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REVIEW

Performance and health implications of feeding athletes with wrong diet during sports competition

Implicaciones en el rendimiento y la salud de alimentar a los atletas con una dieta incorrecta durante la competencia deportiva

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ABSTRACT

Introduction: this study examines the impact of inadequate diets on athletes' performance and health during competitions. It explores the various dietary patterns athletes typically follow, the complications arising from poor nutrition, long-term health consequences, common dietary mistakes, specific challenges faced by different groups, and the significance of personalized nutrition plans.
Method: researchers conducted a literature search utilizing multiple electronic databases, including PubMed, Web of Science, Google Scholar, and Scopus. The search strategy incorporated Medical Subject Headings (MeSH) along with free-text terms, to enhance article retrieval. The use of keywords combined with Boolean operators enabled the identification of all relevant studies. The initial search yielded numerous records for evaluation, and reference manager software was employed to organize all identified studies.
Results: a review of peer-reviewed literature from 2016 to 2025 indicates that generalized or incorrect dietary plans can result in diminished aerobic capacity, prolonged recovery times, heightened injury risk, and hormonal imbalances.
Conclusions: conversely, athletes adhering to personalized nutrition plans demonstrate improved endurance, quicker recovery, and enhanced overall health. Effective nutritional strategies are crucial for maximizing athletic performance and minimizing health risks. Sports nutritionists play an essential role in crafting individualized approaches that address the specific needs of athletes.

Keywords: Athletic Performance; Sports Nutrition; Energy Deficits; Eating Disorders; Recovery Strategies.

RESUMEN

Introducción: este estudio examina el impacto de una dieta inadecuada en el rendimiento y la salud de los atletas durante las competiciones. Explora los diversos patrones dietéticos que suelen seguir los atletas, las complicaciones derivadas de la mala nutrición, las consecuencias para la salud a largo plazo, los errores dietéticos comunes, los desafíos específicos que enfrentan los diferentes grupos y la importancia de los planes de nutrición personalizados.
Método: los investigadores realizaron una búsqueda bibliográfica utilizando múltiples bases de datos

electrónicas, como PubMed, Web of Science, Google Scholar y Scopus. La estrategia de búsqueda incorporó Encabezados de Materia Médica (MeSH) junto con términos de texto libre para facilitar la recuperación de artículos. El uso de palabras clave combinadas con operadores booleanos permitió la identificación de todos los estudios relevantes. La búsqueda inicial arrojó numerosos registros para su evaluación, y se empleó un software de gestión de referencias para organizar todos los estudios identificados.
Resultados: una revisión de la literatura revisada por pares entre 2016 y 2025 indica que los planes de alimentación generalizados o incorrectos pueden provocar una disminución de la capacidad aeróbica, tiempos de recuperación prolongados, un mayor riesgo de lesiones y desequilibrios hormonales.
Conclusiones: por el contrario, los atletas que siguen planes de nutrición personalizados demuestran una mayor resistencia, una recuperación más rápida y una mejor salud general. Las estrategias nutricionales eficaces son cruciales para maximizar el rendimiento deportivo y minimizar los riesgos para la salud. Los nutricionistas deportivos desempeñan un papel esencial en la elaboración de enfoques individualizados que aborden las necesidades específicas de los atletas.

Palabras clave: Rendimiento Deportivo; Nutrición Deportiva; Déficit Energético; Trastornos Alimentarios; Estrategias de Recuperación.

INTRODUCTION

Sports events often undervalue nutrition, despite its vital role in athletic performance, as meeting dietary needs can be challenging. Athletes face intense physical demands that stress their energy systems, and inadequate intake of macronutrients, micronutrients, and fluids can disrupt these systems, ultimately hindering performance.[1] Proper nutrition supports immune function, recovery, injury prevention, musculoskeletal health, and cognitive performance.[2] In contrast, poor dietary choices may lead to energy deficits, glycogen depletion, delayed recovery, increased illness risk, and overtraining—eroding an athlete's competitive edge.[3]

Recent studies suggest that athletes who prioritize nutrition experience enhanced physical performance and overall well-being. A balanced diet rich in essential nutrients optimizes training outcomes and promotes both physical and mental resilience, enabling athletes to manage competitive pressures more effectively.[4,5] Prioritizing nutrition can thus be a decisive factor in achieving both short-term goals and long-term success in athletic careers.

