RESEARCH ARTICLE

PHYSICAL STATUS, DIETARY PATTERNS, AND HEALTH PROFILE OF YOUNG FEMALE ATHLETES: A CROSS-SECTIONAL STUDY

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Abstract:

Background:

Female athletes face unique challenges related to physical health, nutrition, and reproductive well-being. Balanced diet, adequate training, and proper health monitoring are essential to sustain performance and prevent long-term complications.

Objectives:

To evaluate the physical status, dietary patterns, and health profile of young female athletes with special emphasis on nutritional practices, menstrual health, and disease prevalence.

Methods:

A cross-sectional study was conducted on young female athletes (n=52) engaged in various sports including handball and kabaddi. Data were collected using structured questionnaires and anthropometric assessments, covering training patterns, diet type (vegetarian/non-vegetarian), protein intake, menstrual regularity, and general health. Body Mass Index (BMI) was calculated to assess nutritional status. Descriptive statistics were used to summarize findings.

Results:

The mean BMI of participants was 20.6, falling within the normal range. Most athletes reported training for 2 hours daily, primarily emphasizing lower-body strength. Non-vegetarians (72%) outnumbered vegetarians (28%), but the majority (85%) did not consume additional protein supplements. Menstrual cycles were regular in 90% of participants, while 7% reported irregular cycles and 2% reported PCOD. Only one case of thyroid disorder was noted, with no major chronic illnesses reported.

Conclusion:

Adolescent female athletes exhibited normal BMI and overall good physical and reproductive health. However, inadequate dietary planning and low protein intake represent critical gaps that could compromise long-term performance and recovery. Nutrition-focused interventions and athlete-specific diet plans are recommended to optimize health and athletic potential.

Keywords: Female Athletes, Nutrition, Body Mass Index (BMI), Menstrual Health, Sports Performance.

Introduction:

In recent years, the participation of young females in competitive sport has risen markedly, underscoring the necessity of evaluating their physical fitness, nutritional habits, and overall physiological well-being. During adolescence, female athletes undergo complex physiological transitions that exert a profound influence on somatic growth, athletic performance, and reproductive functioning (Malina *et al.,* 2004). The attainment of equilibrium between training intensity, dietary adequacy, and restorative recovery is therefore imperative to sustain optimal performance and ensure enduring health outcomes (Thomas, Erdman & Burke, 2016).

Somatic composition—encompassing stature, body mass, and body mass index (BMI)—serves as a critical determinant of athletic suitability and susceptibility to injury (Ackland *et al.,* 2012). In the present investigation, participants demonstrated an average BMI within the normative range, indicative of well-proportioned physique and sound physical status. Nonetheless, existing literature highlights that suboptimal protein intake may adversely influence muscular repair, endurance capacity, and menstrual regulation in female athletes (Maughan & Shirreffs, 2010).

Table 1: Overview of Physiological and Dietary Findings among Female Athletes

Category	Finding
Total Participants	52
Average Age	~17.9 years
Most Common Sport	Handball
Average Training Hours	2 Hrs
Average Height	1.59 m
Average Weight	51.9 Kg
Average BMI	20.6 (normal range)
Veg vs Non-Veg	37 Non-veg, 14 Veg
Protein Intake	44 No, 5 Egg, 1 Egg & Milk, 1 Banana & Milk
Specific Diet	50 No, 1 Daily Salad
Menstrual Cycle (Regular/Irregular)	47 Regular, 4 Irregular
PCOD/PCOS Cases	1 PCOD case, rest mostly No
Diseases Reported	1 Thyroid case, rest No

Menstrual consistency and the incidence of endocrinal conditions such as polycystic ovarian disease (PCOD) or syndrome (PCOS) constitute important indices of reproductive health. Previous research has associated menstrual irregularities with energetic imbalance and insufficient nutritional support (Loucks, 2004; De Souza *et al.,* 2014). Reassuringly, the findings of the current study reveal that the majority of athletes reported regular menstrual cycles, with only isolated occurrences of PCOD or thyroid dysfunction. These results concur with earlier evidence suggesting that regulated training, combined with appropriate dietary management, fosters hormonal stability and reproductive well-being (Torstveit & Sundgot-Borgen, 2005).

