E-ISSN: 2583-8296 Vol. 1, No. 2, Dec-2023 DOI: 10.60081/SSHA.1.2.2023.143-148

Original Article

Effects of circuit training on selected physical fitness components of kabaddi players

Deepak Kumar[1], Sandeep Kumar[2], Naveen Kumar[3], Siddharth Sagre[4*]

[1,2,3,4]Research scholar, Department of Physical Education and Sports, Central University of Haryana, India

***Correspondence:** sid143932@cuh.ac.in

Abstract

In physical health, body composition is used to explain the odds of fat, bone, and muscle in human bodies. Due to the fact, muscular tissue takes up less space in our body than fat tissue, our body composition, as well as our weight, determines leanness. Due to their unique body compositions, two persons of the same height and weight may appear different from one another. The goal of the current study was to determine the effects of circuit training on the physical fitness factor of Kabaddi players. For this purpose, 120 physically active male Kabaddi players were selected as subjects, and their ages varied from 20 to 30. The experimental group received 8 weeks of circuit training from the researcher, who also administered pre- and post-tests before and after the training period respectively. Five days a week, for eight-week training were given to the experimental group. The gathered results were examined using a t-test with a significance level of 0.05. The results of the test showed that the Kabaddi player's level of physical fitness had significantly improved.

Keywords: bodily health, agility, kabaddi, physical fitness, circuit training

How to cite: Kumar, D., Kumar, S., Kumar, N., Sagre, S. (2023). Effects of circuit training on selected physical fitness components of kabaddi players. *Sports Science & Health Advances*. 1(02), 143-148. https://doi.org/10.60081/SSHA.1.1.2023.143-148

Received: 22-12-2023

Accepted: 25-12-2023

Published: 30-12-2023

Introduction

Circuit training is a method of conditioning combining resistance training and intense aerobics exercise (D. Kumar, Dhull, et al., 2023; NARA et al., n.d.; Nara, Kumar, Rathee, & Kumar, 2022). It is intended to be simple to follow and concentrate on building both muscular endurance and energy. A whole list of the recommended sports activities inside the program makes up a "circuit" for exercising (Deepak Kumar, 2023; Deepak & Yadav, 2016; NARA et al., 2022). Once one circuit is complete, one begins the main exercise a second time for any further circuits In circuit training, physical activity periods have generally been brief, with quick transitions to the next exercise(Deepak et al., 2022; D. Kumar & Dhull, 2023; Nara, Kumar, Rathee, & Phogat, 2022). A great approach to increasing flexibility, strength, and endurance is circuit training contains 6 to ten electricity sporting activities that might be finished one exercise after some other. Every exercise is accomplished for a precise range of repetitions or for a fixed time earlier than moving directly to the following workout(D. Kumar, Nara, et al., 2023). The physical games inside each circuit are separated by using a short relaxation period and every circuit is separated using a longer relaxation length. the full variety of circuits finished in the course of a training session may additionally vary from two to 6 relying on your training age (amateur, intermediate or advanced) and goal. Circuit training is an evolving exercise application that was evolved using R.E. Morgan and G.T. Anderson in 1953 at the college of Leeds in England. Weight training is a topnotch method for boosting stamina and endurance(Dhull, 2017; Kasnia & Dhull, 2022; D. Kumar & Dhull, 2023). Not all weightlifting techniques result in the same degree of muscular hypertrophy. Maintaining muscle strength, muscular endurance, neuromuscular

coordination, and bone density is made easier by weight training. When playing kabaddi, simple techniques like retaining, utilizing, blocking, and breath keeping are essential(D. Kumar, Dhull, et al., 2023; Nara, Kumar, Rathee, & Kumar, 2022; Parveen, 2018). While it is true that these are the fundamental capabilities required of all Kabaddi players, the performance capability depends on certain factors. The coaches and trainers won't be able to determine players' performances through subjective observation. A lot more spectacular manner might be aided by a scientific evaluation of the participant's entire performance concerning their talents. Regrouping and synchronizing the available group capabilities, will not only permit the proper kind of choice based on scientific data but also aid in maximizing the player's potential(Dhull, 2018; George & Dhull, 2023; D. Kumar & Dhull, 2023). Therefore, research on scientific training and the performance of the players may bring the selection, performance, and monitoring of recreation strategies up to date. The players on the team may be from a specific age group, as in the case of college groups, and their general abilities may measure to a modern level, ensuring the selection of their respective university groups, but their levels of overall performance may also vary, indicating the success or failure of their groups.