In countries such as the United States, Canada, and Western European nations, sports organizations are increasingly incorporating nutrition education into athlete development programs.These initiatives offer tailored dietary plans designed to enhance performance and facilitate recovery.[6] Similarly, in the Philippines, the Philippine Sports Commission (PSC) has launched programs in collaboration with sports nutritionists and scientists to improve athletes' nutritional literacy.[7,8] These efforts aim not only to optimize physical performance but also to emphasize the role of nutrition in mental well-being and stress management—key elements in sustaining elite-level athletic output. The consequences of improper nutrition extend beyond immediate performance. Chronic nutrient deficiencies and inadequate dietary practices may contribute to long-term health risks, including metabolic syndrome, hormonal dysregulation, and cardiovascular strain.[9] These risks illustrate the importance of personalized nutrition programs tailored to the physiological demands of specific sports, psychological stressors, and training cycles.[10] Implementing such holistic strategies ensures athletes meet energy requirements while supporting recovery and long-term health. Effective nutritional plans should emphasize macronutrient distribution, micronutrient adequacy, hydration protocols, and nutrient timing. Addressing these factors helps improve injury resilience and supports consistent peak performance throughout the season.[11,12]

Importantly, this discussion aligns with the United Nations Sustainable Development Goal (SDG) 3: Good Health and Well-being, particularly Target 3.4, which aims to reduce premature mortality from non-communicable diseases (NCDs) through prevention and care. While athletes may appear to represent peak health, they are not immune to NCDs. The physiological stress associated with elite performance—when combined with poor dietary habits—can increase the risk of conditions such as type 2 diabetes, osteoporosis, and hypertension.[13] Bridging these nutritional gaps is essential for long-term well-being and reinforces athletes' role as public health ambassadors within their communities.

This review highlights both acute performance challenges and long-term health consequences linked to inadequate nutrition. Short-term effects of poor pre-competition nutrition may include fluctuating energy levels, impaired cognitive focus, and muscular fatigue, while long-term consequences may threaten career longevity and quality of life after retirement from sport.[14,15]

Sports nutrition, therefore, plays a dual role: it enhances immediate performance and supports equitable long-term health outcomes, reinforcing the values of SDG 3. To achieve these goals, athletes, coaches, and

nutritionists must collectively recognize the impact of dietary choices on both competitive success and sustainable well-being. This growing body of evidence points to the urgent need for continued research on sport-specific nutrition strategies and individualized dietary planning—particularly in developing contexts—to ensure athletes perform at their best and thrive beyond the confines of their sporting careers.[16,17,18]

Hence, this study examines the impact of inadequate diets on athletes' performance and health during competitions. It explores the various dietary patterns athletes typically follow, the complications arising from poor nutrition, long-term health consequences, common dietary mistakes, specific challenges faced by different groups, and the significance of personalized nutrition plans.

METHOD

Researchers utilized multiple electronic databases, such as PubMed, Web of Science, Google Scholar, and Scopus, for their literature search. Medical Subject Headings (MeSH), together with free-text terms, formed the search strategy, which improved article retrieval. The usage of keywords together with Boolean operators allowed researchers to identify all important studies. The preliminary research search produced numerous records for evaluation. We used reference manager software to transfer all identified studies. The reference management application served to eliminate all duplicate records. Two independent reviewers reviewed both the titles and abstracts of all available articles. The research excluded sources that did not specifically explore performance and health results of athletes who follow improper dietary routines during competition. The review team addressed dissimilarities between reviewers by using group discussions or seeking help from a third expert. The reviewers obtained full article copies through retrieval while evaluating them based on established selection thresholds for inclusion and exclusion.

Inclusion/Exclusion Criteria

Authors established the inclusion/exclusion criteria to ensure that the study's selections were adequate and relevant.

