EFFECT OF DANCE AEROBICS ON PERCEIVED STRESS IN PHYSIOTHERAPY STUDENTS

Dr. Khayathi Padia*, Murtuza Sabuwala, Nilam Dave, Firoz Shaikh and Dolly Bhatia

India.

ABSTRACT

BACKGROUND: Aerobics dance is said to have an effect on the psychological, behavioural and emotional responses. The literature shows high level of perceived stress among students. Hence, this study is aimed at evaluating the effect of Dance Aerobics on Stress in Physiotherapy students by using PSS score, Clinical parameters and EMG Biofeedback activity. OBJECTIVES: the objectives of this study are to assess the Perceived Stress in physiotherapy students with assessment of PSS, clinical parameters and EMG Biofeedback activity and to evaluate the effect of Dance Aerobics on perceived stress clinical parameters and EMG Biofeedback in physiotherapy students. METHODS: 122 voluntarily participating physiotherapy students were assessed and PSS score was taken. Experimental study design carried out on 46 students who were meeting the inclusion criteria. Outcome measures were Pulse Rate, Respiratory Rate, Blood Pressure, EMG Biofeedback Activity and Perceived Stress Scale. RESULT: The pre mean Systolic BP was 119.4 (±6.29) mmHg, the post (±5.79) mmHg and p value is 0.010. The pre mean of Diastolic BP was 79.26 (3.35±) mmHg, the post 78.39 (4.08±) mmHg and p value is 0.202). The pre mean of Pulse Rate was 77.04 (5.38±) bpm, the post mean was 73.28 (4.56±) bpm and p value is p<0.001. The pre mean of Respiratory Rate was 19.72 (±), post mean was 18.85(±) bpm and p value is 0.011. Perceived Stress Scale Score pre mean for screened participants was 25 (±4.07), post mean 17.65(±)and p value is 0.011. EMG Biofeedback Activity pre mean was 33.59 (±14.2), post mean was 18.76(±7.03) and p value <0.001. CONCLUSION: Thus, this study concludes that there is significant reduction of Perceived Stress, Clinical Parameters and EMG Biofeedback Activity by Dance Aerobics Intervention on stress among physiotherapy students.
INTRODUCTION
The World Health Organisation described Physical fitness as “the ability to carry out daily tasks with vigour and alertness, without undue fatigue, and with ample reserve energy to enjoy leisure pursuits and meet unforeseen emergencies”. It is essential that everyone should exercise regularly to maintain their health and fitness and should follow a judiciously sensible diet. Aerobic Dance Exercise is comprehensive, safe and time-efficient and thus it is a convenient mode of exercise. Two definitions from the dictionary are interesting. Aerobics helps to increase the amount of oxygen carried by the blood and strengthening of the heart and lungs achieved by any system of sustained exercise. Dancing is to move your feet and body rhythmically in time to the beats of music. When these are combined, they result is an exciting, safe, and highly effective form of exercise for people of any age, and of any fitness level and can be enjoyable.

Dance Aerobics has evolved as one of the most popular and widely used exercise modes in the world over the past three decades. Well-trained aerobics instructors play the role of fitness professionals who have the detailed information and skill regarding body mechanics, physiological processes and the changes in human body when it is subjected to various forms of exercises. As it is a skilled science, it is incorporated by trained professionals for the maximal benefit of the clients. It is an activity available for everyone and suitable for all population groups.

Putman defined aerobic dancing as a kind of physical activity with low impact, moderate time and with special music that to motivate among participants. Aerobic dance and perceived wellbeing are related to each other. There are positive effects of aerobic dancing on physiological and mental well-being. Also, according a research on aerobics dance protocol for 3 months, a positive relationship between physical and psychological well-being has been concluded.[33]

EMG Biofeedback is a process that enables one to learn to for the purpose of improving health and performance. It rapidly and accurately gives exact “response” to the examiner. The demonstration of this evidence alters with various types of thoughts, feelings, expressions and conduct. Over a period of time, these fluctuations can withstand without constant use of the biofeedback instrument.
EMG Biofeedback characteristically comprises of the assessment of a marked biological function and imparting it to the therapist using one of two strategies. When a numerical value is displayed on a wearable device, such as a watch it is direct feedback. The biofeedback measurements are used to control an adaptive auditory signal, visual display or tactile feedback method. Also a study by Mohsin Shah et all suggested that there was a significant level of stress perceived by students The mean score of perceived stress scale was found to be 30.84.

