

Impact of Moderate Intensity Exercise on Fitness Level of Adults

Jazil Zafar Butt¹, Azhar Khan², Alamgir Khan³

¹Researcher, Department of Sports Science and Physical Education, University of the Punjab, Lahore, Pakistan.

²Researcher, Department of Sports Science and Physical Education, Abbottabad University of Science and Technology, Abbottabad, Pakistan.

³Assistant Professor, Department of Sports Science and Physical Education, University of the Punjab, Lahore, Pakistan.

Correspondence: jjbuttsdk1122@gmail.com¹

ABSTRACT

Aim of the Study: This research aimed to assess the impact of moderate-intensity exercise on the fitness level of athletes.

Methodology: The study population consisted of 24 adults aged 20 to 25 who regularly engaged in general fitness activities at Lawrence Park in Lahore, Pakistan. The researcher implemented a self-designed exercise protocol for twelve weeks. The training program included exercises such as push-ups, sit-ups, planks, mountain climbers, squats, lunges, toe taps, and butt kicks. Various fitness tests were conducted to assess fitness levels, including the 20m T drill test, a minute sit-up test, standing broad jump, core plank test, 100m sprint test, and 600m running test. Pre and post-test data were analyzed using the Statistical Package for the Social Sciences (SPSS, version-26), and appropriate statistical tools were applied based on the study's nature and requirements.

Findings: Results of the study revealed that 600m running and 100m sprint were significantly ($p<0.05$) correlated with other test variables. Furthermore, moderate-intensity exercises had significant ($p<0.001$) and positive effects on physical fitness and exercise. These findings suggest that such programs can help individuals improve their physical fitness and exercise routines.

Conclusion: Based on the data findings, the researcher concluded that moderate-intensity exercise significantly affects adults' physical fitness level.

Keywords: Exercise, Moderate Intensity, Fitness, Adults.

Article History

Received:
January 12, 2024

Revised:
February 28, 2024

Accepted:
March 16, 2024

Published:
March 23, 2024

Introduction

Background of the Study

A sedentary lifestyle leads to an increased risk of several chronic diseases and premature mortality. Sedentary individuals are also more likely to develop functional limitations. Moderate-intensity exercise is associated with improved health and a reduced risk of morbidity and mortality compared to low activity or fitness levels. We should focus on encouraging the least active and unfit individuals to become moderately active, as this can have significant benefits for the overall population (Steven, 2013).

The World Health Organization (WHO) advises adults to engage in moderate exercise for about 150 minutes each week to maintain a healthy heart. Despite the emphasis on exercise from various health groups, including the WHO, many adults still don't get enough physical activity. One major reason for this is a lack of time. Therefore, if there's a shorter exercise plan that can provide the same benefits for the heart, it could encourage more people to participate in exercise programs (Alansare, 2018).

Not being active as we age can cause problems with our blood vessels and how our heart functions. A study showed that engaging in moderate exercise in one session can improve the function of our blood vessels. However, it's still unclear whether this type of exercise also strengthens the left side of our heart and enhances overall heart performance. In simpler terms, lack of movement as we get older can impact the function of our heart and blood vessels. This study found that moderate exercise in one session can benefit blood vessel function, but its effect on the left side of the heart and overall performance is still uncertain (Widlansky, 2014).

According to international health recommendations, adults should aim for at least 60 minutes of moderate to vigorous physical activity daily. However, many adults are not as active as they should be. Recent international data indicate that a significant number of adult male university students are physically inactive due to a lack of physical activity and insufficient physical education. This can lead to the development of metabolic disorders and other chronic diseases (El-Ashker, 2023).

Being more active and spending less time sitting can significantly reduce the risk of early death. Higher levels of overall physical activity, regardless of the intensity level, and less sedentary time are associated with a lower risk of premature mortality. There is evidence of non-linear, dose-response patterns in middle-aged and older individuals (Ekelund, 2019). Physical activity not only reduces the risk of injuries but also improves physical fitness, weight management, cognitive function, and overall quality of life. Regular exercise is really important for our health. It's beneficial for everyone, regardless of age or background. And remember, sitting less is also really helpful (Branch, 2004).

General fitness is the ability to perform physical activities without easily getting tired, which is a crucial part of overall health. On the other hand, specific fitness refers to how well a person can excel at specific levels of a sport (Hancock et al, 2018). Being aware of physical activity can reduce the risk of injuries and improve physical fitness, weight management, cognitive function, and overall quality of life (Branch, 2004). Including movement in everyday activities, not just recreational events, can have numerous health benefits (Matthews et al, 2007). Physical activities are known to be effective in reducing risk factors and promoting health (De Moor et al, 2006; Salmon, 2001).

