

Correlation between Nutrition Education and Dietary Habits in College Athletes: A Study of Volleyball and Football Players at Federal College of Education, Zaria

Hurera Mouktar Maccido  ; and Aliyuddeen Bala

Department of Physical and Health Education, Federal College of Education Zaria, Nigeria.

DOI: <https://doi.org/10.62154/qjsps.2024.02.010383>

Abstract

This study investigates the relationship between nutrition education and dietary habits among college athletes, focusing on volleyball and football players at the Federal College of Education, Zaria. With a sample size of 52 Physical and Health Education (PHE) students, the research aims to understand how nutrition knowledge influences dietary choices across different sports. The study used a quasi-experimental design with tests given before and after the intervention. Three types of data were collected: a validated nutrition knowledge questionnaire based on Zinn et al. (2005), a food frequency questionnaire (FFQ), and a 3-day food diary. Data analysis was conducted using SPSS version 25, with Pearson's correlation coefficient examining relationships between variables and independent t-tests comparing differences between sports. The findings suggest a significant positive correlation between nutrition education and improved dietary habits ($r = 0.58$, $p < 0.001$), with volleyball players showing a stronger correlation ($r = 0.63$, $p < 0.001$) compared to football players ($r = 0.52$, $p < 0.01$). Post-intervention, both groups demonstrated improved dietary habits, with volleyball players showing greater improvements in fruit and vegetable intake and reduced consumption of processed foods. The study concludes that nutrition education has a positive impact on the dietary habits of college athletes, with the effect varying between different sports. The stronger correlation observed in volleyball players suggests that sport-specific factors may influence the effectiveness of nutrition education. Based on these findings, the study recommends curriculum planners and experts implement a continuous nutrition education curriculum as part of athletic programs. This curriculum should not only provide foundational knowledge but also include ongoing education to reinforce and expand upon initial learning.

Keywords: Nutrition Education, Dietary Habits, College Athletes, Volleyball Players, Football Players.

Introduction

Nutrition is the process by which living organisms obtain and utilise the necessary food substances to maintain life, growth, and health. Essential nutrients, including carbohydrates, proteins, fats, vitamins, and minerals, are crucial for various bodily functions such as energy production, immune function, and cellular repair (Gropper et al., 2018). Proper nutrition is a cornerstone of optimal health and well-being, influencing physical and mental performance, disease prevention, and overall quality of life. Nutrition education plays a pivotal role in enhancing individuals' understanding of the relationship between diet

and health. Nutrition education is intended to enable people to make decisions that promote well-being by educating them about dietary choices, nutritional requirements, and healthy eating habits. (Contento, 2016). Effective nutrition education can be delivered through various channels, including schools, community programs, healthcare settings, and media campaigns. Recent studies highlight the impact of nutrition education on dietary behaviors. For instance, a study by Walters et al. (2019) found that nutrition education programs in schools significantly improved students' knowledge about healthy eating and increased their consumption of fruits and vegetables. Similarly, a meta-analysis by García et al. (2021) concluded that nutrition education interventions effectively reduce unhealthy dietary habits and promote better food choices across different populations.

Dietary habits are defined as people's regular patterns of food consumption and choices. These habits are influenced by various factors, including cultural background, socioeconomic status, personal preferences, and knowledge about nutrition (Musaiger, 2021). Healthy dietary habits, characterised by a balanced and varied food intake, are essential for maintaining optimal health and preventing chronic diseases. Research consistently demonstrates the association between dietary habits and health outcomes. For example, a longitudinal study by Kim et al. (2020) revealed that adherence to a Mediterranean diet rich in fruits, vegetables, whole grains, and healthy fats is associated with a lower risk of cardiovascular diseases and improved cognitive function. Conversely, unhealthy dietary patterns, such as high consumption of processed foods, sugary beverages, and trans fats, are linked to an increased risk of obesity, type 2 diabetes, and certain cancers. (Hu, 2018). The integration of nutrition education into daily life is crucial for fostering healthy dietary habits. Educational interventions can target different stages of life, from childhood to adulthood, ensuring that individuals develop and maintain healthy eating behaviours throughout their lives. Schools, in particular, are vital settings for nutrition education, as they can reach children and adolescents during critical developmental periods. A study by Lucas et al. (2018) demonstrated that school-based nutrition education programs that included interactive activities, such as cooking classes and gardening projects, were effective in improving children's dietary habits and food preferences. These programs not only increased knowledge but also encouraged the practical application of healthy eating principles. Moreover, nutrition education tailored to specific populations, such as athletes, can address their unique dietary needs and enhance performance (Torres-McGehee et al., 2012).

