# Development, Content Validation and Reliability Testing of a Questionnaire Assessing Factors Influencing Dietary Habits among Athletes

**Ms. Pratibha V Jadhav**
Ph.D. Research Scholar, MM's CACPE, Pune

**Dr. Sopan E Kangane**
Research Guide, MM's CACPE, Pune

## ABSTRACT

*The assessment of dietary habits and the factors influencing them is essential for understanding athletes' nutritional behaviours and designing appropriate interventions. However, comprehensive and context-specific instruments to assess the multifactorial determinants of dietary habits among athletes are limited. Therefore, the present study aimed to develop, establish content validity, and assess the reliability of a questionnaire designed to identify factors influencing dietary habits among athletes.*

*An instrument development and validation research design was employed. The questionnaire was developed through an extensive review of literature and expert consultation. Four domains were identified: Personal Factors, Socio-Economic Factors, Environmental Factors, and Sports-Specific Factors. An initial pool of 39 items was generated. Content validity was established through evaluation by five experts from the fields of Physical Education, Sports Nutrition, Coaching, and Research Methodology. Item Content Validity Index (I-CVI) and Scale Content Validity Index (S-CVI/Ave) were calculated. A pilot study was subsequently conducted on 26 athletes, and internal consistency reliability was assessed using Cronbach's Alpha.*

*The I-CVI values ranged from 0.80 to 1.00, while the S-CVI/Ave was 0.97, indicating excellent content validity. The initial reliability analysis yielded a Cronbach's Alpha coefficient of 0.892, demonstrating good internal consistency. Item analysis identified a small number of weak or overlapping items, and the questionnaire was refined accordingly by removing 4 items, resulting in a final instrument consisting of 35 items.*

*The findings indicate that the developed questionnaire possesses satisfactory psychometric properties and can be considered a valid and reliable instrument for assessing factors influencing dietary habits among athletes. The questionnaire may be useful for researchers, sports nutritionists, coaches, and physical education professionals in identifying dietary determinants and developing evidence-based nutritional interventions.*

***Keywords :*** Dietary Habits, Athletes, Questionnaire Development, Content Validity, Reliability, Cronbach's Alpha, Sports Nutrition.

## Introduction

Nutrition plays a crucial role in the health, growth, recovery, and athletic performance of sportspersons. Adequate dietary intake is essential for maintaining energy balance, supporting physiological adaptations to training, enhancing recovery, reducing the risk of injury, and optimizing competitive performance. Athletes have higher nutritional requirements than the general population because of the increased energy expenditure associated with training and competition. Consequently, appropriate dietary practices are considered one of the fundamental determinants of athletic success (Thomas et al., 2016).

Dietary habits refer to the regular pattern of food selection, meal timing, food preparation, and nutrient consumption practiced by an individual. Among athletes, dietary habits influence body composition, physical fitness, recovery processes, immune function, and sport-specific performance. Research has consistently demonstrated that inadequate nutrition can negatively affect endurance, strength, concentration, decision-making ability, and overall athletic performance (Burke & Deakin, 2015). Contemporary sports nutrition guidelines also highlight that meal timing, nutrient quality, and individualized dietary planning significantly influence training adaptations and competitive performance. (Kerksick, 2023). Recent recommendations from the International Olympic Committee emphasize that individualized nutrition assessment and evidence-based dietary interventions are fundamental for optimizing athletic performance, recovery, and long-term athlete health. (Mountjoy, 2023). Therefore, understanding athletes' dietary habits and the factors influencing those habits has become an important area of research in sports nutrition.

Despite growing awareness regarding sports nutrition, many athletes fail to meet recommended dietary guidelines. Studies conducted across various athletic populations have reported inadequate consumption of carbohydrates, proteins,

fruits, vegetables, and fluids among athletes. In addition, excessive intake of fast foods, sugary beverages, and processed foods has been frequently observed (Spronk et al., 2015). Such dietary inadequacies may compromise training adaptations and competitive outcomes.

Dietary habits are influenced by a wide range of factors extending beyond individual food preferences to include personal, social, environmental, economic, cultural, and sport-related determinants. Personal factors such as nutrition knowledge, attitudes, beliefs, motivation, taste preferences, and health awareness significantly affect food choices. Athletes possessing greater nutrition knowledge are generally more likely to adopt healthier dietary practices than those with limited knowledge (Heaney et al., 2011).