Physical fitness means being in good overall health and having the ability to participate in sports, work, and everyday activities with ease. Achieving physical fitness typically involves proper nutrition, moderate to vigorous physical activity, physical awareness, and adequate rest (Joana & Silva, 2022). The author also emphasized that being aware of exercise and physical activity can reduce the risk of injuries and improve physical fitness, weight management, cognitive function, and quality of life (Lanquist, 2022).

Problem Statement

Physical Fitness is a basic element of life. To perform routine activities beneficially, one needs to have a good physical fitness level. Lack of physical fitness may cause different problems while performing routine activities. What role is played by exercise with moderate Intensity in the physical fitness of adults? To discover this fact, this particular research study was initiated.

Significance of the Study

The current research study was conducted to assess the physical fitness level of adults. Thus the findings of the study will help to understand the physical fitness level of adults and will also help to suggest future remedies for those who have low or poor physical fitness levels.

Objective of the Study

The main objective of the study was to assess the role of moderate-intensity exercise in the physical fitness of adults.

Methods and Material

To gather findings and draw conclusions, the researcher followed these procedures.

Research Design

A quantitative research study was conducted with an experimental study design was conducted to evaluate the physical fitness level of participants.

Population

The population of the study was comprised of all adults aged 20 to 25 who regularly engaged in general fitness activities at Lawrence Park in Lahore, Pakistan

Sample Size

There were 20 participants. The participants were already doing their regular activities for general fitness.

Data Collection

The researcher implemented a self-designed exercise protocol for twelve weeks on the participants. The training program included exercises such as push-ups, sit-ups, planks, mountain climbers, squats, lunges, toe taps, and butt kicks. Various fitness tests, including the 20m T drill test, a minute sit-up test, standing broad jump, core plank test, 100m sprint test, and 600m running test, were conducted to assess fitness levels

Data Analysis Technique

The collected was tabulated and analyzed through a statistical package for social sciences (SPSS, version-32) and thus appropriate statistical tools were applied for the analysis of data.

Presentation and Analysis of Data

Table 1: *Showing the Pre-test Results (descriptive)*

| Variables | Minimum | Maximum | Mean | S.D | Skewness |
|---------------------------------|----------------|----------------|-------------|------------|-----------------|
| T Drill Run 20m (in sec) | 29.3 | 40 | 33.81 | 2.70 | 0.22 |
| Sit-ups (in reps) | 8 | 29 | 21.50 | 5.56 | -0.57 |
| Standing broad jump (in meters) | 1.2 | 2.79 | 2.10 | 0.35 | -0.36 |
| Core Plank (in seconds) | 0.3 | 2.53 | 1.31 | 0.65 | 0.27 |
| Sprint 100m (in sec) | 13.59 | 16 | 14.10 | 2.64 | -4.27 |
| Running 600m (in sec) | 2.01 | 3.67 | 2.60 | 0.37 | 0.92 |

Table no.1 shows that the minimum number of sit-ups in the pre-test was 8 the maximum was 29, average number of sit-ups was 21.50. The standard deviation was 5.55 that's shows the average variation in the participant's Sit-ups. The minimum time of the core plank was 30 seconds the maximum time of the core plank was 2.53 seconds in the pre-test the mean was 1.30, and the average variation was 64. In this table the minimum distance (covered in a single jump) of standing broad jump was 1.20m the maximum distance of 2.79m was covered and the normal time was 2.09, the difference was.35. The distance of 20m T Drill running (using 4 cones with a distance of 2.85m each) minimum time was 29.30 sec the maximum was 40.00 seconds the average time was 33.80 seconds and the variation was 2.69. In the 100m sprint (speed) test, the minimum time was 13.59sec and the maximum time was 16.00seconds, and the mean was 14.10, the variation was 2.63. In the 600m running (cardiovascular) test, the minimum time was 2.01 and the maximum time was 3.67, and the mean was 2.60, the variation was 37.