Inclusion Criteria

- Research investigations involving competitive athletes.
- How eating patterns influence athlete performance and health status.
- Focus on nutritional deficiency or mismanagement during sporting competitions.
- Reported Outcomes:
    - Physical performance
    - Physiological parameters
    - Injuries
    - General health assessments

Study Types Included:

- Randomized controlled trials
- Observational studies
- Cohort studies
- Case-control studies
- Review studies

Exclusion Criteria

- Research investigations concentrated on non-professional athletes and recreational activities.
- Articles without empirical data (e.g., conference abstracts, dissertations, or unpublished data).
- Research targeted normal nutrition across different populations without performance or health-related aspects for athletic competitions.
- Articles not available in English.
- Articles that are more than 15 years old
- Articles that do not have complete information about the study without the full paper.

Area of Study

This study was chosen based on the areas that needed improvement in terms of athletes' and coaches' basic knowledge of giving the best nutrition during sports tournaments/competitions to reveal the performance and health implications of feeding athletes with the wrong diet during sports competitions. The study also focused on articles published between 2016 and 2025 to ensure its relevance to the current standards of providing optimal nutrition for athletes. The website search yielded a total of 35 articles, but only 22 of them satisfied the inclusion criteria used in the final study.

Statistical Analysis

In this study, there are no statistical tools utilized. As a review study; it only points out the thematic analysis of the study review in the study. Athletes commonly adopt different types of diets, the consequences of improper nutrition, the long-term health effects, the unique challenges for specific populations, and the individualized approaches to nutrition.

Use of s and Tables

Authors used the appropriate and table to illustrate and support the study findings and review structure.

Table 1. Distribution of Articles review

Key Metrics	Statistics
Total Articles screened	35
Articles Selected for Analysis	22
Geographical Focus	Asia (35 %), North America (20 %), Europe (20 %), Oceania (3,5 %), South America (3,5 %), Middle East (3,5 %), Unknown (14,5 %)

RESULTS

Athletes who follow an improper diet lacking sufficient carbohydrates and proteins develop lower glycogen levels, which ultimately diminishes their performance, leading to early exhaustion and reduced athletic endurance.[19,20] The absence of proper nutritional fuel significantly slows down athletic times, weakens strength levels, and contributes to poor competitive outcomes.[10] Failure to achieve the right balance between macronutrients and essential micronutrients, such as vitamins and minerals, also prolongs the recovery process.[21] The consequences of inadequate nutrition include muscle damage, increased swelling, limited muscle healing, and a heightened risk of injuries from repetitive use, as well as bone fractures and illnesses.[22,23]

Hormonal imbalances resulting from poor eating habits—such as menstrual irregularities in females and decreased testosterone levels in males—can lead to low energy availability while altering metabolic processes.[24,25] These factors accumulate to create performance issues and can lead to long-term health problems if not addressed through proper dietary strategies.[26,27]

Types of Diets Commonly Adopted by Athletes

Athletes often experiment with various dietary patterns to enhance performance, recovery, and overall health. The choice of diet can significantly impact an athlete's energy levels, muscle recovery, and injury risk. Such as:

High-Carbohydrate Diets

High-carbohydrate diets are commonly adopted by endurance athletes, particularly those involved in long-duration sports such as marathon running, cycling, and swimming. These diets typically comprise around 60 % carbohydrates, which are crucial for maintaining glycogen stores and preventing cramping during prolonged activities. Carb-loading, a strategy employed by many endurance athletes, involves consuming a carbohydrate-rich meal 24 to 48 hours before competition to maximize glycogen reserves.

