



An Analytical Study of the 2026 U.S. Dietary Guidelines in Light of Athletes' Nutritional Needs Across Different Types of Physical Activity

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Abstract

The Dietary Guidelines for Americans (DGA) for 2026 can serve as an essential framework for improving public health, but it remains controversial whether they meet athletes' nutritional needs, based on the type and intensity of exercise. This research aims to determine how well these guidelines align with today's principles of sports nutrition and the nutrition needs of athletes to be successful at their sport. To conduct this research, the researchers used a comparative analysis approach and reviewed research literature that was found in the field of sports nutrition, as well as various established sports nutrition guidelines, and compared those findings to the information contained in the 2026 DGA. The results provide evidence of some alignment of the 2026 DGA to the sports nutrition guidelines, particularly as they relate to protein intake and consumption of nutrient-dense food. Significant misalignment was observed regarding carbohydrate recommendations, fluid replacement guidelines, sodium consumption, and energy availability for athletes. The study concludes that national dietary recommendations need to be more integrated with sports nutrition guidelines in order to provide adequate support for athletic performance and health.



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دراسة تحليلية للإرشادات الغذائية الأمريكية لعام ٢٠٢٦ في ضوء الاحتياجات الغذائية للرياضيين باختلاف أنواع النشاط البدني الباحثان:

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ملخص	معلومات الارشفة
تُعد الإرشادات الغذائية الأمريكية لعام ٢٠٢٦ مرجعاً مهماً لتعزيز الصحة العامة، إلا أن مدى ملاءمتها للاحتياجات الغذائية الخاصة بالرياضيين ما يزال محل نقاش، خاصة مع اختلاف شدة وأنواع النشاط البدني. وتبرز أهمية هذه الدراسة في تحليل مدى توافق هذه الإرشادات مع المتطلبات الحديثة للتغذية الرياضية والأداء البدني.	تاريخ الاستلام: ٢٠٢٦ / ٣ / ٢٩ تاريخ القبول: ٢٠٢٦ / ٥ / ٢٤ تاريخ النشر الإلكتروني: ٢٠٢٦ / ١٠ / ١٥
هدفت الدراسة إلى تحليل الإرشادات الغذائية الأمريكية لعام ٢٠٢٦ (DGA) في ضوء الاحتياجات الغذائية للرياضيين، وتقييم مدى توافقها مع التوصيات العلمية المعتمدة في التغذية الرياضية. استخدم الباحثان المنهج التحليلي المقارن من خلال مراجعة الأدبيات العلمية والإرشادات الغذائية المتخصصة ومقارنتها بمحتوى الـ DGA.	الكلمات المفتاحية: الإرشادات الغذائية الأمريكية التغذية الرياضية الأداء الرياضي الاحتياجات الغذائية
وأظهرت النتائج وجود توافق جزئي بين الإرشادات الغذائية الأمريكية وإرشادات التغذية الرياضية، خصوصاً فيما يتعلق بتناول البروتين والأطعمة الغنية بالعناصر الغذائية، في حين ظهرت فجوات واضحة في توصيات الكربوهيدرات، واستراتيجيات الترطيب، وتناول الصوديوم، إضافة إلى ضعف التركيز على مفهوم توافر الطاقة لدى الرياضيين. كما خلصت الدراسة إلى ضرورة دمج الإرشادات المتخصصة في التغذية الرياضية مع التوصيات الغذائية الوطنية لتحقيق أفضل دعم للأداء الرياضي والصحة العامة.	المراسلة: الاسم: أحمد صلاح مفلح ahmed.muflih@org.dpu.edu.tr

1- Introduction:

1-1 Introduction and Significance of the Research:

The National Dietary Guidelines are an essential component of Public Health Policy and are intended to improve people's overall nutrition, prevent chronic diseases, and create evidence-based nutrition practices. The Dietary Guidelines for Americans (DGA) are regularly modified when new scientific research becomes available, or when new health priorities arise. The DGA provide recommendations for everyone, but are not designed specifically for Athletes and do not take into consideration their unique athletic needs. Athletes are particularly different from their peers in that they generally require much more energy and many more nutrients due to their greater training intensity and level of participation in team sports, such as Football, than non-athletes who are the same age, height and weight. This is also important for young athletes, in particular, since they are still physically maturing and continuing to add volume to their training program. If young athletes do not have adequate or appropriate nutrition provided to them, this can result in poor performance, extended recovery times, and may negatively affect their long-term health as well.

The results of research in sports nutrition confirm that the distribution of macronutrients, the adequacy of micronutrients, hydration, and timing of nutrient consumption are all important factors in optimizing performance and recovery in athletes [1]. For instance, the consumption of carbohydrate has proven to be vital for maintaining energy reserves (i.e., glycogen stores) and improving endurance performance through enhanced endurance capacity; protein consumption helps stimulate muscle development and adaptation in response to training stimuli. Furthermore, energy availability is critical to both performance and overall health as previously indicated in the literature [2].

