

**INFLUENCE OF PROPER DIET AND NUTRITION AMONGST  
UNIVERSITY OF BENIN STUDENT-ATHLETES**

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**BENIN CITY**

**JULY, 2021**

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF  
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(EDUCATION)**

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## **CERTIFICATION**

We the undersigned certify that the research work was carried out by Esther Adesuwa EGUAIBOR in the Department of Human Kinetics and Sports Science, Faculty of Education, University of Benin. It is adequate in scope and quality for the in partial fulfillment of the award of Degree of Bachelors of Science (Education) B.SC(ED) in Human Kinetics and Sport Science

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**Date**

## **DEDICATION**

This project is dedicated to Almighty God the owner of intelligence and knowledge, creator of all that is learnable for his grace and inspiration.

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## **ABSTRACT**

This study explored the influence of proper nutrition and diet amongst University of Benin student-athletes. The purpose of the study is to ascertain the influence of proper nutrition and diet, its health implications on student-athletes as well as ways and measures through which sports performance can be improved. This study accessed information on nutrition and diet and its influence on student-athletes. The study was guided by research objectives, significance and scope and Delimitation. Literature review covered relevant texts and documents on the research topic.

The researcher adopted the descriptive survey research design. Random sampling technique was used from the five research questions, 21 items were raised in the questionnaire together with the data for this study. Samples of 324 student-athletes were taken from University of Benin, Benin City, Edo State.

The test – retest reliability method was used to establish the reliability of the instrument. The score from both administrations were correlated using the Pearson's Product – Moment Correlation (PPMC) to establish its coefficient and the reliability score obtained was 0.84 which shows that the instrument is highly dependable. Descriptive statistics of percentage was used to analyze personal data. The results of the study showed that: proper nutrition and diet influences sports performance and physical fitness.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **Background to the Study**

There are several causal factors that can influence the health status of students and thereby impacts their everyday life in general such key area includes proper nutrition and diet. Khan (2014) defines the sports diet as the diet which is needed by athletes before, during and after physical activity. It interprets nutrients and other substances in food in relation to maintenance, growth, reproduction, health and diseases of an organism. The physical performance and the level of functional capacity of human beings are interrelated. Any dietary deficiency that adversely affects or impairs the health of the individual is likely to jeopardize his or her physical performance capacity; mental and emotional well being. Nutrition and diet assume a vital role in the field of sports and individual psychological state. It entails and includes food intake, absorption, assimilation, biosynthesis, catabolism and excretion, increasable recognized as a key component of optimal sporting performance, with both the science of sport nutrition developing rapidly.

A well balanced nutritious diet can help to enhance physical activity, performances and recovery from exercise amongst persons. Recent studies have found out that a planned scientific nutritional strategy (consisting of fluid, carbohydrates, sodium and caffeine) compared with a self choosing nutritional strategy has helped improve performances of individual (Hansen, Emanuelson, Gertson & Sorensen, 2014).

The dietary habits of Nigeria population is largely affected by various social, economic limitations, religious beliefs, lifestyle related changes, knowledge of nutrition and cooking technique and so on, a large number of young students are now adopting vegetarianism. It has been suggested that a vegetarian diet if planned well and has the adequate nutrients and food required, is perfectly reliable for good health and can greatly reduce the threat of numerous chronic diseases and other health issues related to poor diets. A typical vegetarian diet contains fruits, vegetables, nuts, whole grains and legumes excluding all types of meat and fish (Fraiser 2009). A balanced diet and nutrition grossly enhance physical fitness and performances in all ramifications. Nutrition currently sits as the frontier of major public concerns with many nutritional choices trending towards poor decision,

developing unhealthy habits and its associated effects. Obesity is one of the largest health concerns of the world accounting for increased risk of diseases, mortality, morbidity and excess expenditure every year, while obesity and heart related complication is the most common indicator of poor nutrition and diets. Other mainstream diseases that are related to poor nutrition and diets include diabetes, cardio-vascular diseases, cancer, stunted or defective bone growth, skin disorder, dementia; stroke is all linked to as a defect in nutritional dietary factor.

