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THE EFFECTS OF MODERATE INTENSITY AEROBIC EXERCISES UPON HEART RECOVERY OF COLLEGE GIRLS

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KEYWORDS	ABSTRACT
Effects, Moderate Intensity, Aerobic Exercises, Heart Recovery	The existing stud was aimed to observe effects of moderate intensity aerobic exercises upon heart recovery of college girls. The study was experimental by using longitudinal data collection approach i.e., pre-test and post-test. Total participants in study were 40. The selected population was randomly being divided into two groups, "experimental and control group". The experimental group gained special treatment for a period of 8 weeks. The heart beat was checked through Radial artery which is easily felt on thumb side of the wrist of arm. For radial artery, three fingers of hand used. After the completion of eight-week exercise protocol data of RHR the data of pretest and posttest was recorded and analyzed "using paired sample t test" to see the difference between the RHR score of girls in pre-test and post-test. It was concluded that the "there is significant impact of Moderate intensity aerobic exercises upon Resting" Heart Rate. Study provides significant information in reaching the conclusion of the current research study.
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INTRODUCTION

There is a tremendous increase in percentage of obese population in developed and in developing countries of the world (Popkin et al., 2012). It is the curable medical condition caused by increased energy intake and reduced physical activities. Obesity is as epidemic disease spreading at a fast pace. Pakistan is ranked 9th in case of obesity among 198 countries (Hasnain, 2016) Globally obesity is recognized as chronic health problem, facing majority of the people (Xiao et al., 2016). Since obesity is the cause of cardiac diseases that are reason of delayed heart rate recovery (HRR). HRR is important predictor of all cause of mortalities and related with coronary heart diseases (Qiu et al., 2017). In addition to that heart rate recovery is linked with unexpected cardiac arrest in adults (Jouvenet al., 2008). Many scholars have explored relationship amid heart rate recovery and the metabolic risk (Pulgarón, 2013). Rapid decrease in the heart rate is noticed during the first 2 minutes after

exercise (Imai et al., 1994). The author further stated that Physical activity play vital role in development of health and reducing health complications. Result of all above discussion, now it is clear to say that moderate intensity exercise and resting heart rate is very closely linked to each other.

What is the role of moderate intensity exercise in HRR and body composition? To discover the fact, the "researcher intends to conduct a research study" titled "Effects of Moderate Intensity Aerobic Exercises upon Heart Recovery Rate of College Girls". Suitable strategies are required for obesity prevention or treatment in young obese persons, with exercises of their choice concerning their body composition and capacities (Wong et al., 2008). Regular exercises as, walking, running, jogging and cycling are suggested as real way to manage obesity among youngsters. Cycling is substitute activity for controlling/reducing obesity (Akinola, 2012). Still, walking is good for aged people to manage weight (Borg et al., 2002) The ability to walk is a simplest way to examine physical function and vital component for quality life, since it indicates capacity to perform daily activities (Lai et al.,2008). There is a negative relation amid body mass index and walk (Beriault et al., 2009). Although BMI is an index generally accepted to categorize severity of obesity (Akerman et al., 2004). Walking involves the main "muscle groups of the body, and is potentially preferable to running" (Ford et al., 2011). Additionally, "in adults it has been shown that walking can be" done during day in small sessions compared with a single long continuous walk. Accumulated short but abrupt walking throughout day lead to positive changes in body composition in adults (Fritz et al., 2018).

Problem Statement

It is presumed that aerobic exercises have a significant impact upon heart recovery rate and body composition (Chiu et al., 2017). According to Luan et al. (2019) Moderate intensity aerobic exercises are beneficial in preventing heart related disease, osteoporosis, diabetes, overweight, blood pressure, weakness, and depression etc. alongside this, for deterrence and rehabilitation of cardiac vascular diseases and body composition. Primarily this study aims to determine "impact of moderate intensity aerobic exercise upon heart" recovery rate and body composition of college girls. The "researcher intends to conduct a research study entitled" Effects of Moderate Intensity Aerobic Exercises upon Heart Recovery" Rate of College Girls. To determine the impact of moderate intensity aerobic exercise upon the Heart recovery rate of the college girls.

