



Comparative Study on Selected Fitness Components Between Individual and Team Games Players and its Relationship with Their Mental Toughness

Sonu Kumar • Mukul Pant • Hiralal Yadav*

Department of Physical Education, HNB Garhwal University, Srinagar, Uttarakhand, India- 246174

*Corresponding Author Email id: hiralal08@gmail.com

Received: 16.05.2024; Revised: 12.06.2024; Accepted: 13.06.2024

©Society for Himalayan Action Research and Development

Abstract: The study aimed to compare selected fitness components and their relationship with mental toughness between individual and team game players. Participants included 200 male players (100 each from individual and team sports), aged 18 to 26, from Hemvati Nandan Bahuguna Garhwal University, Uttarakhand, India. The fitness components measured were explosive strength (medicine ball throw), muscular endurance (bent knee sit-ups), muscular power (standing broad jump), speed (50m dash), and cardiovascular endurance (800m run/walk test). Mental toughness was assessed using the Sports Mental Toughness Questionnaire (SMTQ) by Sheard, Golby, and Van Wersch (2009). Descriptive statistics, t-tests, and Pearson's Product Moment Correlation (PPMC) were used for data analysis, with significance set at 0.05. Results indicated significant differences in speed, explosive strength, muscular power, cardiovascular endurance, and mental toughness between individual and team players, but no significant difference in muscular endurance. There was a significant positive relationship between cardiovascular endurance and mental toughness, and a significant negative relationship between mental toughness and speed, explosive strength, muscular power, and muscular endurance. The study concluded that male team game players outperformed their individual counterparts in speed, explosive strength, muscular power, and cardiovascular endurance. Both groups were similar in muscular endurance. Additionally, mental toughness was positively related to cardiovascular endurance but negatively related to other fitness components in both groups at the university level.

Keywords: mental toughness • fitness variables • individual game • team game

Introduction

Human being is a psycho-physical entity, working as a unit requires contribution of variables belonging to both domains. In sports, like any other physical activity, psyche and soma component needs to be in sync to execute movement smoothly and successfully. In the modern era, "sports for all" has grown in popularity all over the world. Sports have changed significantly over the years, becoming more scientific, mass-oriented, well-organized, and health-focused. These changes have elevated participants' mental and physical fitness, improved participants' ability to

concentrate mentally, and brought honor and social dignity to the successful dealing with participants who put more effort into physical fitness (Halder and Rahaman 2022).

In recent times, large number of sport persons (male & female) are opting for physical education course as their ultimate career choice, especially players participating at university level of competition. This option provides them lifetime opportunity to indulge with the game they loved most and the playing experience help them in getting the nuances of this field and becoming a successful professional in the field of teaching or coaching. Physical education is linked to the



acquisition of skills and the improvement of fitness through physical activity, as the majority of "Education Through Physical" involves the development of specific skills in games and sports (Kuldeep Singh 2018). These specific abilities can be described as those physical feats that give each game and sport its distinctive character due to things like motor capacity (inborn talent), motor educability (ability to pick up new skills), and motor fitness (acquired or inborn ability to perform motor activity) (Kansal 2012).

Over the years, sports and games are classified on the basis of different criteria. The criteria based on number of participants is most prevalence as team & individual games. A sportsman's performance in both team and individual competitions is influenced by a variety of factors. The same is true for team and individual game sports performance at elite as well as professional levels. Human body composition and physical fitness factors play an important role in the performance of sportsmen (Ahlawat 2016).

Physical fitness includes elements like strength, endurance, power, speed, agility, balance, and flexibility, all of which are essential for improving performance in games and sports. Coaches and athletes focus the majority of sports training on promoting physical fitness because it is so obvious how important physical fitness is for athletic performance (Kumar 2013). The goal of sports training is to create this kind of news in a way that satisfies the demand of each sport. Physical education includes learning about physical activities, acquiring fitness, and enhancing motor skills to promote long-term health and well-being. Several research studies in the fields of physical education and sports have shown that regular exercise raises one's level of physical fitness and increases one's capacity to perform a variety of physical tasks (Ananth 2018).

