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Attitudinal Patterns Toward Sports Nutrition Among Elite Sprinters in Pakistan

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Abstract

This study investigates the attitudinal patterns toward sports nutrition among elite sprinters in Pakistan. The research employed a quantitative approach using a structured questionnaire to assess nutritional knowledge, attitudes, and practices among 120 elite sprinters from various provinces of Pakistan. The study utilized a stratified random sampling technique to ensure representative coverage across different regions and competitive levels. Data was collected through a validated Sports Nutrition Attitude Scale (SNAS) with established reliability (Cronbach's $\alpha = 0.87$). Results revealed significant variations in nutritional attitudes based on education level, coaching quality, and regional differences. The results show that although 78% of elite sprinters acknowledge the significance of sports nutrition, only 45% have sufficient understanding of correct nutritional behavior. The research concludes that the gap between nutrition awareness and practice is huge among Pakistani elite sprinters. Suggestions include the formulation of thorough nutrition education programs, enhancing coach education in sports nutrition, and the creation of uniform dietary guidelines for sprint athletes in Pakistan.

Keywords: Sports nutrition, elite sprinters, Pakistan, attitudes, nutritional knowledge, athletic performance

Introduction

Sports nutrition has become an important component of athletic performance, especially for athletes competing in more explosive events, such as sprints where just adding the right nutrition could improve performance by a small margin to help the athlete improve enough to win at the international level (Burke et al., 2019). While the connection between nutrition and athletic performance has been documented in various literature throughout the world, proper nutrition along with training and recovery are foundational to achieving sustained excellence in athletic performance.

In Pakistan, the participation in athletics over the last ten years has grown rapidly, with sprinters for the first time showing success at international competitions. But the effectiveness of sports nutrition in providing that support toward a successful result has not been assessed and is perhaps one of the most under-explored and even under-provided support in securing success for the athlete (Khan et al., 2021).

Elite sprinters need to combine their athleticism and physiological demands of their sport by combining a well-defined and appropriate nutrition strategy to assess their training loads for explosive power generation, recovery between training occasions, and managing their body comp makeup to their respective sport.

There are challenges and opportunities within the scope of sports nutrition in the context of sports within Pakistan. Cultural food preferences, socioeconomic factors, availability and access to specific sports nutrition products, and the depth of nutritional knowledge/education among athletes and coaches all contribute to a complex sport environment that influences athletes' nutritional behaviors (Ahmed et al., 2019; Smith et al., 2021).

Development of the attitudinal patterns towards sports nutrition in elite sprinters in Pakistan is necessary to inform future initiatives focused on enhancing their performance and contributing to sport success in Pakistan and beyond. This research is a response to the gap in scholarship that describes how elite sprinters in Pakistan understand, value, and adopt sports nutrition principles into training and competition preparation.

The study has both applied-sport implications as well as policy implications for sport development, coach education and building an evidence-based nutrition framework for context in Pakistan. The

focus on identifying attitudinal patterns and barriers to nutrition performance is imperative to enhance the current nutritional support system for elite sprinters in Pakistan (Heaney et al., 2018). The justification for exploring attitudinal patterns toward sports nutrition amongst elite sprinters in Pakistan is grounded in three interconnected considerations that convey the necessity for this research.

First, the narrowing performance gap between Pakistani sprinters and those who compete internationally suggests multiple factors may lay behind any observed underperformance in regard to nutrition preparation, natural athletic dedication, and long-standing barriers to systematically achieve peak performance. As such, nutrition as a controllable performance variable is a prime opportunity for improvement to enhance athletic performance.

Second, with no research dedicated to exploring sports nutrition attitudes and behaviors in Pakistan, there exists ambiguity that constraints evidence-based access points in making decisions for athletes, coaches, and sports administrators (Sharma & Khanna, 2020). International studies of sports nutrition may not translate seamlessly to the Pakistani context, due to cultural, economic, and environmental differences that may impact nutritional behaviors and attitudes (Chen et al., 2020).