LITERATURE REVIEW

The direct reaction of cardiac system to exercise is rise in heart rate and with its stoppage; HR is expected to return to the state of resting period (Dimkpa & Ibhazehiebo, 2009). Lins et al. (2014) led the study to measure suggestion between BMI and HRR after exercise. The authors confirm that the individuals showed impaired HRR, which was three times greater than obese group and twice greater than overweight compared with normal groups after

exercise. A study conducted by de Silva et al. (2017) to measure the difference in HRR level during and after exercise in body fat of college girls. The outcomes of the study showed that the greater body fat group of the college girls showed the lower HR as compared to lower fat groups. Jogging is also called a moderate type of exercise. In physical activities jogging is a current form of aerobic exercise. Peoples with low physical exercise, changing powered lifestyle made humans more sedentary and inactive. Brooks, (2002) indicated that modern technology have made human life easier, but changing lifestyle and lack of physical activities like exercises (jogging & running) cause serious health problems like obesity and cardiovascular diseases.

Basically, females have more body fat than males so chances of obesity are more in girls (Du et al., 2019). To overcome these situations and obtain many other health benefits, regular exercise plays vital role in this regard. According to Taylor (1983) physical activities and exercise are used for the same stance. There are two types of exercise i.e., the Aerobic exercise and anaerobic exercise. Aerobic exercises are performed in such situation where need longer period of determined because in aerobic exercise more amount of oxygen is prerequisite for the quick functioning of the body. On the other side, anaerobic exercise are used where no need extra amount of oxygen for the performing of activity (Fleck & Kraemer, 2014). The recovery Heart rate (RHR) is the close relationship with health, fitness, avoidance of cardiovascular problems and longevity of life. Exactly one of most reliable devices for measuring cardiovascular health of person is HR measured. Dooley et al. (2017) measure intensity of physical activities the most reliable scale is heart rate. When person is completely relaxed and at rest then total number of heart beat is known as HRR (Nosrati & Tavassolian, 2017).

Health authorities have determined that normal rate of RHR of healthy adult are fall within 70-80 beats per minute. A pulse measurement taken just after intense exercise is called as recovery heart rate. This heart rate is used in various fitness tests to assess the heart's capability of girls which improve from exercise. By evaluating recovery heart rate, we can estimate fitness level of exerciser. Lees, (2017) indicated that in sports like tennis and table tennis, heart rate of girl's players reaches to its maximum age-related limit, whereas the average values are usually greater than 75% of maximal heart pulse rate. Rampichini, et al. (2018) monitored heart rate of top yoga players during the table tennis game and training. The author indicated that regular practice of table tennis game increases in heart rate of girl's player. Heart rate average values, during match of table tennis, were from 162 to 172 beats per minute. It was found at beginning of training and at the end of the first part of the training (beginning of pause). The author further concluded that table tennis is a sport, which needs sub-maximal and maximal work that exerts pressure on anaerobic energy system. Heart is a muscular organ which is self-possessed of four chambers. There are two atria and two ventricles.

The Atria from upper chambers of heart, "right side of heart receives" venous blood which is deoxygenated. The deoxygenated blood from body comes into "right atrium through the superior vena cava from upper part of the body and through inferior vena cava from the lower part" of body. The deoxygenated blood from the right atrium is pushed into the right ventricle during diastole. The right ventricle pumps blood over pulmonary arteries into the lungs. The oxygenated "blood from lungs" is pushed back into the heart through the "pulmonary veins into the left atrium. The blood passes through valves and is pushed into the left ventricle" during the diastole. From the left ventricle the blood is pushed into the arch of aorta. From it is transferred into the whole body. The "heart is composed of cardiac muscle" which is striated muscles. Heart is filled during diastole which is resting phase. The blood from the heart is pumped into whole body during systolic, which is the upper limit of blood pressure. The heart is made of cardiac muscles and its weight is round about. Normal size of human heart is equal to a closed human fist. Adult HR is 60-80 beats per minute and that of child is 70-190 beats per/m i.e., HR of newly born baby is faster than that of adult.