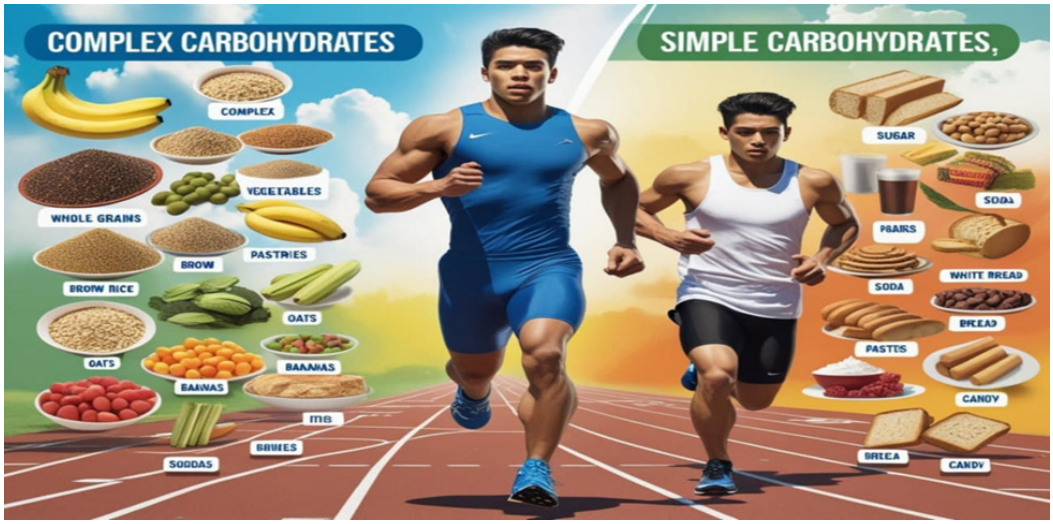

Figure 1. Foods typically included in this regimen are pasta, whole-grain bread, potatoes, and bananas[28]

Mediterranean Diet

The Mediterranean diet has gained popularity among athletes for its balance of macronutrients and its wide variety of food options. This diet emphasizes the consumption of whole grains, fruits, vegetables, lean proteins, and healthy fats.[29] Research indicates that adherence to the Mediterranean diet can lead to improvements in both aerobic and anaerobic performance, making it suitable for power and endurance athletes alike Its diverse food choices also make it easier for athletes to maintain compliance compared to more restrictive diets.[30,31]

Ketogenic and Low-Carbohydrate Diets

Some athletes experiment with ketogenic diets (KD), which are characterized by high fat, low carbohydrate, and moderate protein intake. While this diet may aid in fat adaptation, existing literature suggests it could negatively impact maximum aerobic capacity and strength training performance due to inadequate caloric intake. Low-carbohydrate diets, while often conflated with ketogenic diets, have been shown to have better adherence rates without significant detrimental effects on athletic performance.[32,33]

Plant-Based Diets

Plant-based diets, including vegetarian and vegan options, are increasingly adopted by athletes. While these diets can be nutrient-rich, they pose a risk of micronutrient deficiencies if not carefully planned.[34] Vegans and vegetarians may need to consume higher protein levels to meet their nutritional needs, as their diets often contain lower amounts of certain essential amino acids like leucine. However, athletes on plant-based diets have not reported inferior performance compared to their omnivore counterparts.[35,36]

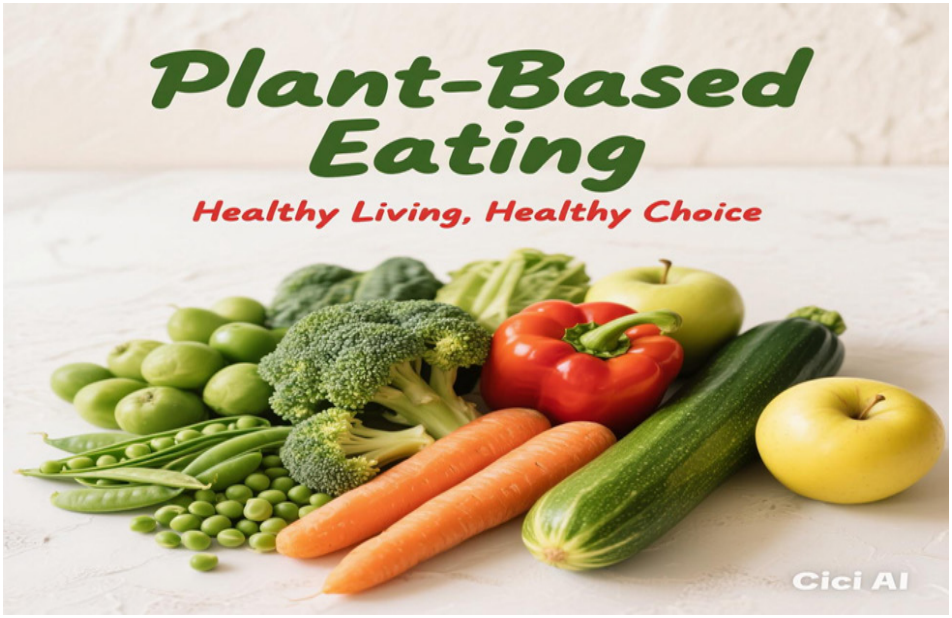

Figure 2. Plant-Based Eating

High-Protein Diets

Many athletes, particularly those engaged in strength and power sports, adhere to high-protein diets in the belief that increased protein intake is essential for muscle growth and repair. Some athletes consume protein levels exceeding 2,5 g/kg body mass per day. However, research indicates that excessively high protein intake does not significantly enhance muscle synthesis and may simply be used for energy, with any surplus nitrogen excreted.[37]

