

Regional Differences in Sports Nutrition Knowledge, Attitude, and Practices among Elite Indian Athletes in Wrestling, Boxing, and Weightlifting Disciplines

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Abstract

Background: Sports nutrition knowledge, attitudes, and dietary practices (KAP) are critical components influencing athletic performance and recovery. This study aimed to assess how the variations in access to nutrition education, cultural dietary habits, and resource availability across various regions of India may lead to disparities in nutritional awareness and knowledge application among elite athletes.

Objective: To assess and compare region-wise differences in knowledge, attitudes, and practices related to sports nutrition among elite Indian athletes competing in wrestling, boxing, and weightlifting.

Methods: A cross-sectional analytical study was conducted among $n = 193$ elite athletes (wrestling = 77, boxing = 79, weightlifting = 37) representing six regions of India (North, South, East, West, Central, North-East). A validated questionnaire assessed knowledge (25 items, max score = 63), attitude (15 items, max score = 75), and practice (24 items, max score = 85). Data were analyzed using descriptive statistics and one-way ANOVA to evaluate regional differences within each sport. Post-hoc comparisons employed Tukey HSD or Welch's t-tests with Holm correction, depending on variance homogeneity. A p -value ≤ 0.05 was considered significant.

Results: Significant regional differences were found in knowledge scores among weightlifters ($F(5,19) = 10.54$, $p < 0.001$, $\eta^2 = 0.735$), with athletes from West India demonstrating higher knowledge than those from Central, North, and East India ($p_{\text{adj}} \leq 0.0004$). Wrestling athletes showed moderate regional variation in attitude ($F(4,72) = 3.03$, $p = 0.023$), with West India scoring significantly higher than North-East India ($p_{\text{adj}} = 0.0119$). No significant regional differences were found in practice scores for any sport ($p > 0.05$). Overall, knowledge and attitude disparities existed, but practices remained consistent across regions.

Conclusion: Regional differences in nutrition knowledge and attitude exist among Indian elite athletes, particularly in weightlifting and wrestling. Targeted region-specific educational interventions, especially in Central and Eastern regions, are warranted to bridge the knowledge gap and translate awareness into improved dietary practices.

Keywords: Sports nutrition, KAP, Indian athletes, Wrestling, Boxing, Weightlifting, Regional variation

1. Introduction

Optimal nutrition is an integral component of athletic performance, influencing training outcomes, recovery, and overall health [1]. Adequate knowledge and a positive attitude towards sports nutrition help athletes make informed dietary decisions that can enhance endurance, strength, and recovery capacity [2]. However, limited access to qualified nutritionists, reliance on coaches for advice, and regional variations in dietary patterns may lead to disparities in nutritional awareness among Indian athletes.

Previous studies have reported moderate to good nutrition knowledge among elite Indian athletes, yet with notable inconsistencies across disciplines and regions [3]. Combat and strength-based sports such as wrestling, boxing, and weightlifting demand precise macronutrient timing, hydration management, and supplement awareness [4]. Despite this, little is known about how nutrition knowledge, attitudes, and practices (KAP) vary across India's diverse regions in these specific sports.

This study aims to identify region-wise differences in KAP about sports nutrition among elite athletes in wrestling, boxing, and weightlifting. Understanding these disparities will inform tailored nutrition education programs and help design region-specific interventions to optimize performance and health outcomes.

2. Methodology

A cross-sectional analytical study was conducted among 193 elite Indian athletes representing the sports of wrestling ($n = 77$), boxing ($n = 79$), and weightlifting ($n = 37$). Participants competed at national or international levels and were recruited from high performance training centers that train athletes from different regions of India. Athletes who participated in this study were from North, South, East, West, Central, and North-East region of India. A self-developed structured questionnaire with five sections was used to assess the study variables. Section 1 consisted of seven demographic questions, including gender, education, marital status, region, religion, and income. Section 2 included the athlete's sports profile and discipline, the years dedicated to that sport, the frequency of participation, and the level of play. Section 3 consisted of 25 questions related to sports nutrition knowledge, Section 4 included 15 items to be assessed on a 5-point Likert scale, and Section 5 comprised 24 questions related to the nutrition practices of these athletes. The questionnaire was validated through a multi-method approach. Face validity was done by a panel of six experts (two sports nutritionists, two sports physiotherapists, one sports coach and one sports training officer) and confirmed by a pilot group of 10 elite athletes for further clarification. Construct validity was assessed through convergent analysis, wherein knowledge ($r = 0.61$, $p < 0.05$) and attitude/practices ($r = 0.55$, $p < 0.05$) showed acceptable validity. Internal consistency was high (Cronbach's $\alpha = 0.89$), indicating that the tool is reliable and valid.

