



A STUDY OF PHYSICAL FITNESS VARIABLES IN RELATION TO THE PERFORMANCE OF MALE WRESTLERS IN BAGALKOT AND BELAGAVI DISTRICTS

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Abstract: The present study investigates the relationship between physical fitness variables and the performance of male wrestlers from varied training centers in Bagalkot and Belagavi Districts of Karnataka. The study aims to determine how different fitness components viz., cardio-respiratory endurance, muscular strength, muscular endurance and agility contribute to game performance. Additionally, it examines differences in performance between wrestlers practicing Freestyle and Greco-Roman wrestling styles. A descriptive survey method was adopted and 60 male wrestlers aged 18 to 25 years were selected using a purposive sampling technique. Standardized tests were used to measure the physical fitness variables and game performance was assessed using a coach-rated performance scale. The Karl Pearson Product-Moment Coefficient of Correlation was applied to analyze the relationship between fitness variables and game performance, while the independent 't' test was used to compare the game performance of Freestyle and Greco-Roman wrestlers. The findings revealed a significant positive relationship between cardio-respiratory endurance, muscular strength, muscular endurance and game performance. However, agility showed a negative correlation, indicating that wrestlers who completed the agility test in less time (better agility) had higher game performance scores. The comparison between wrestling styles indicated that Freestyle wrestlers performed significantly better than Greco-Roman wrestlers in game performance. The study highlights the critical role of physical fitness in wrestling performance, emphasizing that endurance, strength and agility play a vital role in competitive success. These findings can help wrestling coaches and trainers refine training programs to enhance the overall performance of wrestlers in different styles

Index Terms - Physical Fitness, Game Performance, Wrestlers, Freestyle, Greco-Roman, Relationship

I. INTRODUCTION

1.1 Background of the Study

Wrestling is one of the oldest and most physically demanding combat sports, requiring a unique combination of strength, endurance, agility and technical expertise. It has a deep-rooted tradition in India, where it is practiced in both rural and urban settings. Karnataka, particularly the districts of Bagalkot and Belagavi, has produced several talented wrestlers who have excelled at national and international levels. The performance of wrestlers in competitions depends not only on their technical skills but also on their physical fitness, which plays a crucial role in sustaining their strength, speed and stamina throughout a match. Therefore, analyzing the relationship between physical fitness variables and game performance can help develop effective training strategies to enhance the competitive abilities of wrestlers.

Among the key physical fitness components, cardio-respiratory endurance (CVE), muscular strength, muscular endurance and agility significantly impact a wrestler's performance. Cardio-respiratory endurance is essential for maintaining stamina during prolonged bouts, enabling wrestlers to recover quickly between rounds (Sharma & Yadav, 2020). Muscular strength, particularly in the upper and lower body, contributes to powerful offensive and defensive maneuvers, including grappling and takedowns (Kumar et al., 2019). Muscular endurance allows wrestlers to sustain repeated high-intensity movements without fatigue, crucial for maintaining control over opponents (Patil & Desai, 2021). Additionally, agility, which refers to quick directional changes and reflexes, plays a vital role in countering attacks and executing swift movements (Reddy & Rao, 2022). Given the importance of these physical attributes, understanding their relationship with game performance can provide valuable insights for coaches and athletes to optimize wrestling training programs.

1.2 Significance of the Study

The study is significant as it examines the impact of physical fitness on wrestling performance, offering crucial information for athletes, coaches and sports scientists. By identifying key physical fitness variables that influence game performance, training programs can be tailored to enhance wrestlers' competitive abilities. Additionally, the study compares the performance of wrestlers specializing in Freestyle and Greco-Roman wrestling styles, providing an understanding of the specific demands of each style and their influence on competitive success. The findings will contribute to sports science research and wrestling development in Karnataka.

1.3 Reason for selection of topic

Wrestling has a deep-rooted cultural and sporting significance in Karnataka, particularly in Bagalkot and Belagavi districts, where numerous traditional and modern training centers operate. However, limited research has been conducted on the scientific aspects of physical fitness and its impact on wrestling performance in this region. This study was selected to bridge this research gap and provide data-driven insights to improve training approaches for male wrestlers in Karnataka.