Intermittent Fasting

Intermittent fasting (IF) has gained traction among athletes seeking to improve body composition and metabolic health. However, studies indicate that IF may reduce performance levels in endurance and aerobic sports, potentially hindering athletes' capacity to train effectively and recover adequately.[38,39]

Consequences of Improper Nutrition

Improper nutrition can significantly impair athletic performance and overall health.[40] Athletes who restrict calories or eliminate certain food groups are at a higher risk of developing nutrient deficiencies, which can manifest through symptoms such as dizziness, headaches, and shortness of breath. These deficiencies can hinder an athlete's ability to perform optimally during competitions.[41,42]

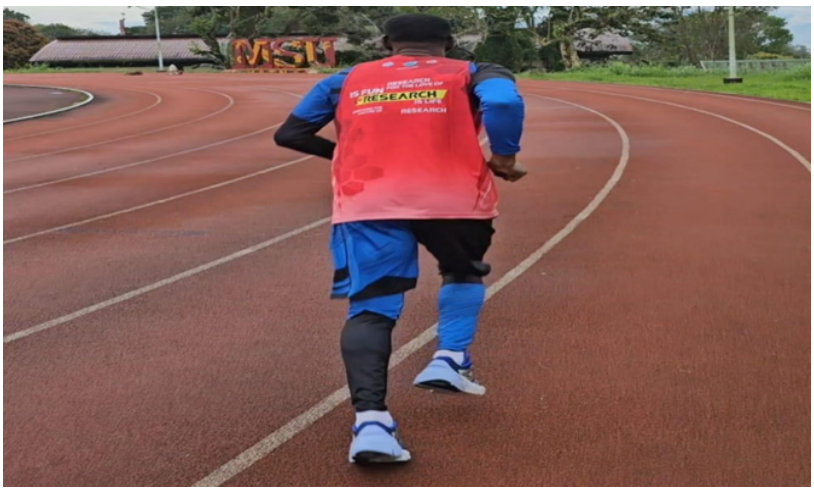

Figure 3. Image of an athlete exercising

Impact on Performance

The performance of athletes is directly correlated with their nutritional intake. A balanced diet is essential for energy production, muscle repair, and recovery. Athletes require adequate nutrition to convert food into energy and build muscle, which in turn enhances strength and speed. Studies indicate that energy deficits, particularly in ultra-endurance events, can lead to poor recovery and sustained fatigue, as athletes often finish races with energy intakes significantly lower than their expenditure.[43] This energy deficiency not only affects immediate performance but also increases the risk of injury and delays recovery from injuries when they occur.

Nutritional Needs During Injury

Injured athletes face unique nutritional challenges. They often experience emotional distress related to their injury, which can lead to decreased food intake. However, the caloric and nutritional requirements during recovery are heightened due to the demands of healing and physical therapy. Failing to meet these increased needs can exacerbate muscle loss and delay recovery processes, thus making proper nutrition crucial during rehabilitation.[41,44]

Common Dietary Mistakes

In the realm of sports nutrition, several common dietary mistakes can significantly impair athletic performance and overall health. Understanding these pitfalls can help athletes optimize their nutritional strategies for better outcomes during training and competition.