According to the United States Department of Health and Human Services and the United State Department of Agriculture (USDHHS, USDA),(2015), it emphasized that over 117 million individuals or close to one and a half Americans have one or more chronic diseases related to poor and improper diet and nutrition. It is imperative to promote an awareness of the nutrients contained in foods in relation to their roles in the body maintenance. The right amount of constituents such as carbohydrates, proteins, fats, vitamins, minerals and water are required for body building defense, energy supply and regulatory functions. The nutritional intake of individual in developing

countries such as Nigeria appear to be undergoing a transition from high fiber, calorie sparse, low-protein diet to low-fiber, calorie dense and high protein diet. This changing a pattern, particularly to carbohydrate intake appears to be a contributory factor to the increasing prevalence of obesity, which is a major risk factor for many non-communicable nutrition related disease such as: hypertension, nutrition induced cancer and so on.

Robinson (1996) posited that individual who fail to consume sufficient nutrient could experience fatigue and/or inability to be actively involved in their activity. Physical fitness in performance is a major component of individual well being. The term fitness is incorporated in the concept of mental health, emotional, cognitive/intelligence, social and emotional learning. Student's fitness and capabilities in sporting is influenced by a combination of individuals and environmental factors, which may and may not be modified. As Buckton and Combat (2015) highlighted, healthy eating habits can be confused with diet and weight management is a problem for the overall health population and relates back to their risk factor of disordered eating. 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 (Burkhead & Slater, 2015). The choice to be physically active and partake in sporting activity may alter student's food choices linking the two closely together; this can have a large impact on how students feel about nutrition and food choices. Physiological factors of body image and weight control along with social and cultural factor all are incredibly what must be noted and emphasized inessential in evaluating the nutrition of students. Once students are exposed to university life they tend to gain 15 pounds as they acquire unhealthy eating habits that promote the development of overweight and obesity (Mihalapoulos, Auinger & Klein, 2008).It is important to investigate the eating habits of University of Benin student-athletes' diets because it often feature low dietary fiber intake, higher intake of carbohydrates such as rice, bread, cereals and refined flour based foods. Such students also show intake of dairy products such as whole milk, and it derivatives, refined sugar, legumes, tubers, and a variety of animal proteins with a high fat content, causing their diets to be high calories, simple carbohydrates, saturated fats

and sodium. In addition, they tend to consume fast foods, sweets, carbonated drinks and fried food due to their accessibility and availability. Eating the right amount of diet can help provide the energy needed to finish any form of physical activity and high intensity training amongst these student-athletes. However the type of amount of food will depend on the type of sport, the amount of training the student-athlete engages in, and the amount of time spent doing the activity or exercise.

### **Statement of the Problem**

The level of awareness of feeding habit and proper nutrition is minimal and is seen as insignificant and irrelevant as a result the health benefit of nutrition is overlooked. Some student-athletes based on religious perspective take religion as a criterion in their decision to be either vegetarian or non-vegetarian. Through personal observation of the researcher, it is clear that some student-athletes embrace the vegetarian lifestyle as a result of financial constraint on their part. If given the opportunity, they would embrace other dietary patterns. As a result of this, these student-athletes are underfed and it

tells on how far and well they can perform and meet up with physical activities.

Taking University of Benin students of the Department of Human Kinetics as an example, as a result of improper nutrition most students find it hard to cope or even decide to take sport as a career on the big stage, because it is believed that going on diet could pose a financial constrain on the individual. There are enormous challenges facing the performance of students including obesity, degenerative disease, stress, tiredness, difficulty in assimilation, malnutrition, death and many others are the adverse effects of improper nutrition and diet among these student-athletes.

It is based on this premise that the researcher seeks to find the influence of proper nutrition and diet on physical fitness and sport performance amongst student-athletes of the University of Benin.

### **Research Questions**

The following questions will be used to guide this study:

1. What is the influence of proper nutrition on sport performance of university of Benin student-athlete?
2. Does proper nutrition influence the physical fitness of University of Benin student-athletes?
3. What are the implications of poor nutrition on student-athletes?
4. What measures and/or solutions can be used in the promotion of proper nutrition among student athletes?
5. In what ways can student-athletes enhance their physical fitness and sports performance?

### **Purpose of the Study**

The purpose of this study includes the following:

1. The influence of nutrition on the sports performance of student-athletes.
2. The influence of proper nutrition on the physical fitness of student-athletes.
3. The health implications of poor nutrition on student-athletes.

4. The measures and solutions in promoting proper nutrition among student-athletes.
5. The ways in which student-athletes can enhance their physical fitness and sports performance.

