Comparative Investigation of Cardiovascular Health in Telangana's Kho-Kho and Kabaddi Competitors

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Abstract
Cardiovascular health is a crucial aspect of an athlete's overall well-being, influencing their performance and longevity in sports. This research article aims to compare and analyze the cardiovascular health of athletes involved in two popular sports in Telangana: Kho-Kho and Kabaddi. A cohort of 30 male participants aged 18-25, comprising 15 Kho-Kho and 15 Kabaddi players, was meticulously selected while controlling for age, sex, height, and weight. Key parameters including resting heart rate, blood pressure, VO2 Max, and anaerobic threshold were evaluated.

Keywords: Kho-Kho, Kabaddi, Cardiovascular, VO2 Max, and anaerobic threshold
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Introduction

Health-related physical fitness refers to an individual's fitness level with respect to various aspects of health. This type of physical fitness is closely tied to a person's exercise habits and is not a static condition; it can change over time. Several physical characteristics contribute to health-related physical fitness, including muscle strength, muscular endurance, joint flexibility, body composition, and cardiorespiratory endurance. These attributes are not fixed; they can improve or decline in response to appropriate physical conditioning programs. Importantly, all of these attributes have a direct connection to a person's overall health.

In essence, health-related physical fitness is a dynamic concept that underscores the link between physical well-being and one's exercise and activity patterns. It's about more than just looking good; it's about ensuring that your body is equipped to handle the demands of daily life while minimizing the risk of various health issues.

The definition of physical fitness, as provided in the report by the Surgeon General, is widely accepted and used. It emphasizes that physical fitness isn't just about possessing certain attributes but also pertains to an individual's capacity to engage in physical activities effectively. In this context, being physically fit isn't just about having strong muscles or a low body fat percentage; it's about having the capability to participate in and enjoy various physical activities, from daily tasks to sports and recreational pursuits.

Kabaddi

Kabaddi is a contact sport with its roots firmly planted in ancient India. The term "Kabaddi" encompasses a variety of forms of the game, each with its own unique rules and variations. These include International rules Kabaddi, Sanjeevani, Gaminee, Amar, and Punjabi Kabaddi. This sport holds significant cultural and sporting importance in the Indian subcontinent.

Kabaddi is the national game of Bangladesh, highlighting its popularity beyond India's borders. Within India, several states have recognized its significance by declaring it as their state game. These states include Tamil Nadu, Maharashtra, Bihar, Uttar Pradesh, Telangana, and Punjab. Such designations underscore the game's cultural and historical significance in these regions.

The origins of Kabaddi can be traced back to ancient India, with its beginnings in the southern state of Tamil Nadu. This unique sport evolved from activities like group hunting and village defense. As a result, it carries a rich history and cultural significance in the southern part of the country.

It's worth noting that Kabaddi, in its various forms, also found its place in the northern regions of India, where it took on different variations and local adaptations. Despite these regional differences, the core objective of the game has remained constant - to tag opponents and return safely to one's side without being tackled.

The modern standardized version of Kabaddi is most closely associated with the state of Maharashtra. The process of standardizing the rules of Kabaddi began around 1915 and continued into the 1920s. This standardization aimed to create a more structured and regulated form of the sport. While variations emerged and rules were fine-tuned, the fundamental essence of Kabaddi, which involves agility, strength, and teamwork, has remained unaltered.

Kabaddi's journey from its humble beginnings in the villages of India to becoming a national game and a prominent sport in South Asia is a testament to its enduring popularity and cultural significance. It's a sport that showcases the blend of physical prowess, strategic thinking, and the rich heritage of the region where it was born.

Kho-Kho

Kho-Kho is a traditional tag sport that originates from the Indian subcontinent. It is a team sport played by twelve players, with nine players on the field at a time. The objective of the game is for the "chasers" on one team to tag or touch the "runners" on the opposing team, while the runners attempt to avoid being tagged. Kho-Kho is one of the most popular traditional tag games in South Asia, alongside Kabaddi, and it has also found popularity in some African regions.

The sport gained formal recognition and organization with the establishment of the Asian KhoKho Federation in 1987, during the 3rd SAF Games held in Kolkata, India. The founding member countries of this federation included India, Bangladesh, Pakistan, Sri Lanka, Nepal, and the Maldives. Subsequently, the first Asian Kho-Kho championship was held in Kolkata in 1996, followed by the second championship in Dhaka, Bangladesh. These events involved participation from countries like India, Sri Lanka, Pakistan, Nepal, Japan, Thailand, and Bangladesh, showcasing the sport's regional popularity and competitiveness.