It is located in chest cavity slightly to the left side (Cirlloet al., 2006). The cavity in which heart lies is filled with fluid and cavity is called pericardial cavity. Pericardium, myocardium and endocardium are the three layers of human heart. The outer membrane pericardium prevents the heart from friction by lubricating it. Heart walls are made of myocardium and it also helps in pumping blood (Kalaria et al., 2002). The innermost and thin layer of heart is called endocardium. It is so smooth that due to this layer blood cannot stick to the heart (Boulpaep, 2005). Thickness of "heart wall is not same throughout but the internal walls of the heart vary from part to part. For example; myocardium in auricle is very thin because it has to pump the blood not far away. But they just pump blood into the lower chambers" (ventricles). The "lower chambers have very thick myocardium than the right ventricle as it has to pump the blood through the entire body while the right side has to only push blood" to the lungs (Cirlloet al., 2006). These are the passages through which the blood is carried to tissues of the body. In this connection, there are "three types of vessels, arteries, veins and capillaries". The "vessels which carry oxygenated blood to the tissue from the heart are veins".

There is "exception in cold of pulmonary vessels. Pulmonary artery carries deoxygenated blood from the heart to the lungs and pulmonary veins carry oxygenated" blood from lungs to the heart (Gadgil et al., 2012). Effectiveness of holistic mental model confrontation in driving conceptual change, there are three types of arteries, large, small and medium and small size arteries. Aorta is the largest artery which is first artery which receives blood from the heart. These are elastic structures arteries are located deep in the body (AlGhatrif & Lakatta, 2015). The period from the beginning of one heart beat to beginning of next is cardiac cycle. Heart beat is pumping oxygen which pumps blood to tissues of the body. During one beat heart passes over three stages, which include contraction of atria called

atrial systole, second ventricular systole and third stage is stage of relaxation (Fung, 2013). All these three are called cardiac cycle. During cardiac cycle, both atria "contract at same time. Right ventricle contract and blood" passes from right atrium passes to right ventricle through the tricuspid value.

The value between "right atrium and right ventricle is called tricuspid because it has three cusps" which prevent backflow of flow of blood from "right ventricle into the right atrium during systole from left atrium blood passes" thorough bicuspid valves into left "ventricle the valves between left atrium and left ventricle" is called bicuspid because it has two cusps (Lilly, 2012). When the ventricle control both the atria relax and are filled with blood. During ventricle and systole, the blood from the right and left ventricle is pumped into the pulmonary and systemic circulation respectfully. Optimum body composition is one of the most important points of success for a sportsman. Body weight is size of a person's body while body composition is absolute and relative amount of bone, muscle and fat tissues that are composing body mass. Or one can also say that chemical compound of body is called body composition. Fat mass and fat-free mass are usually mentioned by scientists when talking about body composition. Fat mass is the body's relative percentage of fat while fat free mass is mass of body without fat. Athlete's strength, appearance and agility are affected by body composition whereas; power, speed and endurance of an athlete are influenced by body weight of the athlete. There is inverse relation between the speed and body weight of an athlete.

Hypothesis of Study

There is significant effect of impact of moderate intensity aerobic exercise upon Heart recovery rate of the college girls

RESEARCH METHODS

The aim of the study was to instigate effect of moderate intensity aerobic exercise upon Heart recovery rate of the college girls. Field experiment method allows the researcher to conduct the experiment with using longitudinal data collection approach i.e., pre-test and post-test where the researcher easily generalized results and record changes in dependent variables due to independent variables. The participant for this study was comprised of 47 volunteer girls studying in Government Degree College for women (GDCW) Taunsa Sharif, Dera Ghazi Khan Punjab. In this connection, 7 volunteer girls were excluded due to subject personal problems. Total participants in study were 40. Selected population was randomly being divided in two groups, experimental and control group. Experimental group gained special treatment for a period of 8 weeks. But control group undergo no treatment and followed routine of their life. A specific protocol of exercise developed by Speakman (2003) was applied for study.

For the purpose of randomization of the subjects into groups the researcher took Resting Heart Rate of subjects and arranged these RHR score into ascending order. The heart beat was checked through Radial artery which is easily felt on thumb side of the wrist of arm. For radial artery, three fingers of hand used. After the process of collecting data of resting heart rate the data of 40 subjects than prepared on the basis of rank order. The researcher divided these 40 subjects into two diverse but equal (identical) group namely experimental group and control group. All subjects who lay in odd in rank order list was assigned to experimental group and all the subjects in even number in rank order list was assigned to control group. During the pretest there were total 47 subjects but 7 subjects were dropout in light of inclusion criteria. The total number of included subjects in the study was 40 i.e., 20 subjects in Experimental group (EG=20) and 20 subjects in control group (CG=20). Data collection is "process of gaging information on interest variables, in established systematic fashion that enables one to answer the stated research questions, test hypotheses, and evaluate outcomes".

