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Frequency of Cardiovascular Risk Factors among the Athletes and Non-Athletes

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ABSTRACT

Background: Proper screening of the cardiovascular risk factors is not a common practice in Pakistan until the development of signs and symptoms, which is a concerning factor regarding the cardiovascular implications on athletes and other individuals.

Objective: To determine the frequency of cardiovascular risk factors among athletes and non-athletes.

Materials and Methods: A cross sectional study was conducted on 417 individuals (n=189 athletes and n=228 non-athletes), aged 15-30 years, recruited from fitness centres of twin cities (Rawalpindi-Islamabad), over a duration of 6 months (January 2016 to June 2016). The sample was selected on the basis of inclusion criteria and non.-probability convenient sampling was employed. A self-structured questionnaire was filled by all the participants to assess the presence of cardiovascular risk factors.

Result: Out of a sample of 417 individuals, 189 were athletes and 228 were non-athletes with a mean age of 23.7 ± 3.22. The frequency of the risk factor hypertension was found to be higher in non-athletes (5.8%) as compared to athletes (0.7%). Smoking was equally present in both athletes 32 (7.7%) and non-athletes 40 (9.6%). Hypertension and cholesterol which showed significant difference with p value < 0.001. Obesity and psychological risk factors depicted low significant difference with the p value <0.05 i.e. (0.023 and 0.027) respectively, whereas the other risk factors smoking and diabetes showed no significant difference.

Conclusion: It was found that the proportion of individuals to have cardiovascular risk factors was higher in the non-athletes as compared to athletes. Also hypertension, cholesterol, obesity and psychological risk factors were significantly associated with non-athletes.

Introduction

Physical activity is a movement of the body which utilizes energy and produced by skeletal muscles.[1] It is reported in literature that females with sedentary lifestyle who adopted a physically active lifestyle between a baseline and a follow-up visit after 6 years had 32% and 38% decreased cardiovascular mortality rates, when compared with females who presented with sedentary lifestyles at both visits.[2] Of particular concern are the cardiovascular risk factors which are affected by the level of physical activity. A large cohort study was conducted on males enrolled in the follow-up Study of Health Professionals. The independent effects of types, intensity and volume of exercise on the possibility of developing coronary heart disease (CHD) were observed. [3] Women's Health Study demonstrated that, an intensity of exercises like walking pace and walking duration had inverse and independent relation with the coronary events risk. [4]

Major risk factor for developing coronary artery disease is physical inactivity. Exercise capacity can be improved by regular aerobic training which has vital role in preventing primary and secondary cardiovascular pathologies.[5] Physical activity also plays an important role to control, diabetes, dyslipidaemias and obesity.[6]

Literature suggested that thorough intrusion like smoking control, normalization of blood lipid, weight reduction, and routine exercise can markedly reduce the severity of atherosclerosis and rate of progression of coronary artery disease.[7], There has been considerable engrossment in the impact of vigorous training on the cardiovascular system of athletes about 100 years.[8] Electronic media reported multiple events of sudden cardiac deaths of trained athletes related to exercise training over last few years, causing a considerable impact on both the physician and community.[9]

Chronic hypertension is one of the most commonly occurring risk factors of CVD and is one of the most frequent risk factor exists among people developing cardiovascular problems.[10] Lifestyle modification in a healthy way like weight reduction and increased physical activity, contribute significantly to control blood pressure.[11] Exercise and routine Physical activity reduce the risk of mortality in diabetic patients. According to the Harvard Alumni Study, the development of type 2 diabetes and free time exercise were inversely related among men.[12] The Diabetes Prevention Program Research Group Study on the comparison of metformin with lifestyle modifications and exercise provided strong evidence that lifestyle changes were more potent in decreasing the incidence of diabetes. The occurrence of diabetes mellitus was 11% and 23% in the intervention and control group respectively after a follow-up of 3.2 years. Among the intervention group, there was 58% reduction in the overall possibility of diabetes mellitus. [13]

