Evaluating the Nutritional Profile and Eating Behaviours of District Level Badminton Players

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Abstract- *Nutrition is a critical determinant of athletic performance, especially for young athletes engaged in high-intensity sports such as badminton. Adequate dietary intake supports energy demands, recovery, growth, and long-term physiological development. The present study examined the dietary profile and nutritional habits of district-level badminton players (N = 163), aged 15–25 years, from Gurugram City. Dietary assessment was conducted using a three-day 24-hour dietary recall and a food frequency questionnaire (FFQ). Nutrient intakes were compared with the Recommended Dietary Allowances (RDA) prescribed by the ICMR (2020). Data were analysed for dietary patterns, meal frequency, supplement use, and nutrient adequacy ratios (NAR). Results showed that 48.5% of players followed an ovo-vegetarian diet, while 28.2% consumed non-vegetarian diets. Most players exhibited positive dietary behaviours, including preference for home-cooked foods, regular meal timings, and appropriate pre- and post-workout snacking. However, substantial micronutrient inadequacies—especially in iron and vitamin A—were observed across age and gender categories. Energy intake was below RDA for most adolescents, indicating low energy availability. Supplement use (52%) was common, largely influenced by coaches rather than professional nutritionists. Overall, while players demonstrated good awareness of sports-specific eating habits, significant gaps remain in energy sufficiency and micronutrient intake, underscoring the need for targeted nutrition counselling and professional dietary guidance.*

Key words*- Badminton players; Sports nutrition; Dietary practices; Nutrient adequacy; Micronutrient deficiency; Energy intake; Supplement use; Nutritional assessment.*

1. INTRODUCTION

Optimal sports performance is the outcome of a complex interaction between an athlete's genetic makeup, structured training, and appropriate nutrition (National Institute of Nutrition, 2010). Nutrition has long been recognised as a foundational element that enhances every aspect of physical performance, recovery, and overall athletic potential (American Dietetic Association, 2009). In the present era of intense competitive sports, close attention to nutrient requirements, informed food selection, appropriate meal timing, and evidence-based supplementation has become indispensable (Lin & Lee, 2005).

Sportspersons require diets that are substantially more nutrient-dense than those of sedentary individuals, owing to their increased physiological demands. Nutritional deficiencies can lead to compromised physical health, early

fatigue, weakened immunity, and ultimately, diminished sports performance (Burke & Deakin, 2011). Several factors contribute to inadequate nutrition among athletes, including poor food choices, lack of nutrition education, taste preferences, and limited availability of healthier options (Jacobson et al., 2001). Although the relationship between nutrition and sports has been recognised for over a century, only in recent decades has detailed research focused on the specific nutritional demands and micronutrient needs of athletes (Lulisn-Doru et al., 2014).

Historically, nutrition awareness in sports evolved gradually. Early work by Brouha et al. (1961) highlighted the growing recognition of the physiological roles of essential nutrients. Green et al. (1989) noted that sports nutrition has progressed from self-experimented dietary practices to a well-established scientific discipline. Despite such advancements, many athletes—particularly in developing countries like India—continue to experience poor health and suboptimal performance due to widespread malnutrition and unbalanced diets (Tripathy, 1985). As emphasised by Lambert et al. (2004), even expert coaching and intensive training fail to produce optimal performance without appropriate dietary modifications tailored to the athlete's needs.

A well-balanced diet is essential for sustaining the high energy demands of badminton and other high-intensity sports. Carbohydrates and fats serve as primary energy sources, with glycogen playing a central role in sustaining repeated high-intensity movements. Proteins support muscle repair, immune function, and hormone synthesis, while fats facilitate metabolic processes, vitamin absorption, and prolonged energy release. Water and fluid balance are equally critical for thermoregulation and physiological function. Micronutrients—particularly iron, calcium, and vitamins A, C, and E—support immunity, antioxidant defence, oxygen transport, and cellular recovery.