“Stress is a condition or feeling that a person experiences when they perceive that the demands exceed the personal and social resources the individual is able to mobilize”- Psychologist Richard S. Stress is a detrimental experience for most people. In health care training it is extremely challenging students to deal with and adapt to its complex learning process. Some individuals may find Health care education to be a stressful experience as this may negatively affect the emotional well-being and educational performance of the students. To let stress become student’s way of living in college is very, harmful because some stress levels can lead to a terrible effect. That may completely change the student’s life and it may result to failure.

A study done by Dr. Tushar Palekar et al. aimed to evaluate the perceived stress, sources and severity of level of stress in physiotherapy students showed the mean PSS score of 20.50 and thus concluding there is presence of high level of stress in physiotherapy students.

Dance Aerobics is said to have an effect on the psychological, behavioural and emotional responses. Thus, it is important to reduce the perceived stress of the students and give them a brighter side of life by enrolling into fitness activities like dance aerobics.

STATISTICAL ANALYSIS AND INTERPRETATION

Study Design: 122 voluntarily participating physiotherapy students were assessed and PSS score was taken. Experimental study design carried out on 46 students who were meeting the inclusion criteria. Outcome measures were Pulse Rate, Respiratory Rate, Blood Pressure, EMG Biofeedback Activity and Perceived Stress Scale.

Table 1: Demographic data of participants & mean PSS score

<table>
<thead>
<tr>
<th>Mean AGE</th>
<th>Mean PSS (n=122)</th>
<th>PSS ≥ 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.24</td>
<td>18.23</td>
<td>N = 46</td>
</tr>
</tbody>
</table>
Table 2: Comparison of Pre and Post Systolic Blood Pressure

<table>
<thead>
<tr>
<th>SYSTOLIC BP</th>
<th>Pre</th>
<th>Post</th>
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</thead>
<tbody>
<tr>
<td>Mean</td>
<td>119.4</td>
<td>116.9</td>
</tr>
<tr>
<td>SD</td>
<td>6.292</td>
<td>5.791</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>2.565</td>
<td></td>
</tr>
<tr>
<td>t Value</td>
<td>2.694</td>
<td></td>
</tr>
<tr>
<td>p value</td>
<td>0.010</td>
<td></td>
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</tbody>
</table>

Table 3: Comparison of Pre and Post Diastolic Blood Pressure

<table>
<thead>
<tr>
<th>DIASTOLIC BP</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>79.26</td>
<td>78.39</td>
</tr>
<tr>
<td>SD</td>
<td>3.356</td>
<td>4.08</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>0.8696</td>
<td></td>
</tr>
<tr>
<td>t Value</td>
<td>1.295</td>
<td></td>
</tr>
<tr>
<td>p value</td>
<td>0.202</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Comparison of Pre and Post Pulse Rate

<table>
<thead>
<tr>
<th>PR</th>
<th>Pre</th>
<th>Post</th>
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</thead>
<tbody>
<tr>
<td>Mean</td>
<td>77.04</td>
<td>73.28</td>
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<tr>
<td>SD</td>
<td>5.383</td>
<td>4.246</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>3.761</td>
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<tr>
<td>t Value</td>
<td>5.646</td>
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</tr>
<tr>
<td>p value</td>
<td>&lt;0.001</td>
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Table 5: Comparison of Pre and Post Respiratory Rate

