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**EFFECT OF PROGRESSIVE RELAXATION AND AEROBIC EXERCISES IN  
IMPROVING MENTAL HEALTH: A RANDOMIZED CONTROLLED TRIAL**

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Received 19<sup>th</sup> Jan. 2019; Revised 10<sup>th</sup> Feb. 2019; Accepted 19<sup>th</sup> March 2019; Available online 1<sup>st</sup> Sept. 2019

<https://doi.org/10.31032/IJBPAS/2019/8.9.4790>

**ABSTRACT**

Mental health is defined as well-being of emotional, psychological and social status. There are multiple biological and psychological factors that trigger anxiety, stress and depression such as extreme workload, traumatic incidents, chronic illness, dependency, feelings of deprivation, lack of emotional contentment, social stressors, multiple responsibilities and inability to manage internal fears. These issues can be rehabilitated by progressive relaxation and aerobic exercises. It improves negative thoughts, mood swings and develops cognitive function. This randomized control trial was conducted among 87 medical students. The purposive sampling was done and data was collected through designated questionnaire and scales. Total numbers of 87 medical students were screened for mental conditions and 20 out of 87 students had positive score for stress, anxiety and depression. The candidates fulfilling the inclusion and exclusion criteria were randomly allocated in two equal groups' i.e. experimental group in which progressive relaxation exercises (PRE) were administered and control group in which aerobic exercises were

administered. The data was analyzed using statistical package for social sciences (SPSS) version 21. *Independent t-test* was applied to find out differences between control and experimental group. A *p-value* of  $<0.05$  was considered significant. This study was conducted among 20 participants of age 18 to 24 with mean age of  $20 \pm 1.986$  having moderate to severe scores for depression, stress and anxiety. *Independent-t test* showed significant post treatment results as per evaluated by DASS 42 in PRE i.e. experimental group with *p-value* of 0.032 for anxiety, 0.013 for stress and 0.042 for depression respectively, whereas in Aerobic exercises i.e. control group post-treatment results were less significant with *p-value* of 0.040 for anxiety, 0.014 for stress and 0.742 for depression. It is evident that Progressive relaxation exercises are more effective in improving mental health among university students. It is concluded that progressive relaxation exercises are more effective than aerobic exercises in improving mental health of university students.

**Key words: Mental Health, Depression, Stress, Anxiety, Progressive relaxation exercises, Aerobic exercises**

## INTRODUCTION

Mental health comprises of emotional, psychological and social well-being. It directly affects how we act and react towards any physiological and psychosocial activity? Instability in mental health leads to significant harms like anxiety, stress and depression<sup>1</sup>. To deal with them, one has to practice Progressive Muscle Relaxation (PMR) exercises which are based upon the simple practice of tensing, or tightening, one muscle group at a time followed by a relaxation phase with release of the tension while Aerobic exercise is physical exercise of light to heavy force that depends chiefly on the aerobic energy generating practice<sup>2</sup>. These things can be improved by progressive

relaxation and aerobic exercises to improve negative mood self-esteem and cognitive function<sup>3</sup>. People pay a lot of attention towards their physiological health that incorporates physical well-being, healthy body having healthy organs and systems. They pay little heed towards psychological health resulting in major cause of frustration among young individuals<sup>4</sup>. Psychological health of an individual is the amalgam of emotional contentment and satisfactory attitude towards life. According to Gauvin and Spencer psychological well-being is best described as the absence of stress, anxiety and depression along with potent capability to deal with daily stressors. Psychological

health comprises of the following major components i.e. mood, anxiety, depression, self-concept, self-esteem, self-efficacy, emotions, and reactivity<sup>5</sup>. There are multiple biological and psychological factors that trigger anxiety, stress and depression such as extreme workload, traumatic incidents, chronic illness, dependency, feelings of deprivation, lack of emotional contentment, social stressors, multiple responsibilities and inability to manage internal fears<sup>6</sup>. From the past few decades work related psychological disorders have been commonly reported specially in university students as it gets really difficult to maintain adequate balance in curricular and extra-curricular activities, in order to maintain a good reputation and to seek efficient grades students bear huge pressure and those who fail to cope up with it ends up in severe anxiety, stress or depression<sup>7</sup>. Stress is reported in response to a range of emotional<sup>8</sup> occupational and physical stimuli, prolonged exposure to stress can lead to mental and physical symptoms such as anxiety and depression<sup>9</sup>. Exercise has been reported to be effective for mood uplift and to overcome depression and stress related disorders<sup>10</sup>. There are various exercise protocols but aerobic exercises and relaxation exercises have proved to be the most effective for coping with stress, anxiety