Furthermore, physiological, psychological, and physical factors that are necessary for

athletic excellence are also involved in the success of team and individual sports. The combination of physical fitness aspects related to health and skills has an impact on many athletes' plays both on teams and individually in the modern era (Das and Sharma 2016). Contrary to this, the majority of the team and individual game sports place higher demands on collective and cooperative fitness orgasm than they do on precise, correct, and fine motor skills, tactical attributes, playing style, seasonal time, or individual and team morale, respectively. However, "the most important of them is the cardiorespiratory endurance because of the complex nature of physical fitness, which includes muscular strength, muscular endurance, and cardiorespiratory endurance" (Karpovich and Wayne 1971).

Since 2000, there has been a lot of progress in the field of sports psychology regarding the idea of mental toughness. Researchers and professionals have looked closely at the variables that are connected to high-level performance to better understand this phenomenon. Sports psychologists, coaches, and athletes have all emphasized the critical role that mental toughness plays in achieving peak performance and sporting success (Uluoz 2023).

"The capacity of athletes to cope more successfully than their competitors with potential challenges that may arise in training and competitive environments; to possess determination, focus, and self-control in high-pressure situations" is the definition of mental toughness (Miçooğulları 2017). Despite the diversity of definitions of mental toughness, academics have concluded that mental toughness is a psychological resource that enables people to maintain stability while achieving the desired performance level under pressure and stress. It should be noted that mental toughness is a key psychological factor linked to sports success and performance (Brito et al 2023).



Physical fitness and mental toughness have a complex and supportive relationship. Physical fitness and mental toughness go hand in hand (Kornspan 2020). Through physical fitness training, mental toughness can be built and strengthened, which improves one's capacity to pursue and maintain physical fitness goals. Better general health, well-being, and performance in a variety of spheres of life are ultimately benefits of the interaction between mental toughness and physical fitness (Clough 2005).

Purpose of Study: This study was designed to compare the selected fitness components between male individual and team games university players and find out their relationship with their mental toughness.

Methodology

For the purpose of this study total 200 male (100 Individual and 100 Team Game players) subjects were selected for the study age ranged between 18 to 26 years from the Hemvati Nandan Bahuguna Garhwal University, Srinagar, (Uttarakhand). The level of performance was considered at the Inter-University participation. The selected fitness components were explosive strength, muscular endurance, muscular power, speed, and cardiovascular endurance, and psychological variables are mental toughness.

Tools used for data collection

The criterion measure for selected fitness components is explosive strength was assessed by medicine ball throw, muscular endurance was assessed by bent knee sit-ups, leg explosive/muscular power was assessed by standing broad jump, speed was assessed by 50m dash, and cardiovascular endurance was assessed with 800 run/walk test. The mental toughness was assessed by using the sports mental toughness questionnaire (SMTQ) developed by Michael Sheard, Jim Golby, and Anna Van Wersch in 2009. Sports Mental Toughness Questionnaire (SMTQ) comprises of three sub-scale i.e., Confidence,

Consistency, and control. It has a total 14 statements on a 4-point Likert scale anchored by Very true, mostly true, A Little true, and Not at all true. The scoring of the questionnaire is based on the following norms which is statement 1 to 8 are positively scored (i.e., A=4, B=3, C=2, D=1) and statement 9 to 14 are negatively scored (i.e., A=1, B=2, C=3, D=4). The composite scored for all the statement range are minimum (17) and Maximum (56) (Sheard et al., 2009).

Collection of Data

Data on selected Physical fitness components was taken on the sports complex ground of the university. The data on mental toughness was collected by using SMTQ. The subjects were sensitised about the significance of study and oriented about the process, they duly supported the cause.

Statistical Technique: For analysis of data the descriptive statistics, t-test was applied to analyse and compare the selected fitness components between team and individual games players of inter-university. The relationship between fitness components and mental toughness was measured by using PPMC test. The level of significance was set at 0.05 level.

Results

Data regarding Selected Fitness Components and Mental Toughness for Individual and Team Games Players is presented in Table 1. From Table 1 it is evident that the mean and SD of individual and team games players on speed are 8.21 ± 0.85 and 8.11 ± 1.00 and explosive strength are 6.54 ± 1.49 and 7.07 ± 1.58 respectively.

