

Muhamad Noor Mohamed . Raja Nurul Jannat Raja Hussain .
Mardiana Mazaulan . Noor Azila Azreen Md Radzi .
Nurul Ain Abu Kasim . Nur Hani Syazwani Bakri .
Umami Khaltum Mohd Mokhtar . Mohd Aizzat Adnan .

Editors

Proceedings of the 1st International Summit Conference on Exercise Science, Sports Management, Outdoor Recreation, and Physical Education, ExSPORT 2024, 28th - 29th August, Malaysia

*Exporting Research Insights to Practical Applications in Sports
Turning Challenges into Opportunities*

ORGANIZED BY



IN COLLABORATION



SUPPORTED BY



Comparison Between Individual and Team Sports in Physical Fitness During the Pre-Competition Phase



Nurshammeza Mohd Shamsul, Maisarah Shari, Mardiana Mazaulan, Sharifah Maimunah Syed Mud Puad, Nurul Ain Abu Kasim, and Raja Nurul Jannat Raja Hussain*.

Abstract | Periodization divides training into phases. The pre-competition phase focuses on sport-specific skills and intensity. This study compared individual and team sport athletes. Results showed no significant differences in body composition, flexibility, muscular power, or cardiovascular endurance. However, individual sport athletes had lower muscular endurance than team sport athletes. This suggests that training programs should be tailored to each sport's needs during the pre-competition phase. Further research is needed to understand factors and evaluate the effectiveness of tailored interventions. Data were analyzed using independent t-tests to compare the physical fitness variables between individual and team sports athletes. The independent t-test analysis revealed that there were no significant differences between individual and team sports athletes in body composition (BMI: individual sports = 21.17 ± 3.05 , team sports = 21.39 ± 2.83 , $t(90) = -0.346$, $p = 0.730$), flexibility (sit-and-reach test: individual sports = 37.48 ± 6.59 cm, team sports = 39.61 ± 5.69 cm, $t(90) = -1.658$, $p = 0.101$), muscular power (countermovement jump test: individual sports = 41.17 ± 11.16 , team sports = 41.68 ± 13.85 , $t(90) = -0.195$, $p = 0.846$), and cardiovascular endurance (yoyo endurance test: individual sports = 43.28 ± 7.89 ml/kg/min, team sports = 40.33 ± 7.43 ml/kg/min, $t(90) = 1.846$, $p = 0.068$). However, a highly significant difference was found in muscular endurance between the two groups during the pre-competition phase (1-minute push-up test: individual sports = 27.65 ± 12.24 , team sports = 40.33 ± 7.43 , $t(90) = 4.357$, $p < 0.01$). This study indicates that while body composition, flexibility, muscular power, and cardiovascular endurance do not significantly differ between individual and team sports athletes during the pre-competition phase, muscular endurance does show a marked difference. These findings suggest that training programs during the pre-competition phase may need to be tailored differently for individual and team sport athletes to address specific fitness components effectively. Future research should explore the underlying factors contributing to these differences and evaluate the long-term impacts of tailored training interventions on athletic performance.

Keywords: *Individual sports, team sports, physical fitness, pre-competition phase, periodization.*

N., Mohd Shamsul, M., Mazaulan, S.M., Syed Mud Puad, N.A., Abu Kasim, and R.N.J., Raja Hussain* (✉).
Faculty of Sports Science and Recreation, Universiti Teknologi MARA Negeri Sembilan Branch, Seremban Campus, Malaysia.

*Corresponding author: nuruljannat@uitm.edu.my

M., Shari.
Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Shah Alam Campus, Selangor, Malaysia.

I. INTRODUCTION

In recent decades, performance monitoring has become an integral part of sports practice globally, providing essential insights for coaches and sports scientists to optimize athlete performance [1]. Performance monitoring plays a pivotal role in identifying athletes with potential, selecting individuals for elite teams, and predicting future performance [2]. The pre-competition phase is a critical period in an athlete's training cycle, where the focus shifts from general fitness to refining sport-specific skills and optimizing physical performance [3]. This phase is essential for both individual and team sports, although the physical and tactical demands differ significantly between these two types of sports. Research indicates that individual sports athletes tend to excel in specific physical fitness components like flexibility, upper body strength, leg power, and agility [4]. On the other hand, team sports athletes show variations in body composition, with differences in lean body mass composition noted between sport categories, while fat mass may not significantly differ among male athletes [5]. Given these differing demands, this study aims to compare the physical fitness components of athletes involved in individual versus team sports during the pre-competition phase. Understanding these differences is crucial for tailoring training programs that effectively prepare athletes for the specific challenges they will face in competition.

II. METHODS

A total of 92 SUKMA athletes were recruited for this study, consisting of 42 individual sports athletes (participating in tennis, karate, pencak silat, and muaythai) and 42 team sports athletes (participating in basketball, cricket, and volleyball). The participants underwent a series of physical fitness assessments, including body mass index (BMI), sit-and-reach test, Yoyo endurance test (YYET), countermovement jump test (CMJ), and one-minute push-up test. These assessments were conducted both before and after the athletes' preparatory phase to evaluate changes in BMI, flexibility, cardiovascular endurance, muscular power, and muscular endurance.