and depression. A single exercise regime of aerobics i.e. walking, jogging and running can affect anxiety, depression and anger. Rapid aerobic activity is extremely effective for positive mood alteration and positive results were reported immediately after short term aerobic exercises<sup>11</sup>. The mood uplift reported by aerobic exercises is manifested as reduction in depression, confusion, lethargy and fatigue<sup>12</sup>. Aerobic exercises promote general well-being of an individual by improving physical and psychological condition in a single session<sup>13</sup>. These exercises promote emotional stability, cardiovascular endurance, decrease work related fatigue and enhance physical fitness. In addition to aerobic exercises progressive relaxation exercises have also been reported to reduce stress and anxiety. PMR techniques have been found to be effective in regulating physiological processes, controlling anxiety, reducing pain, cortisol level and improve quality of life<sup>14</sup>. It is a stress-reducing intervention that consists of systematically tensing and relaxing various muscle groups of body focusing on the contrasting sensations of tension and relaxation<sup>15</sup>. Both aerobic and progressive relaxation exercises serve as anxiolytics and mood boosters provided that they are performed with due concentration.

## MATERIAL AND METHODS

An experimental study i.e. randomized controlled trial was carried out among medical students from September 2018 to December 2018 and comprised all the students who consented to participate in the study. A total of 87 medical students were screened using DASS-42 questionnaire for depression, stress and anxiety that are considered to be the root cause for deteriorating student's mental health. The participants fulfilling the inclusion criterion i.e. having (>15 score for stress), (>8 for anxiety) and (>10 for depression) were enrolled whereas participants having non-co-operative attitude and other comorbidities that can affect their performance for example recent fracture or surgery, asthma and infectious diseases were excluded. 20 out of 87 participants had mild to very severe scores and they were allocated into two equal groups via simple random sampling technique for the interventional phase of this study. After initial assessment experimental group received specially designed regimen of progressive relaxation exercises that consisted of progressive muscle relaxation exercises, passive relaxation exercises, tai chi, relaxation breathing and yoga on 3 days a week aimed at patient centered goals for 4 Months. Each exercise was performed for 5

to 7 minutes. The structured training session was conducted for 15-30 minutes. Control group received a specially designed regimen of aerobic exercises that consisted of jumping jacks, lunges, squats, planks and Pilates on 3 days a week. Each exercise was performed 3 times per week for 4 Months, after every exercise there was a rest interval of 3 to 5 minutes. The structured training session of this group was conducted for 30 minutes. The participants were reassessed at the end of interventional phase. Progress was rated using DASS-42 scale. Data was analyzed using SPSS version 21. Qualitative variable i.e. (age) were presented as frequencies and percentages. Quantitative variables i.e. (anxiety, depression and stress) were presented as means, SD and *P-value*. *Independent sample t-test* was applied at 5% level of significance to compare the means of two study groups for the continuous outcome variables (normally distributed). A *p-value* of less than 0.05 was considered significant.

## RESULTS

The aim of this study was to understand the effectiveness of progressive relaxation exercises versus aerobic exercises in improving mental health of university students.

**Abbreviations:** M (mean), C.G (control group), E.G (Experimental group), SD (Standard deviation)

**Figure 1** shows that out of total 87 medical students' 20 participants having stress, depression and anxiety were included in the study and 10 were placed in each group via random sampling who received two different interventions.

**Figure 2** shows age distribution between experimental and control group with minimum age of 18 years and maximum of 24 years, mean age was  $20 \pm 1.687$ .

**Table 1** shows independent t-test interpretation of DASS-A score. Pre-treatment M in E.G= 21.10, SD= 4.841 P-value= 0.244 whereas pre-treatment M in C.G=18.30, SD=5.539, P-value= 0.245. Post treatment M in E.G=10.40, SD=1.647, P-value= 0.032 whereas post-treatment M in C.G=14.10, SD= 4.771, P-value=0.040.