While the 2026 Dietary Guidelines for Americans (DGA) provides evidence-based recommendations for optimal patterns of eating, there are no specific provisions for high-performance athletes. This absence could create a gap between general dietary recommendations and the actual strategies(ps.) that would be needed to provide adequate nutrition for performance and recovery. Therefore, the majority of sports nutrition professionals will use various guidelines and/or position statements as reference material rather than exclusively depending on national dietary recommendations [3].

Thus, this research aims to find out the degree of alignment between the American dietary guidelines for 2026 and the nutritional needs of athletes-one age group at a time and/or a specific sport (for example, football). This research aims to determine where there are gaps between public health nutrition policy and applied sports nutrition practice, thus providing

information that will develop more precise and effective nutritional strategies for athletes.

1-2 Research Problem:

While the 2026 U.S. Dietary Guidelines (DGA) have a wide-ranging scope, the application of their recommendations for athletes has not been sufficiently investigated, particularly with respect to the sport-specific nutritional demands of these athletes. The majority of the existing literature highlights the general differences between non-athletes and athletes and focuses on macronutrients, micronutrients, hydration and supplementation but lacks a formalized analysis of how the DGA may align with clearly defined individualized dietary strategies that are essential for optimal performance by athletes [1]. For purposes of this study, the individualized nutrition strategies have been defined as:

- (a) carbohydrate periodization based on training load and training and competition phases,
- (b) daily protein distribution to optimize muscle protein synthesis, and
- (c) sport-specific fuelling strategies to provide energy to support performance based on the particular energy requirements of endurance, strength and mixed sports.

The central issue, therefore, is an absence of a systematic framework to evaluate the degree to which the recommendations made in the 2026 DGA align with these individualized nutritional strategies across a variety of physical activities. This deficiency limits the utilization of national dietary guidelines for athletes whose primary objective is the attainment of optimal athletic performance rather than chronic disease prevention.

1-3 Research Objectives:

This research aims to examine both how closely established sports nutrition principles are adhered to in the 2026 U.S. dietary guidelines for three distinct categories of physical activity (endurance, strength, and mixed), as well as the degree to which dietary guidelines directly reflect (or incorporate) sport-specific nutrition concepts (e.g., periodized carbohydrate intake, protein distribution, and performance-oriented fuelling practices). In addition, this study seeks to identify areas of both similarity and difference between public health-oriented dietary guidelines and performance-based sports nutrition frameworks. Lastly, the study will assess to what extent the 2026 U.S. dietary guidelines address athletes' nutritional needs from a sports nutrition perspective, including identification of any limitations in these guidelines.

1-4 Research Hypotheses:

The study hypothesizes that:

1) There will be a good deal of alignment between the Dietary Guidelines and the available scientific evidence in sports nutrition, particularly concerning what is considered to be an adequate protein intake and the importance of using nutrient-dense foods.

2) There will be significant gaps between what is contained in the Dietary Guidelines with respect to recommendations about carbohydrate consumption as it pertains to replenishing glycogen stores, sodium intake for athletes who experience a significant amount of sweating, recommendations about hydration strategies, and overall energy availability

1-5 Scope of the Research:

- Human Scope: athletes and other active individuals who have unique dietary requirements.
- Temporal Scope: the U.S. Dietary Guidelines published in 2026.
- Spatial Scope: the United States with reference to the global standards in sports nutrition.

1-6 Define the Terms:

- Dietary Guidelines for Americans (DGA): The DGAs provide guidance on healthy eating habits. The USDA and HHS developed dietary recommendations to help Americans maintain health and reduce disease risk through nutrition.[4].
- Energy Availability (EA): EA refers to how much energy is left in the body after we account for all our daily energy expenditure from physical activity (i.e., kcal/kg fat-free mass/day). [4]
- Relative Energy Deficiency in Sport (REDs): A syndrome resulting from chronic low energy availability, affecting physiological and psychological functions and athletic performance[1].
- Macronutrients: Nutrients required in large amounts for energy and structural functions, including carbohydrates, proteins, and fats [2].
- Micronutrients: Nutrients required in small amounts for metabolic processes, including vitamins and minerals [1].

2- Previous Studies:

2-1 Study (Spronk et al, 2014). Relationship between nutrition knowledge and dietary intake. [5]

examined the relationship between athletes' nutrition knowledge and dietary intake. Using a systematic review methodology, the study synthesized findings from previous research to identify gaps between athletes' nutrition knowledge and evidence-based dietary recommendations. The results showed that many athletes had insufficient knowledge regarding energy, carbohydrate, protein, and micronutrient requirements, which negatively affected dietary practices. The authors concluded that general dietary recommendations alone

are insufficient for athletes and emphasized the importance of sports-specific nutrition education.

2-2 Study (Jenner et al., 2019). Dietary intakes of professional and semi-professional team sport athletes do not meet sports nutrition recommendations.[6]

Systematically reviewed the dietary intake of professional and semi-professional team sport athletes and compared reported nutrient intakes with current sports nutrition recommendations published by organizations such as the IOC, ACSM, and ISSN. Using the PRISMA systematic review methodology, the authors identified substantial discrepancies between athletes' actual dietary intake and evidence-based nutrition guidelines. The review found that carbohydrate intake was consistently below recommended levels, while protein intake generally met or exceeded recommendations. The authors concluded that nutrition education and individualized dietary planning are essential to improve compliance with sports nutrition guidelines.