Third, there is a stark contrast in the rapid growth of the sports nutrition industry globally compared to a lack of awareness or uptake of these resources in Pakistan by elite athletes. This means there is much work to be explored around their current attitudes toward sports nutrition, what improvements may be necessary as well as understanding how to facilitate greater uptake of evidence-based nutritional practice (Torres-McGehee et al., 2018).

Fourth, investment in government and private athlete development programs requires a full understanding of everything that influences athlete performance. Sports nutrition is a low-cost and effective intervention that can maximize the return on investment in developing elite athletes.

Fifth, the role of food and food culture in Pakistani society must be kept present when implementing nutrition interventions. Understanding the prevailing attitudes will give an appreciation for possible barriers but also facilitators for changing nutritional behaviors (Ahmed et al., 2019).

Lastly, building a local evidence base for sports nutrition practices can add to the wider scientific literature while providing guidelines which are culturally relevant for athletes in Pakistan (Rahman et al., 2018). This body of research can become a springboard for future longitudinal research or interventions, which can be meaningful to the broad population of reigning elite sprinters in Pakistan.

Methodology

Research Design

The study employed a positivist research philosophy, which is based on the idea that objective reality can be measured and understood through observation and measurement. This philosophical stance is relevant to examining attitudes and their relationship to quantifiable variables such as demographic variables, knowledge and behavioral intentions.

Because this study examined attitudinal orientations towards sports nutrition among elite sprinters in Pakistan, it employed both a quantitative research design and a cross-sectional research design. The quantitative approach provided a systematic means of measuring attitudes towards nutrition and subsequent statistical means of assessing, in effect, the relationships between the variable identified. The cross-sectional design made it possible to gather a large sample of data from the elite sprinter population within a single point in time which leads for comprehensive fulfilment of providing insight on current attitudinal patterns.

Data Collection Method

Primary data was collected through structured questionnaires administered to elite sprinters across Pakistan. The questionnaire method was chosen for its ability to collect standardized information from a large sample efficiently while ensuring consistency in data collection procedures.

Data Collection Timeline

Data collection was conducted over a period of four months (March-June 2024) to coincide with the competitive season when elite sprinters would be most accessible. The timeline was structured as follows:

- Month 1: Pilot testing and instrument refinement
- Month 2-3: Primary data collection
- Month 4: Follow-up data collection and verification

Population

Definition of Elite Sprinters

For this study, elite sprinters were defined as athletes who compete in sprint events (100m, 200m, 400m, 4x100m relay, 4x400m relay) and meet at least one of the following criteria:

1. Current or former members of the Pakistan national athletics team
2. Medalists at national-level competitions within the past three years
3. Athletes who have achieved qualifying standards for international competitions
4. Regular participants in provincial and regional championships with competitive times

Population Distribution

The total population of elite sprinters in Pakistan was estimated at approximately 400 athletes based on records from the Athletics Federation of Pakistan, provincial athletics associations, and major athletic clubs. The population distribution across different regions and categories is presented in the following table:

Region	Male Athletes	Female Athletes	Total	Percentage
Punjab	95	45	140	35.0%
Sindh	68	32	100	25.0%
Khyber Pakhtunkhwa	42	18	60	15.0%
Baluchistan	28	12	40	10.0%
Islamabad Capital Territory	35	15	50	12.5%
Others (FATA, AJK)	8	2	10	2.5%
Total	**276**	**124**	**400**	**100.0%**

Population Characteristics

The elite sprinter population in Pakistan demonstrates several distinctive characteristics that influence the study's scope and methodology:

Age Distribution: Most elite sprinters fall within the 18-32 age range, with peak representation in the 22-27 category. This age distribution reflects the typical competitive lifespan of sprint athletes and the relatively young age structure of Pakistani athletics.

