International Journal of Multidisciplinary Research and Development
Online ISSN: 2349-4182, Print ISSN: 2349-5979; Impact Factor: RJIF 5.72
Received: 12-01-2019; Accepted: 15-02-2019
www.allsubjectjournal.com
Volume 6; Issue 3; March 2019; Page No. 72-75

Effectiveness of dance aerobics on stress level in physiotherapy students

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Abstract
Background: Aerobic dance is the most popular, fitness organised activity for women. Aerobics helps to strengthen the heart and lungs by increasing the amount of oxygen taken from the blood. High stress levels can lead to future health problems. Most people today cannot adequately deal with stress. Medical school is generally recognized as a stressful environment that has a negative effect on the academic performance, physical health and psychological wellbeing of the student. Hence this study aims to reduce stress among physiotherapy students with the help of dance aerobics
Methodology: 60 physiotherapy students with age group of 18-25 years were selected based on the inclusion criteria. Pre assessment and PSS scores were taken prior to the intervention. The intervention was carried out for 6 weeks which included moderate to vigorous levels of exercises carried out for 40 mins 4 days a week which included 5 mins of warm up, aerobic dance for 30mins, cool down for 5 mins. Post intervention assessment and PSS scores were noted and both the scores were Analyzed and compared using paired t-test.
Results: The mean and Sd for PSS, Respiratory rate and Heart rate was taken, pre intervention of PSS is 30.35 ± 3.262 and post intervention was 15.4 ± 2.374, pre intervention mean and Sd for Respiratory Rate was 21.5±6.23 and post was 15.4±2.97, for heart rate pre intervention mean and Sd was 82.93 ± 6.23 and post intervention it was 71.16 ± 2.97, all the scores were compared by student paired t test and the result was shown to be highly significant
Conclusion: The present study concluded that dance aerobics was effective in reducing the level of stress.

Keywords: stress, dance aerobics, PSS, physiotherapy students

Introduction
Stress is a very common and real problem in the lives of people today. It affects the lives of every individual and comes in various forms. High stress levels can lead to future health problems in individuals. Stress can result in emotional instability, extreme anxiety, reduces work performance, health issues, etc. The fact that most people today cannot adequately deal with stress they turn to various things to ease the pressure on their minds and bodies most of those things are harmful to the person as well. People are not exposed to proper stress reducing methods and so they choose whatever they can find quickest. Stress affects the human body in many ways [1].

Physiology of stress
Stress is known to stimulate central nervous system (CNS) to release cortisol, stress increases the production of corticotropin releasing hormone (CRH) in the hypothalamus and adrenocorticotropic hormone (ACTH) in the anterior pituitary gland, cortisol inhibits the immune system and so a person's immune response also decreases, cortisol also increases inflammatory response but there is no activation of inflammation removal agents. When a body has low immune system and increased inflammatory response for a longer period of time the individuals don't recover properly and they always appear sick so an individual who is stressed and has high cortisol levels is an immunocompromised person. By the stimulation of cortisol and the sympathetic nervous system, stress results in the increase of heart rate and constriction of blood flow. Stress also results in anxiety, hypertension, and other related incidents. Stress can generate the release of corticosteroids, cytokines, inflammatory proteins, and other molecules that lead to an adhesive effect at sites of damaged endothelium, these adhesive molecules gather there and may begin to block the arteries. These blockages can lead to atherosclerosis which can lead into increased heart rate, blood pressure, heart attacks, etc [1].
The American college of sports medicine (ACSM) defines aerobic exercise as "any activity that use large muscle groups, can be maintained continuously and is rhythmic in nature"
Aerobics helps to strengthen the heart and lungs by increasing the amount of oxygen taken from the blood1. Both the term and the specific exercise method were introduced by Dr. Kenneth H. Cooper, an exercise physiologist, and Col. Pauline Potts, a physical therapist, both belonging to the United States Air Force [2]. In 1968, he published Aerobics, which included exercise programs using running, walking, swimming and bicycling [3].
Dance is a physical movement which helps the individual to convey the mood or attitude. Dance may reduce stress and as it is considered as an aerobic exercise it helps us to stay fit by increasing blood flow which can lead to increase in flexibility, muscle mass, bone strength and overall strength of the body [1]. Aerobic exercise when accompanied with

music, decreases tension, confusion and depression [4]. In previous research it was also shown that dance aerobics had a positive effect on body composition by reducing the body weight, body fat percentage, visceral fat and increases lean body mass [5], Exercise produces seratonin which helps the body to relax and stay in a happy mood, seratonin is essential for a person's well-being because it also regulates sleep, appetite, and the ability to learn. People favourably choose fun over exercise and dance serves both hence it is easy to dance rather then just exercise [1].