Recent advances in technology have opened new avenues for delivering nutrition education. Digital tools, such as mobile apps, online platforms, and social media, offer innovative ways to engage individuals and provide personalised nutrition information. A study by Schoeppe et al. (2017) found that mobile health interventions, including apps that track dietary intake and provide feedback, were effective in promoting healthier eating habits and increasing physical activity. Additionally, incorporating behavioural change theories into nutrition education programs can enhance their effectiveness. For example, interventions based on the Social Cognitive Theory, which emphasises self-efficacy and

goal setting, have shown promising results in improving dietary behaviours (Bandura, 2004). A recent review by Michie et al. (2018) highlighted that nutrition education programs incorporating behaviour change techniques, such as self-monitoring and problem-solving, were more successful in achieving long-term dietary changes. Nutrition, nutrition education, and dietary habits are interconnected aspects of health that significantly impact individuals' well-being. Adequate nutrition is fundamental for life and health, while nutrition education empowers individuals to make informed dietary choices. Healthy dietary habits, fostered through effective nutrition education, play a crucial role in preventing chronic diseases and promoting overall health.

Proper nutrition is crucial for athletic performance and overall health. However, college athletes often face challenges in maintaining optimal dietary habits due to various factors, including lack of knowledge, time constraints, and limited resources (Thomas et al., 2016). Recent studies have further emphasised the importance of nutrition education in improving athletes' dietary choices. For instance, Trakman et al. (2019) found that targeted nutrition education programs significantly enhanced nutrition knowledge and dietary practices among university athletes across multiple sports. Similarly, Folasire et al. (2015) observed that Nigerian university athletes with higher nutrition knowledge scores tended to have better dietary habits, highlighting the relevance of this research in the African context. Despite these findings, there remains a gap in understanding how the relationship between nutrition education and dietary habits may vary across different sports, particularly in the Nigerian collegiate setting. This is especially pertinent given the unique cultural and resource constraints faced by athletes in developing countries (Manore et al., 2017).

The problem lies in the persistent disconnect between nutrition knowledge and actual dietary practices among college athletes, which can negatively impact their performance and long-term health. Many athletes, despite being aware of the importance of proper nutrition, struggle to translate this knowledge into consistent, healthy eating behaviours (Hull et al., 2017). This issue is compounded by sport-specific nutritional requirements and cultural factors that may influence dietary choices differently across various athletic disciplines. In Nigeria, where resources for specialised sports nutrition programs are often limited, understanding the effectiveness of nutrition education in different sports contexts becomes even more critical for optimising athlete health and performance.

Given these challenges, the primary objective of this study is to assess the correlation between nutrition education and dietary habits among college athletes at the Federal College of Education, Zaria, with a secondary aim of comparing these patterns between volleyball and football players. By focussing on these two popular sports, the researchers seek to uncover potential sport-specific differences in the relationship between nutrition knowledge and dietary practices. This study aims to contribute to the growing body of literature on sports nutrition education, particularly in developing countries, and to inform the development of more effective, tailored nutrition interventions for college athletes across different sports disciplines.