Objectives

The principal objective of this investigation is to evaluate the physical condition of young female athletes with particular reference to their age, stature, body mass, body mass index (BMI), and overall body composition. It further endeavours to examine their training regimens, encompassing the duration of physical activity and the emphasis placed on specific muscle development. An additional aim is to analyse the athletes' dietary behaviours, with special consideration of their adherence to structured nutritional plans, adequacy of protein consumption, and preference for vegetarian or non-vegetarian diets. The study also seeks to assess menstrual health and associated endocrinal disorders such as polycystic ovarian disease (PCOD) and polycystic ovarian syndrome (PCOS), together with the occurrence of other health concerns, notably thyroid dysfunctions. Ultimately, this research aspires to identify existing disparities between nutritional practices and physiological demands, thereby illuminating factors that may affect the long-term performance, recovery, and overall well-being of young female athletes.

Hypotheses

It is proposed that most young female athletes exhibit a normal body mass index (BMI) and maintain good overall physical health. They generally engage in about two hours of daily training focused on lower-body muscle development. Nevertheless, many are likely to lack structured dietary routines and consume insufficient protein, which may affect recovery and performance. Menstrual health is expected to remain largely stable, with few cases of irregular cycles or PCOD/PCOS, and minimal occurrence of major disorders such as thyroid imbalance. Overall, a gap is anticipated between training load and nutritional adequacy, potentially influencing long-term growth and athletic performance.

Methodology

Study Design and Participants

This study adopted a cross-sectional descriptive design to evaluate the physical and nutritional status of young female athletes. A total of 52 participants were recruited, all actively engaged in sports such as kabaddi, handball, and rugby. The participants were between the ages of 15 and 20 years, representing students enrolled in higher secondary courses. Cross-sectional designs are widely applied in sports science to describe the health and performance profile of athletes at a given point in time (Setia, 2016).

Data Collection

Primary data were collected using a structured questionnaire and physical measurements. The questionnaire included information on demographic details, type of sport, duration of physical training, dietary practices, and menstrual health. Anthropometric measurements, including height, weight, BMI, bust, waist, and hip circumference, were recorded using standard techniques (Lohman, Roche & Martorell, 1988). BMI was calculated as weight in kilograms divided by the square of height in meters (kg/m^2).

Variables Assessed

The study focused on both physical indicators (age, height, weight, BMI, and body composition) and training variables (hours of daily training, muscle-specific training). In addition, dietary variables such as vegetarian/non-vegetarian preference, protein intake, and use of specific diets were assessed. Health-related indicators included menstrual cycle regularity, prevalence of PCOD/PCOS, and reported diseases such as thyroid. These variables were chosen as they represent key determinants of young athletic health and performance (Mountjoy *et al.,* 2018).

Data Analysis

Data were analyzed using descriptive statistics to obtain means, percentages, and frequency distributions for the study variables. This approach provided a clear picture of the athletes' physical status, training habits, dietary patterns, and health outcomes. Descriptive statistical methods are appropriate for studies aiming to summarize health and performance characteristics without testing complex interventions (Field, 2018).

Ethical Considerations

Participation in the study was voluntary, and informed consent was obtained from all participants. Data confidentiality was maintained throughout the research process, in line with ethical guidelines for human studies (World Medical Association, 2013).