A successful performance against an opponent in sports heavily depends on the players' physical attributes, body composition, muscular functionality, neuromuscular functionality, and mental capacity(Dey et al., 1993; S. Kumar et al., n.d.; Sidhu, 1986). Agility The word "agility" is frequently seen as an essential component of many sports. Agility can be demonstrated by a wrestler accomplishing a takedown, a ballet dancer doing a pirouette, or a boxer dodging a punch. However, those interested in the development and enhancement of athletic performance typically view agility as a locomotor skill that allows athletes to change their path. Football, basketball, and handballs are a few of the field and court games where this type of action is frequently seen. In this light, agility is usually described as an effective and quick coupling of braking, changing direction, and accelerating once more while keeping the motor manipulated in either a vertical or horizontal direction (Drabik, 1996, Plisk, 2000 and Verstegen & Marcello, 2001). it's miles the potential to change the position entirely and accurately either in the area or in the ground (Wynn & Johnson, 1970). An athlete that displays excellent agility will most possibly possess other features inclusive of dynamic stability, spatial consciousness, and rhythm, in addition to visible processing (Ellis et al., 2000). So even as agility can be without a doubt described as a capacity to fast stop and re-begin movement, there may be an excessive diploma of complexity to this motor skill. Physical fitness is a basic prerequisite for most of the responsibilities that a person must carry out in a day of life. The most valuable property somebody can have is physical fitness, which is best acquired through frequent training in physical athletic activities. There is a close relationship between physical health and athletic performance. If the level of video games and sports in the United States is to rise, acceptable stress needs to be given to improve the reputation of athletes' physical fitness. Ordinary participation in the schooling timetable improves all the essential bodily, physiological, and mental fitness additives. R. E. Morgan and G. T. Anderson developed circuit training at the University of Leeds in England in 1953. (Sorani, 1966). The term circuit refers to some cautiously decided physical activities organized consecutively. In the authentic format, 9 to 12 stations comprised the circuit. This quantity may additionally range in keeping with the layout of this system. every player action from one station to the next with little (15 to 30 seconds) or no rest, appearing a 15 to 45, 2nd exercise of 8 to 20 repetitions at every station (the use of the resistance of about 40% to 60% of one-repetition most). The program may be completed with exercising machines, hand-held

weights, elastic resistance, calisthenics, or any combination. Kabaddi is a game of pace, power, approach, and, most significantly, lung power.

Methodology

For this study, 120 Kabaddi players between the ages of 20 and 30, who played at least inter-school competitions were chosen as a sample. The age of the subjects is revealed by their anxious school information. The screening did not cover the kids who had any injuries or illnesses. It was highlighted that all students should turn in their excellent work to get reliable results. All 120 of these individuals engaged in activities following their repeating patterns and had experience with experimental groups. Even though the participants of the observation did not fully understand the aim of the observation, attempts were made to help them understand the tools of the observation and the task that needed to be accomplished by them. Inquiring about their physical education teachers, who addressed them and encouraged them to collaborate during the study's examination, ensuring that a motivating strategy was employed to find their greatest level of collaboration.

Results

Pre and post-test were conducted before and after the training period. And the statistics had been analyzed via the usage of a t-test to know the difference between the groups.