2-3 Study (Cupisti et al., 2019). Nutrient status and perceptions of energy and macronutrient intake in a group of collegiate female lacrosse athletes. [7]

Investigated collegiate female lacrosse athletes' perceptions of their energy and macronutrient requirements compared with sport nutrition recommendations. Using dietary assessments and comparisons with ISSN recommendations, the study evaluated discrepancies between perceived, actual, and recommended intakes. The findings showed that many athletes underestimated their energy and carbohydrate requirements and did not consistently meet sport-specific nutrition recommendations. The authors concluded that nutrition education and individualized dietary guidance are necessary to optimize athletic performance.

2-4 Study (Mufleh, 2025). Assessing the alignment of the Dietary Guidelines for Americans with the nutritional needs of athletes. [8]

Examined the alignment between the Dietary Guidelines for Americans (DGA) and the nutritional requirements of athletes. Using a comparative content analysis supported by a comprehensive literature review, the study compared the DGA with evidence-based recommendations published by organizations such as the American College of Sports Medicine (ACSM) and the International Society of Sports Nutrition (ISSN). The findings showed that although the DGA provides an appropriate nutritional framework for the

general population, it does not adequately address athletes' increased requirements for energy, carbohydrates, protein, hydration, and sodium. The study concluded that national dietary guidelines should be supplemented with sport-specific nutrition recommendations to better support athletic performance and recovery.

3. Research Procedures:

3.1 Research Methodology:

This study adopts a qualitative research design based on a directed content analysis approach, which is particularly suitable for systematically examining policy documents through a theory-driven lens. This methodology will allow evaluation of how aligned the 2026 U.S. Dietary Guidelines (DGA) are with established, evidence-based sports nutrition frameworks. This study uses only document analysis to complete this evaluation and does not include any human participants or empirical data collection; as such, it is solely interpretive, comparative, and non-experimental. A structured, transparent, and replicable analytical framework has been established for this analysis and will involve predefined theoretical categories that were derived from a comprehensive review of authoritative literature in the field of sports nutrition.

3.2 Research Population and Sample:

The study is based on a purposively selected set of official policy documents and scientifically validated nutritional frameworks, chosen according to criteria of credibility, relevance, and evidence-based authority.

The primary document analysed is:

- The 2026 U.S. Dietary Guidelines (DGA)

Comparative analytical frameworks include:

- International Society of Sports Nutrition (ISSN) Position Stands
- American College of Sports Medicine (ACSM) Nutrition Guidelines
- United States Anti-Doping Agency (USADA) Nutrition Frameworks

These sources were selected due to their global recognition, scientific rigour, and direct relevance to athletic nutritional requirements.

3.3 Analytical Model:

In alignment with the qualitative and document-based nature of the study, no human sample is used or implied. Instead, the study employs a theoretical analytical model representing competitive athletes across different types of physical activity, with particular reference to high-performance profiles such as male soccer players aged 18–25 years.

This model serves solely as a conceptual benchmark to interpret nutritional adequacy under conditions of:

- High energy expenditure

- Intensive training frequency
- Increased physiological and metabolic demands

It is emphasized that this model is not a sampled population, but rather an analytical abstraction used to contextualize findings within realistic performance conditions.

3.4 Units of Analysis and Coding Scheme:

This research defines the units of analysis as the conceptual and thematic elements developed from the selected sports nutrition policy, procedures, and scientific literature. The primary units of analysis are nutritional concepts, dietary standards, and performance indicators associated with nutrition. All the units were chosen because they relate directly to evaluating how well the general dietary guidelines align with the scientific basis of sports nutrition frameworks: the facts upon which sound nutrition for athletes is provided. This process aids in systematically interpreting how the guidelines on nutrition address the physiological and performance requirements of athletes. By following a systematic three-phase coding process, the research follows the principles of the qualitative analysis process by extracting meaning from various sports nutrition texts. The first phase involves open coding, where all data are read line by line to identify themes/chains of commonality and significant terms, as well as to uncover the implied meaning of nutritional concepts discussed in the literature. This initial stage creates the foundation upon which the code list is built without providing a restrictive classification system to begin with.

The following phase of the study includes axial coding of the codes generated previously. Axial coding organizes the previously generated codes by group or category according to the similarities of the results and any relevant relationships. This process produced broad categories of major domains with regard to sports nutrition, including macronutrients (carbohydrates, protein, and fat), micronutrients, hydration, supplementation, and energy availability; thus, enhancing analytical coherence through linking all codified fragmented units (results) into thematic clusters that accurately reflect core components of nutrition. The final phase of analysis is directed coding using established theoretical frameworks as determined by authoritative sources with respect to sports nutrition (e.g., ISSN, ACSM, and USADA) to guide the researcher in comparing categories of information generated in previous steps to scientifically validated standards of sports nutrition and to facilitate comparative analyses of its 2026 Dietary Guidelines in comparison to the recommended dietary intakes specific to athletes. By employing a structured

coding approach, the researcher will create a methodological framework for analyzing data as well as a confirmed theoretical basis for analysis.

