherently stressful and demanding.⁴Stress and depression have been consistently linked to mental and physical health effects. An optimal level of stress enhances learning while excess of stress can cause health problems. This results in reduction of student's self-esteem and affects their academic achievement. A high level of stress may have negative effect on functioning and learning of students in medical school. The young student population is vulnerable to stress of higher professional education due to competition. Comparing the stress between medical and non medical student, medical students perceive higher stress.¹²

Stress is the body's way of responding to any kind of demand or threat.¹⁷Stress is generally defined as the body's nonspecific response or reaction to demands made on it, or to disturbing events in the environment.¹⁸ Stress also refers to the reactions of the body to certain events or stimuli that the organism perceives as potentially harmful or distressful.¹⁵When one feels in danger, the nervous system responds by releasing a flood of stress hormones that is adrenaline and cortisol, which rouse the body for emergency action. The heart pounds faster, muscle tighten, blood pressure rises, breath quickens and senses becomes sharper. These physical changes increases the strength and stamina, speed the reaction time, and enhance focus. This is known as the "fight or flight" or mobilization stress response and is body's way of protecting oneself.

Stress is a natural physical response to perception of stimuli. Therefore, stress is simply defined as emotional disturbances or changes caused by stressors. Stress and anxiety is a part and parcel of every student's life. As a student, the origin of stress may be related to academic and social situations, environment and lifestyle⁵. These components combine to create an unpleasant feeling that is typically associated with uneasiness, fear or worry.¹⁰ Anxiety is a generalized mood condition that occurs without an identifiable triggering stimulus, while many symptoms of depression include, persistent sadness, feeling of hopelessness.¹¹Adolescence is a transitional stage of physical and mental human development that occurs between childhood and adulthood.¹⁹. Most of the children meet these challenges successfully and grow into healthy adults while others have a harder time to cope with all these problems.¹³University students are a special group of people that are enduring a critical period in which they are going from adolescence to adulthood and can be one of the most stressful times in a person's life. Studies have reported high rates of psychological morbidity among medical students.

Common causes of stress in college students include greater academic demands, peer pressure, changes in family relations and one's social life, making the individual more vulnerable to depression. Stress can cause immediate effects like increased heart rate and blood pressure, anxiety, panic attacks etc and long term effects like hypertension, myocardial infarction, stroke, memory loss etc. Students suffer from emotional symptoms like feeling overwhelmed, moodiness, irritability or loneliness. Studies which have tried to identify the sources of stress among medical students generally pointed to three main areas i.e academic pressures, social issues and financial problems.⁹Medical school has long been recognized as involving numerous stressors that can affect the well-being of students. Moreover it is necessary to invest in adolescents as they are the future leaders and guardians of nation's development.

No one can avoid all stress, but one can counteract it by learning how to produce the relaxation response, a state of deep rest that is the polar opposite of the stress response. There are various ways to cope up with stress .There are several types of relaxation therapies such as stretch release relaxation (SRR), Jacobson's progressive muscle relaxation (JPMR), cognitive imagery relaxation (COG), and some types of meditations. Relaxation is highly beneficial if practiced routinely in one's everyday life.⁸ Techniques involving relaxation are widely used by people to reduce anxiety and cope with stress-related problems. Without doubt regular, low impact, aerobic exercise like walking is an under-used, powerful therapeutic tool helps to manage stress & anxiety.¹⁴ Research indicates that there are immense benefits to psychological and physical health when one exercises on a daily basis. Lack of exercise, is one causative factor in the development of anxiety. Research indicates that exercise can even help to reduce the risk of developing psychological health problems.

Aerobic exercise is physical exercise that depends on the aerobic energy system, People who exercise regularly tend to more energy, better sleep, and a greater sense of well-being. Regular exercises can lift up the mood and serve as a distraction to all worries, allowing to find some quiet time and break out of the cycle of negative thoughts that feed stress and anxiety also the food you eat can improve or worsen the mood and affect the ability to cope with life's stressors. Activities that require moving both your arms and your legs are particularly effective at reducing stress. Exercises such as walking, running, swimming, dancing, and aerobics are good choices, especially if one exercise mindfully (focusing your attention on the physical sensations as one move).When the relaxation response is activated, heart rate decreases, breathing becomes deeper and slower, Blood pressure drops or stabilizes, muscles relax and

body begins to heal. In addition to its physical effects, the relaxation response also improves energy and focus, combats illness, relieves aches and pains, increases problem solving abilities and boosts motivation. Anyone can get in these benefits with regular practice.