History of dance aerobics

Aerobic dance may be the most popular, fitness organised activity for women in the United States. It traces its origins to Jacki Sorenson, the wife of a naval pilot, who began to conduct exercise classes at a US Navy base in Puerto Rico in 1969 (Schuster 1979). Within 2 years aerobic dancing got united into the YMCA exercise programmes in South Orange, New Jersey. In the following year Sorenson's Aerobic Dance Corporation had been formed. By 1982 Sorenson's programmes claimed 150,000, registrations, 91.9% of the YMCAs in the United States offered some form of aerobic dance, and 350,000 members of the Health and Tennis Corporation of America participated in the activity (Legwold 1982). The growth of aerobic dance has been more recently triggered by the production of videotaped dance exercise programmes. Beginning with the original 'Workout' tape by Jane Fonda in 1982, this option for the home-bound aerobic dancer now encloses scores of programmes from a variety of sources including exercise physiologists, entertainment personalities, professional athletes, physicians and former aerobic dance students. The original aerobic dance programmes consisted a combination of various dance forms including ballet, modern, jazz, disco and folk, as well as callisthenics-type exercises including running, hopping, skipping, jumping, stretching, and gravity-assisted strengthening exercises. Recent innovations include water aerobics (done in a swimming pool), non-impact or low impact aerobics (employing movements where at least 1 foot is on the floor at all times and often encompassing martial arts poses and posturing), specific dance aerobics (programmes staying within the confines of a specific dance form such as ballet or jazz) and 'assisted' aerobics are programmes whereby weights are worn on the wrists and/or ankles while performing the exercises. Aerobic dance has captured the interest of a large group of individuals, most of whom are women and many of whom have failed to previously accept any other form of structured fitness activity [6].

Dance aerobics is an entertaining and non-competitive group activity, which has become very popular in recent years6. Participation in group aerobic programs helps to improve the cardio-respiratory stamina and prevention of cardio-vascular diseases in people of all ages who train with the adequate intensity, duration and frequency Medical school is generally recognized as a stressful environment that has a negative effect on the academic performance, physical health and psychological wellbeing of the student8. Stress is usually found in students studying for examinations. Medical students are expected to learn and understand a huge amount of knowledge and skills. They have to make a lot of personal and social sacrifices in order to maintain good academic results in a competitive environment which puts them under a lot of stress [9]. Undergraduate medical students are the most distressed group of students compared to any other undergraduate courses. This stress can lead to the development of depression and anxiety [10]. Recent studies suggests that group aerobic programs has a positive effect on the participants' quality of life and mental health. Dance aerobics when accompanied by music, decreases tension, confusion and depression and increases energy levels. Mood improvement is an advantage obtained from participating in physical activity programs without requiring a long-term participation. Both long-term and short-term participation in aerobics program improve physical fitness, body image satisfaction, self-efficacy and decrease the sense of anxiety and depression. Thayer, Newman and McClain report that exercise appears to be the most effective strategy for regulating a positive mood in healthy adults4. A study showed that high levels of perceived stress were found in physiotherapy students in an Indian College [11]. Since there are very few studies done on how dance aerobics has effects on stress in physiotherapy students therefor the study aims to determine it.

Methodology

Source of Data: physiotherapy students
Method of collection of data: By principal investigator
Study Design: Experimental study design
Sample size: 60
Participants: Physiotherapy students having stress
Sampling Method: convenient sampling
Study Duration: 6 weeks
Equipments to be used: Proper footwear, light weight well ventilated clothing, spacious area, motivating music, speakers, exercise video tape
Materials to be used: pen, pencil, perceived stress scale (PSS) and record sheet.

Procedure

The ethical approval from institutional ethical committee was taken (registration no. BPT/INT/2018/09)

In the beginning ethical clearance was be obtained. Written consent was taken from the participants. Participants were screened according to inclusion and exclusion criteria. A questionnaire was given which includes perceived stress scale (PSS). The participants were made to mark and fill the formats appropriately. Pre-assesment was done for Heart Rate and Respiratory Rate.