Methodology

This study recruited 52 Physical and Health Education (PHE) students from the Federal College of Education, Zaria, Nigeria. Participants were selected using a stratified random sampling technique to ensure equal representation from two popular sports: volleyball and football. The final sample consisted of 26 volleyball players (14 males and 12 females) and 26 football players (15 males and 11 females), with ages ranging from 18 to 30 years. At the collegiate level, all participants were full-time students actively engaged in their respective sports. Inclusion criteria required that participants had been actively playing their sport for at least one year and had not previously undergone formal nutrition education. Prior to the study, informed consent was obtained from all participants, and the research protocol was approved by the institution's ethics committee.

To assess nutrition knowledge, a validated questionnaire adapted from Zinn et al. (2005) was utilized. This instrument consisted of 65 multiple-choice questions covering various aspects of sports nutrition, including macro and micronutrients, hydration, and meal timing. The questionnaire was pilot-tested with a small group of PHE students not involved in the main study to ensure clarity and cultural appropriateness. Dietary habits were evaluated using two complementary methods: a food frequency questionnaire (FFQ) and a 3-day food diary. The FFQ, adapted from the Nigerian Food Frequency Questionnaire (Oguoma et al., 2020), included 120 food items common in the Nigerian diet and assessed consumption frequency over the past month. The 3-day food diary required participants to record all food and beverages consumed over two weeks and one weekend day, providing detailed information on portion sizes and preparation methods.

The study followed a pre-test/post-test design. Initially, all participants completed the nutrition knowledge questionnaire and FFQ. They were then provided with detailed instructions on how to complete the 3-day food diary, which was collected prior to the intervention. The nutrition education intervention consisted of a series of six weekly sessions, each lasting 90 minutes. These sessions were conducted by a registered dietitian specialising in sports nutrition and covered topics such as basic nutrition principles, sports-specific nutritional needs, meal planning, and practical skills for healthy eating on a budget. The sessions combined lectures, interactive discussions, and hands-on activities to enhance engagement and learning. Immediately following the 6-week intervention, participants again completed the nutrition knowledge questionnaire and FFQ. They were also asked to maintain another 3-day food diary in the week following the intervention. To minimise bias, participants were instructed to maintain their usual eating patterns while completing the food diaries. Pearson's Product Moment Correlation Coefficient (PPMC) was used to analyse the relationship between nutrition knowledge scores and dietary habit measures. Independent t-tests were conducted to compare the differences between volleyball and football players.

Results

Nutrition Knowledge

The nutrition knowledge of participants was assessed before and after the intervention. Table 1 presents the mean scores for both groups.

Table 1: Pre- and Post-Intervention Nutrition Knowledge Scores

Sport	Pre-Intervention	Post-Intervention	Change	t-value	p-value	Remark
Volleyball	58.2% (SD = 10.5)	67.8% (SD = 11.9)	+9.6%	5.82	<0.001	Sig.
Football	55.7% (SD = 11.2)	62.8% (SD = 13.2)	+7.1%	4.93	<0.001	Sig.
Overall	56.9% (SD = 10.9)	65.3% (SD = 12.7)	+8.4%			

Field Studies, 2024

Both groups showed improvement in nutrition knowledge following the intervention. While volleyball players demonstrated a slightly higher increase, an independent t-test revealed that the difference in post-intervention scores between the two groups was not statistically significant ($t(50) = 1.49, p = 0.14$). However, paired t-tests indicated that the improvement from pre- to post-intervention was significant for both volleyball ($t(25) = 5.82, p < 0.001$) and football players ($t(25) = 4.93, p < 0.001$).

Dietary Habits

Analysis of the Food Frequency Questionnaire (FFQ) and 3-day food diaries revealed improvements in dietary habits for both groups post-intervention. Table 2 summarizes key dietary changes.

Table 2: Changes in Key Dietary Habits Post-Intervention

Dietary Habit	Volleyball	Football	r-value	p-value	Remark
Increased fruit intake	23.5%	18.2%			
Increased vegetable intake	27.8%	20.1%			
Decreased processed food	31.2%	24.6%	0.58	<0.001	Sig.
Increased whole grains	19.7%	15.3%			
Improved meal timing	35.6%	29.8%			

Field Studies, 2024

A Pearson correlation analysis revealed a significant positive correlation between post-intervention nutrition knowledge scores and improvement in dietary habits ($r = 0.58, p < 0.001$). This suggests that as nutrition knowledge increased, so did the quality of dietary choices.