Table 1 Analysis of Circuit Training program on Physical Fitness Variables (Sit-Ups)

Sit-Ups	Mean	SD	t-value
Pre-Test (n=120)	45.14	6.16	5.8124*
Post- Test (n=120)	53.16	5.97	

*Significance at .05 level of significant

The means scores of Pre and post-circuit training were 45.14 and 53.16 respectively and the SD of Pre and post-circuit training were 6.16 and 597 respectively and the calculated "t" value of 5.8124 which was more than the table value at 0.05 level of significance. Hence, we can say that a significant difference exists between the Pre and Post Circuit Training programs on Sit up items of physical fitness variables and the hypothesis of the research was rejected.

Table 2 Analysis of Circuit Training program on Physical Fitness Variables (Pull-Ups)

Pull-Ups	Mean	SD	t-value
Pre-Test (n=120)	13.55	4.8	4.726*
Post- Test (n=120)	23.52	4.2	

*Significance at .05 level of significant

The means scores of Pre and post-circuit training were 13.55 and 23.52 respectively and the SD of Pre and post-circuit training were 4.2 and 4.8 respectively and the calculated "t" value of 4.726 which was more than the table value at 0.05 level of significance.

Hence, we can say that a significant difference exists between the Pre and Post Circuit Training programs on pull-up items of physical fitness variables and the hypothesis of the research was rejected.

Table 3 Analysis of Circuit Training program on Physical Fitness Variables (Shuttle Run)

Pull-Ups	Mean	SD	t-value
Pre-Test (n=120)	25.33	3.4	5.123*
Post- Test (n=120)	23.15	2.8	

*Significance at .05 level of significant

The means scores of Pre- and post-circuit training were 25.33 and 23.15 respectively and the SD of Pre and post-circuit training were 3.4 and 2.8 respectively and the calculated "t" value of 5.123 which was more than the table value at 0.05 level of significance. Hence, we can say that a significant difference exists between the Pre and Post Circuit Training program on Shuttle Run items of physical fitness variables, and the research hypothesis was rejected.

Table 4 Analysis of Circuit Training program on Physical Fitness Variables (Standing Broad Jump)

Standing Broad Jump	Mean	SD	t-value
Pre-Test (n=120)	3.46	0.28	3.096*
Post- Test (n=120)	1.93	0.32	

*Significance at .05 level of significant

The means scores of Pre and post-circuit training were 3.46 and 1.93 respectively and the SD of Pre and post-circuit training were .28 and .32 respectively and the calculated "t" value of 3.096 which was more than the table value at 0.05 level of significance. Hence, we can say that a significant difference exists between the Pre and Post Circuit Training program on Standing Broad Jump items of physical fitness variables, and the research hypothesis was rejected.

Discussion

The study aimed to investigate the impact of circuit training on the physical fitness of Kabaddi players. The participants, 120 physically active male Kabaddi players aged 20 to 30, underwent an 8-week circuit training program. The study assessed physical fitness variables such as sit-ups, pull-ups, shuttle run, and standing broad jump before and after the training period using a t-test with a significance level of 0.05.

Circuit Training and Physical Fitness

Circuit training, a combination of resistance training and intense aerobic exercise, has been widely acknowledged for its simplicity and effectiveness in enhancing both muscular endurance and energy. The study employed a program involving 6 to 10 exercises performed consecutively with short rest intervals. The rationale behind circuit training lies in its ability to improve flexibility, strength, and endurance. Developed in 1953, it has evolved into a versatile exercise program with various formats and equipment options.

Kabaddi and Physical Performance

The study focused on Kabaddi players, emphasizing that success in the sport relies on factors such as body composition, muscular functionality, neuromuscular coordination, and mental capacity. Traditional assessments of players often fall short, highlighting the need for scientific evaluations to optimize player selection, performance, and strategy.

Agility as a Key Factor

Agility, defined as the ability to rapidly change direction while maintaining control, is considered a fundamental skill in many sports. In the context of Kabaddi, agility involves dynamic stability, spatial awareness, rhythm, and visual processing. The study recognizes the complexity of agility as a motor skill and its significance in overall athletic performance.