Alongside whole foods, many athletes rely on commercial supplements such as protein powders, amino acids, multivitamins, electrolyte drinks, and energy gels to meet specific performance needs. While these supplements may aid endurance, strength, hydration, and recovery, they are most effective when used judiciously and as complements—not substitutes—for diverse, nutrient-rich diets.

Despite the established importance of nutrition in sports, gaps remain between recommended and actual dietary practices among young athletes. Limited research exists on the dietary habits of district-level badminton players in rapidly urbanising regions such as Gurugram. Understanding their nutritional status is essential for designing targeted interventions, strengthening sports training programs, and enhancing performance outcomes. Therefore, the present study aims to assess the nutritional profile, dietary practices, and nutrient adequacy of district-level badminton players aged 15–25 years in Gurugram City.

2. MATERIALS AND METHODS

Study Design and Participants

A cross-sectional study was conducted among 163 district-level badminton players (both sexes), aged 15–25 years, residing and training in Gurugram City (Haryana).

Dietary Assessment Tools

Two methods were used:

1) **24- hour dietary recall**

   To determine quantitative nutrient intake, including energy, carbohydrates, proteins, fats, vitamins, and minerals.

2) **Food Frequency Questionnaire (FFQ)**

To assess qualitative dietary patterns, frequency of consumption of major food groups, and snacking practices.

Nutrient Analysis and Adequacy

- Nutrient intake was compared against age- and sex-specific **ICMR-NIN RDA (2020)**.
- **Nutrient Adequacy Ratio (NAR)** was calculated for individual nutrients.

Variables Assessed through pretested questionnaires and interviews- Type of diet**,** Meal frequency and timing**,** Reasons for meal skipping**,** Pre- and post-workout nutrition**,** Supplement use and influencing factors**,** Food group consumption patterns**,** Nutrient intake across age and gender

3. RESULT AND DISCUSSION

Dietary Patterns

Nearly half of the players (48.5%) followed an ovo-vegetarian diet, 28.2% consumed non-vegetarian foods, and 23.3% adhered strictly to vegetarian diets. About 36% had shifted from vegetarian to ovo- or non-vegetarian diets to support athletic demands. An overwhelming majority (≈90%) preferred home-cooked meals, citing better hygiene and digestibility.

Meal Frequency and Timing

Approximately 40% consumed 5–6 meals/day, whereas 21% ate three standard meals. About 36% reported no fixed meal schedule. While 77.2% maintained consistent meal timings, 22.7% followed irregular patterns due to lack of time or appetite. Nearly 72% maintained a 2–3 hour gap between meals.

Supplement Use

More than half (52%) consumed nutritional supplements, primarily multivitamins (70%) and calcium-vitamin D preparations (22%). Supplementation was largely influenced by coaches (48%), followed by advertisements and friends.

Food and Snack Practices

Awareness of pre- and post-workout nutrition was notably high.

- **Pre-workout snacks:** fruits, nuts, boiled eggs, light milk-based drinks
- **Post-workout snacks:** fruits, protein shakes, paneer, sprouts

During tournaments, all athletes avoided processed snacks, opting for energy-dense natural foods.

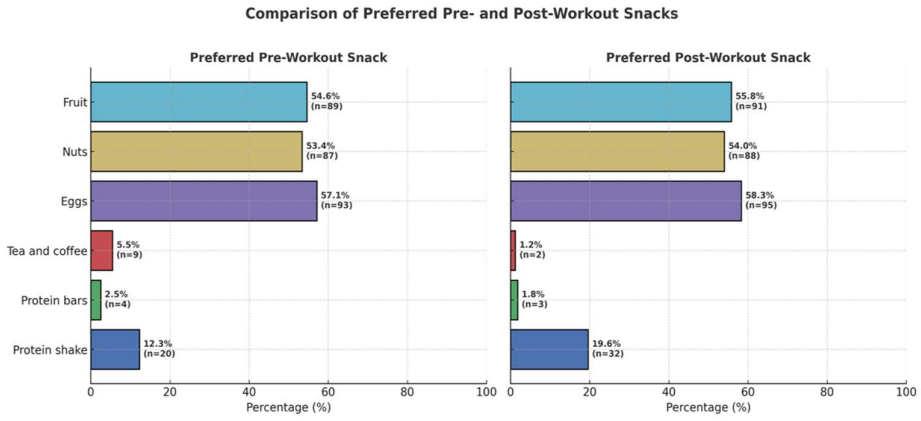

Figure 1: Preferred Pre and Post Workout Snacks by Selected Participants

Eating Out Behaviour

Around 48% ate out once a week (mostly as "cheat meals"), 22% once a month, and none more than 2–3 times per week, indicating strong dietary discipline.