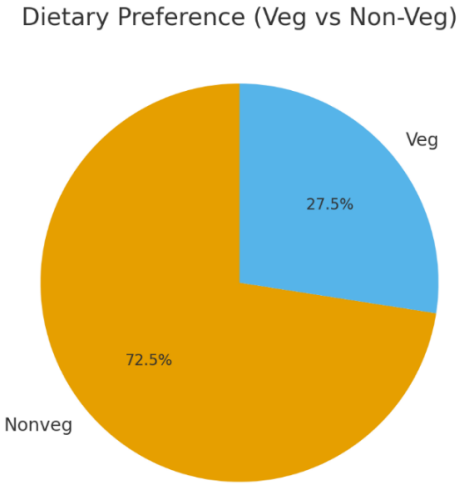

Figure 1: Percentage Distribution of Vegetarian and Non-Vegetarian Individuals

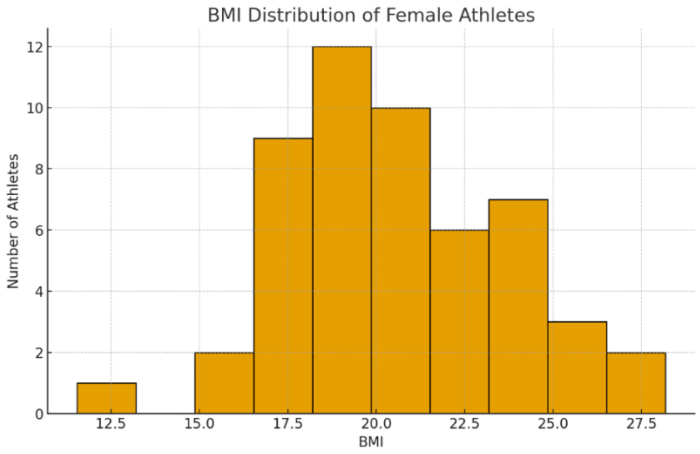

Figure 2: Frequency Distribution of Body Mass Index (BMI) in Female Athletes

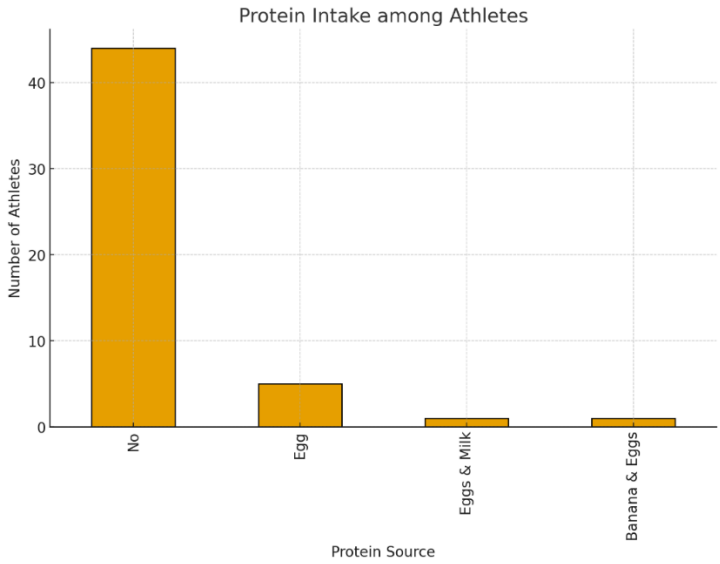

Figure 3: Distribution of Athletes Based on Protein Source Consumption

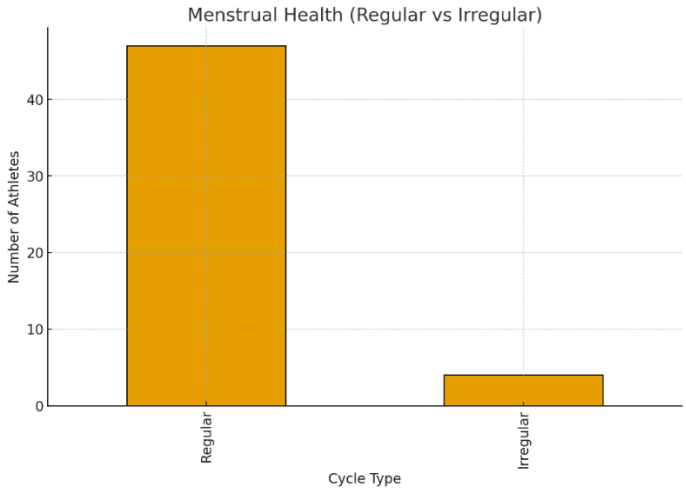

Figure 4: Menstrual Health Patterns: Regular vs. Irregular Cycles among Athletes

Results:

The present investigation encompassed a cohort of fifty-two young female athletes, with a mean age of 17.9 years, ranging from fifteen to twenty years. The average stature of participants was recorded at 1.59 metres, and the mean body weight at 51.9 kilograms. The corresponding mean body mass index (BMI) of 20.6 fell within the normal range, indicating that the majority of athletes maintained an overall healthy physical profile.

With respect to sporting participation, handball was identified as the predominant discipline, followed by kabaddi and rugby. Most athletes reported engaging in approximately two hours of daily physical training, with particular emphasis on lower-limb musculature development—a regimen consistent with the physical demands of agility-based team sports.

