IMPACT OF HIGH-INTENSITY AEROBIC EXERCISES UPON RESTING HEART RATE & BODY MASS INDEX OF THE GIRL-ATHLETES (CASE STUDY Of GOMAL UNIVERSITY, DERA ISMAIL KHAN)

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Abstract

Healthful life, healthy lifestyle and regular participation in exercises are closely associated with each other. Inactive and idle lifestyle renders the person liable to several ailments and fatal diseases. To explore the relationship between attainment and maintenance of good health and exercises is the focal point of this study. To determine the effects of high-intensity aerobic exercises on the Resting heart rate (RHR) as well as the Body Mass Index (BMI) is the prime objective of the in-hand research study in perspectives of the participants. RHR is one of the most reliable indicators of health and fitness whereas BMI is used as the gauge for measuring body composition. Since it was an experimental research study, therefore, volunteer girls' athletes n=46 (EG=23; CG=23) from Gomal University, Dera Ismail Khan were included in the study. Before the start of treatment, the pre-test data in perspectives of the RHR and BMI in respect of the respondents were taken and recorded accordingly. Respondents included in an experimental were undergo the treatment of high-intensity aerobic exercises at 65-80% of the Maximum heart rate (MHR) for six weeks, 40 minutes per session and four times a week. After the specially designed six weeks' exercises protocol, a reduction in RHR, decrease in BMI was recorded in the experimental group (p<0.05. The findings of the present study indicated a positive control in the onset of heart diseases particularly, among those who are overweight.

Keywords: High intensity, aerobic, exercise, girls, athletes

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Introduction

In light of the existing literature, the relationship between health and exercises has been established. The term exercise refers to the physical activity performed by the skeletal muscles done for the sake of health and fitness or any repeated physical activity performed during leisure for the betterment of health and attainment of fitness. In light of the World Health Organization (WHO) constitution 1995, the term health is defined as "A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". Exercises have multi-dimensional benefits and benefits of regular exercising have been diverse. Biddle and Asare (2011) have concluded that physical health, psychological wellbeing, and motor performance have been the main outcomes of exercising on a regular bases.

RHR and BMI are the basic factors for determining the quality and nature of the health of a person. Pivot for this study was to evaluate the impact of high-intensity aerobic exercises on the RHR and BMI of the girl athletes at the university level. In perspectives of health and fitness, an increased state of the RHR and high ratio of BMI are considered to be very much harmful (Jensen, Suadicani, Hein, & Gyntelberg, 2013). On account of the significance of the problem, the researchers conducted a study with its title "Impact of High-Intensity Aerobic Activities upon the Resting Heart Rate and Body Mass Index of the girl-athletes.

Theoretical Background

Exercise stands for the bodily movement which resists against the greater intensity of exertion as compared to our normal level of daily activities. On account of regular participation in exercises, our body becomes adopted to hard physical exertion. Exercise has got a diverse range of benefits in term of attainment of health and improvement of physical fitness (Nelson et al., 2007). Exercise improves cardio-respiratory functioning, regulates healthy BMI, expedites, metabolic process and develops healthy bones. The flexibility of the joints is also

improved, on account of prompt supply of oxygen, an enhanced amount of endmorphine produced which resultantly improves brain functioning.

Regular exercise helps in losing weight, maintaining healthy BMI and reducing stress, anxiety, and depression. During exercises, different systems of the body have to work at their peak level to meet the increased demands of body (Strong et al., 2005). Prompt nutritional supply is made to the active muscles and parts of the body. BMI is one of the reliable index used to determine body composition. BMI chart contains valuable informalities regarding different weight categories e.g. below-weight, normal-weight, over-weight, obese and so on.

The body mass index (BMI) is used to check the range of weight in human body BMI chart tells us either we have normal weight, overweight or obese. To calculate the BMI of a person, divide his or her weight in kg by his or her height in meters squared. In light of the established norms regarding the BMI, a person having 18.5 kg/m2 is regarded as underweight, normal weight ranges from 18.5 to 25kg/m2 whereas overweight weight falls between 25 to 30kg/m2 and 30 kg/m2 as the obese.

Within the human organism, different systems simultaneously remain at work for survival and existence of the individual. During exercise, on account of increased nutritional demand of different organs of the body, various systems have to work more than normal to meet the additional nutritional demands of the body. The role of the cardiorespiratory system is vital for the proper functioning of the body particularly during strenuous physical activities. In light of its significance, the researcher intends to conduct a research study with the title "Impact of High-Intensity Aerobic Activities upon the Resting Heart Rate Body Mass Index of the girl-athletes".

