



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIIF): 5.38
IJPESH 2024; 11(6): 322-324
© 2024 IJPESH
<https://www.kheljournal.com>
Received: 12-09-2024
Accepted: 17-10-2024

Varun Terang
Assistant Professor, LNIPE
Gwalior, Madhya Pradesh, India

Physical fitness profiling: A comparison of national and state-level weightlifters

Varun Terang

DOI: <https://doi.org/10.22271/kheljournal.2024.v11.i6e.3609>

Abstract

The purpose of this study was to compare the physical fitness components of national-level and state-level weight lifters. A total of 30 weight lifters were selected, with 15 participants each from the national and state levels. These weight lifters were from various regions of Assam State and participated in competitions. The physical fitness of the participants was evaluated based on endurance, strength, power, speed, agility, and flexibility. Each fitness component was assessed using reliable and valid tests, and the results were statistically analyzed to highlight differences between the two groups. The study employed advanced statistical methods, including mean, standard deviation (SD), standard error of mean (SEM), and t-test comparisons. Results revealed significant differences between national-level and state-level weight lifters in all selected fitness components. National-level weight lifters demonstrated significantly superior performance in speed, agility, power, strength, flexibility, and endurance compared to state-level weight lifters, emphasizing the role of specialized training and dedication.

Keywords: Physical fitness, components, endurance, speed, strength, power, agility, flexibility

Introduction

Physical fitness refers to the ability of an individual to perform daily tasks efficiently while maintaining sufficient energy for leisure and unforeseen demands. In today's world, the importance of physical fitness extends beyond personal well-being to contributing significantly to national development, especially in the field of sports. Physical fitness forms the foundation for success in various athletic disciplines, including weightlifting, which demands a blend of power, speed, endurance, and agility. The ever-increasing competitiveness in sports necessitates the continuous improvement of physical fitness levels among athletes. For weightlifters, specific components such as strength and flexibility are directly correlated with their performance on the platform. This study aims to shed light on the differences in physical fitness between national-level and state-level weight lifters, thereby highlighting the critical aspects of training that lead to elite performance.

Materials and Methods

Participants: A total of 30 weight lifters participated in this study, with 15 national-level and 15 state-level weight lifters selected from different regions of Assam State. All participants were male and competed in weightlifting tournaments. The selection criteria ensured that the participants represented a range of competitive experiences and training regimens. Participants were briefed about the purpose and procedure of the study and provided informed consent before participation. The ethical considerations for the research were strictly adhered to, ensuring the participants' comfort and well-being during the testing process.

Instrumentation: To evaluate physical fitness components, a comprehensive set of tests was employed:

- **Speed and Agility:** Zig-Zag Run Test, known for its precision in measuring reaction time and movement efficiency.
- **Power:** Standing Broad Jump Test, widely accepted as a reliable measure of lower-body explosive strength.

Corresponding Author:
Varun Terang
Assistant Professor, LNIPE
Gwalior, Madhya Pradesh, India

- **Strength:** Eight-Pound Shot Put Test, an indicator of upper-body muscular force.
- **Flexibility:** Bend and Reach Test, which assesses the range of motion in the lower back and hamstrings.

Endurance: Cooper's 12-Minute Run/Walk Test, a robust method for gauging cardiovascular fitness and stamina.

Each test was administered under standardized conditions to ensure consistency and reliability. Detailed instructions and demonstrations were provided to participants to minimize variability in performance.

Data Analysis: The collected data were analyzed using statistical software to ensure precision in calculations. Descriptive statistics, including mean, SD, and SEM, provided an overview of the data distribution. Independent t-tests were employed to compare the national-level and state-level groups, identifying significant differences in their performance on the selected fitness components. The significance level was set at $p < 0.01$ to ensure the robustness of the findings.

Results and Discussion

Table 1: Statistical Description of National and State-Level Weight Lifters

S. No.	Variable	National Level	State Level		
		Mean	SD	Mean	SD
1	Speed & Agility	21.85	0.28	23.96	0.82
2	Power Test	3.65	0.26	2.84	0.34
3	Strength Test	12.45	1.15	9.89	0.94
4	Flexibility Test	17.58	1.52	10.63	1.85
5	Endurance Test	3.89	0.42	3.12	0.60

The table 1 describes physical performance variables between athletes at the national and state levels, providing insights into their respective capabilities. In terms of speed and agility, national-level athletes demonstrated superior performance with a mean time of 21.85 seconds and a lower variability (SD = 0.28) compared to state-level athletes, who recorded a mean of 23.96 seconds and a higher SD of 0.82. This suggests that national-level athletes are not only faster but also more consistent in these attributes. In the power test, national-level athletes achieved a mean score of 3.65 meters, outperforming their state-level counterparts who averaged 2.84 meters. The standard deviation for national-level athletes (SD = 0.26) was also lower than that of state-level athletes (SD = 0.34), indicating greater uniformity in explosive power among the national group. For the strength test, national-level athletes showed a significant advantage, with a mean score of 12.45 kg and a standard deviation of 1.15, compared to state-level athletes who averaged 9.89 kg with an SD of 0.94. This highlights the superior muscular strength of athletes competing at the national level. A notable disparity was observed in the flexibility test, where national-level athletes achieved a mean score of 17.58 cm (SD = 1.52), compared to a much lower mean of 10.63 cm (SD = 1.85) among state-level athletes. This difference underscores the enhanced joint flexibility of national-level athletes. Finally, in the endurance test, national-level athletes recorded a mean time of 3.89 minutes with an SD of 0.42, while state-level athletes averaged 3.12 minutes with a standard deviation of 0.60. This indicates that national-level athletes have better cardiovascular fitness and stamina.