Nutritional assessment revealed a distinct disparity between training intensity and dietary adequacy. Of the total participants, thirty-seven followed a non-vegetarian diet, whereas fourteen adhered to vegetarian habits. Only a small proportion reported the use of protein supplements: forty-four athletes indicated no additional protein intake, while five consumed eggs, one consumed a combination of eggs and milk, and another reported the inclusion of banana and milk. Moreover, only a single athlete followed a structured dietary plan (daily salad), whereas the remaining fifty did not adhere to any defined nutritional regimen.

Findings related to reproductive and general health were largely reassuring. Menstrual regularity was observed in forty-seven athletes, with merely four reporting irregular cycles. A single case of polycystic ovarian disease (PCOD) was identified, while the remainder reported no such conditions. Regarding general health, only one participant disclosed a thyroid disorder; all others indicated the absence of any major medical concerns.

Collectively, the findings suggest that although young female athletes exhibit a healthy BMI, stable menstrual health, and a low prevalence of chronic ailments, there exists a marked deficiency in structured dietary practices and protein intake—factors that may impede optimal recovery and long-term athletic performance.

Discussion:

The findings of this study highlight that young female athletes generally maintain a healthy physical profile, as reflected in the average BMI (20.6), which falls within the normal range. These results are consistent with previous research emphasizing that regular sports participation supports optimal body composition and weight management in young athletes (Malina *et al.,* 2004).

Sports participation among the group was dominated by handball and kabaddi, with most athletes engaging in an average of two hours of training daily, primarily targeting lower-body strength. This aligns with the requirements of team sports, where agility, explosive power, and endurance are critical (Reilly & Doran, 2003). Such regular training supports cardiovascular health and muscle development, further contributing to the balanced BMI observed.

However, a significant gap was noted in dietary practices. Most athletes reported neither following a structured diet plan nor consuming adequate protein supplementation. Similar findings have been documented in earlier studies, which report that young athletes often fail to meet their nutritional

needs due to lack of awareness or guidance (Maughan & Shirreffs, 2010; Thomas, Erdman & Burke, 2016). Protein intake, in particular, is vital for muscle recovery and adaptation to training, and inadequate consumption may compromise performance and long-term health.

In terms of reproductive health, the majority of athletes reported regular menstrual cycles, with only a small proportion experiencing irregularity or PCOD. This is encouraging, as menstrual dysfunction has been frequently associated with energy imbalance and nutritional deficiencies among female athletes (Loucks, 2004; De Souza *et al.,* 2014). The low prevalence of menstrual disturbances and PCOD in this sample may suggest that training loads were within manageable limits, and energy deficits were not severe, despite the lack of structured diets.

With regard to general health, only one case of thyroid disease was reported, and no major chronic illnesses were found among the athletes. This indicates an overall low disease burden in this population, which is consistent with the positive effects of regular sports participation on young health outcomes (WHO, 2020).

Overall, the results suggest that young female athletes are physically healthy, with minimal reproductive or general health concerns, but there is a clear need for improved nutritional education and dietary planning. Addressing these gaps could further enhance their athletic performance, recovery, and long-term well-being.

Conclusion:

The study highlights that the majority of young female athletes maintain a healthy physical profile, with average age (~18 years), BMI (20.6), height (1.59 m), and weight (51.9 kg) all falling within normal ranges. Their training patterns—primarily around 2 hours daily with a focus on lower-body strength—align well with the demands of sports such as handball and kabaddi.

However, the results also reveal a notable gap in dietary practices. Most athletes neither follow a specific diet plan nor consume adequate protein, despite its critical role in muscle recovery, endurance, and performance enhancement. This imbalance suggests that while their physical status is currently sound, long-term athletic development and injury prevention could be at risk without proper nutritional support.

On the health front, menstrual regularity is stable, and the incidence of conditions such as PCOD, thyroid issues, or other diseases is minimal, indicating overall good reproductive and general health among the participants.

In summary, the athletes display good physical fitness and low disease prevalence, but the lack of structured diet and protein intake stands out as the most significant limitation. Addressing nutritional awareness and dietary planning could further enhance their athletic potential and long-term well-being.

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