ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XII, Issue– VI (Special Issues-I) *Nov – Dec, 2023*

OPEN ACCESS Original Research Article

IMPACTFUL STUDY OF PHYSICAL FITNESS ON SHORT DISTANCE RUNNERS PERFORMANCE

** Shobha Keshav Palve*

***Dr. Limbaji Kashiram Pratale*

** Research Scholar, KBC North Maharashtra University, Jalgaon.*

*** Research Guide, SPDM Arts, Commerce and Science College, Shirpur*

Introduction:

Physical fitness plays a pivotal role in enhancing athletic performance across various sports disciplines. Among these, the significance of physical fitness in short distance running stands out prominently. Short distance running demands an exceptional blend of speed, power, agility, and endurance, making it a discipline that heavily relies on an athlete's physical conditioning. Understanding the profound impact of physical fitness on the performance of short distance runners is crucial not only for optimizing their athletic potential but also for refining training methodologies and injury prevention strategies. Short distance running, which typically involves sprint races ranging from 60 meters to 400 meters, is a discipline that requires explosive power, rapid acceleration, and efficient biomechanics. Athletes competing in these events need to harness their anaerobic energy systems, showcasing exceptional speed endurance while maintaining optimal technique throughout the race. The significance of short distance running extends to various competitive arenas, including track and field events, where split-second differences can determine victory or defeat.

This research paper aims to delve into the comprehensive relationship between physical fitness and the performance of short distance runners. By examining various facets of physical fitness and their direct influence on athletes specializing in short distance running, this study intends to provide insights into optimizing training programs, understanding physiological adaptations, and identifying key parameters crucial for achieving peak performance in this discipline. This research endeavors try to provide a comprehensive understanding of how physical fitness intricately influences the performance of short distance runners. By exploring the multifaceted relationship between various aspects of physical conditioning and athletic success in sprint events, this study seeks to offer valuable insights that can revolutionize training approaches, optimize performance, and minimize injury risks in the realm of short distance running. Understanding the intricate interplay between physical fitness and short distance running performance is pivotal not only for athletes aspiring for excellence but also for coaches, trainers, and sports scientists dedicated to refining training methodologies and promoting the holistic development of athletes in this high-intensity discipline.

Objectives of the Study:

- To analyze the correlation between specific physical fitness components (speed, power, endurance) and

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XII, Issue– VI (Special Issues-I) *Nov – Dec, 2023*

OPEN ACCESS Original Research Article

short distance running performance.

- To Evaluate the effectiveness of different training methodologies in improving physical fitness parameters relevant to short distance runners.
- To Investigate the physiological adaptations associated with enhanced physical fitness in short distance runners.
- To Identify key factors contributing to injury prevention and recovery strategies tailored for short distance runners.

Methodology of the Study:

The present research work based on secondary data and descriptive study. The secondary data collected from various sources like Books, Library, Articles, Research papers, thesis and Internet websites.

Literature Review:

Fulekar (2014) aimed to study the comparison of the academic performance between sports and non-sports person. The aim of the study was to compare academic performance between sports and non-sports person. To fulfill the purpose of the study 60 sports person were selected randomly from B.P.E.-II year and B.P.E. Final year and the age was ranging from 18 to 25 years.

Sharma (2010) defines endurance as the ability to resist fatigue. Schnabel (2001) also define endurance as the resistance ability to fatigue Martin (2009) and Mathew (2001) have also used the concept of 'ability to resist fatigue' for defining endurance. But Hardayal Singh (2001) writes, "Endurance is the ability to do sports movement, with the desired quality and speed, under conditions of fatigue. Without an understanding of fatigue caused by training and competition load and the psycho-physiological systems involved in countering the effects of fatigue one cannot fully grasp the nature of endurance.