1.4 Statement of the Problem

The study aims to explore the relationship between physical fitness variables and the performance of male wrestlers from varied training centers in Bagalkot and Belagavi Districts. It seeks to determine how different fitness components contribute to game performance and whether there are differences in performance between wrestlers practicing Freestyle and Greco-Roman wrestling styles. The topic selected for the present investigation is : "A Study of Physical Fitness Variables in relation to the Performance of Male Wrestlers in Bagalkot and Belagavi Districts."

1.5 Objectives of the Study

The study has the following objectives

1. To examine the relationship between physical fitness and game performance of male wrestlers.
2. To compare the game performance of male wrestlers between Freestyle and Greco-Roman wrestling styles.

1.6 Statement of Hypotheses

The study is based on the following null hypotheses:

1. There is no significant relationship between physical fitness and game performance of male wrestlers.
2. There is no significant difference in the game performance of male wrestlers between Freestyle and Greco-roman wrestling styles.

II. REVIEW OF RELATED LITERATURE

2.1 Introduction

Physical fitness is a crucial determinant of athletic performance, particularly in combat sports like wrestling. Various studies have explored the impact of motor fitness variables such as speed, agility, strength, endurance and flexibility on wrestlers' performance. These studies provide a comparative understanding of how different physical attributes contribute to success in wrestling and similar sports.

2.2 Studies on Physical Fitness and Game Performance

The following studies highlights existing research on physical fitness variables in wrestlers and other combat athletes, leading to the identification of a research gap that the present study seeks to address.

Kumar (2024) conducted a study comparing selected motor fitness variables between wrestlers and kabaddi players. The research included 30 male athletes (15 from each sport) and evaluated speed, agility, strength, flexibility and endurance through standardized tests. Results indicated no significant differences in speed, agility and flexibility between the two groups. However, wrestlers demonstrated superior strength and endurance compared to kabaddi players, highlighting their sport-specific physical demands.

Khaithi and Pungding (2023) compared speed, agility and strength endurance between judo and wrestling athletes in Manipur. The study involved 40 male athletes (20 from each sport), aged 14–19 years. Data analysis completed by using independent t-test revealed significant differences in speed, agility and strength endurance, with wrestlers displaying higher endurance levels, emphasizing their need for sustained strength and power.

Dhillon and Malik (2023) examined muscular strength among boxers and wrestlers using the AAHPER Youth Fitness Test on a sample of 300 athletes (150 from each sport) in Haryana. The study found no significant difference in muscular strength between boxers and wrestlers, suggesting that both sports require a high level of physical conditioning.

Chaliburda and Cieslinski (2022) explored the relationship between physical fitness and wrestling-specific fitness in freestyle wrestlers. Seventy-four wrestlers underwent assessments of agility, dynamic strength and strength endurance. The study concluded that sport-specific fitness tests are the most reliable indicators of performance, reinforcing the need for training programs tailored to wrestling movements.

Rahmani and Mirzaei (2019) compared physical fitness traits of the senior Greco-Roman wrestling teams of Azerbaijan and Iran. The study assessed body composition, muscular strength, endurance, speed and power. Findings showed that Azerbaijani wrestlers outperformed their Iranian counterparts in squats and sprinting, while Iranian wrestlers exhibited superior muscular endurance and agility. These results underscored the role of specialized training in optimizing wrestling performance.

Marques et al. (2019) examined the anthropometric profile and physical fitness of young judo and wrestling athletes. The study found that judo athletes had greater body mass and height and outperformed wrestlers in abdominal endurance, upper limb resistance and power-based tests. These results indicated that strength and conditioning requirements differ significantly between these two combat sports.

Singh and Kumar (2018) investigated the relationship between body fat percentage and muscular endurance among junior freestyle wrestlers. The study, involving 150 wrestlers across five weight categories, demonstrated a negative correlation between body fat percentage and muscular endurance. These findings suggested that optimal body composition is critical for wrestling performance.

Mirzaei et al. (2011) described the physical fitness profile of elite cadet wrestlers. The study assessed key fitness parameters such as maximal oxygen consumption, muscular endurance, strength, power, speed and agility. The results provided baseline data for designing training programs tailored to wrestlers' needs, emphasizing the importance of sport-specific conditioning.