Impact of COVID-19

Pandemic disruptions reduced appetite in 48% of players, while 30% reported increased intake due to stress and irregular schedules.

Sports Drink Consumption

Before competitions, 47% consumed sports drinks often, and 7.4% consumed them always. About 91% consumed bananas, glucose, or electrolyte drinks during matches.

Food Frequency Trends

- High intake: cereals, milk, fruits, eggs
- Moderate intake: pulses, vegetables
- Low intake: leafy greens, millets

  This dietary trend explains observed shortfalls in vitamin A and iron.

Nutrient Adequacy

Across all groups:

- **Energy intake** was below RDA for most adolescents (68–83% adequacy).
- **Macronutrients** (carbohydrates, proteins, fats) met 90–100% adequacy.
- **Micronutrient deficiencies** were substantial:
  - Iron: 34–93% adequacy
  - Vitamin A: 27–65% adequacy
  - Calcium: near RDA for some groups but low in others

This study revealed a blend of positive dietary behaviours and significant nutritional inadequacies among district-level badminton players in Gurugram. Players demonstrated strong nutritional awareness, disciplined meal timing, appropriate pre- and post-training snacking, and limited consumption of processed foods. These practices align with recommendations by the American College of Sports Medicine and other sports nutrition authorities.

However, persistent **micronutrient insufficiencies**, particularly in vitamin A and iron, were evident across all age groups and genders. These findings are consistent with earlier research: **Beard & Tobin (2000)** highlighted widespread iron deficiency among adolescent female athletes, affecting endurance and immunity. **Lukaski (2004)** noted the importance of vitamin A and iron in metabolic and antioxidant functions. **Loucks et al. (2011)** linked inadequate energy availability in athletes with hormonal imbalances and impaired growth.

The insufficient energy intake observed among younger players suggests a risk of low energy availability (LEA), which may hinder growth, bone development, and recovery. While macronutrient intake met RDA, inadequate micronutrients may compromise oxygen transport, immune function, and muscle repair. Overall, the study emphasizes the need for: professional nutrition counselling, micronutrient-rich diet planning, regular screening for deficiencies, and structured meal plans aligned with training loads.

Implementing targeted nutrition education programs can significantly improve dietary adequacy, enhance performance, and support long-term athlete health.

4. CONCLUSION

The present study reveals that district-level badminton players aged 15–25 years in Gurugram exhibit a combination of commendable dietary habits and significant nutritional gaps. While most athletes demonstrate strong awareness of sports-specific nutrition—such as maintaining regular meal timings, consuming appropriate pre- and post-workout snacks, preferring home-cooked foods, and limiting intake of processed items—critical inadequacies persist. Energy intake among adolescents was notably below the recommended levels, indicating potential risk of low energy availability, which may compromise growth, training capacity, and recovery. Furthermore, widespread micronutrient deficiencies, particularly in iron and vitamin A, were evident across both genders and age groups despite adequate macronutrient consumption.

The study also highlights heavy reliance on coach-guided dietary decisions and supplements, underlining the need for professional nutrition counselling. Limited dietary diversity, especially in leafy vegetables, millets, and micronutrient-dense foods, further contributes to nutrient insufficiency. Addressing these gaps through structured nutrition education, personalized diet plans, periodic biochemical assessments, and integration of qualified dieticians into training academies can substantially improve both health and performance outcomes in young athletes.Overall, the findings emphasize that while foundational nutrition practices are strong, targeted interventions are essential to optimize energy intake, correct micronutrient deficiencies, and support the athletic development of badminton players in Gurugram.

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