Table 2: *Showing the Post- test Results (descriptive)*

| Variables | Minimum | Maximum | Mean | S.D | Skewness |
|---------------------------------|----------------|----------------|-------------|------------|-----------------|
| T Drill Run 20m (in sec) | 29 | 37 | 31.88 | 2.05 | 0.75 |
| Sit-ups (in reps) | 10 | 37 | 27.46 | 5.96 | -0.91 |
| Standing broad jump (in meters) | 1.7 | 2.91 | 2.50 | 0.30 | -1.17 |
| Core Plank (in seconds) | 60.00 | 2.9 | 1.98 | 0.53 | -0.28 |
| Sprint 100m (in sec) | 11.01 | 15 | 12.36 | 0.88 | 0.78 |
| Running 600m (in sec) | 14.1 | 3.01 | 1.96 | 0.38 | 0.41 |

Table no.2 shows that the minimum number of Sit-ups in the post-test was 10 and the maximum was 37, the average of Sit-ups was 27.45 and std. the deviation was 5.96 that's the mean variation between Sit-ups in the post-test. The minimum time of the core plank was 60 seconds and the maximum time of the core plank was 2.90 seconds in the post-test the mean was 1.98 and the time difference between was 0.53 seconds. In this table the minimum distance (covered in a single jump) of standing broad jump was 1.70m the maximum distance of 2.91m was covered and the mean was 2.43 and the variation between jumps was .30 meters. The distance of 20m T drill running (using 4 cones with a distance of 2.85m each) minimum time was 29.00sec the maximum was 37.00seconds the mean was 31.87 and the standard deviation was 2.50 this means the difference between times was T drill running. 100m sprint (speed) test, the minimum time was 11.01sec the maximum time was 15.00 seconds, the mean was 12.36 seconds and the difference between 100m time was 0.88 seconds. 600m running (cardiovascular) test, the minimum time was 1.41 and the maximum time was 3.01, the mean was 1.96 and the difference was 0.38 seconds.

Table 3: *Showing the Correlation among various parameter of fitness during PreTest*

| Variables | Sit-Ups | Core Plank | Standing Broad Jump | T drill Run 20m | Sprint 100 m | Running 600 m |
|---------------------|----------------|-------------------|----------------------------|------------------------|---------------------|----------------------|
| Sit-Ups | 1 | 0.79** | 0.41* | -0.28 | -0.51* | -0.64** |
| Core Plank | | 1 | 0.48* | -0.39 | -0.49* | -0.62** |
| Standing Broad Jump | | | 1 | -0.64** | -0.66** | -0.60** |
| T drill Run 20m | | | | 1 | 0.65** | 0.70** |
| Sprint100m | | | | | 1 | 0.67** |
| Running 600M | | | | | | 1 |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table no.3 shows that the correlation between Sit-ups and core planks was 0.788, which shows that at .001 there was a present high relationship between these two the table, it's also revealed that it had significant effects at a 1% level of significance. The value 0.41 shows that there is a highly positive correlation between Sit-ups and standing broad jumps. In this relationship, the significant level is 0.05. There are negative correlations between sit-ups and 20m T drill runs. The numerical value was .283 shows that the relationship between these 2 has no significant effect on our study. Numerical quantity-.511 which was given in the above table shows that there is this significant negative difference between Sit-up and 100m sprint. The significant level was 0.05%. There is a significant negative correlation between sit-ups and 600m running. The value -.644 shows that the significance level was 0.01%. The numerical value .488 shows that positive relationship between the core plank and standing broad jump. In this relationship, the significance level was 0.05%. There is a negative correlation between the core plank and the 20m T drill run. The statistical value -.396 shows that negative relationship. There is a significant negative correlation between core plank and 100m sprint. The mathematical value -.490 shows that the significance level was 0.05%. There is a significant negative correlation between core plank and 600m running. Numerical value -.621 shows that there is a significant negative association between core plank and 600m running. In this study, the significance level was 0.01%.

Table 4: Showing the Correlation among various parameter of fitness during Post Test

| Variables | Push-Ups | Core Plank | Standing Broad Jump | Shuttle Run 20m | Sprint 100m | Running 600m |
|---------------------|----------|------------|---------------------|-----------------|-------------|--------------|
| Sit-ups | 1 | 0.61** | 0.38 | -0.26 | 0.50* | -0.84** |
| Core Plank | | 1 | 0.34 | -0.25 | 0.23 | -0.56** |
| Standing Broad Jump | | | 1 | -0.70** | 0.32 | -0.60** |
| T Drill Run 20m | | | | 1 | -0.30 | 0.60** |
| Sprint 100m | | | | | 1 | -0.48* |
| Running 600m | | | | | | 1 |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The above table shows the numerical value .612 shows that significant relationship between sit-ups and core plank in the post-test. In this association, the significance level was at 0.01%. This value of 0.384 is showing a positive association between sit-ups and standing broad jumps. The correlation between sit-ups and 20m T Drill running was negative. The mathematical value -0.263 shows a negative relation. In this table, the numerical value .504 shows a positive affiliation between sit-ups and 100m sprint. The significance level between the two variables was 0.05%. The numerical value -.844 displays that there is a highly negative correlation between sit-ups and 600m running. The mathematical value 0.346 shows the positive association between core plank and standing broad jump. The value -0.251 displays that negative correlation between core plank and 20m T drill running. In the above table, the statistical value 0.239 shows that positive association between core plank and 100m sprint. The numerical value -.563 displays that negative relation among core plank and 600m running. The significant level was at 0.01%. -.696 in a negative value In the above table that displays the negative association between standing broad jump and 20m T Drill running. In this (-) correlation the significance level was 0.01%. The statistical value 0.327 is a symbol of a positive relationship between the standing broad jump and the 100m sprint. The numerical value -.605 is an indication of a negative association between standing broad jump and 600m running, in this association, the significance level was 0.01%. The value -0.304 is a negative correlation between 20m T Drill running and 100m sprint. The numerical value .603 displays the positive association between 20m T Drill running and 600m running, in these two variables the significance level was 0.01%. In the last the statistical value -.475 shows that negative correlation between 100m running and 600m running. In these variables, the significant value was at 0.05%.