Energy Deficit

One of the most critical mistakes athletes make is not consuming enough calories to meet their energy needs. An energy deficit can lead to a range of negative consequences, including decreased performance, chronic fatigue, slowed metabolism, and increased risk of injury.[6] Athletes require a sufficient caloric intake to fuel their training and promote recovery, making it essential to avoid the energy deficit trap.[19]

Hydration Issues

Hydration is vital for athletic performance, yet many athletes overlook its importance. Under-hydration, particularly during exercise, can lead to significant performance decrements and health risks, including heat-related illnesses. Athletes should aim to maintain proper fluid intake before, during, and after exercise to prevent dehydration. For optimal hydration, a guideline is to drink approximately 5-7 ml of fluid per kg of body weight four hours prior to exercise.[42]

Misguided Carb Restriction

Another common mistake is the excessive restriction of carbohydrates. With the rise of popular diets such as paleo and ketogenic, many athletes mistakenly eliminate carbs from their diets. This approach can be detrimental since carbohydrates are crucial for energy, particularly for high-performance athletes. Instead, athletes should focus on including healthy carbohydrate sources like fruits, vegetables, and whole grains to support their energy needs.[28,29]

Inadequate Meal Timing

Skipping meals or failing to eat regularly can hinder an athlete's ability to maintain energy levels and

optimize recovery. Meal timing is essential for performance, and athletes should prepare convenient, nutrient-dense foods to ensure they have adequate fuel before and after training sessions. Regular reminders to eat can help maintain consistency in their nutrition plan.[38,40]

Over-Reliance on Processed

Foods Consuming "empty carbs" from processed foods can further exacerbate dietary issues. These foods often provide little nutritional value and can lead to poor performance outcomes.[45] Athletes should prioritize whole, nutrient-dense foods over processed options to better support their training needs. By recognizing and addressing these common dietary mistakes, athletes can enhance their nutrition strategy, leading to improved performance and health outcomes in their sports endeavors.[37]

Long-Term Health Implications

Athletes who maintain inadequate nutrition or engage in restrictive eating practices can face numerous long-term health implications that extend beyond immediate performance deficits.[46]

Hormonal and Reproductive Health

Undereating can lead to significant hormonal imbalances, particularly the suppression of gonadotropin-releasing hormone (GnRH), which results in reduced production of luteinizing hormone (LH) and follicle-stimulating hormone (FSH).[47] These hormones are crucial for regulating reproductive health and menstruation, which can have lasting effects on fertility and overall hormonal balance in athletes.[48,49]

Bone Health

Chronic undernutrition can result in inadequate intake of essential nutrients such as calcium and vitamin D, leading to decreased bone density. Moreover, the reduction in LH and FSH due to undereating can lower estrogen levels, further impairing bone growth and increasing the risk of osteoporosis. As athletes age, the consequences of these deficiencies can manifest as a heightened risk of fractures and long-term skeletal issues.[50]

Musculoskeletal Injuries

Long-term under-fueling not only compromises muscle protein synthesis but can also lead to loss of muscle mass, which is essential for optimal athletic performance and bone health. The reduction in muscle mass increases the risk of injuries and may result in prolonged recovery times, making athletes more susceptible to recurring injuries. This cycle of injury and inadequate recovery can significantly diminish an athlete's longevity in their sport.[41]

Immune Function

A consistent lack of energy availability can impair the immune response by increasing the production of reactive oxygen species, which can damage cells and weaken the immune system. This vulnerability can lead to frequent illnesses, further derailing an athlete's training and performance schedule.[51]

Mental Health

Nutritional deficiencies may also contribute to psychological issues such as anxiety and depression, which have been shown to be prevalent among athletes who engage in restrictive eating behaviors. A well-rounded diet supports optimal brain function, and deficiencies can exacerbate mental health challenges.[42] The high rates of mental health disorders among student-athletes, including significant symptoms of anxiety and depression, underscore the importance of a balanced diet in promoting psychological well-being.[52]

Eating Disorders

Athletes are at a heightened risk for developing eating disorders, with prevalence rates ranging from 6 % to 45 % in female athletes and 0 % to 19 % in male athletes.[53] The competitive environment can foster unhealthy relationships with food, leading to patterns of disordered eating that can have lifelong implications. Symptoms of eating disorders can include decreased energy levels, concentration issues, increased injury rates, and ritualistic eating behaviors, which may persist even after an athlete retires from competitive sports. To gain a competitive edge, commonly using substances like nitrates, beta-alanine, and vitamin D. While these can provide benefits, athletes must exercise caution due to risks of contamination and the potential for adverse effects.[54] Access to nutrition guidance, preferably from registered dietitians or nutritionists, is vital for athletes to make informed choices regarding supplementation.

