

Research Article

Primary Diagnosis of Nutritional Status and Physical Quality of First-year Students in the Volleyball Sports Association at NIYPES

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Abstract

Context: Volleyball is a sport that demands specific physical qualities. When paired with a balanced diet, it helps optimize the athletic performance of players, especially students training at the National Institute of Physical Education and Sports in Benin. These students, particularly those in their first year, often adopt inappropriate diets due to a lack of dietary knowledge, which negatively impacts their athletic performance and health. **Objective:** This research aimed to establish the relationships between food consumption and the physical quality of first-year students in the Volleyball Sports Association. **Materials and methods:** This is an analytical cross-sectional study conducted on 23 first-year students of the Volleyball Sports Association at NIYPES from May to June 2023. The surveyed students were selected using a non-random method and the exhaustive choice technique to ensure all students meeting the inclusion criteria were selected. A questionnaire for the students, an electronic scale model CS20M (KAMTHRON, China), and a wall-mounted stadiometer (SECA, France) were used to collect data. **Results:** The results revealed that the majority (82.60%) of the students have a normal weight. However, they have limited knowledge in sports nutrition and do not adopt the recommended dietary practices for athletes. **Conclusion:** It is urgent to provide nutritional education to these students to encourage proper food consumption, which would further improve their physical quality.

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Keywords

Nutrition, Athletic Performance, Physical Quality, Students, Volleyball

1. Introduction

Volleyball is a team sport that requires vigilance and excellent synchronization of each player's movements [1] with a meticulous application of basic techniques during gameplay on the field. Effective consideration of these requirements through proper physical preparation and a series of consistent training sessions with effective methods facilitates the achievement of optimal motor activity in this sport. In achieving performance, nutrition plays a significant role [2, 3]. A healthy and balanced diet combined with regular physical activity is essential for maintaining good health and preventing numerous diseases such as cardiovascular diseases, type 2 diabetes, and obesity [4].

To achieve good performance, it is important to adopt a balanced diet tailored to individual needs [2]. Several authors have listed some foods that can help achieve good performance [5, 3, 6]. These include complex carbohydrates, lean proteins, healthy fats, and fruits and vegetables. Sources of complex carbohydrates like whole grains (brown rice, quinoa, oats), legumes (lentils, beans, chickpeas), and sweet potatoes provide sustained energy to maintain physical and mental performance [3]. Lean proteins such as chicken, turkey, fish, eggs, and Greek yogurt are essential for muscle tissue building and repair [7].

Healthy fats such as avocados, nuts, seeds, extra virgin olive oil, and fatty fish like salmon and sardines are important for overall health and maintaining and enhancing cognitive function [8]. Fruits and vegetables provide vitamins, minerals, antioxidants, and fiber [9]. Among them, berries, spinach, carrots, tomatoes, and citrus fruits are beneficial for the body. Regular hydration is essential for optimal performance and maintaining good health [10]. While nutrition plays an important role in human health, physical activities also bring benefits to practitioners, whether amateurs or professionals, by providing them with a good quality of life.

Moreover, in the pursuit of athletes' sports performance, good nutrition is associated with physical activities under well-established conditions prescribed by professionals. Worldwide, in Africa as well as in Benin, several sports institutions work towards ensuring athletes' performance for competition objectives. The scientific literature is rich with evidence supporting the importance of adequate nutrition for athletes to optimize their performance and promote recovery after training. The specific nutritional needs of athletes, whether professionals, amateurs, or students in sports institutes, require particular attention to meet energy demands, muscle recovery, and injury prevention [6].

In Benin, at the National Institute of Youth, Physical Education, and Sports (NIYPES), an educational program and a training methodology system are implemented through which students acquire knowledge in sports physiology, dietetics, and skills in scheduled sports disciplines. This training often turns these students into amateurs or even professionals in a sports discipline of their choice through practical reinforcement courses in a specialty sport known as a Sports Association (AS). These associations include both team and individual sports disciplines. Consequently, these first-year university students engage in three sports practice sessions of at least three hours each, three times a week as part of regular courses. Additionally, they have weekly specialty sports practice sessions lasting an average of 2 hours and 30 minutes every Wednesday and Saturday morning. Some of them also practice this sport in clubs outside of their courses and the Sports Association. A previous study showed that general physical quality, including muscle strength, cardiorespiratory endurance, flexibility, and agility, is closely related to sports performance and the reduction of injury risks among athletes [11].