### **Significance of the Study**

The findings of this study would be significant in helping the coaches and student-athletes in the University of Benin know about proper nutrition and diet, and how it influences their sports performance. It will enable the student have access to information on how to make a proper diet plan which includes the right meals to take prior, during and after competition and physical activities. It will enable the coaches obtain vital information on ways to work on the student-athletes diet and monitor any changes in their nutritional plan. The coaches can work hand in hand with professional dietician(s) to ensure athletes take in the appropriate and right proportion/amount of food.

### **Scope and Delimitation of the Study**

The researcher in this study is carrying out the study to find out the influence of nutrition and diet on physical fitness and sports performance of student-athletes in the University of Benin (UNIBEN). The study would be delimited to UNIBEN student-athletes. The variables of the study includes: influence of proper nutrition on sports performance; proper nutrition influence on physical fitness of UNIBEN student-athletes; health implications of poor nutrition of students athletes; measures in promoting proper nutrition among student-athletes; and ways Student-athletes can enhance their physical fitness and sports performance.

### **Definition of Terms**

1. Nutrition: the process of providing or obtaining the food necessary for healthy growth.
2. Diet: a special course of food to which a person a person restricts themselves, either to lose weight or for medical reasons.

3. Physical fitness: The ability to execute daily activities with optimal performance, endurance, and strength with the management of disease, fatigue, stress and reduced sedentary behavior.
4. Sports performance: the manner in which sport participation is measured.
5. Obesity: A state of being grossly fat or over weight.
6. Degenerative disease: A continuous process based on degenerative cell changes, affecting tissues or organs, which will increasingly deteriorate over time.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

This chapter reviews the literature related to this study and it is discussed under the following headings:

- Concept of nutrition and diet on sports performance
- Influence of proper nutrition on sport performance
- Influence of proper nutrition on physical fitness
- Health implications of poor nutrition

- Measures and solutions for the promotion of proper nutrition among student-Athletes
- Ways to enhance physical fitness and sports performance
- Summary of Reviewed Related Literature

### **Concept of Sport Nutrition and Diet on Sports Performance**

Nutrition and diet is rapidly recognized as a key component of optimal performance with the combination of science and practice of sport nutrition growing rapidly. Nutrition is how food affects the health of the body. Nutrition and diet can help enhance athletic performance, an active lifestyle and exercise routine, along with proper diet is the best way to stay healthy.

Sports nutrition is a topic of constant change and has grown as a dynamic field of clinical study. The concern for what to eat for good sports performance predates sports science. The few records about the food intake of Greek and Roman athletes indicate a mixture of reality and myth. Initially

records describe a diet similar to that of the general population consisting of whole grains, fruits, cheeses and wine diluted with water, and the sporadic fish and meat (Grivetti & Applegate, 1997). The need for proper nutrition for athletes to enhance optimal sports performance led to the existence of sports nutrition.

Sports nutrition is a specialization within the field of nutrition that partners with the study of the human body and exercise science (Congeni & Miller, 2002). It involves the application of nutrition knowledge to a practical daily eating plan to provide the fuel for physical activity, facilitating the repair and building process following hard physical work in order to achieve athletic performance in competitive events, while also promoting overall health and wellness. Research continues to advise improved nutritional guidelines and support for both active adults and competitive athletes (Kerksik, Wilborn, Roberts, et al., 2018). Nutrition for sports is unique to each person and it is planned according to individual goals. Science recognizes nutrition and energy intake as the cornerstone of athlete's diet.

Consuming a good diet can help provide the energy needed for various sports or physical activities (Berning, 2018). An athlete is more likely to be tired and perform poorly during sports when they do not get enough calories, carbohydrates, fluids, minerals and protein. The ideal diet for an athlete is not very different from the diet recommended for any healthy person. However, the amount of each food group the athlete will require will depend on:

- The type of sport the athlete plays
- The amount of training done by the athlete
- The amount of time the athlete spends doing the activity or exercise.

The most commonly encountered nutritional related problem among sports persons is their failure to consume sufficient total food energy. Food is composed of six basic substances: carbohydrates, proteins, minerals, fats, vitamins and water. Each one of these has a specific function in providing nourishment, energy and fuel for the body (Manikandan & Selvam, 2010). A well planned, nutritious diet should be able to meet most of the athlete's

vitamin and mineral needs, and provide enough protein to promote muscle growth and repair (Burke & Deakin, 2010).

Active adults and competitive athletes turn to sports nutrition to help them achieve goals such as gaining lean mass, improving body composition, or enhancing athletic performance. These sport-specific scenarios require different nutritional programs. Research findings indicate that the right food type, caloric intake, nutrient timing, fluids, and supplementation are essential and specific to each individual (Helms, Aragon & Fitschen, 2014).