**Table 2** shows independent t-test interpretation of DASS-S score. Pre-treatment M in E.G= 24.00, SD= 4.570 P-

value= 0.458 whereas pre-treatment M in C.G=22.40, SD=4.858, P-value= 0.458. Post treatment M in E.G=14.00, SD=2.309, P-value= 0.013 whereas post-treatment M in C.G=17.70, SD= 3.561, P-value=0.014.

**Table 3** shows independent t-test interpretation of DASS-D score. Pre-treatment M in E.G=21.50, SD= 4.916 P-value= 0.328 whereas pre-treatment M in C.G=19.30, SD=4.423, P-value= 0.394. Post-treatment M in E.G=14.30, SD=2.214, P-value= 0.041 whereas post-treatment Mean in C.G=18.70, SD= 3.057, P-value=0.742.

It is justified from above mentioned values i.e. pre and post treatment mean and p-values that progressive relaxation exercises are more effective in reducing anxiety, stress and depression among students as compared to aerobic exercises. From significance level calculated in tables it is evident that PRE are more effective in improving mental health among university students as compared to Aerobic exercises.

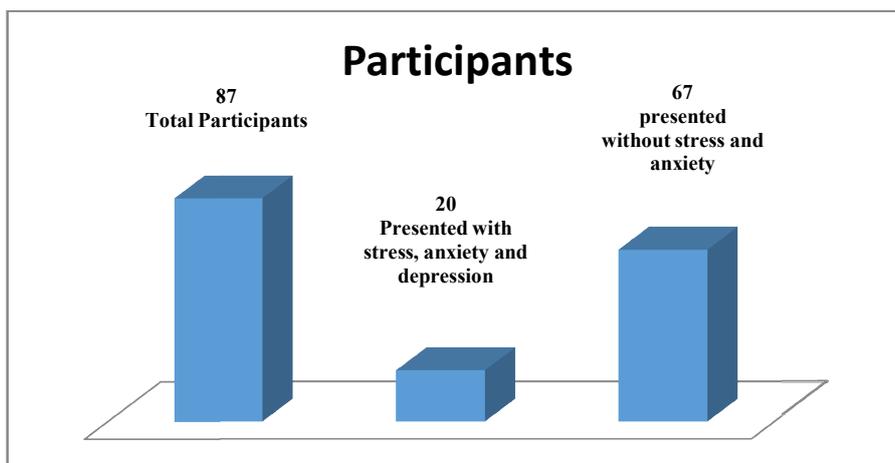


Figure 1: Screening for Stress, Depression & Anxiety

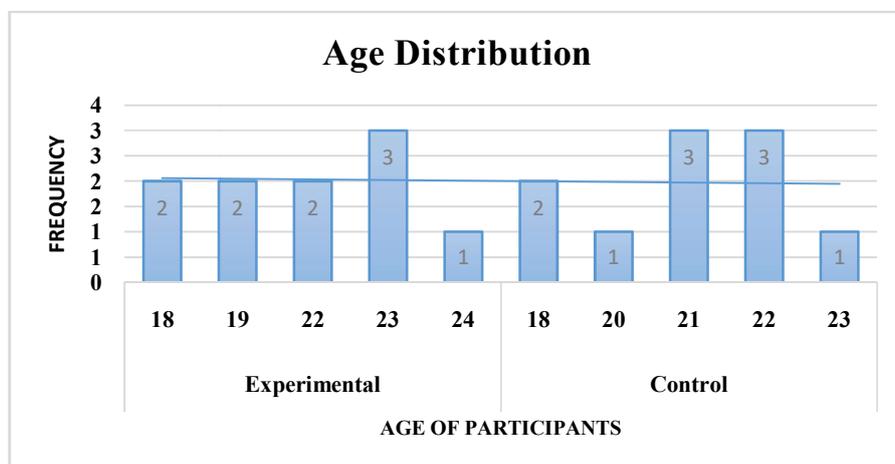


Figure 2: Age distribution in Control and Experimental Group

Table 1: Independent-t Test interpretation for Pre and Post Treatment DASS-A Scores

Pre-Treatment	N	Mean	Std. deviation	P-value
Experimental	10	21.10	4.841	0.244
Control	10	18.30	5.539	0.245
Post-Treatment	N	Mean	Std. deviation	P-value
Experimental	10	10.40	1.647	0.032
Control	10	14.10	4.771	0.040

Table 2: Independent-t Test interpretation for Pre and Post Treatment DASS-S Scores