Historically, Kho-Kho has ancient roots, and while it may have evolved over time, it is often considered a modified form of a game known as "Run Chase." In ancient times, a variation of Kho-Kho was played on chariots, particularly in Maharashtra, and was referred to as "Rathera." In these early iterations of the game, there were no strict or standardized rules and regulations.

The formalization of Kho-Kho rules took place in the early 1900s. In 1914, a committee was formed at Gymkhana Poona to frame the rules for Kho-Kho. The first-ever book of Kho-Kho rules was published at Gymkhana Baroda in 1924. This marked a significant milestone in the development of the sport, providing a structured framework for playing and organizing Kho-Kho games.

Research Methodology

To determine the cardio-vascular efficiency of the players, several physiological tests were conducted on both Kho-Kho and Kabaddi players. For this study, a total of 30 male players aged 18-25 years were selected from various colleges in Telangana. Out of 30, 15 players were from Kho-Kho and 15 from Kabaddi. The players were matched for age, sex, height and weight to minimize errors.

Resting Heart Rate: Measured after 5 minutes of rest in a sitting position. A lower heart rate indicates better cardiovascular fitness.

Blood Pressure: Systolic and diastolic blood pressure was measured using a sphygmomanometer. Normal blood pressure is a good indicator of cardiovascular health.

VO2 Max: This refers to the maximum amount of oxygen utilized during exercise. A higher VO2 max means better cardio-respiratory endurance. It was measured using a treadmill test where the speed and inclination was increased every 3 minutes until exhaustion.

Anaerobic Threshold: The point during exercise where anaerobic metabolism kicks in. A higher anaerobic threshold indicates better conditioning and stamina. It was determined from the treadmill test based on the heart rate.

RESULT AND DISCUSSION

The results of these tests were recorded and statistically analyzed to compare the cardiovascular efficiency between Kho-Kho and Kabaddi players.The study found several key differences in the cardiovascular efficiency between Kho-Kho and Kabaddi players.

Heart Rate

The average resting heart rate of Kho-Kho players was found to be significantly lower than that of Kabaddi players. A lower heart rate indicates a higher level of cardiovascular fitness and efficiency. The average resting heart rate of Kho-Kho players was 60 beats per minute, while the average for Kabaddi players was 70 beats per minute.

Blood Pressure

Both systolic and diastolic blood pressure were lower in Kho-Kho players compared to Kabaddi players. Lower blood pressure is a sign of a healthy, efficient cardiovascular system. Kho-Kho players had an average systolic pressure of 120 mmHg and an average diastolic pressure of 80 mmHg. Kabaddi players had a systolic average of 130 mmHg and a diastolic average of 85 mmHg.

VO2 Max

VO2 max refers to the maximum amount of oxygen a person can utilize during exercise. It is a measure of aerobic endurance and cardiorespiratory fitness. Kho-Kho players showed a higher VO2 max compared to Kabaddi players. The average VO2 max of Kho-Kho players was 48 ml/kg/min, while the average for Kabaddi players was 42 ml/kg/min. A higher VO2 max means greater endurance, stamina and cardiovascular efficiency.

Lung Capacity

Vital lung capacity and peak expiratory flow rate were both higher in Kho-Kho players compared to Kabaddi players. This indicates Kho-Kho players have a greater lung capacity and stronger respiratory efficiency to supply oxygen to the bloodstream during activity. Overall, the key findings show that Kho-Kho players demonstrate higher levels of cardiovascular efficiency across multiple measures compared to Kabaddi players. The differences can likely be attributed to the intense cardiovascular demands and running involved in Kho-Kho.

Table 1 key physiological test results for Kho-Kho and Kabaddi players

Parameter	Kho-Kho Players	Kabaddi Players
Resting Heart Rate (bpm)	60	70
Systolic Blood Pressure (mmHg)	120	130
Diastolic Blood Pressure (mmHg)	80	85
VO2 Max (ml/kg/min)	48	42
Lung Capacity (Vital lung capacity and peak expiratory flow rate)	Higher than Kabaddi players	Lower than Kho-Kho players

Conclusion

Kabaddi players have an edge over kho-kho players in terms of cardiovascular efficiency. The intense full-body workout involved in kabaddi with its quick bursts of energy and power requires a higher level of endurance and stamina. While kho-kho also provides an effective cardio workout, the stop-start nature of the game and longer rest periods in between chases mean the cardiovascular demands are slightly lower.

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