3.5 Data Analysis Procedures:

The analytical process follows clearly defined steps to ensure methodological transparency:

1. Defining the research objective and analytical scope
2. Selecting and reviewing relevant documents
3. Identifying units of analysis (themes and nutritional constructs)
4. Developing a coding framework based on sports nutrition theory
5. Systematically coding the textual data
6. Comparing findings across documents
7. Interpreting agreements, discrepancies, and gaps

The results are presented as comparative analytical insights, rather than statistical findings.

3.6 Study Variables:

The study examines conceptual variables derived from the literature rather than measured variables. These include:

- Physiological Constructs: Energy expenditure, metabolic rate, glycogen storage, recovery mechanisms, fluid loss
- Nutritional Constructs: Macronutrients, micronutrients, hydration, supplementation, energy availability

Special emphasis is placed on carbohydrates, due to their critical role in energy production and glycogen replenishment during high-intensity physical activity.

3.7 Validity, Reliability, and Analytical Rigour:

This research will show that methodological reliability was pursued by utilizing various techniques currently recognised by qualitative research methodology. One method employed was theoretical triangulation using a variety of well-established, evidence-based research studies in sports nutrition from organizations such as ISSN, ACSM and USADA, which gave further credibility to the overall depth of the study's findings through the triangulation of various well-established and evidence-based sources. Another technique to ensure there was consistency in coding used was by continually recoding and periodically recoding the text data (i.e., each timeframe) during the course of this research project to reduce any subjective bias while establishing more consistent, stable categories. In addition, analytical transparency will be accomplished by clarifying each step taken in developing categories and the classifications for coding during the course of this study; therefore, any review of the study will access analytical transparency through documents that outline how coding was completed and how classification categories were established.

Additionally, this research project will be based on well-established peer-reviewed research studies; this gives all researchers who are examining the final findings confidence in the study due to there being well-established peer-reviewed research studies that the interpretations of data have strong results. Although due to the qualitative nature of this study, there are no statistics or numerical data available to assess the reliability of this study; however, systematic coding processes and the ability to replicate the analysis framework used will provide additional evidence of stability and reliability for this research.

3.8 Statistical Considerations:

This study does not employ statistical analysis, as it is purely qualitative. Any numerical values (e.g., nutrient intake recommendations) are derived from existing literature and are used solely for comparative purposes, not as outcomes of statistical testing.

3.9 Scope and Limitations:

The study covers the period 2016–2026, capturing recent developments in dietary science and sports nutrition.

Key limitations include:

- Reliance on documentary sources only
- Absence of empirical or experimental validation
- Findings limited to theoretical and comparative interpretation

3.10 Interpretation and Generalization:

The findings are presented as analytical interpretations of alignment between general dietary guidelines and sports nutrition frameworks.

Therefore:

- Conclusions reflect what the literature suggests, not empirical proof
- Results should not be generalized causally to athletic performance
- Interpretations remain within a theoretical comparative framework

4- Presentation, Analysis and Discussion of the Results:

This section includes descriptions of findings via a systematic content analysis of the 2026 Dietary Guidelines for Americans (DGA), as well as an evaluation of these same findings. The results are organized by the major domains of nutrition for sport, so that comparisons can be made between:

- diets recommended for the population.
- diet needed for optimal sports performance.

The points of discussion in this section include:

- Matching the macro-nutritional content of the diet to the needs of sports.
- The level of micro-nutritional content in the diet and associated deficiencies.
- Hydration and electrolyte balance in the diet.

- The clinical relevance of low-energy availability and the risk of Relative Energy Deficiency in Sport (REDs).

In conclusion, this section discusses the extent to which national dietary policy is congruent with specialized nutritional needs of athletes.

4-1 The 2026 American Dietary Guidelines:

The Dietary Guidelines for Americans (DGAs) that will be published in early 2026 (2025-2030 edition) establish a historic "reset" in the federal nutrition landscape within the USA. This is the first time that the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA) have released dietary guidelines in a collaborative effort. More significantly, the dietary guidelines transition away from an approach heavily reliant on pharmacological interventions to correct chronic diseases that are primarily caused by poor nutrition and insufficient physical activity to a philosophy of providing individuals with a "real food" based support system for their health. With approximately 90% of the total healthcare dollars spent in America being used to treat chronic diseases (principally diseases caused by poor nutrition and lifestyle choices), this shift in focus from pharmacological approaches to nutrition-based approaches has significant implications for improving overall public health [3].

The unique physiological attributes of athletes (e.g., their greater energy expenditure, tissue repair, and micronutrient utilization) yield very different challenges for them with respect to developing and following their nutrition plans than those faced by the general population. In addition to maintaining their general health status, athletes design their nutrition plans to accommodate the demands of training, achieve optimal recovery, and maximize performance according to their individualized and periodized training strategies [9]. Although there are similarities between the 2025-2030 DGAs and sports nutrition principles, including increased protein intake, increased whole-fat dairy consumption, and avoidance of highly processed foods. The DGAs and sports nutrition also differ significantly in principles, including carbohydrate and sodium recommendations [10].