It is evident that the mean and SD of individual and team games players on muscular power are 2.03 ± 0.31 and 2.04 ± 0.37 and cardiovascular endurance are 2.46 ± 0.38 and 2.57 ± 0.36 respectively. It is evident that the mean and SD of individual and team games players on muscular endurance are 37.00 ± 10.20 and 37.76 ± 9.19 and mental toughness are 42.54 ± 6.10 and 42.82 ± 5.02



respectively. Data regarding Selected Fitness Components and Mental Toughness of Individual and Team Games Players is presented in Fig 1. The Independent sample t-

test for Fitness Components and Mental Toughness of Individual and Team Games Players is presented in Table 2

Table 1. Selected Fitness Components and Mental Toughness for Individual and Team Games Players

Variables	Groups	No. of Subjects	Mean	Std. Deviation	Std. Error Mean
Speed	Individual Games	100	6.82	0.27	0.03
	Team Games	100	7.87	0.31	0.03
Explosive Strength	Individual Games	100	6.55	1.50	0.15
	Team Games	100	8.90	2.78	0.28
Muscular Power	Individual Games	100	1.99	0.36	0.04
	Team Games	100	2.27	0.40	0.04
Cardiovascular endurance	Individual Games	100	2.95	0.95	0.10
	Team Games	100	2.57	0.68	0.07
Muscular endurance	Individual Games	100	54.35	9.14	0.91
	Team Games	100	53.88	9.56	0.96
Mental Toughness	Individual Games	100	47.50	3.85	0.38
	Team Games	100	45.09	3.88	0.39

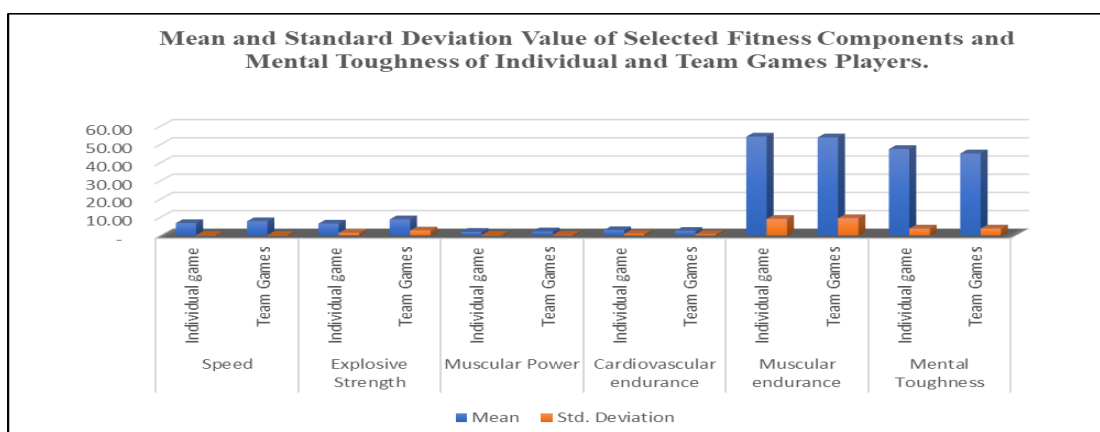


Fig 1. Selected Fitness Components and Mental Toughness of Individual and Team Games Players

It is evident from Table 2 that there was a significant difference on selected physical fitness components of Individual and Team games players. The obtained value of speed 't' (25.33), which was greater than the tabulated value of 't' (1.97), and the obtained value of Explosive Strength 't' (7.44), which was greater than the tabulated value of 't' (1.97) at (198) degree of freedom with 0.05 level of significance. It is revealed from Table 2 that

there was a significant difference on selected physical fitness components of Individual and Team games players. The obtained value of Muscular Power 't' (5.20) was greater than the tabulated value of 't' (1.97) and the obtained value of cardiovascular endurance, 't' (3.24) was greater than the tabulated value of 't' (1.97) at (198) degree of freedom with 0.05 level of significance.



