International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Effects of Aerobics on Cardiorespiratory Variable on Female College Students

Prof. Premkumar K.[1], Prof. Dr. CK Senthilkumar[2]

[1]HoD, EMSCPMS, KUHS, PhD Scholar NECU

[2]PhD Dsc

Abstract: ***Background: Aerobic training is augmentation of the energy utilization of the muscles by means of an exercise programme. Mindfulness-based aerobics programs, including aerobic dance and aerobic training will improve well-being. So, the purpose of the study is to compare immediate responses of cardiorespiratory variables. Methods: Randomly selected 20 female college students, age 19-20 yrs with BMI 18-23. group A -aerobic dance and group B-aerobic training, cardiorespiratory variables were calculated. Results: There is significant difference in HR, SBP immediate after exercise, and SBP 3-minute after exercise between aerobic dance and aerobic exercise. But no significant differences occur in RR, SBP, HR after exercise between aerobic dance and aerobic exercises populations. Conclusions: Findings provide cardiorespiratory variables when comparing aerobic dance and aerobic exercises on mindfulness training can be prescribed for an individually by choice.***

Keywords: aerobic exercise, aerobic dance, mindfulness, cardiorespiratory variables -HR, THHR, RR, BP

1. Introduction

Aerobic exercise refers to repetitive, structured physical activity that requires the body's metabolic system to use oxygen for production of energy. These tend to use large muscle groups and improve the capacity of the cardiovascular system to uptake and transport oxygen[1]. Aerobic exercise may be better referred to as "solely aerobic", as it is designed to be low-intensity enough that all carbohydrates are aerobically turned into energy via mitochondrial ATP production. Mitochondria are organelles that rely on oxygen for the metabolism of carbs, proteins, and fats. Aerobic exercise causes a remodelling of mitochondrial cells within the tissues of the liver and heart[2].Examples of cardiovascular or aerobic exercise are medium- to long-distance running or jogging, swimming, cycling, stair climbing and walking[3]. The use of oxygen to meet energy demands during exercise via aerobic metabolism adequately [4]. The cardiovascular system and the muscles adaption occur to the training stimulus over time 10 to 12 weeks. Regular aerobic exercise strengthens the heart and improves circulation. when combined with mindfulness, it can also help regulate blood pressure and heart rate. Mindfulness practices often include focused breathing which can improve lung capacity and activate the parasympathetic nervous system, which promotes relaxation and reduce bodies stress response. Mindfulness practices higher heartrate variability (HRV) is associated with better autonomic nervous function and overall cardiovascular health. Other benefits of aerobic programs enhance immune response and improved mental health[8]

Aerobics increases heart rate linearly with Vo2 consumption and exercise intensity in both trained and untrained individual. The average resting heart rate of a sedentary person 68-72 beats per minute and In trained athletes is usually a result of an increase in cardiac output. Maximal heart rate may be as high as 200 beats per minute during exercise in generally, heart rate decreases after the age of 30. Respiratory changes occur rapidly, even before the imitation of exercise [4, 5, 6]. Gas exchange (O2, CO2) are increase across the alveolar capillary membrane by the first or second breath. Minute ventilation increase as respiratory frequency and tidal volume increases and results O2 consumption increases during exercise. Aerobic exercise training results an increased maximal CO and maximal O2 uptake, slower resting heart rate, increased capillary density and increased O2 utilization. The distribution of blood in the body varies from rest to exercise. At rest approximately 20 percentage of blood flows to the muscles. With the remaining 80 percent supplying visceral organs. During exercise more blood is diverted away from the visceral organs to supply the working muscles. This distribution of blood flow during exercise is a result of vasoconstriction of the arterioles supplying the visceral organs and a vasodilatation of the vessels supplying the active muscles[9].The rapid increase in energy requirement during exercise require equally rapid circulatory adjustments to meet the increase need for O2 and nutrients to remove the end-product of metabolism such as CO2 and lactic acid and to dissipate excess heat. The shift in the body metabolism occurs through a coordinated activity of all the system of the body. Stimulation of small myelinated and unmyelinated fibres in skeletal muscle involves a sympathetic nervous system response. Mindfulness-based programs have the potential to improve the well-being state can be prescribed for an individually by choice[7]