According to the 2020-2025 DGA guidelines, adopting a life-course approach and emphasizing dietary patterns rather than individual nutrients has been shown to have greater predictive power in determining health outcomes than previous approaches to measuring health based solely on nutrient intake [11]. There is currently emerging scientific evidence on the role of the microbiome, the importance of personalized nutrition, and metabolic health that will be incorporated into the 2026 DGA update [12].

4-2 Macronutrient Alignment and Its Effects on Athletic Performance:

In addition to providing energy, carbohydrates, protein and fat also provide critical signaling functions as well as facilitate the repair of tissues. The 2025-2030 DGA will transition away from using MyPlate as a model for food recommendations to an Inverted Pyramid model where protein sources, full-fat dairy and healthy fats are recommended at the highest level of consumption while decreasing the amount of grain recommended [13]. For athletes, this change in food recommendations may limit carbohydrates available to support maximum performance during high-intensity activities and support glycogen stores after intense workouts.

4-2-1 Carbohydrate Homeostasis: Glycogen Stores and Grain Restrictions:

For our skeletal muscle and central nervous system (CNS), carbohydrates are the main energy source. The Dietary Guidelines for Americans (DGA) state that refined carbohydrates should be limited to no more than 10% of total calories, with 2 to 4 servings of whole grains daily for health benefits to all populations. However, endurance athletes need between 3 to 12 grams of carbohydrate per kilogram of body weight per day depending on training volume [14]. As an example, a 70-kilogram endurance athlete who needs 8 grams of carbohydrate per kilogram of body weight would need to consume 560 grams of carbohydrate per day. The DGA recommends that approximately 30 to 60 grams will be consumed through whole-grain servings; this leaves a large deficit of carbohydrates to meet the needs necessary for proper performance. Eating excessive amounts of fruits and vegetables in an attempt to replace carbohydrates may lead to increased fiber, stomach upset/pain, and decreased energy due to feeling overly full [14].

Table (2)
Carbohydrate Requirements According to Training Intensity

Training Intensity	Activity Type	Carbohydrate Requirement (g/kg/day)
2025–2030 DGA	Low-intensity, technique-focused	3–5
ISSN (Standard)	~1-hour moderate intensity	5–7
ISSN (Hypocaloric Phase)	1–3 hours moderate–high intensity	6–10
USADA	4–5 hours moderate–high intensity	8–12

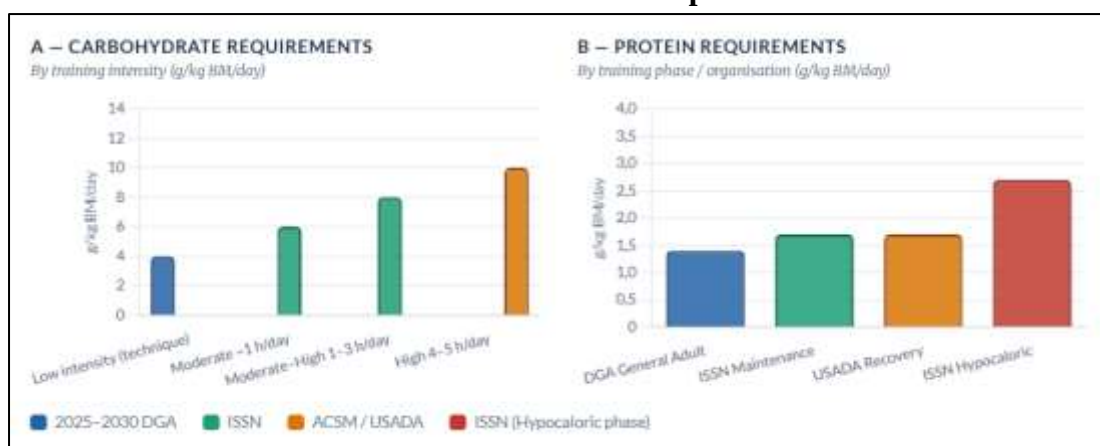
Appropriate amounts of carbohydrate for sedentary or lightly active individuals according to the Dietary Guidelines for Americans (DGA) are 3-5 g/kg/day, however, these amounts would not support an athlete who engages in moderate to high-intensity training. Endurance athletes need 6-12 g/kg/day of

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carbohydrate, depending on the duration and intensity of the exercise performed; therefore, a large gap between the amounts of carbohydrate that will support endurance athletes and those provided by the DGA. For example, an athlete who weighs 70 kg and trains for 4-5 hours/day will require 560-840 g of carbohydrate, whereas the DGA provides only 210-350 g of carbohydrate/day. This difference may inhibit glycogen storage, endurance and recovery, particularly during prolonged periods of successive high-volume training. The International Society of Sports Nutrition (ISSN) and the United States Anti-Doping Agency (USADA) have recommendations that more accurately reflect the amount of carbohydrate that should be consumed by athletes using evidence-based nutritional strategies, and illustrate that athletes need to receive individualized recommendations that do not represent the general population guidelines.