3. Data Analysis

Data were analyzed using SPSS v26.0. Normality was assessed via the Anderson–Darling test, and homogeneity of variances via Levene's test. Descriptive statistics (mean $\pm$ SD) were computed for each variable. For regional comparison within each sport, a one-way ANOVA was used. When assumptions were violated, Welch's ANOVA was applied. Post-hoc comparisons used Tukey HSD or Holm-adjusted Welch t-tests. Effect size (partial η^2) was reported, and $p \leq 0.05$ denoted statistical significance.

4. Results

The final sample comprised 193 elite athletes (male: 84.5%, female: 15.5%). The highest representation

was from North India (30%), followed by Central (22%) and North-East India (14%).

Knowledge Scores

Region-wise knowledge means (out of 63) showed noticeable variation (Table 1). In weightlifting, knowledge differed significantly across regions ($F(5,19) = 10.54$, $p < 0.001$, $\eta^2 = 0.735$), with athletes from West India (mean = 76.6 ± 10.3) scoring significantly higher than those from Central, North, and East India ($p_{\text{adj}} \leq 0.0004$). South India also scored higher than East India ($p_{\text{adj}} = 0.034$). For wrestling, the omnibus ANOVA was significant ($F(4,72) = 5.55$, $p = 0.0006$), but heterogeneity of variance prevented confirmation in post-hoc tests. In boxing, regional differences were not robust after adjusting for unequal variances.

Table 1. Mean Knowledge Scores (mean $\pm$ SD) by Region and Sport

Region	Wrestling	Boxing	Weightlifting
North	42.17 ± 6.21	43.93 ± 6.96	44.00 ± 6.66
Central	45.00 ± 6.05	45.19 ± 9.77	45.14 ± 1.86
East	–	50.40 ± 7.76	42.83 ± 6.79
West	57.67 ± 13.37	58.25 ± 9.48	76.60 ± 10.31
South	55.25 ± 15.88	56.91 ± 8.86	43.33 ± 9.29
North-East	50.67 ± 13.81	44.67 ± 3.92	58.40 ± 8.11

Attitude Scores

Attitude (out of 75) differed significantly among wrestlers ($F(4,72) = 3.03$, $p = 0.023$; $\eta^2 = 0.144$), where West India (40.7 ± 6.5) scored higher than North-East India (31.4 ± 9.4). For boxing and weightlifting, regional differences in attitude were not significant ($p > 0.05$).

Table 2. Mean Attitude Scores (mean $\pm$ SD) by Region and Sport

Region	Wrestling	Boxing	Weightlifting
North	35.17 ± 4.29	37.70 ± 3.83	36.13 ± 6.73
Central	33.63 ± 4.28	36.69 ± 2.54	37.86 ± 5.93
East	–	37.00 ± 2.97	36.67 ± 3.51
West	40.67 ± 6.53	36.00 ± 5.48	36.60 ± 8.20
South	33.62 ± 3.78	36.36 ± 2.97	34.67 ± 9.29
North-East	31.40 ± 9.42	36.36 ± 3.06	36.60 ± 4.32

Practice Scores

Practice scores (out of 85) showed no significant regional differences for any of the three sports ($p > 0.05$). Across all sports, mean practice ranged from 51.3 ± 7.1 (South wrestling) to 61.6 ± 9.4 (North weightlifting), indicating fair to good adherence to dietary and hydration practices.