Socio-economic factors also play an important role in determining dietary behaviour. Household income, food affordability, parental education, family support, and access to nutritious foods may heavily influence dietary choices. Athletes from economically disadvantaged backgrounds may face challenges in obtaining nutrient-rich foods due to financial constraints. Furthermore, family eating patterns and parental influence often shape the dietary behaviours of young athletes.

Environmental factors represent another critical dimension affecting dietary habits. The availability and accessibility of healthy food options within schools, sports facilities, neighborhoods, and communities can significantly influence choices. Peer influence, media exposure, advertising, and social media platforms also contribute to dietary decision-making among adolescents and young adults. The increasing exposure to digital marketing of energy-dense and nutrient-poor foods has been identified as a growing concern in relation to healthy eating behaviours (World Health Organization, 2022).

In addition to personal, socio-economic, and environmental influences, sport-specific factors may affect dietary habits. Training schedules, competition demands, travel requirements, coaching practices, and recovery needs often dictate meal timing and food selection. Athletes participating in different sports may exhibit varying nutritional requirements and dietary behaviours based on the physiological demands of their sport. Therefore, understanding sport-specific influences is essential for developing effective nutritional interventions.

To investigate dietary habits and their determinants, researchers commonly employ questionnaires and survey instruments. Questionnaires provide a practical, economical, and efficient method for collecting information from large groups of participants. However, the usefulness of a questionnaire depends upon its validity and

reliability; it must accurately measure the intended construct and produce consistent results across respondents. Without adequate validation, research findings derived from an instrument may be misleading or scientifically weak.

Although several nutrition-related questionnaires have been developed internationally, many focus primarily on nutrition knowledge, food frequency, dietary intake, or eating behaviours. Limited attention has been given to the comprehensive assessment of the multifactorial determinants influencing dietary habits among athletes, particularly within the Indian context. Furthermore, socio-cultural differences, regional dietary practices, economic conditions, and sport participation patterns necessitate the development of context-specific instruments.

A review of the available literature revealed the absence of a standardized questionnaire capable of comprehensively assessing personal, socio-economic, environmental, and sport-specific factors influencing dietary habits among athletes. Therefore, there was a clear need to develop a scientifically valid and reliable instrument tailored to the target population. The development of such a questionnaire would facilitate the identification of factors contributing to appropriate or inappropriate dietary habits and support the formulation of evidence-based nutritional interventions.

The present study was therefore undertaken to develop, validate, and establish the reliability of a questionnaire designed to assess factors influencing dietary habits among athletes. The instrument was named the MADPSA Questionnaire (Multifactorial Analysis of Dietary Patterns among School Athletes Questionnaire). The questionnaire was developed through a systematic process involving literature review, item generation, expert evaluation, content validation, language validation, pilot testing, and reliability refinement. It is expected that the resulting instrument will serve as a useful tool for researchers, sports nutritionists, coaches, and physical education professionals.

## Purpose of the Study

The purpose of this study was to develop and validate a questionnaire for assessing the factors influencing dietary habits among athletes. The study aimed to establish the content validity and reliability of the instrument so that it could be used as a standardized tool for identifying personal, socio-economic, environmental, and sports-specific factors affecting athletes' dietary habits.

## Methodology

**Research Design** : The present study employed an instrument development and validation research design to construct a questionnaire for assessing factors influencing dietary habits among athletes.

**Development of the Questionnaire :** The questionnaire was developed through an extensive review of literature related to sports nutrition, dietary habits, nutrition knowledge, food choice behaviour, and factors influencing dietary practices among athletes. Based on the literature review and expert consultation, four major domains were identified:

1. Personal Factors
2. Socio-Economic Factors
3. Environmental Factors
4. Sports-Specific Factors

An initial pool of 39 items was generated to represent these domains.

### *Content Validation*

The preliminary questionnaire was submitted to five experts from the fields of Physical Education, Sports Nutrition, Coaching, and Research Methodology for evaluation. The experts assessed each item on the basis of relevance, clarity, simplicity, and adequacy. A four-point relevance scale was used for evaluation. Based on expert ratings, the Item Content Validity Index (I-CVI) and Scale Content Validity Index (S-CVI/Ave) were calculated. Necessary modifications were incorporated according to expert suggestions to enhance the quality and comprehensiveness of the questionnaire.