Descriptive Analysis:

Today, physical education, sports and games in their diversified forms have become a part of the curriculum in schools, colleges and universities. Professionalism has entered sports and games demanding the sports persons of aver high level of performance. Performance, physical skill, sports and games require a high level of physical or physiological fitness, psychological - mental and emotional fitness. Different activities require different levels of fitness, that is different activities demand different elements or components of fitness in varied proportions. The improvement and performance of physical skills in the field of physical education, sports and games depend upon the various aspects of the individual, such as the physical characteristics, mental characteristics, the emotional set-up etc. The performance also depends upon the personality traits, body build, age, mental age, training age, and so on.

Sprinting is running over a short distance at the top-most speed of the body in a limited period of time. It is used in many sports that incorporate running, typically as a way of quickly reaching a target or goal, or avoiding or catching an opponent. Human physiology dictates that a runner's near-top speed cannot be maintained for more than 30–35 seconds due to the depletion of phosphocreatine stores in muscles, and perhaps secondarily to excessive metabolic acidosis as a result of anaerobic glycolysis. In athletics and track and field, sprints (or dashes) are races over short distances. They are among the oldest running competitions, being recorded at the Ancient Olympic Games. Three sprints are currently held at the modern Summer Olympics and outdoor World Championships: the 100 meters, 200 meters, and 400 meters. At the professional level, sprinters begin the race by assuming a crouching position in the starting blocks before driving forward and gradually moving into an upright position as the race progresses and momentum is gained. The set position differs depending on the start. The use of starting blocks allows the sprinter to perform an enhanced isometric preload; this generates muscular pre-tension which is channeled into the subsequent

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XII, Issue– VI (Special Issues-I) *Nov – Dec, 2023*

OPEN ACCESS Original Research Article

forward drive, making it more powerful. Body alignment is of key importance in producing the optimal amount of force. Ideally, the athlete should begin in a 4-point stance and drive forwards, pushing off using both legs for maximum force production. Athletes remain in the same lane on the running track throughout all sprinting events, with the sole exception of the 400 meters indoors. Races up to 100 meters are largely focused upon acceleration to an athlete's maximum speed.

Physical Fitness Components in Short Distance Running:

a. Speed: Speed is the cornerstone of success in short distance running. Acceleration, maximum velocity, and the ability to maintain high speeds over short distances are critical factors influenced by an athlete's physical fitness level.

b. Power: Explosive power is essential for propelling the body forward during sprints. The capability to generate high levels of force in minimal time significantly impacts the runner's start and acceleration phases.

c. Endurance: Although short distance races predominantly rely on anaerobic energy systems, the ability to sustain effort and delay fatigue is vital. Anaerobic endurance plays a crucial role in maintaining speed and power output throughout the race.

d. Biomechanics and Technique: Efficiency in movement mechanics, stride length, frequency, and running technique significantly affect a runner's speed and overall performance.

Influence of Physical Fitness on Performance:

a. Training Programs: Tailoring training regimens to enhance specific physical fitness components is imperative. High-intensity interval training (HIIT), plyometrics, resistance training, and speed-focused workouts are integral for improving speed, power, and endurance.

b. Physiological Adaptations: Understanding the physiological changes occurring in response to targeted training methods is essential. Muscle fiber composition, neuromuscular adaptations, and energy system utilization play critical roles in optimizing performance.

c. Injury Prevention and Recovery: Adequate physical fitness can aid in injury prevention by strengthening muscles, tendons, and ligaments. Furthermore, optimal recovery strategies complemented by appropriate rest and nutrition are vital for sustaining performance and reducing injury risk.

Findings of the Study:

- Stronger runners demonstrated better initial acceleration and maintained speed during the race.
- Muscular strength significantly impacted the start phase of the sprint, aiding in powerful push-offs and rapid acceleration.
- Runners with higher endurance levels showcased consistent performance throughout the race.
- Improved endurance contributed to delayed fatigue, enabling runners to maintain speed until the finish line.
- Greater flexibility correlated with better stride length and range of motion.
- Flexible muscles reduced the risk of injury and facilitated smoother running mechanics, particularly during high-speed sprints.
- Good cardiovascular health positively influenced recovery time post-sprint.
- Efficient oxygen utilization enhanced runners' ability to maintain speed and recover swiftly between sprints.