Pre-Treatment	N	Mean	Std. deviation	P-value
Experimental	10	24.00	4.570	0.458
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Post-Treatment	N	Mean	Std. deviation	P-value
Experimental	10	14.00	2.309	0.013
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Table 3: Independent-t Test interpretation for Pre and Post Treatment DASS-D Scores

Pre-Treatment	N	Mean	Std. deviation	P-value
Experimental	10	21.50	4.916	0.328
Control	10	19.30	4.423	0.394
Post-Treatment	N	Mean	Std. deviation	P-value
Experimental	10	14.30	2.214	0.041
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## DISCUSSION

Time has been revolutionized by scientific inventions and mankind is badly entangled in a global village where life is restrained by gadgets and excessive workload as every individual has to strive hard for survival<sup>16</sup>. Human body is structured with all of the external and internal stressors but body can be exhausted both mentally and emotionally<sup>17</sup>. In 1956 Selye put forward the three stage theory of general adaptation syndrome comprising of alarm, resistance and exhaustion stage in individual who are repeatedly exposed to obnoxious stressful stimuli<sup>18</sup>. In order to enhance efficient performance of students various studies have been conducted to evaluate the impact of physical activity and relaxation trainings in improving work capacity, concentration and boosting student's morale. Evidence obtained from the current studies suggested that work related psychological disorders are continuously being reported in graduate level students due to extremes of academic, financial, social and emotional stressors<sup>19</sup>. Unfortunately, little work has been done to uplift psychological health of students that serves to be the root cause of their promising performances. In different studies various scales have been opted to find out the prevalence and improvements (after

provision of the specific treatment or intervention) in stress, depression and anxiety. Following tools have been used by authors in the previous studies i.e. Beck depression inventory Beck anxiety inventory, DASS-21, DASS-42, Mood profiles<sup>19</sup> and Hamilton rating scale for anxiety and depression. Multiple treatment options have been found to treat these psychological disorders. In the current study DASS-42 was used for screening and evaluating improvements in depression, stress and anxiety among students. Beasley M. while discussing various treatment options suggested for non-pharmacological interventions i.e. physical exercises, as pharmacological treatment provide symptomatic treatment but their major drawbacks are addiction, insomnia, increased drug tolerance, systematic complications and withdrawal effects<sup>20</sup>. In the current study Physical therapy measures taken for psychological disorders such as stress and anxiety relieving yoga, Taichi techniques<sup>21</sup> promoting relaxation, progressive relaxation exercises and aerobic activities had a potent effect of reducing pre-treatment scores of stress, depression and anxiety. Peter salmon observed effects of physical exercise on psychological health of students. He concluded that physical exercises enhance

cardiovascular endurance and they are becoming integral part of treatment in chronic systemic disorders including diabetes, renal disease, and osteoporosis, all of these systemic conditions have psychological manifestations as well. Increased physical activity therefore reduces premature mortality and proper maintenance of exercise habits is becoming the major target for health care professionals<sup>20</sup>. Recent studies are in accordance to it as more involvement in PA resulted in reduction of psychological problems. In comparison to aerobic exercises more positive results were obtained from relaxation trainings as in state of anxiety or stress the major problems are lack of focus, anger issues and hyperactivity. It was concluded in some studies that participants who received APMR demonstrated enhanced relaxation and improved Parasympathetic nervous system activity and reduction in anxiety as compared to individuals in control group<sup>22</sup>. The finding confirms that APMR can be a useful relaxation intervention for high-stress college student<sup>23</sup>. This study confirms a single dose of APMR can enhance beneficial psychological functioning and reduce detrimental psychological and physiological functioning. Rausch, *et al* conducted a study on university students and they reported that

participants in the meditation and PMR groups decreased more in cognitive, somatic, and general state anxiety than control group.<sup>24</sup>. The results interpreted by these studies supports the current study that PRE are more effective in reducing stress, anxiety and depression among university students.

A reliable study demands full attention of the reporter and sufficient time.

### CONCLUSION

It is concluded that progressive relaxation exercises are more effective than aerobic exercises in improving mental health of university students. It is highly recommended that students must manage 20 to 30 minutes per day for healthy and relaxing activities such as yoga, progressive muscle relaxation exercise, walking, running and any particular sports they love as these exercises serve to be a mood booster, reduces fatigue, enhances cardiovascular endurance, promotes physical fitness, decreases work related stress, reduces feelings of gloominess, depression and anxiety.

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