### *Pilot Study*

A pilot study was conducted on 26 athletes selected through purposive sampling. The purpose of the pilot study was to assess the clarity, feasibility, and operational reliability of the questionnaire. Data were collected via Google Forms and direct administration.

### *Reliability Testing & Item Refinement*

The reliability of the questionnaire was assessed using Internal Consistency Reliability. The Cronbach's Alpha coefficient was calculated using SPSS software. Item-total

correlations and Cronbach's Alpha if Item Deleted statistics were systematically examined to identify psychometrically weak, redundant, or poorly functioning items.

### *Data Collection Procedures*

To ensure a standardized and efficient data administrative framework, data collection during the pilot study was executed using a dual approach involving both digital and direct physical administration pathways:

- Digital Administration: A digital counterpart of the preliminary 39-item questionnaire was constructed using the Google Forms platform. A secure hypertext link accompanied by a brief overview detailing the study's objective was shared with participants through verified sports communication channels and email groups. The form settings were configured to restrict multiple responses per athlete while ensuring full encryption of participant data.
- Direct Physical Administration: For athletes with limited digital access or those present at training facilities, physical paper copies of the questionnaire were directly distributed by the researcher. This manual approach allowed for immediate clarification of structural formatting instructions, minimized missing data entries, and ensured high response completion rates under supervised conditions.
- Ethical Considerations: Regardless of the administrative format, all participants were provided an informed consent briefing before accessing the items. For minor school-age athletes, parental assent or institutional permission was acquired. Participation remained entirely voluntary, and anonymity was strictly preserved by assigning unique alphanumeric identification codes to each respondent instead of utilizing personal identifiers.

## Results

### *Content Validation Results*

The content validity of the questionnaire was firmly established through expert evaluation. The baseline psychometric indicators obtained from the five reviewing experts are detailed in Table 1.

**Table 1 :** *Content Validity Performance of the MADPSA Questionnaire Evaluated by Panel Experts*

| Parameter | Value | Interpretation |
|---|---|---|
| Number of Experts 5 | ----- | |
| I-CVI Range | 0.80–1.00 | Excellent Content Validity |
| S-CVI/Ave | 0.97 | Excellent Content Validity |

***Note :*** MADPSA = Multifactorial Analysis of Dietary Patterns among School Athletes; I-CVI = Item Content Validity Index; S-CVI/Ave = Scale Content Validity Index. Benchmarks are interpreted based on Polit and Beck (2006).

### *Reliability Analysis and Item Refinement Results*

The response data from the 26 pilot participants were analysed to determine internal consistency. The initial 39-item metric yielded a strong baseline reliability coefficient, as presented in Table 2.

**Table 2 :** *Baseline Reliability and Internal Consistency Metrics of the Pre-refined Instrument Pool*

| Parameter | Value | Interpretation |
|---|---|---|
| Sample Size | 26 | — |
| Number of Items | 39 | Baseline Pool |
| Cronbach's Alpha | 0.892 | Good Reliability |

***Note :*** Analysis was executed using SPSS software. Evaluation standard follows George and Mallery (2003) where values above .80 demonstrate high internal consistency.

To optimize the instrument, item-total statistics were carefully scrutinized. Item analysis revealed 4 items that demonstrated sub-optimal performance, featuring either low or negative item-total correlations along with conceptual and thematic overlap with other entries. To improve the quality of the questionnaire, these 4 weak items were excised. The specific items removed and the statistical rationale for their exclusion are structured in Table 3.

**Table 3 :** *Item Analysis Refinement and Statistical Rationale for Structural Deletion*

| Item Number | Reason for Removal |
|---|---|
| 18 | Low Item-Total Correlation |
| 31 | Negative Item-Total Correlation and Content Overlap |
| 34 | Negative Item-Total Correlation and Content Overlap |
| 36 | Negative Item-Total Correlation and Content Overlap |

***Note :*** Removal of these sub-optimal items streamlined the final MADPSA metric from an initial 39 items down to an optimized, multi-domain configuration of 35 items.