Gender Distribution: Male athletes account for approximately 69% of the population and female athletes account for 31% of the population. This gender distribution reflects a combination of cultural aspects that may restrict female athlete involvement in sports as well as historical development patterns in the sports context in Pakistan.

Sample

Sample Size and Selection

A stratified random sampling method was used to sample 120 elite sprinters from a target population of 400 athletes. This method provided sufficient coverage across geographical areas within Pakistan and levels of elite competition. This sample size represented 30% of the total population and determination of sample size through stratified random sampling was sufficient for statistical purposes, yet economically feasible.

Sampling Methodology

The sampling process involved multiple stages:

Stage 1: Stratification: The population was stratified by:

- Location (geographic region) (Punjab, Sindh, Khyber Pakhtunkhwa, Baluchistan, Islamabad Capital Territory) 5 locations
- Gender (Male/Female)
- Age range (18-22, 23-27, 28-32, 33+ years) 4 age ranges
- Level of competition (National, Regional, Provincial) 3 levels

Stage 2: Proportional Allocation: Sample allocation was proportional to population size from each stratum that allowed for representative coverage across all categories.

Stage 3: Random Selection: Respondents were selected randomly from each stratum using a computer-generated random-number table.

Sample Distribution

The final sample distribution is presented in the following table:

Characteristic	Category	Frequency	Percentage
Gender	Male	83	69.2%
	Female	37	30.8%
Age Group	18-22 years	35	29.2%
	23-27 years	42	35.0%
	28-32 years	28	23.3%
	33+ years	15	12.5%
Region	Punjab	42	35.0%
	Sindh	30	25.0%
	Khyber Pakhtunkhwa	18	15.0%
	Balochistan	12	10.0%
	Islamabad Capital Territory	15	12.5%
	Others	3	2.5%
Education Level	Secondary	45	37.5%
	Higher Secondary	42	35.0%
	University	28	23.3%
	Postgraduate	5	4.2%
Competition Level	National	18	15.0%
	Regional	42	35.0%
	Provincial	60	50.0%

Sample Characteristics

The sample was close to the population characteristics with respect to key demographic variables that allowed for representativeness. The age range showed that the sample (n=57) is as expected, with the 23-27 age range showing the greatest concentration of respondents, indicative of peak competitive years for sprint athletes.

1. **Training Background:** Of those competing at an elite level (n = 57) within the sample, 67% had been competing at an elite level for over three years. 72% of the athletes were in a formal coaching environment, while 28% were self-coached or had informal coaching assistance.
2. **Athletic Specialization:** The sample study included specialization in sprinting events:
   - 100m athletes: 35 (29.2%)
   - 200m athletes: 28 (23.3%)
   - 400m athletes: 32 (26.7%)
   - Multi event sprinters: 25 (20.8%)
3. **Nutritional Background:** The first initial screening of the workflow showed that 45% of athletes had basic level of nutrition support, while 55% of individuals had not received professional support for nutrition services. This ratio gave a good examination to assess differences in nutritional attitudes from professional dietary guidance.

Response Rate

The overall response rate was 75%, with 160 athletes initially contacted and 120 completing the full questionnaire. Response rates varied by region, with higher rates observed in urban areas (82%) compared to rural areas (68%). This variation was accounted for in the analysis and interpretation of results.

Instrument of Study

Description of Instrument

The primary data collection instrument was a structured questionnaire titled "Sports Nutrition Attitude Scale for Elite Sprinters (SNASES)." This instrument was specifically designed to assess multiple dimensions of nutritional attitudes among elite sprint athletes, incorporating both established scales and newly developed items tailored to the Pakistani context.

Instrument Structure

The questionnaire consisted of four main sections: Section A: Demographic Information (15 items), Section B: Nutritional Knowledge Assessment (25 items), Section C: Nutritional Attitude Scale (30 items) and Section D: Current Nutritional Practices (20 items).