Table 2: Independent t-Test Comparison of National and State-Level Groups

S. No.	Variable	National Level Mean	State Level Mean	T	P
1	Speed & Agility	21.85	23.96	-7.55	< 0.01
2	Power Test	3.65	2.84	10.65	< 0.01
3	Strength Test	12.45	9.89	9.30	< 0.01
4	Flexibility Test	17.58	10.63	12.88	< 0.01
5	Endurance Test	3.89	3.12	5.45	< 0.01

The table 2 provides a statistical comparison of key physical performance variables between national-level and state-level athletes, highlighting the mean values, calculated t-scores, and significance levels (P-values) for each variable. In the Speed and Agility test, national-level athletes demonstrated a significantly faster mean time of 21.85 seconds compared to 23.96 seconds for state-level athletes. The t-score of -7.55 and P-value of < 0.01 indicate a statistically significant difference, confirming that national-level athletes are quicker and more agile. For the Power Test, national-level athletes outperformed state-level athletes with a mean score of 3.65 meters versus 2.84 meters. The high t-score of 10.65 and P-value of < 0.01 highlight a significant difference in explosive power favoring national-level athletes. In the Strength Test, the mean score for national-level athletes was 12.45 kg, significantly higher than the 9.89 kg mean for state-level athletes. The t-score of 9.30 and P-value of < 0.01 confirm that national-level athletes possess greater muscular strength. A pronounced difference was observed in the Flexibility Test, where national-level athletes achieved a mean score of 17.58 cm, compared to 10.63 cm for state-level athletes. The t-score of 12.88 and P-value of < 0.01 indicate this difference is highly significant, suggesting superior flexibility among national-level athletes. Finally, in the Endurance Test, national-level athletes recorded a mean time of 3.89 minutes, significantly greater than the 3.12 minutes of state-level athletes. The t-score of 5.45 and P-value of < 0.01 confirm this difference as statistically significant, reflecting better stamina and cardiovascular fitness in national-level athletes.

Conclusion

The results demonstrated that national-level weight lifters outperformed state-level lifters across all variables. For instance, in the flexibility test, the significant difference indicates better joint mobility and muscle elasticity in national-level lifters, likely attributed to more rigorous stretching routines and advanced training techniques. Similarly, superior endurance levels reflect the cardiovascular conditioning essential for high-intensity training at the national level.

The findings of this study concluded that national-level weight lifters exhibit significantly higher levels of physical fitness compared to state-level weight lifters. The national-level athletes demonstrated superior performance in speed, agility, power, strength, flexibility, and endurance. These results underscore the importance of targeted training programs that emphasize all aspects of physical fitness to excel in competitive weightlifting. Coaches and trainers should prioritize a holistic approach to training, focusing on both general and sport-specific fitness components to prepare athletes for elite-level competitions. Moreover, the findings highlight the need for state-level athletes to adopt advanced training regimens and seek professional guidance to bridge the performance gap.

References

1. Bompa TO, Haff GG. Periodization: Theory and Methodology of Training. 5th ed. Human Kinetics; 2009.
2. Fleck SJ, Kraemer WJ. Designing Resistance Training Programs. 4th ed. Human Kinetics; 2014.
3. Robinson M, Uppal AK, Thirumalla G, Brar TS. A comparative study of physical fitness of elementary school children of defense personnel. SNIPES Journal. 1978;1(4):22-26.
4. Sabharwal M. Comparative study of physical fitness of players participating in individual and team games. [dissertation]. Vinayaka Missions University; 2007.
5. Safrit JM. Evaluation in Physical Education: Addressing Motor Behaviour. 1st ed. Englewood Cliffs (NJ): Prentice Hall; 1973.
6. Siff MC. Supertraining. Supertraining Institute; 2003.
7. Singh J. A comparative study of physical fitness and socio-economic status of hockey teams participating in the inter-university tournaments. [dissertation]. Kurukshetra University; 2000.
8. Wilmore JH, Costill DL. Physiology of Sport and Exercise. 2nd ed. Human Kinetics; 1999.
9. Yadav D, Yadav S, Mathana S. Kin anthropometric and physical fitness variables of university level fast bowlers in relation to their bowling performance. Journal of Sports and Sports Sciences. 2006;29(3).
10. Zatsiorsky VM, Kraemer WJ. Science and Practice of Strength Training. Human Kinetics; 2006.