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Nutritional impact on performance in athletes

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Abstract

Participation in physical activity is essential for physical and mental health of children. Adolescents taking part in sports have high demands of nutrients due to additional needs of increased physical activity besides growth, development and wellness. The health and nutritional status may be compromised in this population due to lack of proper nutritional counseling. Also misinformation about healthy and nutritious foods by the media targeting school going children can be quite hazardous. The purpose of this review paper is to represent the nutritional needs of adolescents participating in different games and also to empower and teach adolescents to know about the importance of nutrition during participation in physical activity or games; hydration level (Fluids) that deliver nutrients involves proper fueling and recovery.

Keywords: Physical activity, Nutrition counseling, Food and health

Introduction

Nutrition currently sits at the forefront of major public health concerns with many nutritional choices trending toward poor decisions, developing unhealthy habits and the associated effects. Obesity is one of the largest health concerns of Americans, accounting for increased risk of disease, mortality, morbidity and billions of health care dollars spent each year. While obesity is the most common indicator of poor nutrition, other main stream diseases including diabetes, cardiovascular disease and stroke are all linked to nutritional factors as well. In fact, 117 million individuals or close to one half of Americans have one or more chronic diseases related to poor diet (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015, p. xi)^[1] therefore emphasizing the importance of intervention.

Why does Nutrition Matter for Athletes?

Athletes at all levels from recreational to the international competitive scale place incredible demands on their bodies. Through the combination of physical work, energy expenditure, time and recovery periods, by nature they are pushing their bodies to further limits. In doing so, athletes therefore require additional energy and fuel through nutrients and ultimately their diet. According to renowned Sports Nutritionist, Nancy Clark and her Sports Nutrition Guidebook (2013), eating for every day active people must be different than those who are more sedentary. In this case, athletes are assumed to be much more active individuals. Furthermore, just as a medication plan or physical training regimen, these eating patterns, needs and requirements are unique to every individual athlete or "active person." This concept of individualism is one that is essential when considering sports nutrition. The Dietitians of Canada, the Academy of Nutrition and Dietetics and the American College of Sports Medicine (2016)^[3] highlight that nutrition plans must be individualized for athletes to account for their own specific goals and uniqueness of the event, performance goals, practical challenges, food preferences and responses to what works and ultimately what does not. The differences are evident in the comparison of a 250lb offensive lineman versus a 115lb female gymnast. Two incredibly unique individuals with different goals. One is not necessarily healthier than the other or works any harder but what they put into their bodies to achieve those individualized goals matters. Athletes walk a fine line between balancing to train hard enough to reach those goals and avoiding the risk to injury. Nutrition and the benefits it can provide, fall somewhere right in the middle (Nutrition and Athletic Performance, 2016)^[3]. There is evidence to support the fact that an increase in energy (calories) is important for maintaining a balance and

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appropriate consumption of the right protein sources can have a profound impact on muscle recovery, stimulation and synthesis and that caffeine may have a positive stimulus effect on sustaining endurance (Moran *et al.*, 2013). In addition, in order to maintain a balance and modification the standard dietary guidelines of incorporating the micronutrients in fruits and vegetables must not be forgotten (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015) ^[1].

Nutrition Influencing Factors

What must be noted and emphasized in evaluating the nutritional risks for athletes is the component of influence and identifying the specific factors that influence nutritional decisions. An evaluation of how actual food choices are made by student-athletes and those things that influence their decisions play a key role in how they fuel their bodies, where they obtain their nutritional information and personal perceptions as college students. As Buckton and Combet (2015) ^[6] highlight, healthy eating can be confused with diet and weight management. This association between healthy eating and weight management is a problem for the overall health population and relates back to the risk factors of disordered eating for athletes. It is estimated that individuals make 220 food choices each and every day. These choices are impacted by a substantial amount of internal and external factors highlighted by physiological factors such as hunger, food and taste preferences and gastronomical discomfort (Birkenhead & Slater, 2015) ^[4]. New diet evidence and trends around gluten now play a role more than ever for athletes. While specific benefits are unclear around gluten free diet benefits on performance, when it comes to preference more and more endurance athletes are choosing to take this route (Lis, Stellingwerff, Shing, Ahuja, & Fell, 2015) ^[7]. The research reported in this study has a likelihood of bias based on the self-report information and possibility that subjects adhere to a gluten free diet based on a number of other factors. However, it is interesting to consider the current trends and new influencing factors in sports nutrition. Lifestyle and knowledge factors also play a role in decision making of both nutritional and sport decisions. As highlighted by Birkenhead and Slater (2015) ^[4]: "Motives for participating in sport may influence the importance placed on food choice as personal goals may differ from an athlete with physique goals to another who enjoys the freedom of eating whatever they desire...motivation to participate in sport may be based on a lifestyle choice that influences food choice (p.1515)."