2.3 Overview and Research Gap

The reviewed literature provides a comprehensive understanding of physical fitness variables in combat sports, with a particular focus on wrestling. The studies highlight the significance of strength, endurance, speed, agility and body composition in determining wrestling performance. However, most research has been conducted in international and national contexts, with limited focus on district-level wrestling athletes in India. Additionally, existing studies primarily compare wrestling with other combat sports rather than examining intra-sport variations among wrestlers themselves.

The present study seeks to address these gaps by analyzing the physical fitness variables of male wrestlers in Bagalkot and Belagavi districts. By focusing on district-level athletes, this research aims to provide insights into their fitness levels, training requirements and performance determinants. The findings will contribute to developing localized training programs that cater to the specific needs of wrestlers in these regions, ultimately enhancing their competitive performance.

III. METHODOLOGY

3.1 Method

Descriptive Survey Method was followed for the present investigation.

3.2 Selection of Samples

Sixty male freestyle and Greco-Roman wrestlers drawn from different training centres of Bagalkot and Belagavi Districts of Karnataka are selected as subjects on purposive sampling technique. The age of the subjects were ranged from 18 to 25 years.

3.3 Selection of Variable, Test and Criterion Measures

The following criterion variables selected for the present study

Variables	Test	Criterion Measure
1. Cardio Respiratory Endurance	Cooper's 12 Minutes Run or Work	In Meters
2. Muscular Strength	Pull Ups	In Counts
3. Muscular Endurance	Sit Ups	In Counts
4. Agility	6 x 10 M. Shuttle Run	In Secs.
5. Game Performance	Game Performance Rating Scale (Coach-Rated)	In points

3.4 Statistical Procedure

The Coefficient of Correlation was utilized to find out the relationship between Physical Fitness (cardio respiratory endurance, muscular strength muscular endurance, agility) and Game Performance of male wrestlers of both Freestyle and Greco-roman styles. Independent 't' test as statistical technique was utilized to find out the significant differences in the game performance of male wrestlers between different styles and level of significance was fixed at 0.05 and 0.01 levels.

IV. RESULTS AND DISCUSSION

The present study aimed to examine the relationship between physical fitness variables and the game performance of male wrestlers from different training centers in Bagalkot and Belagavi Districts of Karnataka. The findings were analyzed using the Karl Pearson Product-Moment Coefficient of Correlation and the independent 't' test.

Table-1: Relationship between Physical Fitness Variables and Game Performance of male wrestlers of varied training centres in Bagalkot and Belagavi Districts of Karnataka.

Physical Fitness Variable and Game Performance	Mean	Standard Deviation	'r' value	Sig. Level
1. Cardio Respiratory Endurance	2212.350	520.856	0.612	**
2. Muscular Strength	11.383	3.778	0.446	**
3. Muscular Endurance	40.083	7.618	0.598	**
4. Agility	16.188	0.773	-0.420	**
Game Performance	55.200	5.423		

** Sig. at 0.01 level (*r*0.354); ^{NS}Not Significant for N=60 and df=58.

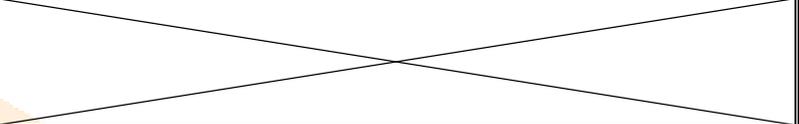
4.1 Relationship Between Physical Fitness and Game Performance

The relationship between physical fitness of male wrestlers and their Game Performance variables were determined by applying Karl Pearson Product-Moment Coefficient of Correlation. The results are presented in Table-1.

The correlation analysis (Table-1) revealed a significant positive relationship between most physical fitness variables and game performance. Specifically, cardio-respiratory endurance ($r=0.612$, $p=0.000$; $p<0.01$) and muscular endurance ($r=0.598$, $p=0.000$; $p<0.01$) exhibited strong positive correlations with game performance. This suggests that wrestlers with higher stamina and endurance tend to perform better in competitive matches. Additionally, muscular strength ($r=0.446$, $p=0.000$; $p<0.01$) was moderately correlated with game performance, indicating that greater strength contributes positively to performance outcomes.