<table>
<thead>
<tr>
<th>RR</th>
<th>Pre</th>
<th>Post</th>
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</thead>
<tbody>
<tr>
<td>Mean</td>
<td>19.72</td>
<td>18.85</td>
</tr>
<tr>
<td>SD</td>
<td>1.951</td>
<td>2.564</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>0.8696</td>
<td></td>
</tr>
<tr>
<td>t Value</td>
<td>2.660</td>
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<tr>
<td>p value</td>
<td>0.011</td>
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Table 6: Comparison of Pre and Post Perceived Stress Score

<table>
<thead>
<tr>
<th>PSS</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>25</td>
<td>17.65</td>
</tr>
<tr>
<td>SD</td>
<td>4.072</td>
<td>4.85</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>7.348</td>
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<tr>
<td>t Value</td>
<td>8.320</td>
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</tr>
<tr>
<td>p value</td>
<td>&lt;0.001</td>
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</table>

Table 7: Comparison of Pre and Post EMG Biofeedback Activity

<table>
<thead>
<tr>
<th>EMG Biofeedback Activity</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>33.59</td>
<td>18.76</td>
</tr>
<tr>
<td>SD</td>
<td>14.2</td>
<td>7.036</td>
</tr>
<tr>
<td>Mean Difference</td>
<td>14.83</td>
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<tr>
<td>t Value</td>
<td>7.44</td>
<td></td>
</tr>
<tr>
<td>p value</td>
<td>&lt;0.001</td>
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</tr>
</tbody>
</table>
RESULTS
Table 1 shows the age of the Mean age (19.24 years) and Mean PSS score (18.23) of the 122 screened physiotherapy students. It also shows number of participants with PSS score ≥ 20.

Table 2 shows the comparison of pre and post comparison of Systolic BP of the participants. The pre mean was 119.4 (±6.29) mmHg and the post dance aerobics mean for 46 participants was found to be 116.9 (±5.79) mmHg. The statistical analysis according to paired t-test showed significant improvement in Systolic BP (p=0.010).

Table 3 shows the comparison of pre and post comparison of Diastolic BP of the participants. The pre mean was 79.26 (±3.35) mmHg and the post dance aerobics mean for 46 participants was found to be 78.39 (±4.08) mmHg. The statistical analysis according to paired t-test showed little improvement in Diastolic BP (p = 0.202).

Table 4 shows the comparison of pre and post comparison of Pulse Rate of the participants. The pre mean was 77.04 (±5.38) bpm and the post dance aerobics mean for 46 participants was found to be 73.28 (±4.56) bpm. The statistical analysis according to paired t-test showed significant improvement in Pulse Rate (p<0.001).

Table 5 shows the comparison of pre and post comparison of Respiratory Rate of the participants. The pre mean was 19.72 (±1.95) and the post dance aerobics mean for 46 participants was found to be 18.85(±2.564). The statistical analysis according to paired t-test showed little improvement in Respiratory Rate (p=0.011).

Table 6 shows the comparison of pre and post comparison of Perceived Stress Scale Score of the participants. The pre mean for screened participants was 25 (±4.07) and the post dance aerobics mean for 46 participants was found to be 17.65 (±4.85). The statistical analysis according to paired t-test showed significant improvement in Perceived Stress Scale Score (p<0.001).

Table 7 shows the comparison of pre and post comparison of EMG Biofeedback Activity of the participants. The pre mean was 33.59 (±14.2) and the post dance aerobics mean for 46 participants was found to be 18.76(±7.03). The statistical analysis according to paired t-test showed significant improvement in EMG Biofeedback Activity (p<0.001).
DISCUSSION

This study was aimed to determine the effect of dance aerobics intervention on perceived stress in physiotherapy students using Perceived Stress Scale, clinical parameters and EMG Biofeedback activity.

Studies on stress reduction with dance aerobics have not yet been reported in the literature. In this study, physiotherapy students reported a higher level of perceived stress. The study done by Dr. Tushar Palekar et al. suggested that there is high level of stress in physiotherapy students. They also suggested that in other countries as well, there were varied levels of stress found in health care learners and physiotherapy students. The amount and chronicity of stress varies amongst individual students according to their curricula, evaluation system etc.