2. Review of Literature

Norlina, et al (2014) Conducted a study on the effects of selected aerobic exercise modalities on self-esteem among female students and found that the result of this study shed light on self-esteem and identify the nature of the most effective exercises in improving self-esteem of under graduate female students. It shows that the result of this study will offer a new view in boosting self-esteem. The findings can also be useful for fitness professionals, who play an important role in physical exercise and health literacy. However, more research is needed to determine the effect of combining aerobic exercise and weight training on mental health and well-being[10]

PAN TELIC, S et al (2013) Conducted a study on the effect of a twelve-week Aerobic dance exercises on body composition parameters in young women and found that Twelve-week aerobic dance training program led to significant decreased in measurement of body composition. Research that programmed physical activity can contribute to quantitative and qualitative changes to the anthropometric characteristics of the body, especially a decrease in volume and skin folds[12].

Kostis et al (2002) Conducted a study on the effect of combined training on body fat percents and lipid profile in sedentary females of AL ZAHRA university and the study shows the result of this study indicated that 12 weeks of combined training of aerobic dance, step test and resistant training have beneficial effect on serum concentration of high density, lipoprotein and cholesterol and body fat percentage in sedentary females[11]

Dowdy, et al (1985) Conducted the study on the change in the Cardiovascular fitness and Body composition of women under the influence of the aerobic dance and the result of this research has confirmed the hypothesis is that statically significant change will occur to the parameters of cardiovascular fitness and body composition on examined sample of women under influence of the aerobic dance model. In the area of cardiovascular fitness statically significant changes were noted of the values of Resting heart rate, Heart rate under stain, Relative value of maximum o2(o2max) uptake and absolute value of o2 uptake[14]

3. Methodology

Sampling: Convenience sampling.

Sample Size: 20

Research Design: Comparative study.

Inclusion Criteria: Female population, medically stable. Age group 19-20 yrs with BMI 18-23.

Exclusion Criteria: > 180/105 mm Hg. Systemic illness (Fever, SLE). Physiological and anatomical dysfunction.

Tools and Material: BMI Chart, Pulse Oximeter, Stop Watch, Tape, Record Apparatus, Stethoscope.

Outcome Measurement: HR, RR, SBP, DBP

Procedure

The study was conducted on 20 females aged between 19 to 20 years into A&B group. Subjects were selected on inclusion and exclusion criteria standing height, weight and BMI. Evaluated cardiorespiratory variables such as resting BP, HR and RR. Subjects allotted each 5-minutes duration for warm up and cool down in 30minutes aerobic dance and aerobic training program, cardiorespiratory variables were calculated.

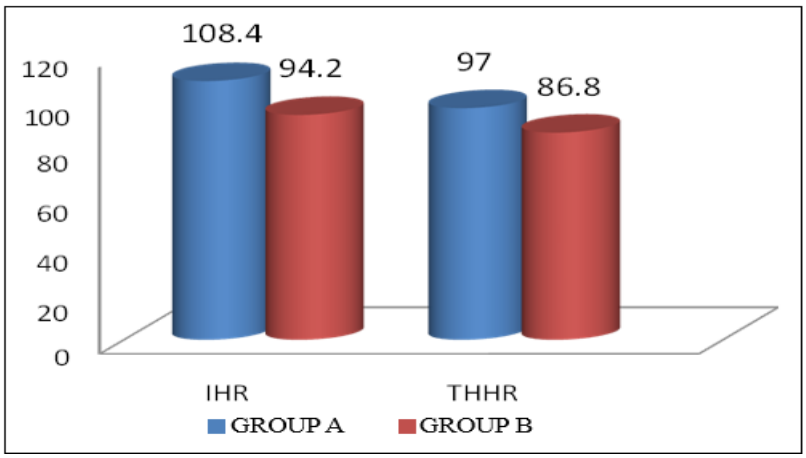
4. Result

Table 1: Descriptive Statistics.