Hypotheses

HA 1   There is a significant possible effect of high-intensity aerobic exercise protocol in maintaining RHR among the girl-athlete.

HA 2   There is a significant possible effect of high-intensity aerobic exercise protocol in maintaining healthy BMI among the girl-athletes.

Literature Review

Regular participation in exercise plays a vital role as preventative strategies in chronic diseases such as cardiac abnormalities, high cholesterol, diabetes, cancer, obesity (Buttar, Li, & Ravi, 2005). Cardiac output is increased from 5 to 40 liters per minute during strenuous physical exertions. High-intensity aerobic activity positively contributes in improving the overall performance of heart including an increase in per stroke blood volume, decrease in the RHR and stability in the blood pressure (Chodzko-Zajko et al., 2009).

In light of the suggestion, the exercise of moderate intensity on most days of the week plays a significant role in this regard. In addition to the above, regular participation in exercise can significantly decrease the RHR from 60 to100 beats per minute (bpm) to 40 to 60 bpm which alternately reduces the risk factors of cardiac abnormalities associated with premature deaths. Literature has repeatedly confirmed that several cardiac diseases that can be prevented and cured with the help of low RHR (Thelle et al., 2013). Low RHR is closely associated with eliminating the chance of pre-mature death and vice versa. Roundabout 25% of the Olympic medals are associated with combat sports. In weight lifting, boxing and other strength events athletes are categorized according to weight. High-intensity aerobic activities help maintain healthy BMI and low RHR (Osadchii, 2014).

To maintain and improve the health, 150 minutes per week exercises are required; and to prevent weight gain, 150-250 minutes per week exercises are needed; to promote significant weight loss, 225-420 minutes per week exercises are required; to prevent regain the weight after once it is lost, 200-300 minutes per week physical activities of moderate intensity are recommended. Alongside exercise intervention, the role of diet cannot be ignored as findings of the research indicated

that weight loss is directly proportional to the energy consumed and the energy spent through physical exercises; the more energy is spent in physical activities the greater amount of weight is lost (Garland et al., 2011).

Resting heart rate is commonly referred to as the number of heartbeats in a minute at resting position. RHR is defined as the number of per minute heart contractions at rest. Low RHR is the indicator of physical fitness; as resting heart rate decreases it shows the capability of the heart which can efficiently perform its duty with a slower pace. High-intensity aerobic exercises like up-stair running or cycling are most effective in lowering the RHR whereas moderate-intensity activities are comparatively less effective in lowering the RHR (Verschuren, Peterson, Balema, & Hurvitz, 2016).

Technically speaking, when the heart muscles become stronger enough to efficiently supply more blood to the body per stroke, it reflects a low pace of the RHR. RHR varies from person to person depending upon the fitness level of the person, the higher is the level of physical fitness the lower is the RHR and vice versa. Normally, a healthy resting heart rate for healthy adults is between 60 to 80 bpm. As a rule of thumb, a person having a high level of fitness will certainly have RHR below 60 and in case of a conditioned elite athlete, the RHR maybe 40 BMP or even below. The average adult RHR may be between 60-100 BMP but its upper limit may carry a health risk. Research has confirmed that RHR of 80 BMP and above reflects poor health status and is closely associated with all causes mortality risks and the situation is more dangerous when RHR exceeds 90 BMP (Thayer & Lane, 2007).

Method
Participants
The researcher selected the study sample comprising of the conveniently available 38 volunteer girl athletes from Gomal University, Dera Ismail Khan. They were divided into an experimental and control group.

Experimental Group

This study focused upon evaluation of the impact of high-intensity aerobic exercises upon the RHR and BMI of the university girl-athletes. Therefore, the experimental group comprised of 18 girls-athletes from Gomal University, Dera Ismail Khan. All the respondents included in the experimental group were undergo a specific exercises protocol developed by Speakman (2003). The researcher employed the aforementioned exercises protocol specifically designed for testing the RHR and BMI for six weeks.

Control Group

The second group in this study was named as the control group comprising of 18 girl athletes from Gomal University, Dera Ismail Khan. As the experimental group, the researchers took the pre and post-test data in respect of all the respondents included in the control group.

Treatment

A specially designed six weeks' exercises protocol developed by Speakman (2003) comprising of the aerobic exercises was used as a treatment for improving the cardiac performance in terms of the RHR and BMI in respect of the respondents included in the experimental group. Before starting the treatment plan, a pre-test was conducted to collect the pre-test data in respect of all the respondents. The collected data were entered into a specially developed chart.