Table 5: Showing the difference among various parameter of fitness during Pre-Test and Post Test Analysis

| Variables | Category | Mean | Mean Difference | S.E | T | P Value |
|---------------------|----------|-------|-----------------|------|--------|---------|
| Sit-ups | pre | 21.5 | 5.95 | 1.13 | 16.16 | 0.000 |
| | post | 27.45 | | 1.21 | | |
| Core plank | pre | 1.30 | 0.67 | 1.13 | 11.07 | 0.000 |
| | post | 1.98 | | 0.10 | | |
| Standing broad jump | pre | 2.09 | 0.39 | 0.07 | 9.45 | 0.000 |
| | post | 2.49 | | 0.06 | | |
| 20m T drill run | pre | 31.87 | 1.92 | 0.55 | -9.47 | 0.000 |
| | post | 33.80 | | 0.41 | | |
| 100m sprint | pre | 12.02 | 0.34 | 0.53 | 0.53 | 0.590 |
| | post | 12.36 | | 0.17 | | |
| 600m running | pre | 1.96 | -0.63 | 0.07 | -12.39 | 0.000 |
| | post | 2.60 | | 0.07 | | |

This table shows the significant difference in sit-ups from pre- to post-session. The mathematical value $P = .000(***)$. This means there is a highly significance difference. The above table also shows the difference of mean in 6 (count). In the 2nd variable, the mean difference was .67 seconds. It means that the maximum number of people has increase by .67 seconds time in their core plank hold time. $P = .000(***)$ difference is also significant from pre to post. In 3rd variable the significance level is high, $P = .000(***)$. In the standing broad jump, the mean difference is .39m (like maximum participants have increased this distance from pre to post-duration). In this table, the 4th variable has also a significant difference. The mean difference is 1.92 seconds in the 20m T drill running test. In the 5th variable, the p-value of .60 shows that no significance (0.60= N.S). That means there is less difference from pre to post-test timing in the 100m sprint. In this table, the last variable the 600-meter running test has also a significant difference. The p-value shows that highly significant difference.

Results & Discussion

The primary goal of this study was to increase general fitness through promoting awareness of physical activity among adults. The participants, aged 20 to 25, were assessed for their fitness levels. Training took place twice a week for 8 to 12 weeks, resulting in significant improvements in maximum fitness for all participants. Inline of this emerging finding, the study conducted by Heinrich et al (2015) shows that exercise with aerobic exercise has significant role in improving body composition, cardiovascular endurance, strength, and flexibility. Same findings were drawn by Feito et al (2018) that exercise with different intensity significant resultant in maximal oxygen consumption ~12%. Such emerging concept was supported by Serafini et al (2016) that exercise caused in reduction in adipose tissue and increases in bone mineral density.

Conclusion

Based on data analysis and findings, the study concluded that moderate-intensity exercise significantly affects adults' physical fitness levels. Likewise, the study also showed that the majority of the participants of the study had good physical fitness levels.

Recommendations

Based on the findings and conclusions, the researcher has made several recommendations:

- Awareness should be created among the masses about the physical fitness and its benefits by conducting different awareness sessions like seminars, workshops, and training programs
- In public places, jogging track should be made for facilitating the public in term of routine exercise.
- For most adults, it is recommended to engage in at least two and a half hours of moderate-intensity aerobic physical activity per week, which amounts to about half an hour each day. Examples of activities include light jogging, swimming, and horse riding.

Acknowledgements

None.


Conflict of Interest


Authors declared NO conflict of interest.


Funding Source

The authors received NO funding to conduct this study.