The study confirmed a direct relationship between physical fitness components and short-distance running performance. Strength, endurance, flexibility, and cardiovascular health collectively contribute to a runner's ability to accelerate quickly, maintain speed,

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XII, Issue– VI (Special Issues-I) *Nov – Dec, 2023*

OPEN ACCESS Original Research Article

and recover efficiently. Training programs focusing on strength-building exercises like resistance training and plyometrics can improve initial acceleration. Endurance training, including interval runs and aerobic exercises, is crucial for maintaining speed and delaying fatigue. Incorporating flexibility routines like stretching and mobility exercises enhances stride efficiency and reduces injury risks. Cardiovascular training enhances oxygen uptake, benefiting both performance and recovery.

Conclusion and Future Aspects:

The study's exploration into the correlation between physical fitness and the performance of short-distance runners has yielded insightful findings. The meticulous analysis of various fitness parameters, including strength, endurance, flexibility, and agility, has underscored their pivotal roles in enhancing the runners' capabilities. Through meticulous data collection and analysis, this research has not only affirmed the significance of physical fitness in short-distance running but has also illuminated the specific areas where targeted training can yield significant improvements. The positive relationship between enhanced fitness levels and improved performance highlights the need for tailored training regimens that address individual weaknesses while optimizing strengths.

Furthermore, this study reinforces the importance of a holistic approach to training, encompassing not just physical conditioning but also nutritional considerations, rest, and recovery strategies. Such a comprehensive approach is crucial in maximizing an athlete's potential and ensuring sustained performance gains over time. As this research serves as a valuable resource for coaches, athletes, and sports scientists, providing evidence-based insights that can guide training programs aimed at optimizing short-distance runners' performance. It is hoped that these findings will contribute to the ongoing discourse in sports science and inspire further investigations into refining training methodologies for athletes aiming to excel in short-distance running events.

This research underscores the critical role of physical fitness in enhancing short-distance running performance. A holistic approach targeting strength, endurance, flexibility, and cardiovascular health is essential for optimizing a runner's capabilities and improving overall race outcomes. Further studies can explore specific training regimens tailored to individual runners' needs, considering their unique strengths and areas for improvement. Additionally, investigating the long-term effects of specialized training programs on short-distance runners' performance and injury prevention could provide valuable insights for coaches and athletes. The study drew upon prior research on athletic performance, fitness training methodologies, and physiological aspects of running to support its findings.

References:

Baumgartner, Ted. A. and Andrews, Jockson, "Measurement for Evaluation Physical Education and Exercise Science." 3rd Ed. (Iowa: C. Brown Publisher, 1987).

Carter, J.E.L. "Physical Structure of Olympic Athletics" (London: S. Karger, 1982).

Davis, B. "Physical Education and the Study of Sport." (UK: Harcourt Publishers Ltd., 2000).

Guliford, J.P., "Fundamental Statistics in Psychology and Education," Mc Graw Hill International Edition Singapore, 1978.

Hardayal Singh, "Sports Training General Theory and Methods," 1st Ed., (Patiala: Netaji Subhas National Institute of Sports, 1984).

Harold M. Barrow and Rosemary McGee, "A Practical Approach to Measurements to Physical Education." Second Edition (Philadelphia: Lea and Febiger, 1973).

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XII, Issue– VI (Special Issues-I) *Nov – Dec, 2023*

OPEN ACCESS Original Research Article

Sodhi H.S. and Sidhu L.S. "Physique and Selection of Sportsmen – 2017, Aryan Publication, Agra.

Cite This Article:

Palve S.K. & Dr. Pratale L.K. (2023). IMPACTFUL STUDY OF PHYSICAL FITNESS ON SHORT DISTANCE RUNNERS PERFORMANCE. In Aarhat Multidisciplinary International Education Research Journal: Vol. XII (Number VI, pp. 260–264). AMIERJ. https://doi.org/10.5281/zenodo.10518450