In the next stage of the study, six-week aerobic exercises treatment comprising of high-intensity aerobic activities was employed to check its impact upon the RHR and BMI of the respondents. As soon as the treatment of six-week high-intensity aerobic training is completed, post-test was conducted to get the data regarding the possible effect of exercises protocol upon the RHR and BMI of the respondents. After the pre and post-test data are collected, it was cross-examined to identify the

difference, if there is any, in terms of the effect of high-intensity aerobic exercises upon the RHR and BMI on both groups.

Variables Evaluated

This research study is aimed at to measure and determine the impact of high-intensity aerobic exercises upon the RHR and BMI of the university girl athletes. In this regard, the following independent and dependent variables were cross-examined during the study.

Dependent Variables   ↔   Independent Variables
1) RHR   1) High intensity Aerobic Exercise
    2) BMI   2) Girl Athletes
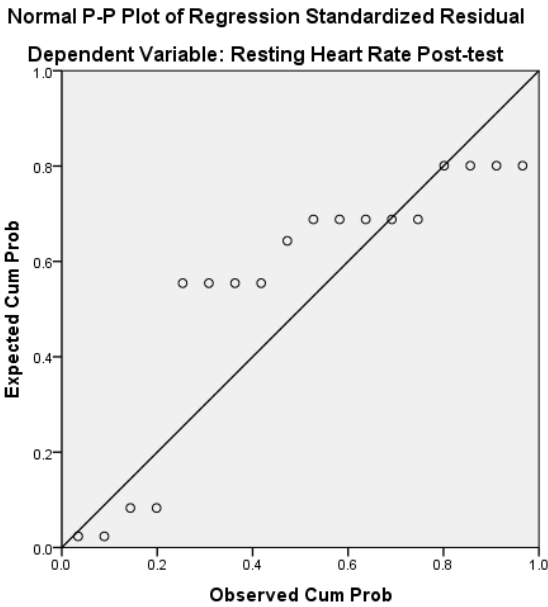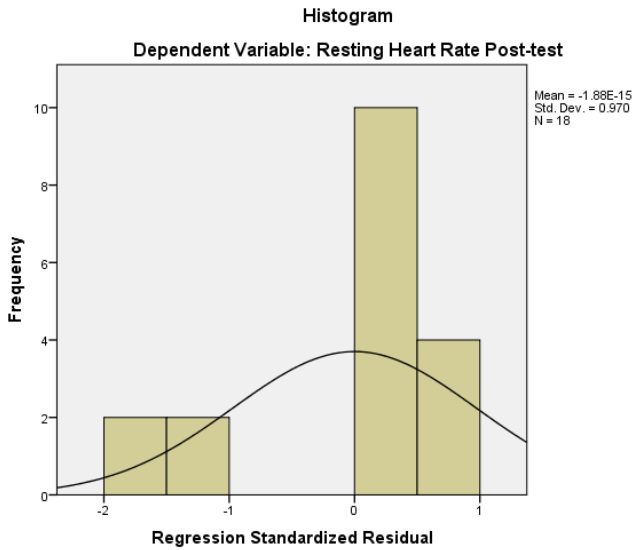
Results and Discussion

Effects of High Intensity Aerobic Exercise Protocol on RHR

H1: High intensity aerobic exercises put significant effect upon the RHR score of female athletes in KPK province.

Table # 4.30: *KPK female athletes effect of treatment upon RHR*

Predictor	Dependent variable	R	R Square	Adjusted R Square	F	T	Un-stand-β	Sig.
High Intensity Aerobic Exercises	Resting Heart Rate	.670[a]	.449	.414	13.016	3.608	.346	.002

Histogram
Dependent Variable: Resting Heart Rate Post-test

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Resting Heart Rate Post-test

In the above Table 4.30 simple linear regression was performed to test the hypothesis. The independent variable was High Intensity Aerobic

Exercises and dependent Variable was RHR. The result shows that that effect of High intensity aerobic exercises upon the resting heart reate of female athletes from KPK was 44% which was found significant. The High intensity aerobic exercises significantly predicted resting heart rate of female athletes of KPK Province β = .346, t= 3.608, p < .05. High Intensity aerobic exercises also explained a significant proportion of variance in resting heart rate scores, $R2$ = .449, F = 13.016, p < .05. Hence the hypothesis H1: H1: High intensity aerobic exercises put significant effect upon the RHR score of female athletes in KPK province is hereby accepted.