Result of our research supports the present evidence of literature, demonstrating that physical therapy graduation students are subjected to various stressors that may unfavourably affect their health in both ways: physically and psychologically. The results supported the research hypothesis and we evaluated mean perceived stress among physiotherapy students of 18.23.

This result is supported by a study done by Dr. Tushar Palekar from Dr. D. Y. Patil College of Physiotherapy who found the mean PSS score to be 20.50 among the students. The researcher also reported that 74% of the students experienced stress for some duration throughout their physiotherapy education due to various precipitating factors.

Forty Six students with moderate plus stress level according to PSS score were subjected to EMG Biofeedback Activity assessment. Frontalis is an important muscle of expression, therefore every time an individual is having stress, this muscle contracts, involuntarily. Thus, it is sensitive to detect stress by way of EMG biofeedback activity at rest. It is easier for isolated pick-up, suitable for placement of surface electrodes. Significant reduction in stress levels was showed by PSS and EMG Biofeedback activity both.

The significant reduction is advocated to be an outcome of physiologic changes caused by aerobic exercises. Results showed that there were positive effects of stress reduction due to aerobic dance training and these were coherent with Schiffer et al. and Hui et al. who showed aerobic dancing had a positive affect psychological well-being. According to the scores during post-test, the present results highlighted the positive role of aerobic dancing classes environmental and its climate on positive effects of psychological well-being and stress.
reduction as suggested by Dr. Palavi Sawant.\textsuperscript{[2]} Also it seems that aerobic dancing class’s climate can affect maintaining and enhancing well-being.\textsuperscript{[33]}

Results of the current study showed improvement in clinical parameters namely Pulse Rate, Respiratory Rate and Blood Pressure. Dr. Pallavi Sawant also showed a positive correlation between dance aerobics and cardiovascular benefits. It has shown significant changes in the Respiratory Rate and Systolic and Diastolic Blood Pressure. The study advocated better cardiovascular endurance in the dancing group.

The aerobic format of exercises cause marked vascular remodelling by amassed angiogenesis and arteriogenesis. Consistent aerobic dancing involves alternate contraction and relaxation of the larger muscle groups. This causes opening of undeveloped capillaries. There is an increased synthesis of enzymes vital for the TCA cycle and ETC, especially in the slow twitch fibers. Also, aerobic conditioning causes increased capacity to remove lactate from the circulation. Exercise may improve the vagal tone causing lower levels of blood pressure, resting heart rate and other cardiovascular parameters.

The Central Nervous System’s neural control mechanisms finely control human motions. The cerebellum serves as the major comparing, evaluating, and integrating centre to fine tune muscular activity. Numerous muscular functions are controlled by the spinal cord and other subconscious areas of the CNS. Automatic muscular movements and responses are processed and initiated by the reflex arc. The muscle’s movement function determines the number of muscle fibers a single motor unit may contain. The fiber-to-neuron ratio is relatively small for fine and complicated movement patterns, whereas for gross movements, a single neuron may innervate several thousand muscle fiber units.

The anterior motor neurons transmit the action potential from spinal cord to the muscle via neuromuscular transmission process. Dendrites receive impulses and then pass them to the cell body. The axon transmits the impulse in one direction only and mainly towards the muscle. The neuromuscular junction (NMJ) is the crossing point between the motor neuron and its motor unit of the muscle. Neurotransmitter released at the neuromuscular junction activates the muscle. The impulses- Excitatory or inhibitory continuously keep passing through these synaptic junctions between neurons and the muscle. The excitation thresholds of the neurons altered by these impulses either increase or decrease the firing rate\textsuperscript{35}. 
A large degree of disinhibition aids exercise performance as it allows for maximal activation of a muscle’s motor units during an all-out, high-power output exercise.

Thus, in our study we found a significant reduction in stress as assessed by PSS, EMG Biofeedback Activity and Clinical Parameters due to dance aerobic intervention.

CONCLUSION

Thus, this study concludes that there is significant reduction in Perceived Stress, Clinical Parameters and EMG Biofeedback Activity by Dance Aerobics Intervention on stress among physiotherapy students.

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