Experimental groups were treated through especially design exercise protocol developed by the Speaksman (2003) in order to record change in resting heart rate of college girls. The heart beat was checked through Radial artery which is easily felt on thumb side of the wrist of arm. For radial artery, three fingers of hand will be used. Heart beat was recorded in 15 seconds and multiply it to 4 for purpose to record the beats per minutes. After the completion of eight-week exercise protocol data of RHR data of pretest and posttest was recorded and analyzed using paired sample t test to see difference between RHR score of girls in pre-test and post-test and independent sample t test was applied to measure the difference between control group and experimental in pretest and posttest with special reference to RHR and body composition of girls at college level. The researcher also used ANOVA analysis of variance to measure difference in RHR and body composition in demographic variables. On the basis of data analysis findings and conclusions were drawn (Egami et al., 2018).

Table 1 Activities and Execution of Eight Week Treatment Program

Duration	Frequency of the Exercises Protocol	One Session Duration	Intensity of the Activity	Type and Description of the Activities
Eight Weeks	Four Sessions per Week (Monday, Tuesday, Wednesday and Thursday)	40 Minutes (the time spent on Warming up and Moderate intensity activities is in addition to the 40 minutes time limit)	(Moderate Intensity) 55% 65% of the MHR (Karvonen, 1957)	1. Warm up=10mint (walking and stretching) 2. Walking & Jogging = (10 mint) 02 Repetition (Rep). Each of 04 minutes. Interval between each Rep =1 minute 3. Running = (10 Minutes) 02 Rep. each of 04 minutes. Interval between each Rep = 1 minute 4. Table Tennis = (10 Minutes)

DATA ANALYSES

Table 2 Descriptive of Experimental and Control Group

		Pretest	Posttest
Measurements	N	Mean ± SD	Mean ± SD
Resting Heart Rate	40	76.37±5.63	73.55±5.51
Heart Recovery Rate	40	116.70±70	110.77±10.0

The above table showing descriptive of experimental and control group in RHR Resting Heart Rate of 40 participants in pretest was 76.37±5.63 and in posttest was 73.55±5.51. The Heart Recovery Rate of the 40 participants in pretest was 116.70±4.46 and in posttest was 110.77±10.00.

Table 3 Comparison of Resting Heart Rate and Heart Recovery Rate

		Pretest	Posttest	t	Sig.
Measurements	N	Mean ± SD	Mean ± SD		
Resting Heart Rate	20	76.35±3.85	71.55±3.45	7.610	.000
Heart Recovery Rate	20	116.70±2.70	102.03±4.79	9.79	.000

Table 2 and 3 indicates that Moderate Intensity Aerobic exercise positively impact heart recovery rate of 20 college female students in experimental group when compared pretest (116.28±2.70) and posttest (102.03±4.79) heart recovery rate t19=9.79, p<.05. Researcher concluded that there is significant effect of Moderate Intensity Aerobic Exercises on Heart recovery rate of girls.

Table 4 Comparison of Resting Heart Rate and Heart Recovery Rate

		Pretest	Posttest	t	Sig.
Measurements	N	Mean ± SD	Mean ± SD	t	Sig.
Resting Heart Rate	20	76.40±7.09	75.55±6.48	1.535	.141
Heart Recovery Rate	20	117.30±5.74	119.51±4.65	-1.714	.103

The above table indicates the score of control group in pretest and posttest data indicate that score of pretests RHR (76.40±7.09) and post RHR (75.55±6.48) were not significantly different. In same way, significantly pretest measurement of HRR (117.30±5.74), of control group was not different from the posttest measurement of HRR (119.51±4.65) t19= -1.714, p> .05. Table highlighted result of resting heart rate and Resting Heart Rate of 20 college female students in control.