Figure (1)

Macronutrient Recommendations: DGA vs. Sports Nutrition Guidelines¹



The figure compares macronutrient recommendations from the 2025–2030 DGA with sports nutrition guidelines (ISSN, ACSM, USADA). It shows that carbohydrate requirements increase substantially with training intensity, whereas DGA recommendations are particularly insufficient for athletes engaging in moderate to high-intensity exercise. Protein recommendations are generally more aligned, though they diverge in performance-focused scenarios. These findings highlight the need for tailored strategies beyond general dietary guidelines for athletes.

¹ Note. Error bars represent the reported ranges for each guideline. Bars show midpoints of recommended ranges. BM = body mass; DGA = Dietary Guidelines for Americans; ISSN = International Society of Sports Nutrition; ACSM = American College of Sports Medicine; USADA = United States Anti-Doping Agency. Data derived from ISSN (2024), Henselmans et al. (2022).

4-2-2 Protein: 1.2–1.6 g/kg Standard and Muscle Repair:

The DGA recommends increasing protein from 0.8 g/kg/day to 1.2–1.6 g/kg/day, aligning with ISSN and ACSM recommendations for athletes [15]. The emphasis is on animal proteins (red meat, seafood, eggs, dairy) rich in leucine, which is essential for muscle protein synthesis (MPS).

Table (3)
Comparative Protein Recommendations

Organization / Guideline	Recommended Protein Intake (g/kg/day)	Notes
2025–2030 DGA	1.2–1.6	New standard for adults
ISSN (Standard)	1.4–2.0	Muscle mass gain & maintenance
ISSN (Hypocaloric Phase)	2.3–3.1	Preserve lean mass during weight loss
USADA	1.6–1.8	For recovery & muscle building

DGA recommendations from 1.2-1.6 g/kg/day are consistent with the general adult population but are likely not sufficient for those in high training volume (a lot of training) or doing phase (different kinds) of hypocaloric training. The ISSN provides guidance for athletes needing to maintain muscle mass between 1.4-2.0G/kg/day; to recover from workout sessions and build muscle mass, they will also need a higher daily protein intake and, depending on their caloric intake, should be consuming somewhere between 2.3-3.1G/kg i.e., an average of 2.5 g for some athletes. USADA recommends 1.6-1.8G/kg/day to assist the athlete's recovery after exercise. This analysis shows that while athletes will get some degree of benefit by following DGA protein recommendations, their actual needs, i.e., protein intake, will be much higher and dependent on the training they are performing, the phase of training, and their actual goals. This is especially true for athletes participating in resistance training or endurance sports.

4-2-3 Lipids: “Healthy Fats” and Saturated Fat:

Olive oil, butter, and animal fat are now included as “fats” by the DGA. Energy from fats is used at low to moderate intensity; they help absorb fat-soluble vitamins and assist in hormone production [13]. The DGA has recommended 20–35% of total energy from fats for athletes but has not called out omega-3 PUFAs (EPA/DHA), as research supports their contribution to

endurance, as well as reduction of DOMS and to help protect the nervous system[16], [17].

4-3 Micronutrient Alignment and Deficiency Analysis:

Increased metabolic activity, sweat loss, and mechanical hemolysis all lead to increased turnover of micronutrients for athletes. Iron is an essential nutrient that carries oxygen in your blood. Endurance athletes (especially females) may have a higher risk of getting less than needed due to their ovulatory losses and because foot-strike hemolysis occurs with running. Iron RDA for women is 18 mg/day, and for men is 8 mg/day. Vegans/vegetarians may require 1.8× RDA for iron because of lower bioavailability[18]. Vitamin D, calcium, and magnesium are all necessary for proper bone health, muscle function, and neuromuscular activity. Many outdoor athletes remain deficient despite DGA recommendations. Active athletes therefore lose magnesium in their sweat and require greater than 300–400 mg/day of magnesium [19].

Table (4) Micronutrients in Athletic Performance

Micronutrient	Physiological Role in Athletes	DGA-Identified Sources
Iron	Oxygen transport, ATP synthesis	Red meat, seafood, spinach
Vitamin D	Bone integrity, muscle strength	Fatty fish, full-fat dairy, eggs
Calcium	Muscle contraction, nerve transmission	Dairy products, dark leafy greens
Magnesium	Protein synthesis, electrolyte balance	Nuts, seeds, whole grains

Athletes have higher nutrient needs due to their increased metabolism, mechanical destruction of blood cells, and sweat losses. The Dietary Guidelines for Americans (DGA) describe where to get certain nutrients, but do not give any idea about how much of each of these nutrients is needed specifically by athletes, such as the need for iron by female runners and magnesium by those who sweat heavily during competition. Failure to address the higher needs of athletes could lead to greater risks of causing fatigue, cramping, or impaired recovery. For athletes who are at risk, a more specific approach to providing adequate nutrients, including supplements and fortified foods, may be warranted.

4-4 Fluid and Electrolyte Alignment:

Cognitive function, focus, and endurance performance are negatively affected by a loss of more than 2% of body weight due to dehydration [20]. As stated in the 2026 DGA, sodium intake should not exceed 2,300 mg/day for the "average" person; however, sodium can be lost significantly through sweating when participating in extended high-intensity physical activity. To ensure

optimal performance and safety, athletes engaged in long-duration or high-intensity physical activity need a higher sodium intake compared to the average person.