At the time of final performance an athlete is supposed to be well nourished, uninjured, fit, focused and ready to compete. Sports nutrition is not just about calories to achieve weight or body composition goals; nor is it about protein for muscles or carbohydrates for fuel. Nutritional and eating habits have been of specific interest in sports, especially given their impression on athletic performance. General recommendations need to be suggested by sports nutrition experts to accommodate the specific requirements of individual athlete regarding health, sports, nutrient, food choices and body weight and body composition (Bonci, 2010). Nutrition is important for an

athlete because it provides energy required to perform the activity. The food they take leaves an impact on strength, training, performance and recovery. Not only the type of food is important for sport nutrition but also the time is equally important for what they eat throughout the day. It also has an impact on their performance level and their body's ability to recover after physical activity. An athlete needs to pay attention about when, what and how much food substance he eats or drink prior to a game or match (Jeukendrup & Cronin, 2011).

The role of nutrition in sports performance is very important. Proper nutrition must be available prior, during and post competition. From fueling for recovery, muscle building weight and making optimal nutrition ensure the best platform for success in any sport (Greany, 2015; Jeukendrup & Cronin, 2011).The definition of what constitutes a healthy diet is continually shifting to reflect the evolving understanding of the roles the different foods, essential nutrients, and other food components play in health and disease. The term diet refers to the collection of some certain type of food which helps to improve the physical condition, control as well as the cure to

diseases by making the immune system strong (Hoch, Gossen & Kretsehmen, 2008). A balanced diet and good dietary practices allows athletes train hard, regenerate quickly, adapt better, while reducing the risk of illness and injury. As a result of this, certain dietary strategies prior, during and after performance must be encouraged, so as to achieve a positive result. An unhealthy diet has become a health threat to individuals today. Poor diet, such as those high in fat may increase the risk of obesity and heart related disease as well as depression (Yang, Liu &Jiang, 2016). A healthy diet is one in which macronutrients are consumed in appropriate proportions to support energetic and physiologic needs without excess intake, while also providing sufficient micronutrients and hydration to meet the physiologic needs of the body (Stark, 2013).Macronutrients (i.e. carbohydrates, protein and fats) provide the energy necessary for the cellular processes required for daily functioning (Stipanuk & Caudill, 2013). Micronutrients (i.e. vitamins and minerals) are required in comparatively small amounts for normal growth, metabolism, development and physiologic functioning (Stipanuk & Caudill, 2013).

Carbohydrates are the primary source of energy in the diet and are found in greatest abundance in grains, fruits, legumes and vegetables (Slavin, 2013). In terms of deriving a health benefit, whole grains are preferred to processed grains, the latter having being stripped of germ and bran during the milling process, resulting in lower amounts of fiber and micronutrients (Benisi-Kohanal, Saneei, Salehi-Marzijarani, Larijani & Esmailzadeh, 2016). Meta-analyses of prospective cohort studies have linked increased whole-grain intake to a reduced risk of coronary heart disease, stroke, cardiovascular disease, and cancer, as well as to the decreased risk of mortality due to any cause, cardiovascular disease, cancer, respiratory disease, diabetes, and infectious disease (Benisi-Kohansal et al., 2016; Zong, Gao, Hu & Sun, 2016). Fresh fruits and vegetables supply energy as well as dietary fiber, which promote the feeling of satiety and have positive effects on gastrointestinal function, cholesterol levels, and glycemic control (McRorie&McKeown, 2017). In addition, fresh fruits and vegetables are key sources of phytochemicals (for example: polyphenols, phytosterols, carotenoids), which are bioactive compounds believed to confer many of the health benefits associated with fruit and vegetable consumption (Probst,

Guan & Kent, 2017). Fruits and vegetables intake has been shown to inversely correlate with the risk of non-communicable diseases, including: hypertension (Li, Li, Wang & Zhang, 2016), cardiovascular disease (Gan, Tong, Li, Cao, Yin, et al., 2015; Zhan, Liu, Cai, Xu, Xie & He, 2017), chronic obstructive pulmonary disease (Kaluza, Larsson, Orsini, Linden & Wolk, 2017), lung cancer (Wang, Li, Wang, Qiu, Shen & Wang, 2015) and metabolic syndrome (Tian, Su, Wang, Duan & Jiang, 2018).