Don't Stress About the Future. Live Life and Love Now said Anthony Avina

Progressive muscle relaxation is a technique used to achieve a deep state of relaxation and has been shown to improve health-related QOL in a variety of medical and psychiatric illnesses.¹⁶ Jacobson's Relaxation Technique have been very effective in reducing stress, depression & anxiety among individuals. It was developed by American physician Edmund Jacobson's in the early 1920s. PMR entails a physical and mental component.⁶ The pathophysiology involves the contracting and relaxing of muscle groups of the body. The individual places a tension in a given muscle group for approximately 10 seconds and then release it for 20 seconds before continuing with the next muscle group with eyes closed. Relaxation must be attempted in order to reduce pain or pain perception, tension, reduce anxiety as a response to stress, increase parasympathetic activities, increase the feeling of control, reduce the cardiac index, lower blood pressure & enhance performance of physical activities. Hence, the individual is taught this technique by a trained professional, & performs the sequence 2-3 times daily for 15-20 minutes per session.⁶

In the present study, effectiveness of Aerobic exercise and Jacobson's relaxation technique on stress management is compared among the college students of PIMS. Literature available in reducing stress in college students is sparse. To the best of our knowledge the comparative study between Aerobic exercise and Jacobson's relaxation technique is lacking. So, the objective of the study is to determine & compare the effect of Aerobic exercises and Jacobson's relaxation technique on stress in college students. The secondary objective is to study the effect of above intervention on the vital parameters.

METHODOLOGY

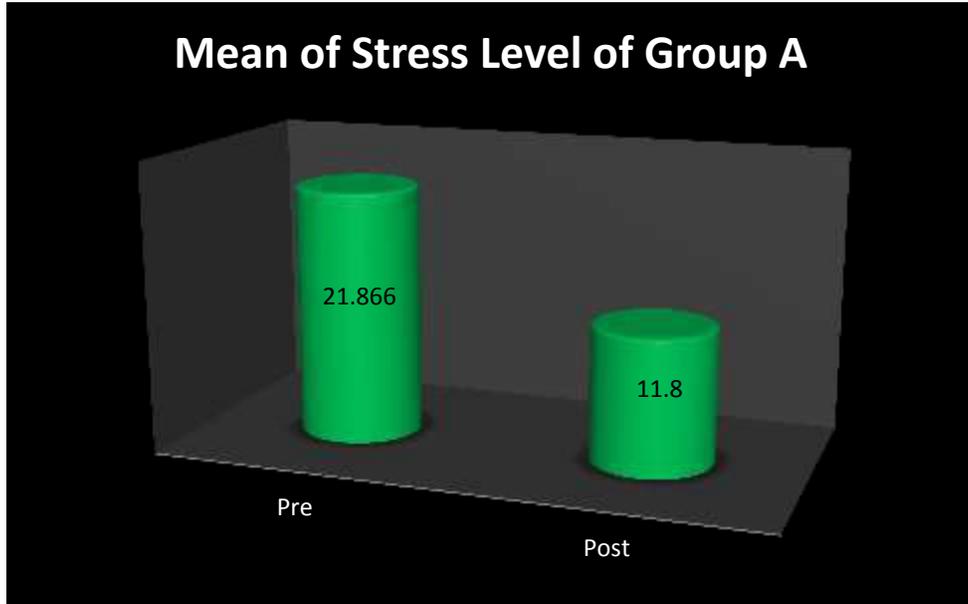
30 participants who had stress were included in this study based on the inclusion and exclusion criteria. All the participants were selected from Dr. A.P.J. Abdul Kalam College of Physiotherapy. The participants willing to participate were asked to signed a written informed consent. The procedure was explained to all the participants. Before proceedings for the procedure Perceived Stress Scale was explained to the participants. Participants were evaluated for the baseline measurements of all outcome measures such as HR, BP, and RR. All the participants were given the Perceived Stress Scale to record the baseline data that was collected before the interventions. The participants were divided into 2 groups conveniently. Group A participants were given Aerobic exercise training for a period of 4 weeks. The vital parameters were also checked. Group B participants were given Jacobson's Relaxation technique for a period of 4 weeks & vitals were checked. The data was collected and recorded. After the intervention period of 4 weeks, data analysis was done.

