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ORIGINAL ARTICLE

Investigating the Dynamic Relationship between Exercise and Cardiovascular Disease Risk Reduction

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ABSTRACT

Objective: to investigate the dynamic relationship between exercise and cardiovascular disease (CVD) risk reduction.
Methodology; in this cross sectional survey sample of 500 patients from different hospitals of Lahore was included in the study between October 2021 and February 2022. Participants who exercised at least three times a week for an average of 30 minutes or more were considered as physically active. Data was entered and analyzed using SPSS 26. Odds ratio were computed.
Results: The demographic characteristics of the participants show that 64.2% of the participants were females with a mean age of 46.2 years. The study results suggest that exercise is significantly associated with a lower risk of CVD. Participants who exercised had a 76% lower risk of CVD compared to those who did not exercise. Additionally, the study demonstrated that longer duration and higher frequency of exercise were associated with lower CVD risk.
Implication: Assessing the existing professional exercise recommendations for hypertension, Healthcare professionals can use the findings to guide patients on the benefits of exercise and promote a healthy lifestyle.
Conclusion: The findings emphasize the importance of regular physical activity for the prevention of CVD. Future research should explore the most effective types of exercises for risk reduction in different sub-groups. We recommend targeted interventions aimed at promoting an active and healthy lifestyle and raising awareness on the importance of exercise for the prevention of CVD.
Keywords: Exercise, Cardiovascular, Risk factors, Physical inactive

INTRODUCTION

Sedentary lifestyles and lack of physical activity are known risk factors for cardiovascular disease (CVD).[1] On the other hand, regular physical activity has been identified as a key factor in reducing the risk of CVD. It is estimated that sedentary/ low physical activity accounts for 74% of deaths among patients with cardiovascular disease in middle and low income countries.[1, 2]

Despite the numerous health benefits of regular exercise, physical inactivity persists as a major public health challenge globally. Physical inactivity is estimated to cause as much as 5 million deaths annually, with the highest contribution from CVD.[3] Physical activity has beneficial effect among cardiovascular disease patients.[4] World health organization (WHO) reported that CVD cases were increased during COVID-19 lockdown due the physical inactivity.[5]

There are many risk factors associated with inactive physical activity and cardiovascular disease like obesity and psychological stress.[6] Hyperlipidemia association is debatable but the relation of non-alcoholic fatty liver (NAFLD) is establishing during the past years[7], the risk increases 3 fold as compared to non-NAFLD patients.[8, 9] Dynamic changes have been observed regarding CVD, it's been observed that female ratio with CVD is increasing as compared to males. In a recent research it's been also observed that the gestational diabetes increases the risk two time for CVD.[10]

The study aimed to examine the frequency and duration of exercise and its relationship to CVD risk among participants. The findings of this study can be utilized to develop targeted interventions aimed at promoting physical activity and raising awareness on the importance of exercise for the prevention of CVD. It is hoped that the results will provide valuable insights for medical professionals and policymakers in Pakistan and elsewhere to encourage individuals to adopt a physically active lifestyle for their own well-being.

SUBJECTS & METHODS

A cross-sectional study was conducted between October 2021 and February 2022 in Lahore, Pakistan, involving participants from various hospitals in the city. A total of 500 patients were included in the study through convenience sampling. The study participants were aged 18 years or older and had no previous history of CVD. Participants who had missing data or incomplete questionnaires were excluded from the study. Demographic characteristics such as age, gender, and level of education were collected through a self-administered questionnaire. CVD risk factors, such as smoking history, family history of CVD, and hypertension, were also included in the questionnaire.

The study's primary outcome was the association between exercise and CVD risk reduction. Exercise was assessed by asking participants about their frequency and duration of exercise. Participants who exercised at least three times a week for an average of 30 minutes or more were considered as physically active.

Data analysis was conducted using SPSS version 26. Descriptive statistics were used to summarize the demographic characteristics of the participants. Chi-square tests were used to examine differences in CVD risk factors and exercise behavior between physically active and inactive participants. Bivariate logistic regression analysis was used to determine the association between exercise and CVD risk reduction. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were calculated after controlling for potential confounding factors. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Among the participants, 321 (64.2%) were females, and the mean age was 46.2±9.30 years. The prevalence of CVD risk factors was higher among inactive participants compared to active participants. For example, hypertension (41.9% vs. 25.6%), smoking history (24.2% vs. 11.3%), and a family history of CVD (34.2% vs. 19.3%) were more common in inactive participants than active ones ($p < 0.05$).