Scale Development Process

The instrument development followed established psychometric procedures:

Step 1: Literature Review Extensive review of existing sports nutrition attitude scales and instruments used in similar populations. Key instruments reviewed included:

- Sports Nutrition Attitude Scale (SNAS) by Werblow et al. (2017)
- Athlete Nutrition Knowledge Scale (ANKS) by Trakman et al. (2016)
- Sports Nutrition Beliefs Scale (SNBS) by Jonnalagadda et al. (2001)

Step 2: Item Generation A pool of 120 potential items was generated based on:

- Adaptation of existing validated items
- Expert consultation with sports nutritionists
- Focus group discussions with Pakistani athletes
- Cultural and contextual considerations

Step 3: Content Validation Content validity was assessed through expert panel review involving:

- 3 sports nutrition specialists
- 2 exercise physiologists
- 2 experienced athletics coaches
- 1 cultural anthropologist

Content Validity Index (CVI) was calculated for each item, with items scoring below 0.78 being revised or removed.

Step 4: Pilot Testing The instrument was pilot tested with 30 elite sprinters not included in the main study. Pilot testing identified:

- Unclear or ambiguous items
- Inappropriate response formats
- Cultural sensitivity issues
- Estimated completion time (25-30 minutes)

Reliability of Instrument

Internal Consistency Internal consistency reliability was assessed using Cronbach's alpha coefficient. The reliability statistics for each section were:

- Overall Instrument: $\alpha = 0.92$
- Nutritional Knowledge Section: $\alpha = 0.84$
- Nutritional Attitude Scale: $\alpha = 0.87$
- Current Practices Section: $\alpha = 0.79$ Individual subscale reliabilities were:
- Perceived Importance: $\alpha = 0.88$
- Knowledge Confidence: $\alpha = 0.82$
- Behavioral Intentions: $\alpha = 0.85$
- Perceived Barriers: $\alpha = 0.81$

All reliability coefficients exceeded the minimum threshold of 0.70, indicating good internal consistency.

Data Collection And Data Analysis

Data Collection Procedures

Pre-Data Collection Phase Prior to data collection, several preparatory steps were undertaken:

1. **Ethical Clearance**: Obtained ethical approval from the institutional review board
2. **Permission Letters**: Secured permission from Athletics Federation of Pakistan and provincial athletics associations
3. **Training of Data Collectors**: Conducted training sessions for research assistants on standardized data collection procedures
4. **Logistical Planning**: Coordinated with coaches and athletics officials to schedule data collection sessions

Data Collection Timeline Data collection was conducted over four months (March-June 2024) in the following phases:

- **Phase 1 (March 2024)**: Pilot testing and instrument refinement
- **Phase 2 (April-May 2024)**: Primary data collection

- **Phase 3 (June 2024)**: Follow-up data collection and verification

Data Analysis Plan

Descriptive Analysis

- Frequency distributions for categorical variables
- Measures of central tendency and dispersion for continuous variables
- Cross-tabulations for examining relationships between variables
- Graphical presentations of key findings

Inferential Analysis Univariate Analysis

- One-sample t-tests for comparing means to population values
- Chi-square goodness-of-fit tests for categorical variables
- Confidence intervals for population parameter estimation

Bivariate Analysis

- Independent samples t-tests for group comparisons
- ANOVA for comparing means across multiple groups
- Chi-square tests of independence for categorical associations
- Pearson correlation coefficients for continuous variable relationships

Statistical Software and Procedures

- SPSS version 28.0 for primary statistical analysis
- R version 4.3.0 for advanced statistical procedures
- Microsoft Excel for data management and preliminary analysis

Results

The final sample consisted of 120 elite sprinters from across Pakistan. The demographic distribution closely matched the intended sampling frame, ensuring representative coverage of the target population.