DATA ANALYSIS AND RESULT

The present study "Effect of Aerobic Exercise & Jacobson's Relaxation Technique on Stress among College Students" was conducted in department of CardioRespiratory Physiotherapy in Dr. APJ Abdul Kalam College of Physiotherapy; Loni, Taluka: Rahata District: Ahmednagar, Maharashtra, India. Thirty participants (n=30) who had stress were included in this study based on the inclusion and exclusion criteria. Data for each subject was collected and recorded by the principal investigator. Demographic data was collected and analyzed for Stress levels, Heart Rate, Respiratory Rate & Blood pressure. The data was coded and entered into Microsoft Excel spread sheet. Analysis was done using Graph pad INSTAT demo version. Data was collected and presented in graphs & tabular form and was analyzed by using the Students paired "t" test & unpaired 't' test.

DATA ANALYSIS

Graph no 1: Demographic Representation of Mean of Stress level of Group A (Aerobic Training)



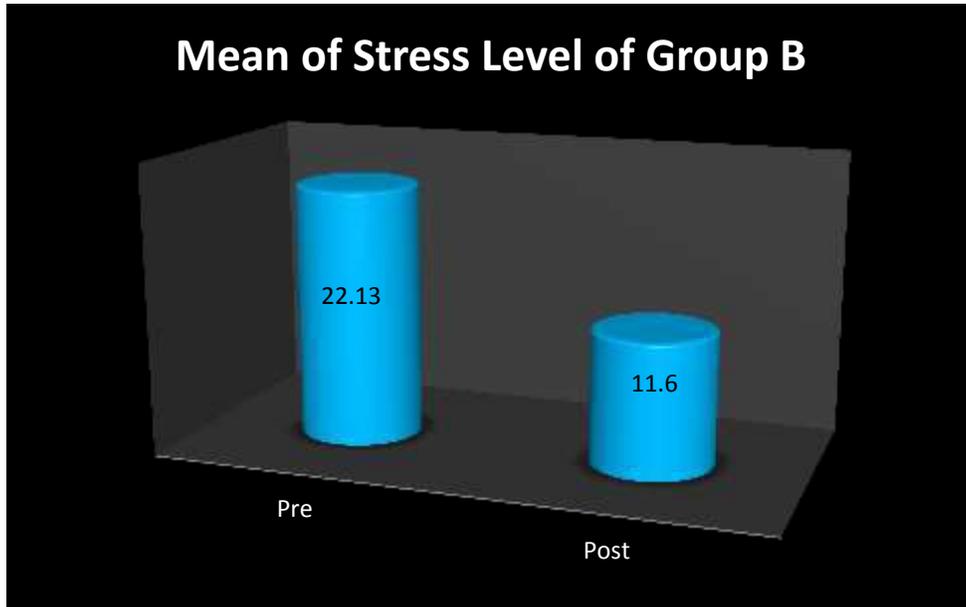
Result no 1: The results of the above graph shows the mean difference between the pre and the post readings of stress levels of Group A. The mean of the pre

readings was 21.866 and the post readings after the intervention is 11.8 which shows tremendous reduction in the stress level of participants of Group A (Aerobic Training)

Table no 1: Mean of Stress Level of Group A

Group A	Mean+-SD	p value	t value
Pre	21.866+-3.962	<0.0001,considered extremely significant	12.749
Post	11.8+-1.740		

Graph no 2: Demographic Representation of Mean of Stress level of Group B (Jacobson’s Relaxation)



Result no 2: The results of the above graph shows the mean difference between the pre and the post readings of stress levels of Group B. The mean of the pre readings was 22.13 and the post readings after the

intervention is 11.6 which shows significant reduction in the stress level of participants of Group B (Jacobson’s Relaxation)

Table no 2: Mean of Stress Level of Group B

Group B	Mean+-SD	p value	t value
Pre	22.13+-4.565	<0.0001, considered extremely significant	10.540
Post	11.6+-1.920		

Table no 3: Mean of Group A & Group B (Pre & Post Readings)

SCALE	PRE (Mean+ SD)	POST (Mean+ SD)
GROUP A	21.866+-3.962	11.8+-1.740
GROUP B	22.13+-4.565	11.6+-1.920

Table no 4: Mean value of the Heart Rate of Group A

Heart rate	Mean +-SD	p value	t value
Pre	73.13+-2.69	0.0008, considered extremely significant.	4.2617
Post	69.93+-2.53		