Table 1: Demographic characteristics of participants

Variables	Categories	F (%)
Gender	Male	179(35.80%)
	Female	321(64.20%)
Age(Years)	18-29	97(19.40%)
	30-39	114(22.80%)
	40-49	131(26.20%)
	50-59	89 (17.80%)
	60 and above	69(13.80%)
Education	No formal education	96(19.20%)
	Primary education	121(24.20%)
	Secondary education	137(27.40%)
	Tertiary education	146(29.20%)

Overall, physically active participants had a 76% lower risk of CVD compared to those who were physically inactive (OR = 0.24, 95% CI: 0.15-0.38, p < 0.001). The odds of CVD risk were higher in females (OR = 1.96, 95% CI: 1.27-3.01, p = 0.002) and individuals with hypertension (OR = 2.15, 95% CI: 1.34-3.44, p = 0.002). However, age, smoking history, and family history of CVD were not significantly associated with CVD risk (p > 0.05).

Table 2: Comparison between Exercise and CVD Risk

CVD Risk Factors	Physically Active (n=256)	Physically Active (n=244)	Adjusted Odds
Hypertension	63 (25.6%)	107 (41.9%)	2.38 (1.41-4.01)*
Smoking history	28 (11.3%)	62 (24.2%)	1.19 (0.64-2.23)
Family history of CVD	47 (19.3%)	87 (34.2%)	1.11 (0.67-1.84)

*Significant at <0.001

Regarding the duration and frequency of exercise, participants who exercised three or more times a week had a lower risk of CVD compared to those who exercised less frequently (OR = 0.25, 95% CI: 0.14-0.44, p < 0.001). Participants who exercised for 30 minutes or more had a lower risk of CVD compared to those who exercised for less time (OR = 0.20, 95% CI: 0.11-0.35, p < 0.001). Furthermore, longer duration and higher frequency of exercise were associated with lower CVD risk independent of other risk factors (adjusted OR = 0.27, 95% CI: 0.14-0.53, p < 0.001).

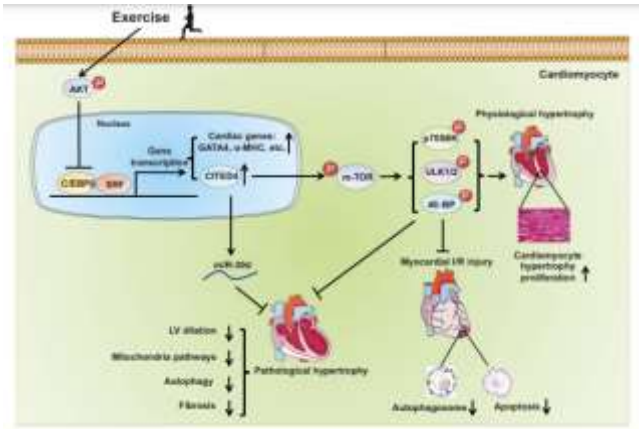

Figure 1: Figure showing the biochemical changes and physiological activities/changes in body due to exercises[17]

Our results are depicting the same activities as shown in the figure 1.[17]

DISCUSSION

According to World health organization (WHO) by the 2030 the leading cause of mortality will be CVD due to physical inactivity. [11] Five days per week, at least 30 minutes, is suggested to prevent CVD. [12-14] Numerous studies in the past have investigated the relationship between exercise and CVD risk reduction, but few have been carried out in Pakistan,[13] thereby prompting this study. The present study aims to fill this gap in literature by examining the association between exercise and CVD risk reduction in a Pakistani population. Recently frequency of CVD is increasing in young adults of Pakistan. Protein intake is increased by gym user that contains Trimethylamine N-Oxide (TMAO), it is a protein, that may myocardial infarction. [15]

The study results showed that the patients doing regular exercise are at a low risk. The chances of CVD were higher in female in this study as compared to male it could be due to population selection from the female with gestational age. And as mentioned earlier the gestational diabetes increases the risk two time for CVD.[10]

The results of this study can be utilized to develop targeted interventions aimed at promoting physical activity and raising awareness on the importance of exercise for the prevention of CVD. Healthcare professionals can use the findings to guide patients on the benefits of exercise and promote a healthy lifestyle. Additionally, interventions can be developed that specifically engage individuals who are less active or who have higher risk for CVD to encourage them to start and maintain regular exercise habits.[16]

Future research should explore the specific types of exercises that are most effective in reducing the risk of CVD. Furthermore, the study should aim to explore different subgroups such as age, gender, and individual preferences of physical activity to better understand how these factors impact the relationship between exercise and CVD.

In conclusion, by adopting regular physical activity patterns, we can improve our overall health and significantly reduce the risk of CVD. We recommend that the public be made aware of these findings through public health campaigns and medical professionals to continue advising and encouraging individuals to adopt a physically active lifestyle for their own well-being.

CONCLUSION

The findings of this study suggest that exercise is significantly associated with a lower risk of CVD among the Pakistani population. Physically active participants had a 76% lower risk of CVD compared to inactive participants. Participants who exercised three or more times a week and for 30 minutes or more per session had a lower risk of CVD compared to those who exercised less frequently and for less time. These findings emphasize the importance of regular physical activity for the prevention of CVD. Future research should explore the most effective types of exercises for risk reduction in different sub-groups. We recommend targeted interventions aimed at promoting an active and healthy lifestyle and raising awareness on the importance of exercise for the prevention of CVD.

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