Practical Implications

The study's outcomes carry practical implications for the training and conditioning of Kabaddi players. Circuit training emerges as an effective method

for enhancing leg strength, leg explosive power, and abdominal strength endurance. Coaches and trainers can consider incorporating circuit training into the regular training regimen to optimize the players' physical performance. The results of the study indicate significant improvements in physical fitness variables after the 8-week circuit training program. The t-test analyses revealed notable increases in sit-ups, pull-ups, shuttle run, and standing broad jump. The findings reject the null hypotheses, suggesting that circuit training positively influenced the participants' physical fitness levels.

Conclusion

Circuit training helps to develop or maintain physical fitness and overall health. It is evident from a number of the adaptations that occur with circuit training that there are several health-related benefits. Circuit training has been shown to increase factors associated with Physical fitness. The results of the study provided evidence, that circuit training is an effective method for developing physical fitness variables such as leg strength, leg explosive power, and abdominal strength endurance. The study provides empirical evidence supporting the effectiveness of an 8-week circuit training program in improving physical fitness variables among Kabaddi players. The findings contribute to the understanding of the role of circuit training in enhancing specific aspects of athletic performance, highlighting its potential applications in sports training programs.

Conflict of interest: No conflict of interest

References

Baechle, T. R., & Earle, R. W. (Eds.). (2008). Essentials of strength training and conditioning. Human kinetics.

Baudr, S., & Roux, P. (2009). Specific circuit training in young judokas: Effects of rest duration. Research quarterly for exercise and sport, 80(2), 146-152.

Berryman, N., Maurel, D., & Bosquet, L. (2010). Effect of plyometric vs. dynamic weight training on the energy cost of running. The Journal of Strength & Conditioning Research, 24(7), 1818-1825.

Ackland, T. R., Elliott, B., & Bloomfield, J. (2009). Applied anatomy and biomechanics in sport. Human Kinetics.

Craig, B. W. (2004). What is the scientific basis of speed and agility? Strength & Conditioning Journal, 26(3), 13-14.

Drabik, J. (1996). Children and sports training. Island Pond, VT: Stadion Publishing Company.

Ellis, L. (2000). Protocols for the physiological assessment of the team sport players. Physiological tests for elite athletes, 128-144.

Field, A. (2000). Advanced techniques for the beginner: exploring data. Discovering statistics using SPSS for windows

Fisher, A. G., & Jensen, C. R. (1990). The scientific basis of athletic conditioning.

Lea & Febiger. Sukumar, M. (2017). Effect of plyometric exercises on agility among the netball players. International Journal of Physical Education, Sports, and Health, 4(1), 277-279.

Kansal, D. K. (2008). Applied measurement, evaluation, and sports selection. SSS Publication New Delhi.

Luebbers, P. E., Potteiger, J. A., Hulver, M. W., Thyfault, J. P., Carper, M. J., & Lockwood, R. H. (2003). Effects of plyometric training and recovery on vertical jump performance and anaerobic power. The Journal of strength & conditioning research, 17(4), 704-709.

Nara, K. (2017). A study of physical fitness between basketball and football players of Haryana. International Journal of Physiology, Nutrition and Physical Education, 2(1), 1–4.

Nara, K., Kumar, P., Rathee, R., & Kumar, J. (2022). The compatibility of running-based anaerobic sprint test and Wingate anaerobic test: a systematic review and meta-analysis. Pedagogy of Physical Culture and Sports, 26(2), 134–143.

Nara, K., Kumar, P., Rathee, R., Kumar, S., Pal, R., AHLAWAT, J. S., & SINGH, S. (2022). Grip strength performance as a determinant of body composition, muscular strength and cardiovascular endurance. Journal of Physical Education and Sports, 22(7), 1618–1625.

Nara, K., Kumar, P., Rathee, R., & Phogat, P. (2022). Predicting lower body explosive strength using hand grip dynamometer strength test.

