



Original Article

Alteration of Serum Bilirubin and Myeloperoxidase Concentration Associated Moderate Intensity Exercise Among Novice Students Athletes

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ABSTRACT

Bilirubin and Myeloperoxidase (MPO) are both biochemical parameters that play a vital role in maintaining various physiological activities of the human body. **Objective:** To scrutinize the Alteration of serum bilirubin and MPO Concentration Associated with moderate-intensity exercise among Novice student-athletes. **Methods:** The study participants involved twenty (20) newly registered athletes of Punjab University and were placed randomly in a control group (CG, N=10) and an experimental group (EG, N=10). Five (05) ml blood samples were collected from each subject, and thus a different identification code was given to each blood sample. Bilirubin and MPO test were conducted in the home care laboratory. A self-made moderate-intensity exercise intervention of eight (08) weeks was applied to EG. Pre and post-test data were administered through a statistical package for social sciences (SPSS, version-26.0), and thus mean, standard deviation, and T-score were used as statistical tools for analysis. **Results:** Results revealed that there is a significant difference in pre and post-test of EG in terms of MPO (0.049 < 0.05), Likewise in terms of Bilirubin of CG, there is a significant difference in pre and post-test results (.546 > 0.05). **Conclusions:** Similarly, based on analysis, the researcher concluded that moderate Intensity Exercise caused a significant alteration in serum bilirubin and MPO among Novice student-athletes.

INTRODUCTION

In immune cells, usually MPO as part of peroxidases is found. In addition, MPO is also found in other cells [1-3]. MPO is deposited in cytoplasmic membrane-bound azurophilic granules, and during stimulation, these granules are produced to the extracellular space by degranulation or exocytosis. Oxidative stress (OS) also instigated the release of MPO [4-6]. MPO is considered a vital part of the immune system of the body and thus primarily produced or released by neutrophils which help the body defend against invading pathogens. [7]. Red blood cells (RBCs) contain hemoglobin which carries oxygen from one part to another part of the body and thus the average life span of the body is three (03) months [8-10]. RBCs Similarly, bilirubin takes

place during the catabolic pathway that breaks down heme in vertebrates [8]. Bilirubin is transported by the circulatory system to the liver and likewise, it is removed from the blood and passed out from the body in pee. Excessive levels of Bilirubin in the body may cause different medical issues [10-12]. MPO is a leukocyte-derived enzyme that helps to manage the formation of different reactive oxygen species (ROS). Maximum production of ROS may lead to oxidative stress which may cause different health complications. Increased production of ROS may cause an imbalance between ROS and antioxidants which causes oxidative stress (OS). Exercise with moderated intensity may strengthen the immune system as well antioxidant

system which helps in avoiding oxidative stress and maintaining a blood redox state. As a result of all the above critical analyses of previous studies, it is clear that exercise has a significant impact on antioxidants such as Bilirubin and MPO.

Is there any effect of moderate intensity on Bilirubin and MPO? To discover this fact, the researcher intends to conduct a study titled Alteration of Serum Bilirubin and MPO Concentration Associated Moderate Intensity Exercise among Novice Students Athletes.

METHODS

As the study was associated with the alteration of MPO concentration with Moderate-intensity exercise among novice student-athletes therefore an experimental research approach was used with quantitative research methods. The study participants comprised twenty (20) newly admitted athletes of Punjab University. Based on Cohen's suggestion, the sample size was measured by using the statistical test G* Power, providing the size effect of the sample size. i.e. small, median, and large, and thus participants of the study were randomly placed into two groups i.e. control group (CG, N=10) and an experimental group (EG, N=10). In addition, the criteria for selecting the subjects were; subjects aged not under 18 and more than 25 years, subjects using no meditations as well as nutritional supplementations, subjects who voluntarily participated in the study, and subjects having no chronic health problems. Written informed consent was taken from all topics, and thus ethical approval was taken from the Department of Sports Sciences & Physical Education, University of the Punjab, Lahore, Pakistan (Ref. SPSS/28/10 2023). Five (05) ml blood samples were collected from each subject, and thus a different identification code was given to each blood sample. Bilirubin and (MPO) tests were conducted in the home care laboratory. A self-made moderate-intensity exercise intervention of eight (08) weeks was applied to EG. Application of exercise on the EG was started from 1st Nov to 29 December 2023 which was personally monitored by the researcher. Pre and post-test data were processed through a statistical package for social sciences (SPSS, version-26), and thus appropriate statistical tools i.e. mean, standard deviation, and t-test were used for analysis.