ORCID iDs

Jazil Zafar Butt ¹  <https://orcid.org/0009-0008-4145-7804>

Azhar Khan ²  <https://orcid.org/0009-0005-5912-7182>

Alamgir Khan Qureshi ³  <https://orcid.org/0000-0002-1253-4654>

References

- (2022). Effects of Age and Lifelong Moderate-Intensity Exercise Training on Rats' Testicular Function. *International Journal of Molecular Sciences*, 23(19), 11619.
- Abdelbasset, W. K., & Alqahtani, B. A. (2019). A randomized controlled trial on the impact of moderate-intensity continuous aerobic exercise on the depression status of middle-aged patients with congestive heart failure. *Medicine*, 98(17).
- Alansare, A., Alford, K., Lee, S., Church, T., & Jung, H. C. (2018). The effects of high-intensity interval training vs. moderate-intensity continuous training on heart rate variability in physically inactive adults. *International journal of environmental research and public health*, 15(7), 1508.
- Ayala, A. M. C., Salmon, J., Dunstan, D. W., Arundell, L., & Timperio, A. (2022). Does light-intensity physical activity moderate the relationship between sitting time and adiposity markers in adolescents?. *Journal of Sport and Health Science*, 11(5), 613-619.
- Cerqueira, É., Marinho, D. A., Neiva, H. P., & Lourenço, O. (2020). Inflammatory effects of high and moderate intensity exercise—a systematic review. *Frontiers in physiology*, 10, 1550.
- Clark, T., Morey, R., Jones, M. D., Marcos, L., Ristov, M., Ram, A., ... & Keech, A. (2020). Highintensity interval training for reducing blood pressure: a randomized trial vs. moderateintensity continuous training in males with overweight or obesity. *Hypertension Research*, 43(5), 396-403.
- Dixit, S. (2020). Can moderate intensity aerobic exercise be an effective and valuable therapy in preventing and controlling the pandemic of COVID-19? *Medical hypotheses*, 143, 109854109854.
- El-Ashker, S., & Al-Hariri, M. (2023). The effect of moderate-intensity exercises on physical fitness in Saudi males university students. *Journal of Medicine and Life*, 16(5), 675.
- Farahati, S., Hosseini, S. R. A., Moazzami, M., Daloe, M. H., & Daloe, S. H. (2020). The impact of high-intensity interval training versus moderate-intensity continuous training on carotid intima-media thickness and ankle-brachial index in middle-aged women. *International journal of preventive medicine*, 11.
- Feito, Y., Heinrich, K. M., Butcher, S. J., & Poston, W. S. C. (2018). High-intensity functional training (HIFT): definition and research implications for improved fitness. *Sports*, 6(3), 76.

- Hansen, D., Dendale, P., Jonkers, R.A.M. (2009). Continuous low- to moderate-intensity exercise training is as effective as moderate- to high-intensity exercise training at lowering blood HbA1c in obese type 2 diabetes patients. *Diabetologia* 52, 1789–1797.
- Heinrich, K. M., Becker, C., Carlisle, T., Gilmore, K., Hauser, J., Frye, J., & Harms, C. A. (2015). High-intensity functional training improves functional movement and body composition among cancer survivors: a pilot study. *European journal of cancer care*, 24(6), 812-817.
- Jimenez, L. Q., Arwari, B., Perry, A., Signorile, J., Ahn, S., Kamakawiwo'ole, S. A. R. A. H., & Jacobs, K. A. (2019). Moderate intensity exercise reduces impacts of simulated altitude on cognition. *Biology of Exercise*, 15(2).
- Marchant, D., Hampson, S., Finnigan, L., Marrin, K., & Thorley, C. (2020). The effects of acute moderate and high intensity exercise on memory. *Frontiers in Psychology*, 11, 1716.
- Serafini, P., Hoffstetter, W., Mimms, H., Smith, M., Kliszczewicz, B., & Feito, Y. (2016). Body composition and strength changes following 16-weeks of high-intensity functional training. *Med. Sci. Sports Exerc*, 48(5S), 1001.
- Silva, J. V., Santiago, J., Matos, B., Henriques, M. C., Patrício, D., Martins, A. D., & Fardilha, M., Stevenson, J. S., & Topp, R. (1990). Effects of moderate and low intensity long-term exercise by older adults. *Research in Nursing & Health*, 13(4), 209-218.
- Suboc, T. B., Strath, S. J., Dharmashankar, K., Harmann, L., Couillard, A., Malik, M., & Widlansky, M. E. (2014). The impact of moderate intensity physical activity on cardiac structure and performance in older sedentary adults. *IJC Heart & Vessels*, 4, 19-24.