Nutritional Knowledge Assessment

Table 3: Sports Nutrition Knowledge Scores by Category

Knowledge Domain	Mean Score	Standard Deviation	Percentage Correct
Basic Nutrition	6.8	2.1	68.0%
Sports-Specific Nutrition	5.2	2.4	52.0%
Hydration	7.1	1.8	71.0%
Supplementation	4.3	2.6	43.0%
Timing and Recovery	4.9	2.3	49.0%
Overall Knowledge	28.3	8.4	56.6%

Knowledge scores varied significantly across domains. Athletes demonstrated strongest knowledge in hydration (71.0%) and basic nutrition (68.0%), while supplementation knowledge was weakest (43.0%). The overall knowledge score of 56.6% indicates moderate understanding but suggests substantial room for improvement. The high standard deviations indicate considerable variability in knowledge levels among participants.

Nutritional Attitude Assessment

Table 4: Nutritional Attitude Scale Scores by Dimension

Attitude Dimension	Mean Score	Standard Deviation	Score Range	Interpretation
Perceived Importance	4.2	0.8	1-5	High
Knowledge Confidence	3.1	0.9	1-5	Moderate
Behavioral Intentions	3.8	0.7	1-5	High
Perceived Barriers	3.4	0.8	1-5	Moderate
Overall Attitude	3.6	0.6	1-5	Moderate-High

Athletes demonstrated high perceived importance of sports nutrition (M=4.2) and strong behavioral

intentions (M=3.8). However, knowledge confidence was moderate (M=3.1), indicating a gap between recognition of importance and confidence in nutritional knowledge. The perceived barriers were moderate (M=3.4), suggesting that while barriers exist, they are not insurmountable.

Regional Variations in Nutritional Attitudes

Table 5: Nutritional Attitude Scores by Region

Region	N	Mean Attitude Score	Standard Deviation	ANOVA F-value	p-value
Punjab	42	3.8	0.5	4.23	0.003*
Sindh	30	3.7	0.6		
Khyber Pakhtunkhwa	18	3.4	0.7		
Balochistan	12	3.2	0.8		
Islamabad Capital Territory	15	4.1	0.4		
Others	3	3.3	0.6		

*p < 0.05

Significant regional differences were observed in nutritional attitudes (F=4.23, p=0.003). Athletes from Islamabad Capital Territory and Punjab showed the highest attitude scores, while those from Balochistan had the lowest scores. These differences likely reflect variations in access to nutritional resources, coaching quality, and educational opportunities across regions.

Gender Differences in Nutritional Attitudes

Table 6: Nutritional Attitudes by Gender

Attitude Dimension	Male (n=83)	Female (n=37)	t-value	p-value	Effect Size (d)
Perceived Importance	4.1	4.4	-2.12	0.036*	0.38
Knowledge Confidence	3.2	2.9	1.67	0.098	0.33
Behavioral Intentions	3.7	4.0	-2.04	0.044*	0.43
Perceived Barriers	3.3	3.6	-1.89	0.061	0.38
Overall Attitude	3.6	3.7	-1.23	0.221	0.17

*p < 0.05

Female athletes showed significantly higher perceived importance (p=0.036) and behavioral intentions (p=0.044) compared to males. While not statistically significant, females also reported higher perceived barriers and lower knowledge confidence. The effect sizes were small to moderate, suggesting meaningful practical differences between genders.

Educational Level and Nutritional Attitudes

Table 7: Nutritional Attitudes by Educational Level

Education Level	N	Mean Attitude Score	Standard Deviation	Post-hoc Comparisons
Secondary	45	3.4	0.7	a
Higher Secondary	42	3.6	0.6	a,b
University	28	3.9	0.5	b
Postgraduate	5	4.2	0.3	b
F-value				5.67**
p-value				0.001

**p < 0.01; Different letters indicate significant differences (p < 0.05)

A significant positive relationship was observed between educational level and nutritional attitudes (F=5.67, p=0.001). Post-hoc analysis revealed that university and postgraduate participants had significantly higher attitude scores than those with secondary education. This finding suggests that higher education contributes to more positive nutritional attitudes.