Table . Independent sample t-test for Fitness Components and Mental Toughness of Individual and Team Games Players

Variables	Groups	No. of Subjects	't' Value	df	p-Value
Speed	Individual Games	100	25.33	198.00	0.00
	Team Games	100			
Explosive Strength	Individual Games	100	7.44	198.00	0.00
	Team Games	100			
Muscular Power	Individual Games	100	5.20	198.00	0.00
	Team Games	100			
Cardiovascular endurance	Individual Games	100	3.24	198.00	0.00
	Team Games	100			
Muscular endurance	Individual Games	100	0.36	198.00	0.72
	Team Games	100			
Mental Toughness	Individual Games	100	4.41	198.00	0.00
	Team Games	100			

**significant at 0.05 level, $t_{.05}(198) = 1.97$

It is evident from Table 2 that there was a significant difference on selected physical fitness components of Individual and Team game players. The obtained value of mental toughness 't' (4.41) was lesser than the tabulated value of 't' (1.97) at (198) degree of freedom with 0.05 level of significance. It is evident from Table 2 that there was no significant difference on muscular endurance

of Individual and Team game players. The obtained value of 't' (0.39) was lesser than the tabulated value of 't' (1.97) at (198) degree of freedom with 0.05 level of significance.

Pearson Product Moment Correlations Between Selected Fitness Components and Mental Toughness of Individual and Team Games Players is presented in Table 3.

Table 3. Pearson Product Moment Correlations Between Selected Fitness Components and Mental Toughness of Individual and Team Games Players

Variables	Speed	Explosive strength	Muscular power	Cardiovascular endurance	Muscular endurance	Mental toughness
Speed	1.00	.442**	.335**	-.244**	-0.05	-.166*
Explosive strength	.442**	1.00	.320**	-0.09	-0.04	-.255**
Muscular power	.335**	.320**	1.00	-.204**	0.07	-.168*
Cardiovascular endurance	.244**	-0.09	-.204**	1.00	0.04	.146*
Muscular endurance	-0.05	-0.04	0.07	0.04	1.00	-0.01
Mental toughness	-.166*	-.255**	-.168*	.146*	-0.01	1.00
* $p < 0.05$.						
Tab $r_{.05} = .138$						



It is depicted from Table no-3 that there is a significant relationship between selected physical fitness components and mental toughness of individual and team players as Pearson product moment correlations value for speed ($r = .166$), explosive strength ($r = .255$), muscular power ($r = .168$), cardiovascular endurance ($r = .146$), which is significant at 0.05 level of significance.

It is also evident that there was no significant relationship between muscular endurance and mental toughness among individual and team game players as the correlation coefficient ($r = .01$) was not significant at 0.05 level of significance.

Discussion of the findings

The main goal of this study was to compare the male individual and team games players on their selected fitness variables and observe the relationship between mental toughness and physical fitness variables in male players of both team and individual games.

The findings of the study clearly showed that there was a statistically significant difference between individual and team players in explosive strength ($t=7.44$, $p=0.00$), muscular power ($t=5.20$, $p=0.00$), speed ($t=25.33$, $p=0.00$), cardiovascular endurance ($t=3.24$, $p=0.00$) and Mental toughness ($t=4.41$, $p=0.00$) but there was no significant difference on muscular endurance ($t=0.36$, $p=0.72$) between two groups. This finding is contrary to the findings of Ananth (2018), Shukla et al., (2020), Kornspan et al., (2020), Rohit and Joginder., (2023), and Kumar Sanjeev (2013) which show no significant differences in their studies. Begum K. Shahnaz & Singh Kumar Alok (2019) found significant difference between team and individual games players on mental toughness.

The findings of the study also revealed that there was a significant positive relationship between mental toughness and cardio vascular endurance ($r=0.146$) of male individual and team game players. Whereas, the negative

relationship between mental toughness and speed ($r=-1.66$), Explosive strength ($r=-0.55$), Muscular power ($r=-0.168$) and muscular endurance ($r= -0.01$) for both groups.

The contribution of psychological factors towards endurance performance can hardly be overestimated. Endurance performance because of a high degree of fatigue involved are always a result of a sportsman's fight and resistance against the uncomfortable and painful sensations and feelings which are an inevitable part of endurance activity (Singh H.1984). The negative relationship between mental toughness and fitness components i.e. speed, muscular power, muscular endurance and explosive strength may be attributed to their nature and duration of activity which is antagonist to psyche of an individual. The level of participation of the subjects also can be influencing reason behind this result.