H1: High intensity aerobic exercises put significant effect upon the BMI score of female athletes in KPK province.

Table # 4.29: *KPK female athletes effect of treatment upon BMI*

Predictor	Dependent variable	R	R Square	Adjusted R Square	F	T	Un- stand- β	Sig.
High Intensity Aerobic Exercises	Body Mass Index	.879[a]	.773	.758	54.354	7.373	.857	.000

Figure # 4.22

Histogram

Dependent Variable: Body Mass Index Post-test

Mean = -1.64E-15
Std. Dev. = 0.970
N = 18

Figure # 4.23

Normal P-P Plot of Regression Standardized Residual
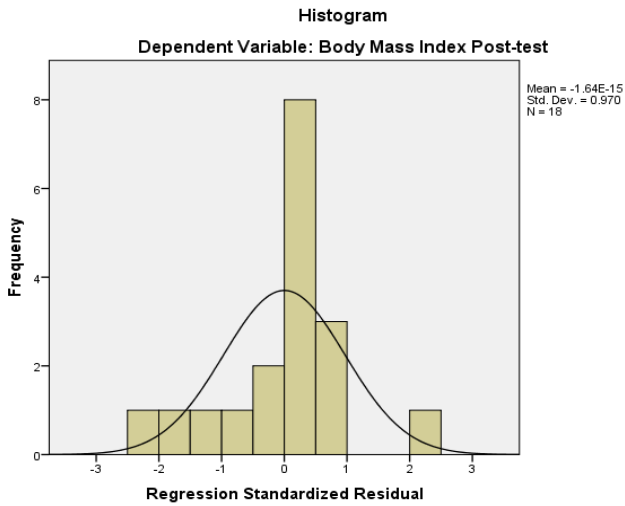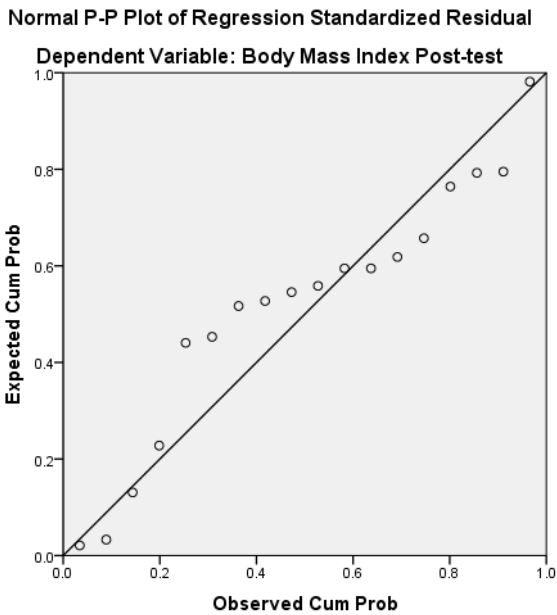
Dependent Variable: Body Mass Index Post-test

In the above Table 4.29 simple linear regression was performed to test the hypothesis. The independent variable was High Intensity Aerobic Exercises and dependent Variable was Body Mass Index. The result shows that that effect of High intensity aerobic exercises upon the body mass index of female athletes from KPK was 77% which was found significant. The High intensity aerobic exercises significantly predicted Body Mass Index of female athletes of KPK Province β☐= .857, t= 7.373, p < .05. High Intensity aerobic exercises also explained a significant proportion of variance in body mass index scores, R2 = .773, F = 54.354, p < .05. Hence the hypothesis H1: High intensity aerobic exercises put significant effect upon the BMI score of female athletes in KPK province is hereby accepted.

Conclusion

The present study was conducted to assess the effects of high-intensity aerobic exercises on the Resting heart rate (RHR) as well as the Body Mass Index (BMI) of girls-athletes. The findings of the present study endorse the association between health and participation in regular exercises. And the role of the exercise in the perspective of HRH and BMI has never been underestimated. After the specially designed six weeks' exercises protocol, a reduction in RHR, decrease in BMI were recorded in the experimental group. The findings of the present study indicated a positive control in the onset of heart diseases particularly, among those who are overweight. The findings of this research study will be an effort to take the knowledge to an advanced stage and to add some new body of knowledge evaluating the impact of high-intensity exercises upon the two basic factors such as RHR and BMI, which have got very prominent concerning health and fitness in everyday life.

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