Table no 5: Mean value of the Heart Rate of Group B

Heart rate	Mean +-SD	p value	t value
Pre	73.866+-2.642	<0.0001, considered extremely significant.	4.600
Post	69.8+-2.178		

Table no 6: Mean value of the Respiratory Rate of Group A

RR	Mean +-SD	p value	t value
Pre	19.20+-1.26	0.0001, considered extremely significant.	7.6184
Post	16.33+-1.05		

Table no 7: Mean value of the Respiratory Rate of Group B

RR	Mean +-SD	p value	t value
Pre	18.33+-1.291	<0.0001, considered extremely significant.	6.991
Post	15.33+-1.047		

Table no 8: Mean value of the Systolic BP of Group A

SYSTOLIC BP	Mean +-SD	p value	t value
Pre	123.866+-4.307	0.0007, considered extremely significant.	3.935
Post	119.6+-1.882		

Table no 9: Mean value of the Diastolic BP of Group A

DIASTOLIC BP	Mean +-SD	p value	t value
Pre	80.466+-2.100	0.0181, considered significant.	2.316
Post	79.266+-1.438		

Table no 10:Mean value of the Systolic BP of Group B

SYSTOLIC BP	Mean +-SD	p value	t value
Pre	123.2+-4.329	0.0014, considered very significant.	3.617
Post	120.133+-1.922		

Table no 11:Mean value of the Diastolic BP of Group B

DIASTOLIC BP	Mean +-SD	p value	t value
Pre	79.2+-3.069	0.0023, considered very significant.	3.080
Post	76.133+-2.336		

RESULTS

30 individuals when participated in Aerobic Training & Jacobson’s Relaxation Technique. Mean value of the stress levels of Group A in the pre readings was 21.866 and the post readings after the intervention is 11.8; there were significant difference within the groups. (t value is 12.749 & the p value is <0.0001) which is ,considered extremely significant. Similarly, the mean value of the stress levels of Group B in the pre readings was 22.13 and the post readings after the intervention is 11.6 (t value is 10.540 & the p value is <0.0001)which is ,considered extremely significant.

Comparing the stress level of both the groups, Group B (Jacobson’s Relaxation) was more effective in reducing the stress level among the students than Group A (Aerobic Training) & also shows the effect on the vital parameters.

Aerobic Training (Group A)

Heart Rate: Mean of pre intervention value was 73.13 and post intervention is 69.93.(t value is 4.2617 & the p value is 0.0008)considered extremely significant.

Respiratory Rate: Mean value of pre intervention was 19.20 & after the intervention is 16.33. (t value is 7.6184 & p value is 0.0001)considered extremely significant.

Blood Pressure (Systolic): Mean value pre intervention was 123.866 and post value is 119.6. (t value is 3.935 & the p value is 0.0007)considered extremely significant.

(Diastolic): Mean value pre intervention was 80.466 and post value is 79.266 (t value is 2.316 & the p value is 0.0181) considered extremely significant.

Jacobson’s Relaxation Technique (Group B)

Heart Rate: Mean value of pre intervention was 73.866 and post reading is 6.98. (t value is 4.600 & the p value is <0.0001)considered extremely significant.

Respiratory Rate: Mean value pre intervention was 18.33 &post readings showed 15.33 i.e (t value is 6.991 & p value is <0.0001) considered extremely significant.

Blood Pressure (Systolic): Mean value pre intervention was 123.2 and post is 120.133.(t value is 3.617 & the p value is 0.0014)considered extremely significant.

(Diastolic): Mean value pre intervention was 79.2 and post is 76.133(t value is 3.080 & the p value is 0.0023) considered extremely significant.

DISCUSSION

The present study “Effect of Aerobic Exercise & Jacobson’s Relaxation Technique on stress among college students” included 30 participants from Dr. A.P.J. Abdul Kalam College of Physiotherapy, and was conducted in the CardioRespiratory Department of Dr. APJ Abdul Kalam, COPT of Pravara Institute of Medical Sciences, Loni. The aim of this study was to study the effect of Exercise & Jacobson’s Relaxation Technique on stress among college students & its effect on the vital parameters. (HR, RR, BP)

STRESS

Stress is a natural physical response to perception of stimuli. Stress is defined as emotional disturbances or changes caused by stressors. Stress and anxiety is a part and parcel of every student’s life. As a student, the origin of stress may be related to academic and social situations, environment and lifestyle⁵. In the present study, the mean value of the stress levels of Group A in the pre readings was 21.866 and the post readings after the intervention is 11.8.The t value is 12.749 & the p value is <0.0001 which is, considered

extremely significant. Similarly, the mean value of the stress levels of Group B in the pre readings was 22.13 and the post readings after the intervention is 11.6. The t value is 10.540 & the p value is <0.0001 which is considered extremely significant.