Despite this intense physical activity level, new students, those in their first year, are not subject to specific dietary monitoring. They consume all foods based on their preferences, financial means, accessibility, and availability of these foods on the market. Lacking solid notions in sports dietetics and physiology, they adopt an uncontrolled diet. This situation leads to a disorder in their weight status with sometimes negative consequences on their health, muscle quality, and physical quality. This diet induces body mass gain that can affect their fundamental vertical jump abilities in volleyball. Thus, there is an issue of adequacy between food consumption and physical activity practice among these students. It is therefore important to assess the dietary profile and physical quality of new students (first-year university) to develop their athletic capacity, improve their diet, and optimize their performance in practical courses and sports associations.

2. Methods

2.1. Research Framework and Type

This is an analytical cross-sectional study involving first-year students of the Volleyball Sports Association at NIYPES. The study was conducted within the Laboratory of

Motor Skills, Performance, and Sports Health at the National Institute of Youth, Physical Education, and Sports in Porto-Novo. NIYPES is an institute located in the south of Benin, in the Ouémé Department, specifically in the city of Porto-Novo. Some of the students had practiced volleyball before coming to NIYPES and, in addition to the AS courses, still participate in volleyball sports activities in clubs.

2.2. Population and Sampling

The target population consists of 23 first-year students from the Volleyball Sports Association at NIYPES. This sample results from a non-random method using the exhaustive choice technique, ensuring that all students who met the inclusion criteria were selected. To be part of this sample, each student must:

- 1) Be enrolled at NIYPES during the 2022-2023 academic year;
- 2) Be enrolled in the Volleyball specialty at NIYPES;
- 3) Regularly attend the different specialty activity sessions;
- 4) Give informed consent to participate in the survey;
- 5) Participate in anthropometric measurements.

2.3. Materials and Techniques

For data collection, data collection forms were designed and provided to the subjects. An electronic scale model CS20M (KAMTHRON, China) was used to measure body mass, and a wall-mounted stadiometer (SECA, France) (Photo 2) was used to measure the height.

3.2. Food Consumption Status of the Surveyed Students in Relation to Their Dietary Habits

Table 1. Food consumption of new students in the Volleyball Sports Association at NIYPES ($n = 23$); 2023.

Variables	Modalities			
	Never (%)	Sometimes (%)	Often (%)	Very often (%)
Fatty foods	00 (00,0)	01 (04,3)	19 (82,7)	03 (13,0)
Salty foods	00 (00,0)	06 (26,1)	16 (69,6)	01 (04,3)
Fruits	00 (00,0)	08 (34,8)	08 (34,8)	07 (30,4)
Starchy foods	00 (00,0)	01 (04,3)	19 (82,7)	03 (13,0)
Vegetables	01 (04,3)	03 (17,4)	13 (56,5)	05 (21,8)
Alcohol	13 (56,6)	06 (26,1)	03 (13,0)	01 (04,3)
Sugary drinks	02 (08,7)	12 (52,2)	05 (21,7)	04 (17,4)
Tobacco	13 (56,6)	06 (26,1)	03 (13,0)	01 (04,3)

From this table, 82.6% of the students often consume fatty foods and starchy foods. The results also reveal that 69.6%

2.4. Independent Variables

The independent variables include physical activity practices, the number of sessions per week, and dietary habits. The dependent variables include various physical qualities (coordination, speed, muscle strength, jump height, cardiorespiratory endurance).

2.5. Statistical Analysis

The recorded data were processed using SPSS software (version 21). Descriptive statistics such as counts, means, and standard deviations were calculated for age, height, and body mass. Absolute frequencies and corresponding percentages were determined for variables related to food consumption and physical quality. The χ^2 test was used to assess the significance of differences between proportions of food consumption and physical qualities. The significance level of the statistical tests was set at $p < 0.05$.

3. Results

3.1. Characteristics of the Surveyed Students

The average values for height, body mass, and body mass index are 168.04 ± 5.69 cm, 56.19 ± 5.05 kg, and 19.92 ± 1.85 (kg/m^2), respectively.

of the surveyed students consume less salty foods. Regarding fruit consumption, 30.4% consume them very often. As for

vegetable consumption, 56.5% often consume vegetables, while 4.3% almost never consume them.

Table 2. Exploration of the Weight Status and Physical Quality of New Students in the Volleyball Sports Association at NIYPES ($n = 23$); 2023.