Interestingly, agility showed a significant negative correlation with game performance ($r=-0.420$, $p=0.001$; $p<0.01$). This does not imply that agility is unimportant; rather, it suggests that wrestlers who complete agility-based tasks in less time (higher agility) tend to perform better. In other words, lower agility scores (indicating faster movement and reaction times) are associated with higher game performance. This finding highlights that agility is a crucial factor in wrestling, allowing athletes to execute quick maneuvers, defensive actions and counterattacks effectively. However, agility alone may not be sufficient unless it is supported by adequate strength and endurance, which are also key determinants of success in wrestling.

Table-2: Independent 't' test results on Game Performance (in points) of male wrestlers of Freestyle and Greco-Roman wrestling styles.

Style	Number	Mean (M)	Std. Deviation (SD)	Std. Error Mean (SEM)
Freestyle	43	55.984	5.922	0.903
Greco-Roman	17	53.216	3.251	0.788
't' Value	2.30*			
P value	0.025			
Level of Sig.	0.05 level			

*indicates sig. at 0.05 level for $N=60$, $df=58$ and the table value is 2.00

4.2 Comparison of Game Performance in Different Wrestling Styles

The independent 't' test was conducted to compare the game performance of male wrestlers specializing in Freestyle and Greco-Roman wrestling styles (Table-2). The findings indicated a significant difference in game performance between the two styles ($t=2.30$, $p=0.025$; $p<0.05$), favoring Freestyle wrestlers as the obtained value greater than the table value. The mean game performance score of Freestyle wrestlers ($M=55.984$, $SD=5.922$) was significantly higher than that of Greco-Roman wrestlers ($M=53.216$, $SD=3.251$).

This result suggests that Freestyle wrestling may offer certain competitive advantages, possibly due to its broader range of techniques, including leg attacks, which allow for greater maneuverability and scoring opportunities. In contrast, Greco-Roman wrestling, which restricts holds below the waist, may require a different skill set that could impact scoring in competitive matches. The findings highlight the need for specific training approaches tailored to each wrestling style to optimize performance.