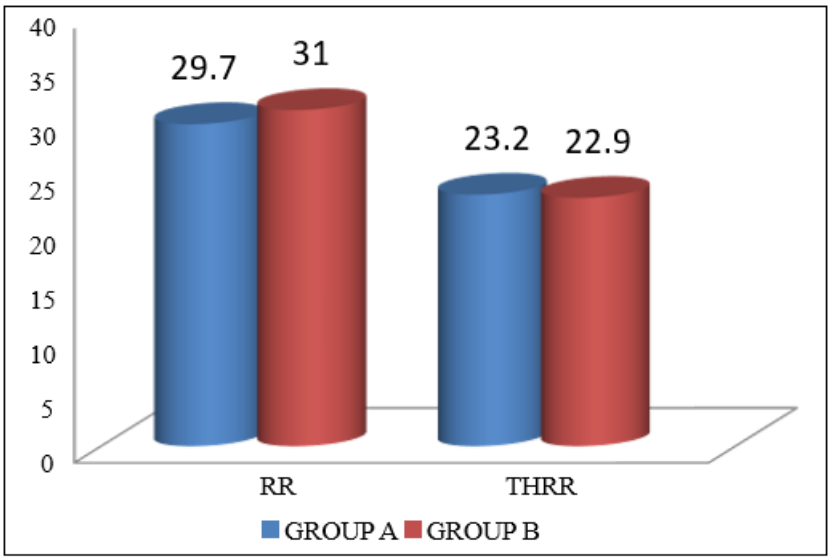
S. No	Variable	Mean	Standard Deviation
1	Age	19.1	0.31
2	Height	158.5	4.24
3	Weight	51.1	4.22
4	BMI	20.25	1.43
5	RHR	72.8	6.12
6	RRR	21.7	5.45
7	RSBP	111.2	9.00
8	RDBP	75.8	7.28

Table 2: Outcome Variables

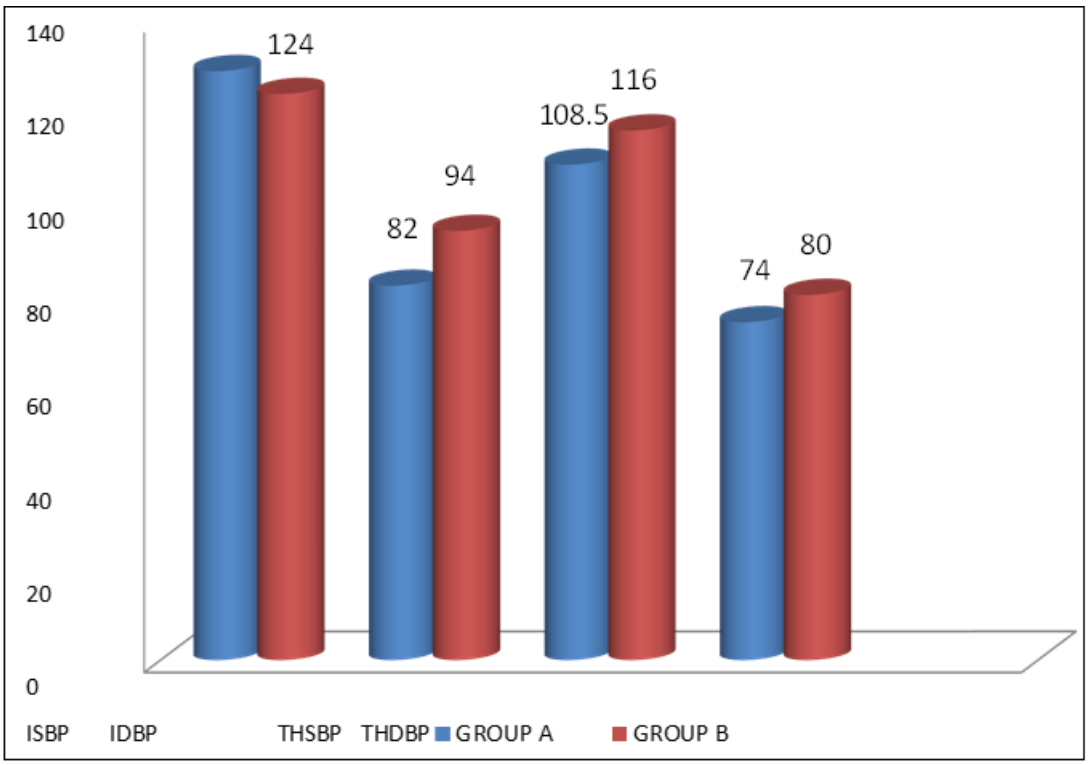
S. No	Variable	Group A	Group B	P-Value
1	HR immediately after exercise	108.40±14.78	94.20±8.09	<.016
2	RR immediately after exercise	29.70±6.79	31±5.37	>.641
3	SBP immediately after exercise	129.0±9.94	124±5.16	>.175
4	DBP immediately after exercise	82.0±7.88	84±5.16	<.001
5	HR three minute after exercise	97.0±31.90	86.8±6.81	>.336
6	RR three minute after exercise	23.2±6.76	22.9±3.81	>.904
7	SBP three minute after exercise	108.5±4.74	116±6.99	<.012
8	DBP three minute after exercise	74.0±5.67	80±8.16	>.072