Conclusions

Within the limitation of present study and on the basis of available data, following conclusions may be drawn: -

- The Male team games players were better than individual games players on some of the fitness variables like explosive strength, muscular power, speed, cardiovascular endurance, and mental toughness while both the groups were more or less same on muscular endurance.
- It is also concluded that mental toughness and explosive strength, muscular power, speed, cardiovascular endurance for team and individual games has positive relationship but insignificant relationship with muscular endurance for team and individual games players.

References

Ahlawat Ravinder pal. (2016). A Comparative Study on Selected Motor Fitness Between Football and Hockey Male Players. *Physical Education*, 5(5), 1–5. <http://pe.lsrj.in/UploadedArticles/480.pdf>



- Begum K Shahnaz & Singh Alok Kumar (2019). A comparative study of mental toughness between individual game and team game players. *International Journal of Physiology, Nutrition and Physical Education* 2019; 4(1): 2575-2577.
- Brito et.al., (2023). Mental toughness and physical fitness tests of boxing athletes associated with big five personality factors. <https://doi.org/10.1590/1980-0037.2023v25e87135>.
- Clough P J (2005). Relationship between mental toughness and physical endurance. 1, 192–194.
- Uluoz E (2023). Investigation of the Relationship between Mental Toughness and Courage Levels of Sports Sciences Faculty Students for Sustainable Performance.
- Kornspan A (2020). The relationship of physical activity and mental toughness in collegiate esports varsity student-athletes History of Baseball Statistics View Project Utilization of Sport Psychology Consultants in Professional and Collegiate Sports View project. March. <https://www.researchgate.net/publication/344809575>
- Miçooğulları B O (2017). The Sports Mental Toughness Questionnaire (SMTQ): A psychometric evaluation of the Turkish version. *Studia Sportive*, 11(2), 90–98.
- Kansal Devinder K. A practical approach to test measurement and evaluation. New Delhi: sports and spiritual Science Publications, 2012.
- Halder A and Rahaman A (2022). Comparative analysis of selected physical fitness components among team game players. *International Journal of Physiology, Nutrition and Physical Education*, 7(2), 82–85.
- Ananth S (2018). Comparison of selected physical fitness variables of school-level hockey and cricket players. *International Journal of Physiology, Nutrition and Physical Education*, 3(1), 1113–1115.
- Kuldeep Singh D R K (2018). Comparative study of selected physical fitness components between hockey and soccer players of university level. *International Journal of Academic Research and Development*, 3(01), 20–22.
- Kumar Singh M (2016). A comparative study of Kabaddi. *International Journal of Physical Education Wwww. Phyedusports. In*, 1(2), 39–42. www.phyedusports.in
- Sarkar D and Kandar B (2022). A comparative study of selected physical fitness variables between university-level cricket and football players. *International Journal of Physical Education, Sports and Health*, 9(1), 354–357.
- Sharma A and Prasad B K (2023). Effect of Vmbr Training on Psychological Dimensions of Anxiety and Mental Toughness of Table Tennis Players. *Physical Education Theory and Methodology*, 23(1), 28–34.
- Kumar Sanjeev (2013). Comparative study on physical fitness between inter-varsity male players of selected team games from the universities of northern India. 01(08), 21–26.
- Peter Karpovich V, Wayne Sinning E. *Physiology of Muscular Activity* (Philadelphia: W.B. Saunders Company), 1971, 183.
- Das A, Sharma R. Comparative Analysis of Health-Related Fitness among Female Vegetarian Athletes of Football, Basketball and Volleyball. *American Journal of Sports Science* 2016;4(1-1):27-30.
- Sullivan A L (2006). Relationship between BMI and health-related physical fitness knowledge. 1(6), 3–19.
- Kumar Research Scholar, S., Singh Professor, D., Suresh Kumar Research Scholar, C., Kumar, S., & Singh, D. (2019). Analysis of relationship between motor fitness and



sports performance among high performer cricketers. ~ 1043 ~ International Journal of Physiology, 4(1), 1043–1045. www.journalofsports.com

Knapik A, Brzęk A, Famuła-Waż A, Gallert-Kopyto W, Szydłak D, Marcisz C, & Plinta R (2019). The relationship between physical fitness and health self-assessment in elderly. *Medicine*, 98(25), e15984.