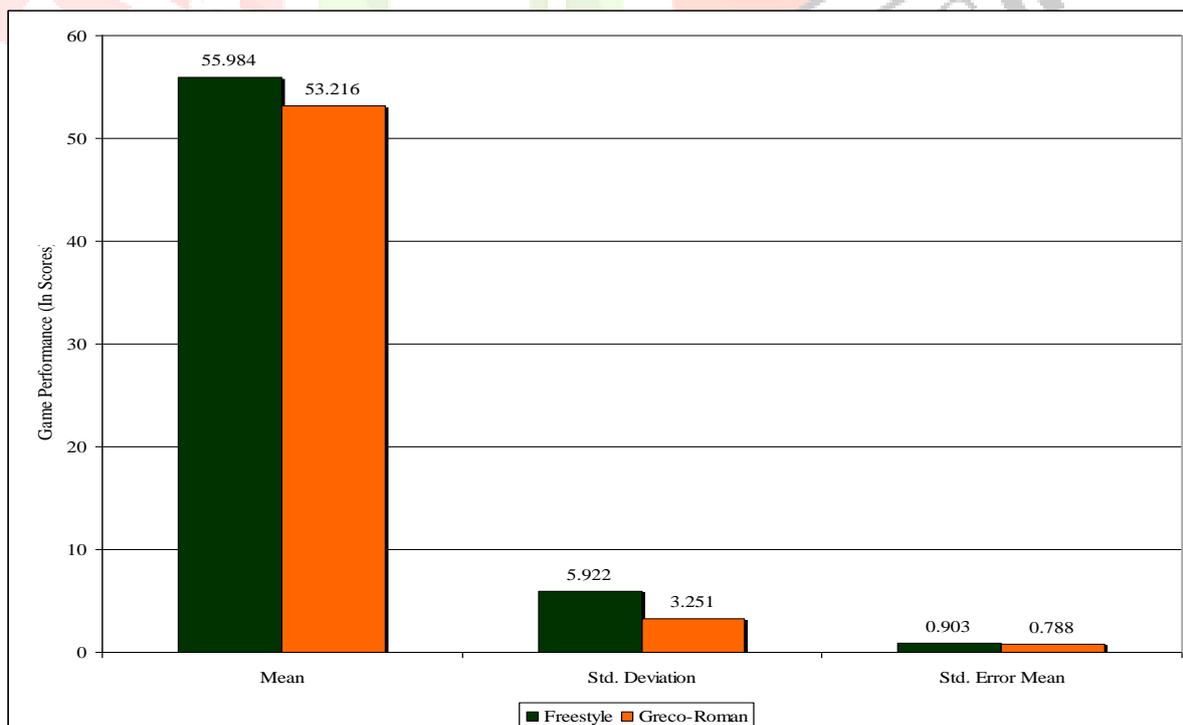


Fig.1: Comparison of game performance scores of male wrestlers between freestyle and Greco-Roman wrestling styles.

V. DISCUSSION OF RESULTS

The findings of the study indicate a significant relationship between physical fitness variables and the game performance of male wrestlers in Bagalkot and Belagavi districts. The results reveal that cardio-respiratory endurance, muscular strength and muscular endurance have a positive correlation with game performance, whereas agility exhibits a negative correlation. These findings align with previous studies, highlighting the importance of endurance and strength in wrestling performance.

Cardio-respiratory endurance, as measured by Cooper's 12-minute run, demonstrated the highest correlation with game performance ($r=0.612$, $p<0.01$). This result suggests that wrestlers with better endurance can sustain high-intensity efforts for prolonged durations, which is crucial for success in wrestling competitions. Similarly, muscular strength and muscular endurance also exhibited significant positive correlations ($r=0.446$, $p<0.01$ and $r=0.598$, $p<0.01$, respectively), confirming the necessity of upper body and core strength for grappling, takedowns and control over opponents.

On the other hand, agility showed a negative correlation with game performance ($r=-0.420$, $p<0.01$). This finding suggests that while agility is important in sports requiring rapid directional changes, wrestling prioritizes strength and endurance over quick footwork. However, further studies may be needed to explore agility's role in specific wrestling maneuvers.

The comparison between freestyle and Greco-Roman wrestlers revealed a significant difference in game performance, with freestyle wrestlers scoring higher than their Greco-Roman counterparts ($t=2.30$, $p=0.025$). This result suggests that freestyle wrestlers may have a competitive edge in the studied parameters, possibly due to the greater emphasis on leg attacks and varied grappling techniques in freestyle wrestling.

VI. CONCLUSION AND IMPLICATIONS

The study concludes that physical fitness plays a crucial role in the game performance of male wrestlers. Among the selected variables, cardio-respiratory endurance, muscular strength and muscular endurance significantly contribute to better performance in wrestling. The negative correlation between agility and game performance suggests that strength and endurance training should be prioritized over agility drills for improved wrestling outcomes.

The findings also indicate that freestyle wrestlers outperform Greco-Roman wrestlers in game performance, emphasizing the need for tailored training programs specific to each wrestling style. These insights can be utilized by coaches and trainers to refine conditioning regimens, ensuring that wrestlers develop the necessary physical attributes for optimal performance.

In practical applications, wrestling training programs in Bagalkot and Belagavi districts should focus on enhancing cardio-respiratory endurance and muscular strength through sport-specific drills. Strength and endurance-based training methods, including plyometric exercises, resistance training and high-intensity interval training (HIIT), should be incorporated to improve game performance.

VII. SUGGESTIONS AND RECOMMENDATIONS

- a. Wrestling academies should develop structured training programs that emphasize strength and endurance training while incorporating sport-specific techniques modified for both freestyle and Greco-Roman wrestling.
- b. While agility showed a negative correlation with performance in this study, future research should explore its impact on specific wrestling movements to determine if agility drills should be integrated into training.
- c. Given the importance of physical fitness, diet and nutrition plans should be developed to optimize body composition and enhance endurance levels.
- d. Training programmes should include wrestling-specific skill drills along with fitness conditioning to ensure a holistic development approach.
- e. Future research should consider a larger sample size covering multiple regions to gain broader insights into the relationship between physical fitness and wrestling performance.
- f. A comparison between district-level wrestlers and national/international wrestlers could provide valuable insights into performance gaps and training improvements required for elite competition.

By implementing these suggestions and recommendations, wrestling training centers in Karnataka can enhance athletes' physical capabilities, optimize performance and contribute to the development of wrestling at the regional and national levels.

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