Unique Challenges for Specific Populations

Certain athlete populations, such as youth athletes or those from lower-income backgrounds, may face

challenges in accessing quality nutrition, which can adversely affect their performance and health.[55] Addressing issues like food deserts and food insecurity is critical for supporting these athletes in achieving optimal dietary intake.

Individualized Nutrition Approach

Recognizing that every athlete is unique, it is essential to personalize nutrition strategies based on specific goals, such as improving endurance, building muscle, or managing weight. This tailored approach ensures that athletes meet their caloric and nutritional needs effectively. Additionally, continuous monitoring and adjustments to the nutrition plan are vital as training intensity and competition schedules change. By adhering to these recommendations, athletes can significantly improve their performance outcomes and overall health, setting a solid foundation for success in their sporting endeavors

CONCLUSION

Fueling Futures, Not Just Games: As both an athletic coach and school nurse, you hold a powerful position to champion the health and success of student-athletes. Nutrition is not just an athletic advantage—it's a critical pillar of adolescent development, academic focus, emotional resilience, and lifelong well-being. This review reinforces that proper fueling isn't a luxury or optional add-on—it's the foundation for peak performance and protection against preventable health risks.

What the Evidence Shows:

- Performance at Risk: Skipping on carbs or protein depletes energy stores, triggers early fatigue, and delays recovery—undermining both training gains and game-day results.
- Dangerous Diet Trends: Restrictive eating patterns like keto or intermittent fasting can impair endurance, compromise hormonal health, and elevate risks for injuries or eating disorders.
- Widespread Missteps: Chronic energy deficits, dehydration, overreliance on supplements, and poor food quality are common pitfalls that quietly sabotage athletic potential.
- Lifelong Consequences: Malnutrition during adolescence can derail puberty, increase injury risk, suppress immunity, and even cause irreversible bone or reproductive harm.

This isn't just about sports. For students, especially teens in their critical growth years, nutrition directly impacts classroom performance, social participation, and mental wellness. The connection is clear: when student-athletes eat well, they live, move, and learn better.

Building the Bridge Between Knowledge and Action

This review calls for urgent action across three key fronts:

- Research: Explore inclusive, plant-based dietary strategies that respect cultural contexts, support adolescent growth, and address food insecurity in school sports.
- Tools: Create age-appropriate screening tools and nutrition literacy materials to help coaches, nurses, and educators detect risks early.
- Policy: Advocate for budget-friendly, athlete-focused nutrition initiatives—like subsidized school meals and mandatory nutrition training in coaching certifications.

Your Call to Lead:

- Educate athletes, parents, and coaches about nutrition timing, hydration, and early warning signs of deficiency.
- Collaborate with dietitians to personalize meal plans and support vulnerable athletes in weight-sensitive sports.
- Advocate for school-wide policies ensuring access to balanced meals and snacks, especially before and after training.
- Screen routinely for nutritional gaps and disordered eating during athletic check-ups.

By taking these steps, you can help young athletes fuel not only their performance—but their futures. Your leadership can ignite a culture where food is respected as fuel, nutrition becomes a form of care, and every athlete, regardless of background, is empowered to thrive both on and off the field.

RECOMMENDATIONS

- Each sport requires dietary plans tailored to individual athletes, which are created by nutritionists and sports dietitians. This process enables teams to receive nutritional advice.
- The goal for macronutrient balance requires a diet composition with carbohydrates at 60–70 % of

total calories for proper stores of glycogen. A diet containing 10–15 % protein calories helps maintain muscle healing as well as post-performance recovery. The dietary consumption of 20–30 % healthy fats should be maintained because it provides sustained energy across prolonged competitions.

- Athletes should eat a nourishing carbohydrate-rich meal that should consist of 3–4 hours before their competition to achieve optimal energy availability. Smaller meal portions with soft, digestible food should replace heavy meals when the competition time approaches quickly.
- Hydration needs during competition, along with pre-event dehydration and post-event recovery, should remain adequate for supporting performance excellence. The practice of fad and highly restrictive diets prevents athletes from using extreme dietary methods that lower their energy availability and reduce athletic performance.
- Sustained educational and monitoring sessions for athletes exist to teach proper diet practices in relation to training needs and post-workout recovery plans based on competition schedules.
- Athletes who follow these recommendations will achieve optimal performance together with long-term health benefits during the competition period.

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