Table 3. Mean Practice Scores (mean $\pm$ SD) by Region and Sport

Region	Wrestling	Boxing	Weightlifting
North	55.93 ± 4.59	55.70 ± 6.18	61.63 ± 9.37

Central	54.05 ± 7.14	56.63 ± 6.06	58.00 ± 7.09
East	—	56.70 ± 9.11	62.00 ± 8.13
West	53.00 ± 4.24	51.25 ± 10.21	58.20 ± 7.09
South	51.88 ± 7.94	58.09 ± 5.31	60.17 ± 9.09
North-East	55.13 ± 6.22	56.55 ± 3.73	54.20 ± 8.07

Table 4. One-way ANOVA Summary for Knowledge, Attitude, and Practice Scores across Regions among Elite Indian Athletes in Wrestling, Boxing, and Weightlifting Disciplines

Sport	Outcome	MS Between	F	p-value	Partial η^2
Wrestling	Knowledge	165.88	5.55	0.0006	0.236
	Attitude	61.70	3.03	0.023	0.144
	Practice	22.63	0.95	0.442	0.050
Boxing	Knowledge	262.27	4.27	0.0019	0.226
	Attitude	20.52	1.27	0.284	0.080
	Practice	30.98	0.90	0.462	0.058
Weightlifting	Knowledge	1215.70	10.54	<0.001	0.735
	Attitude	37.84	1.31	0.297	0.256
	Practice	26.88	0.39	0.899	0.093

Significant regional variations were observed in knowledge scores among wrestlers ($p = 0.0006$) and weightlifters ($p < 0.001$), and in attitude scores among wrestlers ($p = 0.023$). Boxers did not show robust regional differences across any KAP domain, and practice scores remained consistent across all sports and regions. The largest effect size ($\eta^2 = 0.735$) was noted in knowledge among weightlifters, highlighting substantial regional disparities—particularly with athletes from West India outperforming others.

5. Discussion

The present study explored regional variations in sports nutrition KAP among elite Indian athletes in three high-intensity sports—wrestling, boxing, and weightlifting. The findings reveal that knowledge levels vary more prominently across regions than attitudes or practices. Notably, weightlifters from West India demonstrated significantly higher nutrition knowledge than athletes from other regions, aligning with the observation that certain western training centers and federations have established stronger collaborations with sports nutrition professionals.

For wrestling, attitude differences suggest that regional culture and access to resources may shape how athletes perceive nutrition importance [5, 6]. West Indian wrestlers' more positive attitudes compared to their North-East counterparts indicate that awareness programs and mentorship can meaningfully influence mindset [7]. Despite knowledge and attitude disparities, practice scores were largely uniform across regions. This suggests that while knowledge is necessary, environmental and systemic factors (e.g., meal provision, training schedules, access to sports nutritionists) likely determine actual behavior [8].

These findings are consistent with prior Indian and global studies showing that combat and strength-sport athletes often rely on coaches for nutritional guidance, with limited input from qualified nutritionists [9]. Regional access inequities, particularly in the North-East and Central zones, may explain lower KAP scores in these areas.

The findings of this study emphasize the need for region-specific nutrition education initiatives among elite Indian athletes. The significantly higher knowledge scores among weightlifters from West India suggest that structured access to sports nutrition expertise can positively influence awareness levels. Replicating such models in regions like Central, East, and North-East India could help narrow the knowledge gap. Since coaches often serve as the primary source of nutritional information, incorporating targeted nutrition training modules within coaching certification programs may enhance the accuracy of information passed to athletes [10]. Additionally, integrating qualified sports nutritionists into national and regional training camps can help ensure evidence-based dietary guidance and bridge the gap between knowledge and actual practices [11]. Periodic KAP assessments and nutrition monitoring should be implemented as part of athlete development programs to evaluate the long-term impact of educational and behavioral interventions [12].

While this study provides valuable insights, certain limitations should be acknowledged. The relatively small sample size within specific region–sport categories, such as South Indian wrestlers and West Indian weightlifters, may have limited the statistical power to detect smaller yet meaningful differences. The reliance on self-reported data may also have introduced recall and social desirability biases, potentially leading to an overestimation of positive dietary behaviors. Furthermore, the cross-sectional nature of the study restricts causal interpretations between nutrition knowledge, attitude, and actual practices. Future research should adopt longitudinal and intervention-based designs to examine how improvements in nutrition knowledge and attitude translate into sustained behavioral changes and performance outcomes.