What are the basic nutrients?

Food and beverages are composed of six nutrients that are vital to the human body for producing energy, contributing to the growth and development of tissues, regulating body processes and preventing deficiency and degenerative diseases. The six nutrients are classified as essential nutrients. They are carbohydrates, proteins, fats, vitamins, minerals and water. The body requires these nutrients to function properly however the body is unable to endogenously manufacture them in the quantities needed on a daily basis Weber S (2004) ^[11]. Carbohydrates: Carbohydrates are stored in the body in a form of glycogen, which can be used during physical activity. Carbohydrate is necessary to meet the demands of energy needed during exercise, to maintain blood glucose level and replenish muscle glycogen store. During sub-maximal exercise, carbohydrates in the body are the major source of fuel (2005) US Department of Health. Protein: Protein is

needed for nutrient transfer in the blood, connective tissue support and the repair of tissue in response to periods of exercise Clark's Nancy (2008) ^[8]. Fats: Fat is primarily used as a fuel during low to moderate intensity exercise. Fat is also engaged in providing structure to cell membranes, helping in the production of hormones, lining of nerves for proper activity and make it easier for process of absorption of fat soluble vitamins Clark's Nancy (2008) ^[8].

Vitamin and Minerals: Vitamins are required in wide variety of bodily functions and operations which helps to sustain the body healthy and disease free. The function of minerals is for structural development of tissues as well as the regulation of bodily process Srilakshmi B (2003) ^[10]. Water: The human body can survive for a long duration without any of the micro and macro nutrient but not without water. The body is made of 55-60% water, representing a nearly ubiquitous presence in bodily tissues and fluids. In athletics, water is important for temperature regulation, lubrication of joints and the transport of the nutrients to active tissues. It regulates the body's temperature, cushion and protects vital organs, aids the digestive system, acts within each cell to transport nutrients and dispel waste Clark's Nancy (2008) ^[8].

Why sports nutrition is important?

Athlete challenges their bodies on a regular basis through tough physical training and competitions. In order to keep up with demand for stamina of their activity or sport, athlete needs adequate fuel for their body on day to day basis (Jeukendrup A, Cronin L. 2011) ^[14]. The role of nutrition in sports performance is very important. Proper nutrition must be available prior, during and post competition. Greany and Jeukendrup stated that from fueling to recovery, muscle building weight and making optimal nutrition ensure the best platform for success in any sport (Greany J (2015) ^[13]. Sharma *et al.* found that carbohydrates, is the preferred fuel for working muscles particularly during high intensity activity. Some carbohydrate will be consumed irrespective of the type of exercise performed. A study was conducted to evaluate the knowledge of adolescent female football players regarding carbohydrate and its significances. It was found that 70% adolescent females were aware of the term carbohydrate. The knowledge of the females regarding the term carbohydrate (simple and complex) and its affiliation with the function of carbohydrate is highly significant ($P < 0.001$). The awareness of the females on carbohydrate sources, type of carbohydrate to be ingested before, after and during competition was insignificant. A need for developing nutrition education programs becomes pertinent to enable the players to choose appropriate diet to enhance their performance.

Impact of other factors responsible for food choice

The use of weight loss diet, selection of foods and frequent weight fluctuation among athletes preparing for competition in weightclasses and leanness sports have shown various problem for years, but the extent of the problem and the health and performance results have yet to be fully examined. (Garthe I 2011) ^[16].

Muslim athletes who fast during Ramadan should use overnight opportunities to consume foods and drinks that can supply the nutrients require enhancing performance, adaptation and recovery in their sports or activity. Because of the benefits of being able to consume at least some of these according to the nutritional needs of athletes, their exercise and nutrition plan should be revised (Burke LM, King C 2012) ^[17].

Conclusion

Athletes believe nutrition is an essential part of their overall health. Their desire to perform better or improve physical feelings can influence how they make nutritional decisions. It is evident that there are perceived challenges of both accessibility and time in making proper nutritional decisions which could be identified independently or linked with one another. The physical feeling that athletes receive from food and as a result of eating food weighs into their decisions and beliefs. The theme of knowledge is quite possibly the most important theme that emerged from this study in the comparison to existing literature. There are significant gaps in both the nutritional knowledge of student-athletes and coaches but also gaps in how they apply the knowledge that does exist to positively impact performance.

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