Sources of Nutritional Information

Table 8: Primary Sources of Nutritional Information

Information Source	Frequency	Percentage	Perceived Reliability (1-5)
Coaches	87	72.5%	3.8
Internet/Social Media	64	53.3%	3.2
Fellow Athletes	58	48.3%	3.1
Family/Friends	45	37.5%	3.4
Sports Nutritionist	23	19.2%	4.6
Medical Professionals	19	15.8%	4.4
Books/Literature	16	13.3%	4.1
Media (TV/Radio)	12	10.0%	2.8

Coaches were the most frequently used source of nutritional information (72.5%), though their perceived reliability was moderate (3.8). Sports nutritionists, while used by only 19.2% of athletes, had the highest perceived reliability (4.6). This suggests a need for better access to qualified sports nutrition professionals.

Barriers to Optimal Sports Nutrition

Table 9: Perceived Barriers to Optimal Sports Nutrition

Barrier	Frequency Reporting	Percentage	Mean Severity (1-5)
Cost of Sports Nutrition Products	98	81.7%	4.2
Lack of Knowledge	76	63.3%	3.8
Limited Access to Nutritionist	73	60.8%	3.9
Time Constraints	65	54.2%	3.4
Cultural/Family Influences	52	43.3%	3.2
Lack of Variety in Available Foods	48	40.0%	3.1
Conflicting Information	43	35.8%	3.3
Lack of Motivation	28	23.3%	2.8

Cost emerged as the most significant barrier (81.7% reporting, severity 4.2), followed by lack of knowledge (63.3%) and limited access to nutritionists (60.8%). These findings highlight the economic and educational challenges facing Pakistani elite sprinters in accessing optimal sports nutrition.

Relationship Between Knowledge and Attitudes

Table 10: Correlation Matrix of Key Variables

Variable	1	2	3	4	5
1. Overall Knowledge	1.00				
2. Perceived Importance	0.45**	1.00			
3. Knowledge Confidence	0.67**	0.38**	1.00		
4. Behavioral Intentions	0.52**	0.71**	0.48**	1.00	
5. Overall Attitude	0.58**	0.84**	0.67**	0.89**	1.00

**$p < 0.01$

Strong positive correlations were observed between knowledge and attitudes ($r=0.58$, $p<0.01$). Knowledge confidence showed the strongest correlation with actual knowledge ($r=0.67$), while behavioral intentions were most strongly correlated with perceived importance ($r=0.71$). These findings support the theoretical relationship between knowledge, attitudes, and behavioral intentions.

Predictors of Nutritional Attitudes

Table 11: Multiple Regression Analysis Predicting Overall Nutritional Attitudes

Predictor Variable	B	SE B	β	t	p-value
Constant	1.89	0.34		5.56	<0.001**
Knowledge Score	0.024	0.008	0.32	3.01	0.003**
Education Level	0.18	0.06	0.28	2.87	0.005**
Gender (Female)	0.15	0.09	0.12	1.67	0.098
Age	0.008	0.009	0.09	0.89	0.375
Region (Urban)	0.21	0.08	0.24	2.63	0.010*
Coaching Quality	0.19	0.07	0.23	2.71	0.008**

$R^2 = 0.52$, Adjusted $R^2 = 0.49$, $F(6,113) = 20.45$, $p < 0.001$, *p < 0.05, **p < 0.01

The regression model explained 52% of the variance in nutritional attitudes. Knowledge score (β=0.32), education level (β=0.28), urban region (β=0.24), and coaching quality (β=0.23) were significant predictors. These findings suggest that interventions targeting knowledge enhancement, education, and coaching quality could effectively improve nutritional attitudes.