6. Conclusion

This study highlights that regional disparities exist in nutrition knowledge and attitudes among elite Indian athletes, particularly in weightlifting and wrestling, while dietary practices remain relatively consistent across regions. The variations observed reflect not only differences in access to professional nutritional support but also regional cultural and institutional influences on dietary understanding. These findings underscore the importance of tailored, region-specific education programs and the integration of qualified sports nutrition professionals within athletic ecosystems. Strengthening nutritional literacy through continuous education and structured guidance can contribute to optimizing performance, recovery, and overall health among elite Indian athletes.

References

Bibliography

1. Kali VR, Meda SS. Functional nutrition for the health of exercising individuals and elite sportspersons. Nutrition and Health [Internet]. 2023 Aug 15;2601060231191865. Available from: <https://pubmed.ncbi.nlm.nih.gov/37583297/>
2. Sai laavanya, Silambu selvi Kumbamoorthy. A Comprehensive Analysis of Sports Nutrition Knowledge and Diet Diversity Among South Indian Athletes. Physical rehabilitation and recreational health technologies. 2024 Mar 30;9(2):52–60.
3. Nazni P, Vimala S. Nutrition Knowledge, Attitude and Practice of College Sportsmen. Asian Journal of Sports Medicine. 2010 Jun 1;1(2).
4. Rathod N, Chandorkar S. Assessment of Nutritional Status and Energy Availability of Indian Boxers. Cureus. 2024 Jul 3;
5. Sharma A, Singh P. Knowledge, attitude, and practices of sports nutrition amongst elite track and field

- athletes in India: A pilot survey. *International Journal of Physical Education, Sports and Health* [Internet]. 2025 May 1 [cited 2025 Oct 11];12(3):341–4. Available from: <https://www.kheljournal.com/archives/2025/vol12issue3/PartE/12-3-46-779.pdf>
6. Heaney S, O'Connor H, Michael S, Gifford J, Naughton G. Nutrition Knowledge in Athletes: A Systematic Review. *International Journal of Sport Nutrition and Exercise Metabolism* [Internet]. 2011 Jun;21(3):248–61. Available from: <https://journals.humankinetics.com/view/journals/ijsnem/21/3/article-p248.xml>
 7. Tyagi S, Wasuja M, Vanaik A. Impact Factor: 5. 2018 [cited 2025 Oct 11];2(5):487–9. Available from: <https://www.allresearchjournal.com/archives/2018/vol4issue5/PartG/6-12-121-266.pdf>
 8. Rasouli A, Badpeyma M, Kazemi M, Majnoui A, Mohammadi SG, Khederlou H, et al. Knowledge, attitudes, and practices (KAP) regarding nutrition among bodybuilders of Zanjan, Northwest of Iran: a cross-sectional study. *BMC Sports Science, Medicine and Rehabilitation* [Internet]. 2025 Aug 9 [cited 2025 Oct 11];17(1). Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC12335761/>
 9. Januszko P, Lange E. Nutrition, supplementation and weight reduction in combat sports: a review. *AIMS Public Health* [Internet]. 2021 Jul 6;8(3):485–98. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8334642/>
 10. Jacob R, Couture S, Lamarche B, Provencher V, Morissette É, Valois P, et al. Determinants of coaches' intentions to provide different recommendations on sports nutrition to their athletes. *Journal of the International Society of Sports Nutrition*. 2019 Nov 27;16(1).
 11. Ritson AJ, Hearn MA, Bannock LG. Bridging the gap: Evidence-based practice guidelines for sports nutritionists. *Frontiers in Nutrition*. 2023 Mar 29;10.
 12. Ranil Jayawardena, Weerasinghe K, Nanayakkara I, Madhujith T, Hills AP, Nishan Sudheera Kalupahana. The effects of a nutritional intervention on the sports nutrition knowledge and nutritional status of track and field athletes: protocol for a randomized controlled trial. *Trials*. 2025 Feb 20;26(1).