Before starting with the aerobics session the participants were taught to measure the Heart Rate (HR) using 3 finger method and Respiratory Rate (RR) using. Dance aerobics was conducted which included moderate to vigorous levels of exercises carried out for 40 mins 4 days a week for 6 weeks which will included 5 mins of warm up, aerobic dance for 30 mins and cool down for 5 mins. After the aerobics session, the Heart Rate (HR) and Respiratory Rate (RR) were recorded again.

Warm up included static stretches held for 10-20seconds from head to toe which included neck, shoulder and arms, low back, side stretches, gluts, quadriceps, hamstrings, hip flexors, calves, tendo Achilles and ankle. Dance aerobics was performed in rhythemic manner (8 beats 32 counts)

Cool down included simple stretches like hamstring, abductors, adductors, gluteals held for 20-45 seconds and relaxation was given using jacobsons relaxation. The participants were asked to lie down and close their eyes and

were asked to contract a muscle group for 10 seconds and relax it for 20 seconds before contracting the next muscle group. The contraction of the muscle group was done in a sequential pattern which involved contraction of the muscle groups of the lower extremity, thorax, upper extremity and face.

Instructions were given to the participants according to the movements. They were asked to wear proper gym clothing or loose clothing with proper sports shoes. Participants were requested to get their water bottles for hydration. After 6 weeks of training the students were reassessed for stress on perceived stress scale.

Fig 1: Dance Aerobics

Result

Baseline characteristics (pre interventional test score) were taken and analyzed. The mean and Sd for PSS, Respiratory rate and Heart rate was taken, pre intervention of PSS is 30.35 ± 3.262 and post intervention was 15.4 ± 2.374, pre intervention mean and Sd for Respiratory Rate was 21.5±6.23 and post was 15.4±2.97, for heart rate pre intervention mean and Sd was 82.93 ± 6.23 and post intervention it was 71.16 ± 2.97, all the scores were compared by student paired t test and the result was shown to be highly significant

Table 1

PSS	Mean and SD	P value	T value
Pre	30.35 ± 3.262	P<0.0001 considered extremely significant	28.28
Post	15.4 ± 2.374		

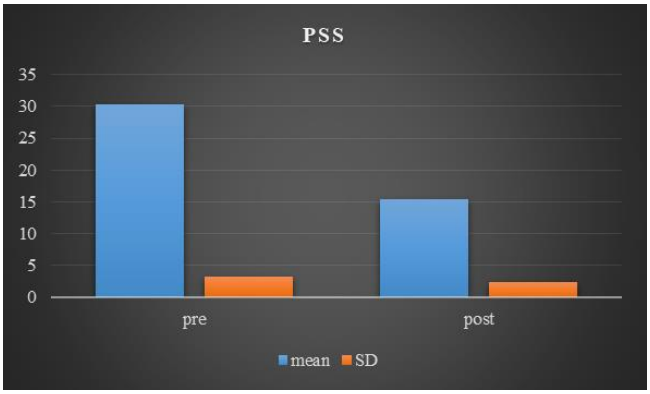

Fig 1: Pre and post PSS

Table 2

Heart Rate	Mean and SD	P value	T value
Pre	82.93±6.23	P<0.0001 considered extremely significant	18.108
Post	71.16±2.97		

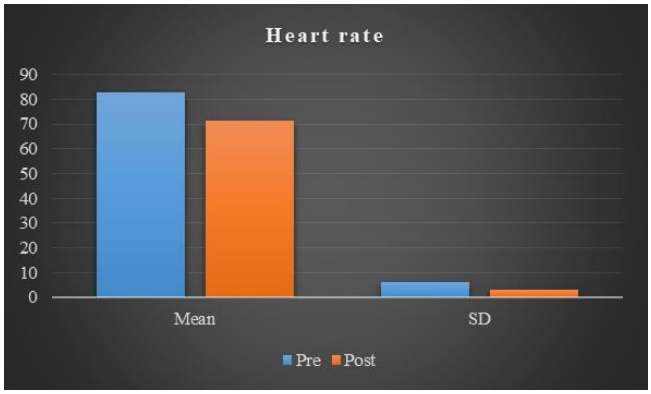

Fig 2: Pre and Post Heart Rate

Table 3

Respiratory rate	Mean and SD	P value	T value
Pre	21.5±6.23	P<0.0001	13.406
Post	15.4±2.97		

Fig 3: Pre and Post Respiratory Rate

Discussion

This study aims to determine the effects of dance aerobics on stress level in physiotherapy students. In this study 60 students were taken and were assessed using Perceived Stress Scale.