Sodium loss through sweating varies among athletes based upon their individual sweating rates, appearance of sweating, duration of exercise, and environmental temperature and humidity during exercise. On average, sweating with various intensities of physical activity results in a concentration of sodium in sweat of between 460-1,840 mg/L and a cumulative sodium loss of between two and six grams during a single day for athletes who sweat heavily [20]. Therefore, athletes who sweat heavily (i.e., 'salty sweaters') can lose near the upper limit of this range, and if they are not provided with adequate sodium replacement, they may be at risk for cramping, hyponatremia, and impaired performance.

There is a wide variety of organizations that provide athletes with scientifically backed recommendations to help replace the sodium loss associated with exercise. For example, the ISSN has recommended that athletes consume between 300 and 600 mg of sodium/hour during prolonged bouts of exercise. The ACSM has suggested that sodium replacement be individualized based on the athlete's body mass loss and sweat rate, indicating that the average amount of sodium in sweat is approximately 1-1.5 grams/liter [21]. The USADA has also provided recommendations to athletes regarding sodium intake, encouraging them to tailor their intake based on their sweat rate, the intensity of their training, and the environmental conditions in which they are training. Overall, the recommendations provided by each organization differ substantially from the general DGA recommendations, which reinforces the need for athletes to modify their sodium intake to meet their individual demands, especially during periods of training and competition characterized by extended duration or high intensity.

Table (5)
Evidence-Based Hydration Timing

Hydration Timing	Recommended Volume	Electrolyte/Carbohydrate Notes
2 hours pre-exercise	475–710 ml	Initiates optimal hydration status
10–20 min pre-exercise	200–300 ml	Final fluid top-off
During exercise	175–350 ml every 10–20 min	Adjust according to sweat rate
Post-exercise	475–710 ml per 0.5 kg body mass lost	Prefer sodium-containing beverages

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Athletes must create individualized hydration strategies based on many factors that include their sweat rate, duration of the workout/exercise session, and electrolyte losses. While Dietary Guidelines for Americans (DGA) provide general recommendations regarding how much fluid should be consumed by all U.S. citizens, the recommendations for fluid consumption based upon an athlete's specific sport differ greatly with regard to the timing, amount and replacement of sodium. Electrolyte imbalances, particularly sodium, will have a significant negative impact on an athlete's performance and increase the risk of muscle cramps (cramping) or hyponatremia (low sodium levels), when sodium is not replaced. This table demonstrates that the hydration plan needs to be individualized based on the athlete's needs rather than the DGA recommendations.

Figure (2)
Evidence-Based Hydration Timing Protocol for Athletes²



This figure illustrates differences between athletes' hydration requirements and the DGA recommendations. Evidence-based strategies for athletes with respect to hydration and sodium requirements are presented here, illustrating the significant differences between the athlete's needs and the general DGA recommendations. Individualized fluid replacement and electrolyte replacement (sodium) are critical for athletes to maintain their levels of performance, to prevent dehydration, and to reduce the risk of cramps or hyponatremia during high-intensity or prolonged exercise sessions.

² Note. BM = body mass. Sweat sodium concentration ranges 460-1,840 mg/L. DGA sodium limit (<2,300 mg/day) is designed for the general population and represents a clear divergence from athlete-specific needs, particularly in prolonged high-intensity exercise and warm environments.

4-5 Clinical Risk: Relative Energy Deficiency in Sport (REDs):

Low energy availability (LEA) can occur when athletes cannot meet caloric needs due to high-fiber, low-calorie DGA patterns. Chronic LEA leads to REDs, affecting bone health, reproductive function, metabolic rate, and immunity.

Energy Availability Calculation:

$$EA = \frac{EI(kcal) - EEE(kcal)}{FFM(kg)}$$

- EA <30 kcal/kg FFM/day (female athletes) = clinically low
- EA 9–25 kcal/kg FFM/day (male athletes) = risk zone

The DGA's high-satiety whole-food recommendations may inadvertently reduce total energy intake, increasing REDs risk among high-volume athletes.[22]

Table (6)
RED-S and Hormonal / Physiological Consequences

Sex	Key Hormonal Effects	Physiological Consequences	Related Condition
Female	↓ Estrogen, ↓ Leptin, ↑ Cortisol	Menstrual dysfunction, low bone mineral density, impaired recovery	Female Athlete Triad
Male	↓ Testosterone, ↓ IGF-1	Reduced muscle synthesis, impaired bone health, fatigue	Male Athlete RED-S
Both	Altered thyroid, compromised immunity	Reduced metabolic rate, slower recovery, increased injury risk	RED-S

Chronic low energy availability (LEA) has a range of physiological impacts beyond performance; in particular, on the endocrine system. In female athletes, LEA can disrupt the hypothalamic-pituitary-ovarian axis and lead to menstrual dysfunction (estrogen deficiency) and an increased risk of developing osteoporosis; together, these conditions have been coined the Female Athlete Triad. Estrogen deficiency ultimately compromises bone formation and elevates bone resorption, leading to decreased bone mineral density and increased risk of fracture. LEA also lowers levels of leptin and insulin, alters cortisol rhythmicity, and adversely affects thyroid function, which collectively negatively impact metabolism, energy balance and recovery in both male and female athletes. In male athletes, LEA also adversely affects hormonal

function, with decreases in testosterone and IGF-1 levels, thereby negatively affecting muscle protein synthesis, bone health and recovery. Both sexes also experience compromised immune function, increased susceptibility to illness and decreased cardiovascular and hematologic efficiency. The DGA's high satiety recommendations, though beneficial for the general population, may unintentionally exacerbate energy deficits in high-volume athletes, highlighting the need for athlete-specific dietary strategies that balance nutrient quality and caloric intake in order to achieve optimal physiological function and avoid RED-S.