Graph 1: HR Immediate after and 3minute after Exercise



Graph 2: RR Immediately after and 3minute after Exercise



Graph 3: BP Immediately after and 3minute after Exercise.

5. Discussion

In the present study evaluated acute responses cardiorespiratory variables on "Mindfulness-based interventions of aerobic dance and aerobic training female college students". Mean HR immediately after exercise of group A was 108.4 with std of 14.7, in group B the mean HR immediately after exercise was 94.2 with std of 8.09 which is statistically not significant (p-value <.016). Group A the mean RR was 29.7 with std of 6.79, in group B the mean RR immediately after exercise was31 with std of 5.37 which is statistically significant (p-value>.641).

Group A the mean value SBP immediately after exercise was 129 with std of 9.94, In group B the mean value of SBP immediately after exercise was 124 with std of 5.16 which is statistically not significant (p-value >.175). In group A the mean value of DBP immediately after exercise was 82 with std of 7.88. In group B the mean value of DBP immediately after exercise was 94 with std of5.16 which is statistically significant.

Group A the mean value of HR three minute after exercise was 97 with std of 31.9, In group B the mean value of HR three minute after exercise was 86.8 with std of 6.81, which is statistically not significant (p-value>.336). In group A the mean value of RR three minute after exercise was23.2 with std of 6.76, In group B the mean value of RR three minute after exercise was 22.9 with std of 3.81 which is statistically not significant (p- value>.904). In group A the mean value of SBP three minute after exercise was 108.5, In group B the mean value of SBP three minute after exercise was 116 with std of 6.99 which is statistically significant (p-value<.012). In

group A the mean value of DBP immediately after exercise was 74.0 with std of 5.67, In group B the mean value of DBP three minute after exercise was 80 with std of 8.16 which is statistically not significant (p-value>.072). Results of study revels no significant changes between aerobic dance and aerobic training will be targeted to individual mindful wellbeing. combining mindfulness with exercise may be most effective for improving psychological well-being

Normally in a healthy person's cardiorespiratory variables increases linearly to the workload during exercise because the heart pumps more blood to lungs to get oxygenation and supply working muscles. Rise diastolic BP or more than 10-15mmHg during exercises may indicate an unstable form of hypertension related to CAD [10]. Whelton spa, et al (2002) conducted a study on the effect of aerobic exercise on systolic and diastolic Blood Pressure in adult and the study was to find out the aerobic exercise is effective for lowering systolic and diastolic Blood Pressure.