RESULTS

Table 1 expressed Anthropometric measurements as a whole in Age, Weight, Height, and BMI of both CG and EG. The M and SD in terms of age was 20.22 ± 1.44 . The M and SD in terms of height was 174.44 ± 6.76 , the M and SD in terms of weight (pre) was 68.33 ± 9.01 , M and SD in terms of weight (post) was 62.51 ± 8.28 .

Table 1: Anthropometric measurements as a whole in Age, Weight, Height and BMI of both CG and EG

Testing Variables	N	Min	Max	Mean \pm SD
Age (years)	10	18.00	23.00	20.2222 + 1.44425
H (cm)	10	160.00	184.00	174.4444 + 6.76406
W (kg) pre	10	56.00	92.00	68.3333 + 9.01010
W (kg) post	10	53.00	90.00	62.5111 + 8.28367
Total Number	20			

A=Age

W=Weigh

SD=Standard Deviation

M=Mean

Table 2 indicates the pre and post-test results of CG and EG in terms of Serum Bilirubin. The result revealed that there is a significant difference in pre and post-test of EG in terms of MPO ($0.049 < 0.05$), Likewise in terms of Bilirubin of CG, there is a significant difference in pre and post-test results ($.546 > 0.05$)

Table 2: Mean difference between CG and EG in term of Bilirubin before and after exercise

Measurements	Pretest Bilirubin	Posttest Bilirubin	T	Sig
	M \pm SD	M \pm SD		
EG	.560 \pm .112	.626 \pm .096	-2.092	.049
CG	.546 \pm .112	.533 \pm .111	.619	.546

p value=.005

N=10

Table 3 indicates the pre and post-test results of CG and EG in terms of MPO. A statistically significant difference was found in the pre and post-test of EG in terms of MPO ($0.000 < 0.05$) On the other hand, no statistical difference was found in the pre and post-test of CG in terms of MPO ($.546 > 0.05$).

Table 3: Illustrate the differences between Pre and Post of CG and EG in term of MPO before and after exercise

Measurements		Pretest Bilirubin	Posttest Bilirubin	T	Sig
		M \pm SD	M \pm SD		
EG	10	.526 \pm 1.03	.880 \pm .236	-5.734	.000
CG	10	.546 \pm .112	.533 \pm .111	.619	.546

p value=.005

N=10

DISCUSSION

This study aimed to assess Bilirubin and MPO Concentration Associated Moderate Intensity Exercise among Novice Students Athletes. The study participants comprised twenty (20) newly admitted athletes of Punjab University. Thus, it was categorized and randomly placed in a control group (CG) and an experimental group (EG). A self-made exercise protocol of eight (08) weeks was applied to EG. This study concluded that moderate-intensity exercise significantly affects serum bilirubin and MPO levels among the subjects. The current study shows the pre and post-test results of CG and EG in terms of Serum Bilirubin.

Results revealed that there is a significant difference in pre and post-test of EG in terms of MPO ($0.049 < 0.05$), Likewise in terms of Bilirubin of CG, there is a significant difference in pre and post-test results ($.546 > 0.05$). In line with these emerging findings, the study conducted expressed that moderate-intensity exercise significantly increases the level of serum Bilirubin level among subjects [10]. The same results were also drawn by that exercise with different volumes and intensity particularly high-intensity exercise (HIT) increases the Bilirubin level among adults [13, 14]. Likewise, the study conducted by Witek *et al.*, found that according to the normal range, athletes participating in aggressive sports can achieve higher levels of total blood level [15]. The result of the current study shows that there is a significant difference in the pre and post-test of EG in terms of MPO ($0.000 < 0.05$) On the other hand, no statistical difference was found in the pre and post-test of CG in terms of MPO ($.546 > 0.05$). Likewise, Belcastro *et al.*, shows that MPO activity is raised in most rat tissues and not solely in skeletal muscle [16]. Such an emerging concept was supported that aerobic exercise helps in managing or controlling different health complications such as high blood pressure, heart problems, and so on [17-20]. Intensive aerobic training with vitamin C may have healthier efficacy. The same result was drawn that exercise modalities have a significant impact on MPO among the subjects of EG as compared to CG [21, 22].

CONCLUSIONS

Based on data analysis and findings, the researcher concluded that moderate-intensity exercise caused a significant alteration in serum bilirubin and MPO. Considering this conclusion, the researcher recommended that regular exercise, particularly moderate-intensity exercise, may be performed due to its close linkage with serum bilirubin MPO.

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Authors Contribution

Conceptualization: MJ

Methodology: MJ

Formal analysis: MJ, JAS

Writing review and editing: MJ, JAS, MAA, AK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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