Figure (3)
Energy Availability (EA) Balance Model³



5. Conclusions and Recommendations:

5-1 Conclusions:

Using a directed approach to qualitative content analysis, researchers examined the extent to which the 2026 U.S. Dietary Guidelines for Americans (DGAs) meet the nutritional needs of athletes using specific frameworks of sports nutrition (International Sports Sciences Association, American College of Sports Medicine, U.S. Anti-Doping Agency) as points of reference. Overall, DGAs focus on the long-term health of the general population and the prevention of chronic illness by means of proper nutrition rather than

³ Note. EI = energy intake; EEE = exercise energy expenditure; FFM = fat-free mass; LEA = low energy availability; REDs = relative energy deficiency in sport. DGA high-satiety whole-food patterns may inadvertently reduce EI in high-volume athletes, increasing REDs risk (Areta et al., 2021).

improving or supporting the performance of athletes or the specific physiological requirements of sport.

Although the results of the analysis indicate that some principles from DGAs (i.e., promotion of balanced eating pattern; emphasis on the importance of whole foods; appropriate intake of protein within the general tolerable range)) could be matched with principles of sports nutrition; additional contextual factors exist when applying DGAs to high-performance athletes (i.e., energy availability; timing of macronutrients; replacing electrolytes).

The analysis indicates that the carbohydrate intake recommendations from general pop. do not adequately account for the high and periodized amounts of carbohydrates required during sustained high-intensity training. The quantity of carbohydrates needed to restore glycogen after an exhaustive or repeated training session is highly dependent on exercise intensity and length of time spent training.

With regard to hydration and sodium, the Dietary Guidelines recommend moderate sodium intake only for chronic disease prevention; this does not specifically address the great amount of electrolytes lost through sweat from prolonged or high-intensity exercise by athletes. This is a contextual gap, not an incorrect recommendation in the Dietary Guidelines. In addition, while the Dietary Guidelines support eating nutrient-dense foods and high-fiber foods, such recommendations may lead to low energy availability (LEA) in athletes because energy expenditure may be high and can occur unintentionally due to prolonged restriction on what is eaten.

Overall, the 2026 Dietary Guidelines remain appropriate and evidence-based for the general population, but their direct application to athletic populations requires contextual interpretation and modification based on sport-specific physiological demands and training conditions.

5-2 Recommendations:

- Dietary Guidelines Tailored to Athletes

To make future revisions to national dietary guidelines, we recommend including an addendum that specifically addresses people who are training or competing and providing sport-specific nutritional adjustments instead of simply providing general recommendations for the population as a whole.

- Carbohydrate Periodization

Guidance related to carbohydrates should be developed to help distinguish between public health recommendations relating to reducing total carbohydrates, and sport related carbohydrate periodization that utilizes carbohydrates during the respective training, recovery and competitive phases.

- Activity-Specific Electrolyte Guidelines

Our recommendation is to incorporate variability based on physical activity to electrolyte guidelines to offer sufficient replacement opportunities due to sweating for those individuals who sweat heavily during continuous exercise.

- Targeted Monitoring of Micronutrients

Inclusion of micronutrient risk for athletic populations, particularly, but not limited to, iron, vitamin D, and other nutrients that are frequently deficient among high-performance athletes as part of the guidelines, as well as promoting screening of at-risk individuals.

- Low Energy Availability and RED-S

Address, through public health messaging, the potential negative effects of chronic energy deficit in active individuals, including the development of low energy availability (LEA) and relative energy deficiency in sport (RED-S), to prevent unintentional performance and health consequences.

- Interdisciplinary Policy Development

Future dietary guideline development should involve collaboration between public health experts and sports nutrition specialists to ensure that recommendations are adaptable across both general and athletic populations without compromising scientific integrity.

In conclusion, the 2026 U.S. Dietary Guidelines will serve as the basis of nutrition science for preventing chronic diseases in the population at large but must be used carefully with regard to the context of athletic populations. The optimal application of these guidelines in sport-related contexts will require a combination of principles from sports nutrition science, an awareness of the physiological requirements of individual athletes, and the creation of specific recommendations that connect public health nutrition with performance nutrition.

Author Contributions:

Ahmed MUFLIH contributed to the conceptualization of the study, data collection, data analysis, and drafting of the manuscript. Prof. Dr. Mustafa Said ERZEYBEK contributed to the supervision of the research, methodological design, critical revision of the manuscript, and final approval of the version to be published. Both authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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