Comparing the stress level of both the groups, Group B (Jacobson's Relaxation) was more effective in reducing the stress level among the students than Group A (Aerobic Training)

Similar studies also showed that Jacobson's Relaxation Technique was found to be more effective in reducing the stress level among the individuals whereas Aerobic Training is also one of the method of relieving stress in individuals.¹⁷

Heart Rate:

In the present study, the mean of pre intervention value was 73.13 and post intervention is 69.93. (t value is 4.2617 & the p value is 0.0008) which is considered extremely significant for Group A, & the mean value of pre intervention was 73.866 and post reading is 6.98. (t value is 4.600 & the p value is <0.0001) which is considered extremely significant for Group B.

Yamamoto et al. carried out a study & concluded that physical exercise is very important for daily living & aerobic training have effect on the vital parameters also. He further reported decrease in HR after the seventh day of training.²²

Some studies also showed that Jacobson's Relaxation Technique was found to be effective in reducing the Heart Rate in normal individuals as well as individuals with stress & hypertension.

Respiratory Rate:

In the present study, the mean value pre intervention was 19.20 which after the intervention showed 16.33. (t value is 7.6184 & p value is 0.0001) which is considered extremely significant for Group A. Also the mean value pre intervention was 18.33 which after the intervention in the post readings showed 15.33 i.e (t value is 6.991 & p value is <0.0001) which is considered extremely significant for Group B

Sunita Choudhary, Jayant Kumar in their study concluded that all the resting cardiovascular parameters (HR, RR) were significantly ($p < 0.0001$) less in case of trained subjects as compared to untrained subjects which is similar to my present study. Their study also revealed highly significant reduction in resting cardiovascular parameters and post exercise fluctuation, in untrained group after 3 months of aerobic exercise.²⁴

Some studies also revealed that Jacobson's relaxation technique was effective in every parameter & found decrease in RR after the relaxation.

Blood pressure:

In the present study, the mean value pre intervention was 123.866 and post value after the intervention is 119.6. (t value is 3.935 & the p value is 0.0007) that is considered extremely significant which showed decrease in Systolic BP for Group A. Similarly, the mean value pre intervention was 80.466 and post value after the intervention is 79.266, which shows decrease in the Diastolic BP of the participants. (t value is 2.316 & the p value is 0.0181) that is considered extremely significant, for Group A (Diastolic)

The mean value pre intervention was 123.2 and post value after the intervention is 120.133. (t value is 3.617 & the p value is 0.0014) that is considered extremely significant for Systolic BP for Group B & the mean value pre intervention was 79.2 and post value after the intervention is 76.133, which shows slight decrease in the Diastolic BP of the participants. (t value is 3.080 & the p value is 0.0023) that is considered extremely significant, for Group B.

Grassi et al. studied normal blood pressure in young individuals and found that after 10 weeks of physical exercise, there was decrease on the systolic and diastolic blood pressure, a significant decrease in the sympathetic nerve activity was also observed, & was not observed for the control group composed of those who did not perform physical exercises.²¹

A significant decrease in the pressure levels was obtained with low intensity training of the peak oxygen intake). Thus, low intensity physical exercises reduce the blood pressure because they cause decrease in the cardiac output, that may be due to the decrease in the rest cardiac frequency and the decrease on the sympathetic tonus in the heart as result of a is possible that the blood pressure drop is due to the decrease on the peripheral vascular resistance²¹

CONCLUSION

The present study concluded that Aerobic Training & Jacobson's Relaxation Technique are effective ways to reduce the stress levels among the individuals. Results showed that comparing both the methods, Jacobson's Relaxation Technique was found to be more effective in reducing the stress levels among students than the aerobic training. Also there was a effect on the vital parameters in both the methods (HR, RR, BP) after 4 weeks of intervention. Hence the present study rejects the null hypothesis and accepts the alternate hypothesis.

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