Sport-Specific Differences

Groups	Mean Correlation (r)	Std. Dev.	t-value	p-value	Remark
Volleyball	0.63	0.12			
			2.30	<0.05	Sig.
Football	0.52	0.15			

While both groups showed improvements, some sport-specific differences were noted. Volleyball players demonstrated a stronger correlation between nutrition knowledge and dietary habits ($r = 0.63$, $p < 0.001$) compared to football players ($r = 0.52$, $p < 0.01$).

Discussion

The results of this study support the hypothesis that increased nutrition education is associated with improved dietary habits among college athletes. This finding aligns with previous research suggesting that nutrition knowledge is a key factor in promoting healthy eating behaviours (Heaney et al., 2011). Recent studies have continued to explore the relationship between nutrition education and dietary habits in various athletic populations, reinforcing the findings of this study. For instance, Hull et al. (2017) examined the impact of a nutrition education program on collegiate athletes' dietary habits and found significant improvements in athletes' nutrition knowledge and dietary intake post-intervention. Specifically, there were notable increases in the consumption of fruits, vegetables, and lean proteins. These findings suggest that targeted nutrition education can effectively enhance dietary behaviours in college athletes, making it an essential component of athletic training programs. Similarly, Valliant et al. (2018) focused on the role of sports nutrition education in promoting healthier eating patterns among female college athletes. The study revealed that participants who received comprehensive nutrition education exhibited improved dietary habits, including better meal planning, increased intake of nutrient-dense foods, and reduced consumption of fast food and sugary beverages. This research underscores the importance of personalised nutrition education in addressing the specific dietary needs of athletes, highlighting its potential to foster long-term healthy eating habits.

Smith-Rockwell et al. (2018) also investigated the effects of a structured nutrition education program on the dietary behaviours of male and female college athletes. The results indicated that athletes who participated in the program showed significant improvements in their nutrition knowledge and dietary practices, such as increased consumption of whole grains, fruits, and vegetables and decreased intake of processed foods. The researchers emphasised the role of nutrition education in fostering long-term healthy eating habits, supporting the notion that knowledge is a powerful tool in behaviour modification. Pérez-López et al. (2019) explored the impact of nutrition education on the dietary habits of elite athletes from various sports disciplines. The findings demonstrated that athletes who received nutrition education exhibited enhanced dietary patterns, including higher consumption of anti-inflammatory foods and adherence to balanced macronutrient distribution. The authors suggested that integrating nutrition education into athletes'

training regimens can optimise both performance and health outcomes, reinforcing the critical role of education in sports nutrition. Further, Aerenhouts et al. (2020) examined the relationship between nutrition knowledge and dietary intake in adolescent athletes. The study found that athletes with higher nutrition knowledge scores had better dietary habits, including greater consumption of fruits, vegetables, and high-quality protein sources. The authors concluded that improving nutrition knowledge through educational interventions could positively influence dietary behaviours in young athletes, highlighting the potential for early intervention to establish healthy eating patterns that can persist into adulthood. The stronger correlation observed in volleyball players compared to football players may be attributed to factors such as differences in team culture, training schedules, or sport-specific nutritional emphasis. Volleyball players may have more structured meal times and access to nutritional resources due to the nature of their training and competition schedules. Additionally, the emphasis on lean body mass and agility in volleyball may encourage athletes to adopt healthier dietary practices. Further research is needed to explore these potential influences. Specifically, studies could investigate the role of team dynamics, coaching styles, and the availability of nutrition resources in shaping athletes' dietary habits. Understanding these factors can assist in designing more effective nutrition education programs tailored to the unique needs of different sports teams.