In both the normo-lipidemic and dyslipidaemic persons, properly prescribed aerobic exercise results in favourable changes in serum lipids and lipoproteins. [14] In people with low-fat diets, moderate to high level aerobic activities can reduce the HDL cholesterol levels in the blood.[15] Obesity is a multifactorial factor which not only directly increases the risk of CHD but also causes unfavourable effects on other risk factors, like peripheral insulin resistance and hypertension and boosts it indirectly. Although the causes of obesity are multiple, but the most important factor is physical inactivity. According to literature, in American adults, the risk of developing diabetes among physically active individuals (≥ 5 bouts of physical activity/week in free time) was 50% lower compared to physically inactive adults.[16]

In addition to the aforementioned risks, smoking is another risk factor which plays a crucial role in the development of CVD. A recent systematic review found that smoking termination in persons with known coronary heart disease was linked with a 30% lower primitive risk rate of death and myocardial infarction during the following 3 to 7 years.[17] These can be present both in athletes, living a healthy lifestyle as well as in non-athletes as most of them adopt a sedentary lifestyle.[18] This study was intended to determine the cardiovascular risk factors in athletes and non-athletes, hence it would be significant in highlighting the issue among the individuals who are more prone to develop CVD, as well as in facilitating them regarding lifestyle modification for better survival. The chief objective of this study was to determine the frequency of cardiovascular risk factors among athletes and non-athletes of twin cities (Rawalpindi-Islamabad).

Methodology

A cross sectional observational study was conducted on 417 individuals (including athletes and non-athletes) in various gyms of Twin Cities (Rawalpindi-Islamabad) (Smarts Gym Safa Gold Mall, Fitness centre G-7 Markaz Islamabad, Dar Gym, Bright figure gym and Pakistan Sports Complex Islamabad) over a time frame of 6 months (from January 2016- June 2016). The sample was selected on the basis of inclusion/ exclusion criteria. Both genders male/female with age 15 to 30 were included and individuals with any musculoskeletal or neurological disorders were excluded from the study. Non-probability convenient sampling technique was used for the sampling of data. A semi-structured questionnaire was designed under the supervisor's guidance, keeping in view the variables and objectives of the study. The online version of this form was spread among numerous International field Hockey players too. Additional questionnaire part; screening tool Physical Activity Readiness Questionnaire (PAR-Q) was also applied to assess the potential health risk status.[19] Ethical approval was obtained from the gyms and fitness centres and informed consent was also obtained from all individuals involved in the study. The data collected was then analysed on SPSS 20. Basic frequency tables and cross tabulations were formed and chi square test of association was applied to find out the significant value.

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Results

A total number of participants of the study was 417, out of which there were 189 (45.3%) athletes and 228 (54.7%) non-athletes. Mean age of the participants was 23.7 ± 3.22 years. Descriptive analysis showing the frequency of gender-wise distribution among athletes and non-athletes (Figure 1)

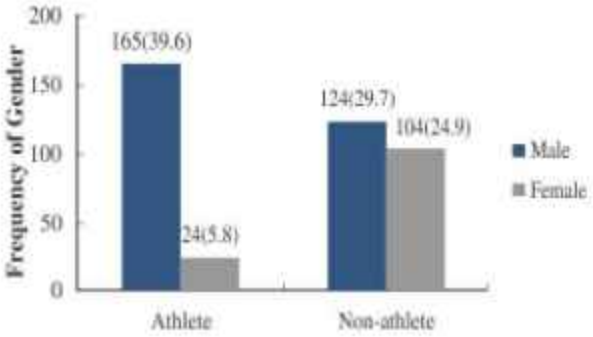

Figure 1. Shows the Frequency of male and female athletes and non-athletes

Chi square test of association was applied between the athletes and the non-athletes with different cardiovascular risk factors (Table no I)

Table I: Shows the frequency of cardiovascular risk factors among the athletes and non

Cardio Vascular Risk Factors	Athlete Frequency (%)	Non thlete Frequency (%)	P-value
Hypertension	3(0.7 %)	24 (5.8%)	0.000***
Non Hypertensive	186 (44.6%)	204 (48.8%)	
Smoker	32 (7.7%)	40 (9.6%)	0.869
Non-smokers	157 (37.6%)	188 (45.1%)	
Obesity	4 (1.0%)	0 (0.0%)	0.027*
Non- Obesity	185 (44.4%)	228 (54.7%)	
Psychological	1 (0.2%)	9 (2.2%)	0.023*
Non-Psychological	188 (45.1%)	219 (52.5%)	
Diabetic	0 (0.0 %)	0 (0.0 %)	-
Non Diabetic	189 (45.3%)	228 (54.7%)	
High Cholesterol	0 (0.0 %)	0 (0.0 %)	
Never check	24 (5.8%)	69 (16.5%)	0.000***
Did Check Cholesterol but don't know	165 (39.6%)	159 (38.1 %)	