Following the extraction of these 4 items, the MADPSA Questionnaire was streamlined from 39 items to a final configuration of 35 items. The final distribution of items across the four structural domains is outlined below:

- Personal Factors: 12 items
- Socio-Economic Factors: 8 items
- Environmental Factors: 11 items
- Sports-Specific Factors: 4 items
- Total Instrument Length: 35 items

## Discussion

The present study successfully developed and validated a questionnaire to evaluate the Multiple factors influencing dietary habits among athletes. Content validity indices met strict empirical benchmarks. According to Polit and Beck (2006), an I-CVI value of 0.78 or above and an S-CVI/Ave value of 0.90 or above indicate excellent content validity. The indices achieved here (I-CVI: 0.80–1.00; S-CVI/Ave: 0.97) confirm that the questionnaire adequately measures the intended factors influencing athletes' dietary habits. Expert review improved the clarity, wording, and relevance of the questionnaire for athletes. Furthermore, formal language validation was executed to ensure the linguistic precision and cultural suitability of the Marathi version of the instrument. Review by language specialists maintained exact conceptual equivalence between the English and Marathi variants, ensuring data consistency when administered to Marathi-speaking athletes.

The internal consistency testing of the items yielded a Cronbach's Alpha of 0.892. In psychometric testing, Cronbach's Alpha values above 0.80 are categorized as good, and values above 0.90 are excellent (George & Mallery, 2003). The reliability coefficient achieved in this study proves that the tool offers consistent and dependable measurements.

During item analysis, statistical indicators were carefully balanced against theoretical imperatives. While a few remaining items displayed lower item-total correlations, they were retained due to their vital conceptual importance in capturing specific sub-dimensions of athlete lifestyle and dietary frameworks. Removing four weak items reduced questionnaire length while improving reliability and maintaining content validity. In conclusion, the MADPSA Questionnaire displays strong psychometric health, supported by unified expert validation, language adaptation, pilot execution, and internal consistency testing. The instrument provides an effective framework for researchers, sports nutritionists, team coaches, and physical education specialists seeking to isolate dietary determinants and build targeted nutritional guidance programs. The findings of the present study are consistent with previous questionnaire development and validation research in health, education, and sports sciences. Polit and Beck (2006) suggested that an I-CVI value of 0.78 or above and an S-CVI/Ave value of 0.90 or above indicate excellent content validity. The MADPSA questionnaire exceeded these recommended thresholds, with I-CVI values ranging from 0.80 to 1.00 and an S-CVI/Ave of 0.97, indicating strong expert agreement regarding the relevance of the questionnaire items. Similarly, Cronbach's Alpha of 0.892 demonstrates good internal consistency and is comparable to reliability coefficients reported for nutrition knowledge, dietary behaviour, and health-related questionnaires, which commonly range between 0.80 and 0.95. The refinement of the questionnaire by removing four statistically weak items follows accepted psychometric practice and has been reported in several questionnaire validation studies to improve internal consistency while maintaining content coverage.

## References

Best, J. W., & Kahn, J. V. (2016). Research in education (10th ed.). Pearson.

Burke, L. M., & Deakin, V. (2015). Clinical sports nutrition (5th ed.). McGraw-Hill Education.

George, D., & Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference (11th ed.). Allyn & Bacon.

Heaney, S., O'Connor, H., Michael, S., Gifford, J., & Naughton, G. (2011). Nutrition knowledge in athletes: A systematic review. International Journal of Sport Nutrition and Exercise Metabolism, 21(3), 248–261.

Kothari, C. R., & Garg, G. (2019). Research methodology: Methods and techniques (4th ed.). New Age International.

Oppenheim, A. N. (1992). Questionnaire design, interviewing and attitude measurement. Pinter Publishers.

Spronk, I., Heaney, S. E., Prvan, T., & O'Connor, H. T. (2015). Relationship between nutrition knowledge and dietary intake. British Journal of Nutrition, 111(10), 1713–1726.

Thomas, D. T., Erdman, K. A., & Burke, L. M. (2016). Position of the Academy of Nutrition and Dietetics: Nutrition and athletic performance. Journal of the Academy of Nutrition and Dietetics, 116(3), 501–528.

World Health Organization. (2022). Food marketing exposure and healthy diets among children and adolescents.