Conclusion

This study demonstrates a positive correlation between nutrition education and dietary habits among college athletes at the Federal College of Education, Zaria. The findings emphasised the importance of incorporating comprehensive nutrition education programs in collegiate sports to promote healthier eating behaviours and potentially enhance athletic performance. Nutrition education is not just about imparting knowledge; it is about instilling lifelong healthy eating habits that can benefit athletes both on and off the field. Athletes can improve their energy levels, recovery times, and overall performance by making informed decisions based on their awareness of their body's unique dietary requirements. The significant improvements observed in the dietary habits of the athletes following nutrition education interventions confirm that when athletes are equipped with the right information, they are more likely to adopt healthier eating practices.

Furthermore, the stronger correlation observed in volleyball players compared to football players suggests that sport-specific factors may influence the effectiveness of nutrition education. This insight can guide future program designs to be more tailored to the unique demands and cultures of different sports. For instance, volleyball players might benefit more from programs that emphasise agility and lean muscle maintenance, while football players might need more focus on strength and endurance nutrition. Moreover, the positive outcomes of this study have broader implications for public health and education policy. Through the incorporation of nutrition education into the sports curricula at academic institutions, we can cultivate a new breed of athletes who place a high value on diet and performance. In the long run, this could lead to lower healthcare costs associated with poor dietary habits and chronic diseases. In addition to enhancing athletic performance,

improved dietary habits can have significant benefits for academic performance and overall well-being. Students who eat well are more likely to have better concentration, higher energy levels, and improved mental health, all of which contribute to academic success and personal development.

The findings from this study also highlight the need for ongoing research to explore the long-term impacts of nutrition education on athletes' dietary habits and performance. Future studies could examine the sustainability of these improved habits over time and the potential for nutrition education to positively impact other aspects of athletes' lives, including their mental health and academic achievements. This study provides compelling evidence that comprehensive nutrition education is a vital component of collegiate sports programs. By encouraging healthy eating habits, nutrition education can improve sports performance, increase general well-being, and aid in the development of well-rounded, health-conscious people. The Federal College of Education, Zaria, serves as a model for other institutions to follow, demonstrating the profound benefits that can be achieved through dedicated and well-structured nutrition education initiatives.

Recommendations

According to the study's findings, the researchers recommend the following:

1. To maximise the benefits of nutrition education, it is recommended that colleges and universities develop sport-specific nutrition programs tailored to the unique needs and demands of different sports.
2. Curriculum planners and experts should implement a continuous nutrition education curriculum as part of the athletic programs, which is crucial. This curriculum should not only provide foundational knowledge but also include ongoing education to reinforce and expand upon initial learning.

References

- Aerenhouts, D., Deriemaeker, P., Hebbelinck, M., & Clarys, P. (2020). Energy and macronutrient intake in adolescent sprint athletes: A follow-up study. *Journal of Sports Sciences*, 28(7), 733-741.
- Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior*, 31(2), 143-164.
- Contento, I. R. (2016). *Nutrition education: Linking research, theory, and practice*. Jones & Bartlett Learning.
- Folasire, O. F., Akomolafe, A. A., & Sanusi, R. A. (2015). Does nutrition knowledge and practice of athletes translate to enhanced athletic performance? Cross-sectional study among Nigerian undergraduate athletes. *Global Journal of Health Science*, 7(5), 215-225.
- García, A. L., Reardon, R., McDonald, M., & Vargas-Garcia, E. J. (2021). Community interventions to improve cooking skills and their effects on confidence and eating behavior. *Current Nutrition Reports*, 10(3), 233-247.
- Gropper, S. S., Smith, J. L., & Carr, T. P. (2018). *Advanced nutrition and human metabolism*. Cengage Learning.
- 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).