Variables	Effectives	Percentages
Weight status		
- Underweight	04	17,40
- Normal weight	19	82,60
Means of transport to SA		
- Walking	10	43,48
- Bicycle	05	21,74
- Motorcycle / Moto-taxi	08	34,78
Duration of a session in speciality		
- Less than 2 hours	00	00,00
- 2 hours and more	23	100,00
Extension of volleyball practice in club		
- Yes	02	08,70
- No	21	91,30

From this table, it emerges that 17.39% and 19.82% of the surveyed students are respectively underweight and normal weight. Regarding their means of transportation to AS, 43.47% of the surveyed students walk, 21.73% come by bicycle, while 17.39% come by motorcycle, and the same percentage use motorcycle taxi, commonly known as "z énidjan".

4. Discussion

This research proved crucial in obtaining reference data on the dietary habits and physical qualities of new students enrolled in sports associations, specifically those specializing in volleyball. The status of new students was confirmed by a high consumption of fatty foods, starches, and salty foods among the respondents. More than half often consume vegetables and sometimes sugary drinks. Studies have shown that the consumption of sugary foods and drinks is a determining factor in obesity among young people [12].

In this study, none of the respondents were identified as obese. This can be explained by the regular physical activity carried out during the week in academic activities and in sports clubs competing in professional leagues or amateur championships. An author [13] revealed that to protect their health, young people must pay more attention to their eating habits. Thus, the authors [14] suggested consuming more than 400 g of fruits and vegetables per day to enhance health and

reduce the risk of exposure to certain non-communicable diseases.

The ignorance or low level of knowledge of these new students about nutrition, sports dietetics, or human physiology leads them to adopt uncontrolled and often unbalanced diets. A study revealed that one of the societal causes of the rampant obesity epidemic is an increasingly unbalanced diet [15]. A good diet plays an essential role in maintaining good physical qualities.

Research conducted in 2016 revealed that a balanced diet provides the necessary elements for growth, development, proper body function, and helps prevent various diseases [3]. Additionally, a balanced diet and maintaining a healthy body weight help address health issues faced by adolescents [13]. Dietary habits and regular physical activity are factors likely to boost athletes' health and enhance their sports performance.

In terms of physical quality, this research revealed that the majority of the surveyed new students extend their volleyball practice to a club. This result can be understood by the normal weight status observed in the majority of the respondents. This extension of physical effort to clubs could prevent weight gain and deterioration of these students' physical quality. Data from France's National Nutrition Health Program in 2008 showed that repeated physical activity could prevent a progressive deterioration of athletes' physical condition [16].

The pedagogical context of this training institute promotes a normal weight status for these students, who have more than two hours of specialized sports practice. Meeting the 30 minutes of moderate-intensity physical activity daily reduces the risk of sedentary behavior [17]. Other recommendations specify that it is necessary to accumulate at least 60 minutes of daily physical activity to improve the health of children and adolescents [18], thus enhancing their performance. It is important to adopt a regular practice of moderate-intensity physical activity to prevent major chronic diseases, improve quality of life, and reduce mortality risk [19].

For this research, it would be ideal to have data on all new students enrolled in different sports specialties. Interpersonal communication strategies could be implemented to improve these students' dietary habits and strengthen their physical qualities. This research is one of the first of its kind, and it would be very interesting to delve deeper into the subject through innovative new studies.

5. Conclusion

This research aimed to evaluate the relationship between dietary profiles and physical qualities that determine sports performance among first-year students enrolled in the Volleyball Sports Association (AS Volleyball) at NIYPES. It was based on the hypothesis that the normal weight status of the new students in AS Volleyball at NIYPES favors their physical qualities. The results of this study revealed that the majority of respondents are of normal weight. Moreover, they adopt a diet rich in starchy foods, fatty foods, and salty foods.

The results of this research provide convincing reasons to encourage new students and those in higher years to engage in regular physical activity and, importantly, to adopt a more varied and balanced diet. Implementing nutritional education at the foundational level, in schools and colleges, would enable schoolchildren and students to acquire appropriate knowledge on how to eat properly to control their weight status.

It is necessary to continue physiological investigations to understand the hydration status of these new students and to assess their energy expenditure and electrolyte losses during the practice of sports in the associations.

Abbreviations

NIYPES National Institute of Youth, Physical Education, and Sports

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Ethical Considerations

All participants in the survey gave their informed consent to take part in the research.

Authors Contributions

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Conflicts of Interest

The authors declare no conflicts of interest.

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