Clearly M. et al (1948) Conducted a study on the effect of aerobic dance training on maximal oxygen uptake (vo2 max) of college women, show that there is significant improvement in maximal oxygen uptake due to the influences of aerobic dance training in college women. The results clearly indicated the maximal oxygen uptake of experimental group improved due to the influence of aerobic dance training program[13]

P R Vivek , et al (2016) Conducted a study on The Effect of step aerobic exercise on Blood pressure, Heart rate, Triglyceride, High density lipoprotein and Low density lipoprotein on a patient with acute Myocardial Infarction and found that these step aerobic exercise programs was effective in inducing post-exercise hypotension, lowering Heart rate and serum lipids in a patient with acute Myocardial Infarction and regular practice may play an important role in the prevention of Hypertension and Hyperlipidemia [15].

Reference

[1] ASCM'S guidelines for exercise testing and prescription, ed 7. Lippincott Williams and Wilkins, Philadelphia, 2005.
[2] O'Reilly, Colleen L.; Miller, Benjamin F.; Lewis, Tommy L. (2023-01-01). "Exercise and mitochondrial remodeling to prevent age-related neurodegeneration". Journal of Applied Physiology. 134 (1): 181–189. doi:10.1152/japplphysiol.00611.2022. ISSN 8750-7587. PMC 9829476. PMID 36519568.
[3] 10 great reasons to love aerobic exercise". Mayo Clinic. Retrieved 2024-05-1
[4] McArdle WD, Katch FI, Katch VL (2006). Essentials of exercise physiology. Lippincott Williams & Wilkins. p. 204. ISBN 978-0-7817-4991-6.
[5] 5.Power, SK, Howley, E T : Exercise physiology: Theory and Application, ed 4. Mc Graw – Hill Eickhoff, J., Thorland, W., & Ansorge, C. (1983). Selected physiological and psychological effects aerobic dancing among young adult women. Journal of sports medicine and physical fitness, 23 (3), 273- 1. 280).
[6] Carolyn kisser, Lynn Allen Colby; Therapeutic Exercise foundation and techniques, 5th edition. Jaypee brother's medical publishers (p) Ltd.2007 MICHAEL HIGGINS: Therapeutic Exercise from theory to practice, 1st edition. Jaypee brothers' medical publishers (p) Ltd. 2011)
[7] Students' experiences of an 8-week mindfulness-based intervention at a college of opportunity: a qualitative investigation of the mindfulness-based college program William R. Nardi, Nour Elshabassi, Jayson Spas, Alex Zima, Frances Saadeh & Eric B. Loucks BMC Public Health volume 22, Article number: 2331 (2022)
[8] Yi Yuan Tang et al physiology mechanisms of mindfulness meditation 2017 pp23-28 springer link
[9] Diastolic Blood Pressure during exercise http://healthylivng.azcentral.com/diastolic-blood-pressure-during-execise-1686
[10] Norlina Salamuddin1, Mohd Taib Harun1 & Sanaa Ali Ahmed Al-Rashed2.The effects of Selected Aerobic Exercise Modalities on Self Esteem among Female Students. Asian Social Science; Vol. 10, No. 5; 2014. ISSN 1911-2017
[11] Effects of a twelve-week aerobic dance exercises on body compositions parameters in young women. Int. J. Morpho., 31(4):1243-1250, 2013.
[12] Jaspal Singh, Kirpal Singh. (2013) Effect of Aerobic dance on selected physiological variables among college students. Nov- Dec, 2013. Volpi/IX
[13] Clearly, M. L., Moffatt, R.J., & Knutson, K.M. (1984) The effects of two and three day per week aerobic dance programmed on maximal oxygen uptake. Research quarterly for exercise & sport, 55(2), 172-174
[14] Dowdy, D.B., Cureton, K.J., Du Val. H.P., & Ouzts, H.G. (1985). Effects of aerobic dance on physical work capacity, cardiovascular function and body composition of middle- aged women. Research quarterly for exercise& sport, 56(3), 227-233.
[15] P R Vivek 1, shanmugananth 2, prabhakaran natraj 3, k. Rekha *4. A study on the effect of step aerobic exercise on blood Pressure, heart rate, triglycerides, high density Lipoprotein and low-density lipoprotein on a patient with acute myocardial infarction: a case study international journal of physiotherapy and research, Int j physiotherapy res 2016, vol 4(3):1546-49. ISSN 2321-1822 DOI: http://dx.doi.org/10.16965/ijpr.2016