The results showed that there was decrease in the amount of stress after performing dance aerobics and significant changes were found in heart rate and respiratory rate.

Stress stimulates central nervous system (CNS) to release cortisol, stress increases the production of corticotropin releasing hormone (CRH) in the hypothalamus and adrenocorticotropic hormone (ACTH) in the anterior pituitary gland, a person's immune response also decreases as cortisol inhibits the immune system, inflammatory response is also increased by cortisol, but there is no activation of inflammation removal agents. An individual who is stressed and has high cortisol levels is an immunocompromised person because when a body has low immune system and increased inflammatory response for a longer period of time the individuals don't recover properly and they always appear sick. Stress results in the increase of heart rate and constriction of blood flow by the stimulation of cortisol and the sympathetic nervous system. Stress also results in anxiety, hypertension, and other related incidents. Stress can generate the release of corticosteroids, cytokines, inflammatory proteins, and other molecules that lead to an adhesive effect at sites of damaged endothelium, these adhesive molecules gather there and may begin to block the

arteries. These blockages can lead to atherosclerosis which can lead into increased heart rate, blood pressure, heart attacks, etc [1].

The result of the present study showed that there was a significant reduction in the level of stress, this result was supported by a study done by Shilpa Khandare and this study concluded that there is significant reduction in Perceived Stress by Dance Aerobics Intervention on stress among physiotherapy students [12]. Dance reduces stress and as it is considered as an aerobic exercise as it helps us to stay fit by increasing blood flow which can lead to increase in flexibility, muscle mass, bone strength and overall strength of the body [1]. In previous research it was also shown that dance aerobics had a positive effect on body composition by reducing the body weight, body fat percentage, visceral fat and increases lean body mass [5], Exercise produces seratonin which helps the body to relax and stay in a happy mood, seratonin is essential for a persons well being because it also regulates sleep, appetite, and the ability to learn [1].

Similarly previous studies have suggested that group aerobic programs has a positive effect on the participants' quality of life and mental health. When dance aerobics is accompanied by music it helps in increasing the energy levels, decreasing tension, confusion and depression. A previous study done by Thayer, Newman and McClain showed that exercise appears to be the most effective strategy for regulating a positive mood in healthy adults without requiring a long-term participation in any physical activity program. Both long-term and short-term participation in aerobics program improve physical fitness, body image satisfaction, self-efficacy and decrease the sense of anxiety and depression [4].

The result of the present study showed that there were significant changes in the Heart Rate and Respiratory Rate which is in accordance with the study of Marcos B. Almeida1 and Claudio Gil S. Araújo and concluded that that an aerobic dance program can be an effective way to improve cardiovascular fitness. Studies suggest that a lower resting-HR is present in well-trained or physically well-fit (aerobically) which suggests that there is higher parasympathetic activity or lower sympathetic activity. A lower resting-HR can also be a reult of other factors obtained from a training program, such as the increase of venous return and systolic volume. When there is an improvement of the venous return, there is an increase in the systolic volume, and according to Frank Starling law, when there is an increase in the volume of blood, there is an increase in heart contractility. To keep resting heart output constant, HR decreases in response to a higher systolic volume and these adaptations are generally found in individuals with good aerobic conditioning [13].

Hence the present study showed that dance aerobics was effective in reducing the stress level as well as improving the aerobic fitness.

Conclusion

The present study concluded that dance aerobics was effective in reducing the level of stress.

Acknowledgement

I am very glad to present this project as a part of my B.P.T internship. I take this opportunity to thank everyone that has helped me to make this project a success.

I would like to acknowledge Dr. Mahendra Shende, Principal, Dr. A.P.J. Abdul Kalam College of Physiotherapy, Loni for permitting me to carry out the project in this institution.

I wish to express my sincere gratitude to my advisor and project in-charge Dr. Nupoor Kulkarni, for her expert advice and immense knowledge. Her guidance helped me in all the time of research and writing of this project. I am also thankful to all the teaching staff who have provided me with their insightful comments which incented me to widen my research from various perspectives.

I wish to thank all the participants for their cooperation and tolerance towards this project.

I would like to thank my family for their constant encouragement and persistent support throughout writing this project and my life in general.

Last but not the least I would like to thank all my friends for their timely help and wonderful collaboration in this project.

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