III. RESULTS AND DISCUSSION

Results in Table 1 revealed that there were no significant differences between individual and team sports athletes in body composition (BMI: individual sports = 21.17 ± 3.05 , team sports = 21.39 ± 2.83), flexibility (sit-and-reach test: individual sports = 37.48 ± 6.59 cm, team sports = 39.61 ± 5.69 cm) muscular power (countermovement jump test: individual sports = 41.17 ± 11.16 , team sports = 41.68 ± 13.85), and cardiovascular endurance (yoyo endurance test: individual sports = 43.28 ± 7.89 ml/kg/min, team sports = 40.33 ± 7.43 ml/kg/min). However, a highly significant difference was found in muscular endurance between the two groups during the pre-competition phase (1-minute push-up test: individual sports = 27.65 ± 12.24 , team sports = 40.33 ± 7.43).

TABLE 1
COMPARISON BETWEEN INDIVIDUAL AND TEAM SPORTS IN PHYSICAL FITNESS

| Variables | Statistic | df | p-value |
|--------------------------|-----------|------|---------|
| Body Mass Index | -0.346 | 90.0 | 0.730 |
| Flexibility | -1.658 | 90.0 | 0.101 |
| Muscular Power | -0.195 | 90.0 | 0.846 |
| Cardiovascular Endurance | 1.846 | 90.0 | 0.068 |
| Muscular Endurance | 4.357 | 90.0 | < 0.001 |

The results of this study provide important insights into the physical fitness differences between athletes involved in individual and team sports during the pre-competition phase. As shown in Table I, there were no significant differences between individual and team sports athletes in body composition (BMI), flexibility, muscular power, and cardiovascular endurance. The research findings from multiple studies provide insights into the comparison of body composition, flexibility, muscular power, and cardiovascular endurance between individual and team sports athletes. Studies [6] indicate that there were no significant differences in body composition metrics such as BMI between individual and team sports athletes. Additionally, researcher [4] highlight that various physical fitness parameters, including flexibility, muscular power, and cardiovascular endurance, did not significantly differ between these two groups. These results suggest that while there may be differences in specific body composition components like lean body mass, the overall physical fitness aspects analyzed across these sports categories show no significant disparities, emphasizing the importance of tailored training programs to meet the unique demands of individual and team sports.

However, a highly significant difference was observed in muscular endurance, with team sports athletes outperforming their individual sports counterparts in the one-minute push-up test. The research data from various studies indicates that there is a significant difference in muscular endurance between team sports athletes and individual sports athletes [4] [7]. Muscular endurance was found to be notably higher in team sports athletes compared to individual sports athletes, showcasing superior physical fitness levels in the former group. This difference in muscular endurance could be attributed to the specific training regimens and demands of team sports, which likely emphasize endurance and strength components to a greater extent. Additionally, the results suggest that team sports athletes tend to excel in various physical fitness parameters, highlighting the importance of considering the specific requirements of different sports disciplines when assessing athletes' performance levels [4] [7].

IV. CONCLUSIONS

In conclusion, the findings of this study reveal that while no significant differences exist in body composition, flexibility, muscular power, and cardiovascular endurance between individual and team sports athletes, a notable difference is present in muscular endurance, with team sports athletes demonstrating superior performance. This emphasizes the importance of sport-specific training, particularly in enhancing muscular endurance for team sports. Coaches and trainers should consider these differences when developing pre-competition training programs, ensuring that athletes are adequately prepared for the unique demands of their sport. Future research should explore the underlying factors contributing to these

differences and investigate how targeted training interventions might further improve performance in both individual and team sports contexts.

ACKNOWLEDGEMENTS We would like to extend our heartfelt gratitude to all the authors who contributed to this study: Nurshammeza Mohd Shamsul, Maisarah Shari, Mardiana Mazaulan, Sharifah Maimunah Syed Mud Puad, and Nurul Ain Abu Kasim. Their collective efforts, valuable insights, and unwavering commitment were instrumental in the successful completion of this research. We appreciate their dedication and collaboration throughout the entire process.

REFERENCES

- [1] R. Vaeyens, M. Lenoir, A. M. Williams, and R. M. Philippaerts, "Talent identification and development programmes in sport," *Sports Medicine*, vol. 38, no. 9, pp. 703-714, 2012, doi: 10.2165/00007256-200838090-00001.
- [2] A. Abbott and D. Collins, "A Theoretical and empirical analysis of a 'State of the Art' talent identification model," *Taylor & Francis Online*, vol. 13, no. 2, pp. 157-178, 2010, doi: 10.1080/1359813022000048798.
- [3] V. Adamchuk, N. Shchepotina, V. Kostiukevych, O. Borysova, V. Bohuslavskaya, V. A. Tyshchenko, V. Ovcharuk, A. E. Bondar, and V. Poliak, "Optimization of the training process of highly qualified athletes in athletics combined events at the stage of direct preparation for competitions," *Teoriya i Metodika Fizychnoho Vychovannya*, 2023.
- [4] A. K. Noor, M. R. Abdullah, R. M. Musa, V. Eswaramoorthi, B. H. M. Musawi, A. M. A. Rasid, and A. Nadzmi, "Physical fitness performance comparison based on body mass index between individual sports and team sports athletes," *International Journal of Academic Research in Progressive Education and Development*, vol. 11, no. 1, p. 12057, 2022, doi: 10.6007/ijarped/v11-i1/12057.
- [5] U. Azmy, N. Rahmaniah, A. R. Renzytha, D. R. Atmaka, R. Pratiwi, M. Rizal, S. Adiningsih, and L. Herawati, "Comparison of body compositions among endurance, strength, and team sports athletes," *Sport Mont*, 2023, doi: 10.26773/smj.231007.