Discussion

The study revealed significant gaps in sports nutrition knowledge among elite sprinters in Pakistan. With an overall knowledge score of 56.6%, athletes demonstrated moderate understanding but substantial room for improvement. Particularly concerning was the low knowledge in supplementation (43.0%) and timing/recovery nutrition (49.0%), critical areas for sprint performance optimization. Despite moderate knowledge levels, athletes showed high perceived importance of sports nutrition (4.2/5.0) and strong behavioral intentions (3.8/5.0). This finding suggests that Pakistani elite sprinters are receptive to nutritional interventions and recognize the value of proper nutrition for performance enhancement.

The regional analysis identified significant differences in nutrition attitudes among athletes, with athletes from the Islamabad Capital Territory and Punjab exhibiting significantly greater scores than athletes from Baluchistan and the other provinces. This suggests that unequal distribution of access, coaching, and educational opportunities, amongst others, exist among diverse regions in Pakistan.

The female athletes had significantly greater perceived importance and behavioral intentions compared to the male athletes. The female athletes also reported lower knowledge confidence and higher perceived barriers indicating while female athletes may be more motivated to engage with sports nutrition, they face more barriers to access and acting upon that nutritional knowledge. A strong positive relationship was observed between educational level and nutritional attitudes. University and postgraduate participants showed significantly higher attitude scores than those with secondary education, highlighting the importance of general education in facilitating sports nutrition adoption.

Only 19.2% of athletes had access to sports nutritionists, despite this being the most trusted source of nutritional information. The heavy reliance on coaches for nutritional guidance (72.5%) underscores the need for improved coaching education in sports nutrition. Cost emerged as the most significant barrier to optimal sports nutrition, with 81.7% of athletes reporting it as a major constraint. This finding highlights the economic challenges facing Pakistani athletes and the need for cost-effective nutritional strategies. The study confirmed a strong positive correlation (r=0.58) between nutritional knowledge and attitudes, supporting the theoretical framework that knowledge enhancement can lead to improved attitudes and potentially better nutritional practices.

Conclusions

Elite sprinters in Pakistan are a receptive cohort for an inquiry regarding sports nutrition. The combination of a high level of perceived importance and strong behavioral intentions, and moderate levels of knowledge suggests that educational interventions could be developed that would have positive and meaningful improvements in the nutritional attitudes and behaviors of this cohort. The pronounced geographic and educational inequities in nutritional attitudes are bear out the flaws of systemic inequities in the sports development framework in Pakistan. Therefore, addressing inequities around nutrition requires some kind of coordinated plan for equitable access to nutrition resources and education, where it is not available.

The reliance on course-related coaches to seek nutritional knowledge, with relatively moderate reliability, suggests that analyzing the study's conclusions around the valid health-related knowledge of a coach as a source of nutritional guidance needs attention and strengthening. In terms of the

acquired study's conclusions around gendered nutritional attitudes of male and female athletes, it is likely will be more beneficial with an approach developed specifically for the female athlete, rather than diffuse male and female athletes. Expectedly, female athletes would be served well with an approach designed to build confidence and reduce barriers.

The importance of cost as a barrier suggests that any successful sports nutrition intervention needs to be cheaper for Pakistani athletes. Consequently, it is required to implement cost-effective strategies, relying on readily available local resources. The difference between knowledge and confidence suggests that knowledge is not enough. Any intervention needs to consider knowledge translation, so that athletes can get knowledge of theory, on a more practical based scheme and thus have the confidence to act on it.

Final Recommendations

The results of the present study indicate that Pakistani elite sprinters have adequate motivation and receptivity for successful sports nutrition interventions. However, this potential requires teamwork on multiple levels of the sports structure in order to be ultimately realized. Success will require addressing economic barriers, improving coaching education, advancing equitable access to programs and resources, as well as developing culturally appropriate programming.

The establishment of sports nutrition infrastructure and education, in addition to improving individual athlete performance, also has the potential to improve Pakistan's competitive position in athletics at the international level. By employing these systematic recommendations and monitoring progress, Pakistan will have the opportunity to develop a world-class sports nutrition support system, which other developing nations can equally draw from.

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