Parsons, L. S., & Jones, M. T. (1998). Development of speed, agility, and quickness for tennis athletes. Strength & Conditioning Journal, 20(3), 14-19.

Parveen, D. J. P. (n.d.). Developing a Regression Model for Psychological Factors Predictor of Sports Injuries. Int. J. Phy. Edu. Spo, 3(04), 75–79. Singh, M., & Sharma, A. K. (2020).

Deepak Kumar, S. D. K. N. (2023). Effect of Plyometric Training on Body Composition of Kabaddi Players. Atishay Kalit Volume 10 Issue 18 Pages 424-431, 10(18), 424–431.

Deepak, N. K., & Yadav, A. (2016). Contribution of sports and games for the promotion of health and sanitation in India. Development, 4, 32–36.

Deepak, N. K., Yadav, A., & Sagre, S. (2022). Relationship between motor ability and anthropometric components of Kho-Kho and Kabaddi players.

Dey, S. K., Khanna, G. L., & Batra, M. (1993). Morphological and physiological studies on Indian national kabaddi players. British Journal of Sports Medicine, 27(4), 237–242.

Dhull, S. (2017). A Comparative study of Sports Achievement Motivation among National Level Athletes. Int. J. Phy. Edu. Spo, 2(12), 43–45.

Dhull, S. (2018). Comparative study of selected physical fitness parameters on the students of technical and non-technical institutes.

George, M., & Dhull, S. (2023). The role of physical educators in mitigating health risks among adolescents from increasing screen time. Sports Science & Health Advances, 1(01), 31–35.

Kasnia, S., & Dhull, S. (2022). Study of Sports Psychological Variables in Relation to Different Playing Positions in Field Hockey. Defenders, 50(18.52), 3–49.

Kumar, D., & Dhull, K. N. S. (2023). A comprehensive analysis of circuit training: Assessing the benefits and drawbacks for diverse fitness goals. Journal of Sports Science and Nutrition, 4(1), 190–193.

Kumar, D., Dhull, S., Nara, K., & Kumar, P. (2023). Determining the optimal duration of plyometric training for enhancing vertical jump performance: a systematic review and meta-analysis. Health, Sport, Rehabilitation, 9(3), 118–133.

Kumar, D., Nara, K., & Dhull, S. (2023). The advantage and disadvantage of body composition on athletic success: A kabaddi player perspective. Methods, 1, 19.

Kumar, S., Mazumdar, I., Choudhary, S., & Dhull, S. (n.d.). Analysis of stress, coping strategies and happiness of urban and rural students during COVID-19 pandemic: A cross sectional study. International Journal of Health Sciences, I, 7639–7651.

NARA, K., KUMAR, P., KUMAR, R., & SINGH, S. (n.d.). Normative reference values of grip strength, the prevalence of low grip strength, and factors affecting grip strength values in Indian adolescents.

Nara, K., Kumar, P., Rathee, R., & Kumar, J. (2022). The compatibility of running-based anaerobic sprint test and Wingate anaerobic test: a systematic review and meta-analysis. Pedagogy of Physical Culture and Sports, 26(2), 134–143.

NARA, K., KUMAR, P., RATHEE, R., KUMAR, S., Pal, R., AHLAWAT, J. S., & SINGH, S. (2022). Grip strength performance as a determinant of body composition, muscular strength and cardiovascular endurance. Journal of Physical Education and Sports, 22(7), 1618–1625.

Nara, K., Kumar, P., Rathee, R., & Phogat, P. (2022). Predicting lower body explosive strength using hand grip dynamometer strength test.

Parveen, D. J. P. (2018). Developing a Regression Model for Psychological Factors Predictor of Sports Injuries. Int. J. Phy. Edu. Spo, 3(04), 75–79.

Sidhu, H. (1986). Kabaddi: A Vigorous Game. Journal of Physical Education, Recreation & Dance, 57(5), 75–77.