Table 5 Regression Showing the Impact of Moderated Intensity Aerobic

Predictor	Dependent variable	R	R Square	B	Sig.
MIAE	Resting Heart Rate	.911	.890	.879	.000
	Heart Recovery Rate	.942	.901	.891	.001

a=0.05

Table 5 shows that there is significant impact of Moderate intensity aerobic exercises upon Resting Heart Rate (p< .05) of girls at college level. The R square indicates that effect of Moderate intensity aerobic exercises on Weight (r2= .866 "87%"), and Resting Heart Rate (r2= .911 "91%") of girls at college level and Resting Heart Rate (.879) and heart Recovery Rate (.90) of girls at the college level. In this connection, the researcher concluded that the projected hypothesis HA: There is significant effect of Moderate Intensity Aerobic Exercise upon the resting heart rate and Heart Recovery Rate of college girls is hereby accepted and thus substantiated.

DISCUSSION

The main purpose of the study was to investigate Effects of Moderate Intensity Aerobic Exercises upon Heart Recovery Rate of College Girls. Existing study indicate that Moderate Intensity Aerobic exercise positively impact the heart recovery rate of 20 college female students in the experimental group when compared pretest (116.28±2.70) and posttest (102.03±4.79) heart recovery rate t19= 9.79, p< .05. However, the researcher concluded that there is significant effect of Moderate Intensity Aerobic Exercises upon the Heart recovery rate of girls at the college level. Nybacka, (2019) confirm that girls with moderate intensity exercise, by using bicycles and jogging for three months, got improved HRR, autonomic system and reduced breast cancer were noted in them. Lees (2003) indicated that in sports like tennis and table tennis, heart rate of the girl's players reaches to its maximum age-related limit, whereas average values are usually greater than 75% of the maximal heart pulse rate. Present study indicates the score of control group in pretest and posttest the data show that score of pretests RHR (76.40±7.09), post of RHR (75.55±6.48) were not significantly different. In same way, significantly the pretest measurement of HRR (117.30±5.74), of control group was not different from the posttest measurement of HRR (119.51±4.65) t19= -1.714, p> .05.

Lees (2003) indicated that in sports like tennis and table tennis, heart rate of the girl's players reaches to its maximum age-related limit, whereas the average values are usually greater than 75% of maximal heart pulse rate. In study Đukanović et al. (2015) monitored heart rate of top yoga players during the table tennis game and training that there is significant impact of Moderate intensity aerobic exercises upon Resting Heart Rate (p< .05) of girls at college level. R square indicates that effect of Moderate intensity aerobic exercises on Weight (r2= .866 "87%"), and Resting Heart Rate (r2= .911 "91%") of the girls at college level and Resting Heart Rate (.879) and heart Recovery Rate (.90) of the girls at college level. Same study conducted by Freeman et al. (2006) argued that heart recovery rate is indicated by the difference between peak level of heat rate through exercise and reduced heart rate after one minute to exercise. In this connection, Malandish et al. (2020) confirm that girls with moderate intensity exercise, by using bicycles and jogging for three months, got improved HRR, autonomic system and reduced breast cancer were noted among them in diverse situations.

CONCLUSION

The aim of study was to instigate effect of impact of moderate intensity aerobic exercise upon Heart recovery rate of college girls. It was concluded that indicates that moderate intensity Aerobic exercise really effect heart recovery rate of 20 college female students in experimental group when compared pretest (116.28±2.70) and posttest (102.03±4.79) heart recovery rate t19= 9.79, p< .05. However, the researcher concluded that there is significant effect of Moderate Intensity Aerobic Exercises upon the Heart recovery rate of girls at college level. It was also highlighted that the score of control group in pretest and posttest the data indicate that the score of pretests of RHR (76.40±7.09) and post of RHR (75.55±6.48) were not significantly different. In same way, significantly pretest dimension of HRR (117.30±5.74), of control group was not different from the posttest measurement of HRR (119.51±4.65) t19= -1.714, p> .05. It was found that there is significant impact of Moderate intensity aerobic exercises upon Resting Heart Rate (p< .05) of girls at college level. R square indicates that effect of Moderate intensity aerobic exercises on Weight (r2= .866 "87%"), and Resting Heart Rate (r2= .911 "91%") of girls at college level and Resting Heart Rate (.879) and heart Recovery Rate (.90) of girls at college level. Hence researcher concluded that the hypothesis.

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