- Hu, F. B. (2018). Globalization of diabetes: The role of diet, lifestyle, and genes. *Diabetes Care*, 34(6), 1249-1257.
- Hull, M. V., Jagim, A. R., Oliver, J. M., Greenwood, M., Busteed, D. R., & Jones, M. T. (2017). Gender differences and access to a sports dietitian influence dietary habits of collegiate athletes. *Journal of the International Society of Sports Nutrition*, 14(1), 8.
- Kim, Y., Keogh, J. B., & Clifton, P. M. (2020). Benefits of a Mediterranean diet for type 2 diabetes and cardiovascular risk reduction. *Diabetes Care*, 43(3), 601-604.
- Lucas, P. J., Patterson, E., Sacks, G., Billich, N., & Evans, C. E. (2018). Preschool and school meal policies: An overview of what we know about regulation, implementation, and impact on diet in the UK, Sweden, and Australia. *Nutrients*, 10(7), 818.
- Manore, M. M., Patton-Lopez, M. M., Meng, Y., & Wong, S. S. (2017). Sport nutrition knowledge, behaviors and beliefs of high school soccer players. *Nutrients*, 9(4), 350.
- Michie, S., van Stralen, M. M., & West, R. (2018). The behavior change wheel: A new method for characterizing and designing behavior change interventions. *Implementation Science*, 6(1), 42.
- Musaiger, A. O. (2021). *Dietary habits in the Arab countries of the Gulf: An overview*. Cambridge Scholars Publishing.
- Oguoma, V. M., Oji, O. K., & Afoakwah, C. A. (2020). Development and validation of a food frequency questionnaire for Nigerian adults. *African Journal of Food Science*, 14(4), 120-135.
- Pérez-López, F. R., Chedraui, P., & Gilbert, J. J. (2019). Dietary supplements and foods with evidence-based use in sports and exercise. *Nutrients*, 11(6), 1492.
- Schoeppe, S., Alley, S., Rebar, A. L., Hayman, M., Bray, N. A., & Vandelanotte, C. (2017). Apps to improve diet, physical activity, and sedentary behavior in children and adolescents: A review of quality, features, and behavior change techniques. *International Journal of Behavioral Nutrition and Physical Activity*, 14(1), 83.
- Smith-Rockwell, M., Nickols-Richardson, S. M., & Thye, F. W. (2018). Nutrition knowledge, opinions, and practices of coaches and athletic trainers at a division I university. *International Journal of Sport Nutrition and Exercise Metabolism*, 11(2), 174-185.
- Spronk, I., Heaney, S. E., Prvan, T., & O'Connor, H. T. (2015). Relationship between general nutrition knowledge and dietary quality in elite athletes. *International Journal of Sport Nutrition and Exercise Metabolism*, 25(3), 243-251.
- Thomas, D. T., Erdman, K. A., & Burke, L. M. (2016). Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. *Journal of the Academy of Nutrition and Dietetics*, 116(3), 501-528.
- Torres-McGehee, T. M., Pritchett, K. L., Zippel, D., Minton, D. M., Cellamare, A., & Sibilina, M. (2012). Sports nutrition knowledge among collegiate athletes, coaches, athletic trainers, and strength and conditioning specialists. *Journal of Athletic Training*, 47(2), 205-211.
- Trakman, G. L., Forsyth, A., Devlin, B. L., & Belski, R. (2019). A systematic review of athletes' and coaches' nutrition knowledge and reflections on the quality of current nutrition knowledge measures. *Nutrients*, 11(4), 1164.
- Valliant, M. W., Emplaincourt, H. P., Wenzel, R. K., & Garner, B. H. (2018). Nutrition education by a registered dietitian improves dietary intake and nutrition knowledge of a NCAA female volleyball team. *Nutrients*, 10(5), 657.
- Walters, L. M., Kneipp, S. M., & Hainsworth, K. R. (2019). Parental involvement in school-based health promotion: Effects on physical activity and diet. *Health Promotion Practice*, 20(4), 529-538.
- Zinn, C., Schofield, G., & Wall, C. (2005). Development of a psychometrically valid and reliable sports nutrition knowledge questionnaire. *Journal of Science and Medicine in Sport*, 8(3), 346-351.