*$p < 0.05$
***$p < 0.001$

According to the PAR-Q score, majority of the athletes and non-athletes had no probable health risk associated with exercise. Among the non-athletes, 2.6% individuals scored >3 on the screening tool, which showed that they were at increased risk, as compared to the athletes in whom only 0.5% individuals were at risk. (Figure 2)

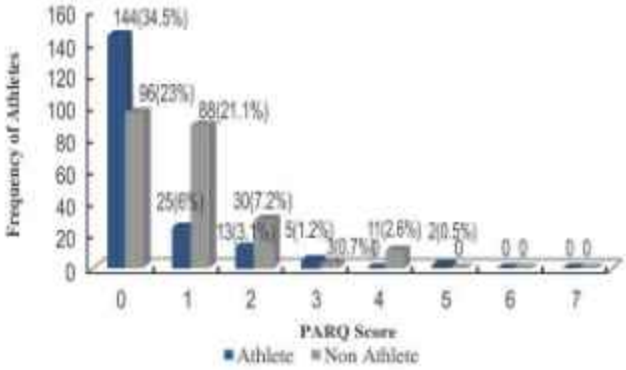

Figure 2. Shows the Frequency/percentage of PAR-Q Score among athletes and non-athletes

Discussion

This cross-sectional survey based study compared two groups (athletes and non-athletes) for the presence or absence of cardiovascular risk factors. According to the results, non-athletes showed more risk factors of cardiovascular diseases than the athletes.

The given results are supported by many previous researches such as a study conducted on global burden of cardiovascular diseases found that increase in CVD is related to the presence of hypertension, smoking and diabetes in people of South Asia.[20] Another study showed that the National Football League (NFL) players had a lower prevalence of reported smoking and dyslipidaemia, and a higher prevalence of hypertension which supports the current study in aspect of smoking and dyslipidaemia that was low among the athletes as compared to non-athletes but contraindicate with hypertension prevalence which was low among athletes in our study.[21] As exercise produces various beneficial effects on cardiac function, atherosclerotic risk factors, size of a coronary artery, vascular tone and vasodilating ability, hence counteracts the negative effects of other factors, leading to fewer cardiovascular risk factors in the athletes.[22] This stands true particularly for hypertension as in our study, majority of the hypertensives were non-

athletes, thus the odds of hypertension are reduced in physically active individuals.

Other study reports have concluded that there was a trend towards obesity (56%) among the players in the National Football League (NFL), whereas the current study contradicts these results as in our study, very less proportion (1.0%) of the athletes were lying in obese risk factor category.[23] This is because of the acknowledged fact that in addition to diet, regular exercise and physically active lifestyle is the most important adjunct in weight reduction and maintenance.[24]

Another study done on Retired National Football League Players (non-athletes) found a high prevalence of obesity and significantly lower prevalence of diabetes, hypertension, and hyperlipidaemia. The current study findings regarding obesity are in accordance with these results as obesity was seen in higher frequency among non-athletes, whereas the results contradict regarding the other risk factors with a higher frequency of diabetes, hypertension, and hyperlipidaemia seen among the non-athletes in our study.[25] Physical activity is associated with a reduction in glucose intolerance, insulin resistance and hepatic glucose output,[26] thus a lack of physical activity as in the non-athletes in our study might have led to the development of diabetes and hyperlipidaemia.

Conclusion

This study was conducted that showed significant differences as cardiovascular risk factors were significantly higher frequent in non-athletes as compared to athletes, hence emphasizing upon the importance of regular physical activity and exercise in the non-athletes in order to prevent the development of cardiovascular disease risk factors. It was recommended to further evaluate each cardiovascular risk factor in a quantitative manner to present the data more statistically.

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