Dietary proteins provide a source of energy as well as amino acids, including those that the human body requires but cannot produce on its own (i.e., essential amino acids). Dietary proteins are derived from both animal (meat, dairy, fish, and eggs) and plant (legumes, soya products, grains, nuts, and seeds) sources, with the former considered a richer source due to the array of amino acids, high digestibility, and greater bioavailability (Lonnie, Hooker, Brunstrom, Corfe, Green, Watson et al., 2018). However, animal-based sources of protein contain saturated fatty acids, which have been linked to cardiovascular disease, dyslipidemia, and certain cancers. Although the mechanisms are unclear, red meat, and processed meat in particular, have

been associated with an increased risk of colorectal cancer (Demeyer, Mertens, De Smet & Ulens, 2016). Animal-derived proteins also increase the dietary acid load, tipping the body's acid-base balance toward acidosis (Della Guardia, Roggi & Cena, 2016; Della Guardia, Thomas & Cena, 2018). The increased metabolic acid load has been linked to insulin resistance, impaired glucose homeostasis, and the development of urinary calcium stones (Della Guardia et al., 2016; Della Guardia et al., 2018).

Adequate dietary protein intake is important for maintaining lean body mass throughout the life span. In older adults, protein plays an important role in preventing age-related loss of skeletal muscle mass (Kim, O'Connor, Sands, Slebdonik & Campbell, 2016), preserving bone mass, and reducing fracture risk (Curneen, Casey & Laird, 2018). For older individuals not obtaining adequate protein from their diets, supplementation with amino acids can improve strength and functional status (Cheng, Hong, Underwood, Petocz, Hirani, Dawson & O'Leary, 2018).

Fats (or lipids) are the primary structural components of cellular membranes and are also sources of cellular energy (Brenna & Sacks, 2013). Dietary fats

fall into four (4) categories: monounsaturated fats, polyunsaturated fats, saturated fats, and trans fats. The fat content of food is generally a mixture of these different types (Brenna & Sacks, 2013). Unsaturated fats are found in a variety of foods, including fish, many plant-derived oils, nuts, and seeds, whereas animal products (and some plant-derived oils) contribute a larger proportion of saturated fats (Brenna & Sacks, 2013; de Souza, Mente, Maroleanu, Cozma, Ha, Kishibe, Uleryk, Budylowski et al., 2015). Trans fats found in foods are predominantly the result of processing vegetable oils but are also present in small quantities in animal products (i.e., ruminant trans fats from cows, sheep, and goats) (Brenna & Sacks, 2013; de Souza et al., 2015). Among the types of dietary fats, unsaturated fats are associated with reduced cardiovascular and mortality risks, whereas trans fats and, to a lesser degree, saturated fats are associated with negative impacts on health, including increased mortality risk (de Souza et al., 2015, Ricci, Baumgartner, Zec, Kruger & Smuts, 2018). Two families of polyunsaturated fatty acids, omega-3 and omega-6, are described as essential fatty acids, because they are required for normal growth and reproduction but are not produced by the body and, therefore, must be obtained from dietary sources (Stark, 2013).

Omega-3 fatty acids, in particular, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA), have been widely studied for their potential health benefits, with evidence suggesting positive effects including cardio protection, preventing cognitive decline, reducing inflammation, sustaining muscle mass, and improving systemic insulin resistance (Cederholm, Salem & Palmblad, 2013; Buoite, Gortan Capellari, Barazzoni & Zanetti, 2018). Seafood, especially oily fish, provides EPA and DHA, and supplements are widely available for those not meeting recommended intakes with diet alone (Calder, 2017; 2018). Nuts and some seeds and plant oils provide alpha-linolenic acid, the major plant omega-3 fatty acid (Baker, Miles, Burdge, Yaqoob & Calder, 2016).

Although required in trace amounts compared with macronutrients, micronutrients are necessary for normal growth, metabolism, physiologic functioning, and cellular integrity (Stipanik & Caudill, 2013). The shift from whole foods to processed, refined foods has reduced the micronutrient quality of the modern western diet (Ames, 2006). Vitamin and mineral inadequacies have been implicated in cellular aging and late-onset disease,

as scarcity drives chronic metabolic disruption. Keeping with these observations, adequate dietary intake of, or supplementation with, micronutrients that have antioxidant properties (e.g., vitamins A, C, and E, copper, zinc, and selenium) has been suggested as a means to reduce the risk for and progression of age-related diseases (Hohn, Weber, Jung, Ott, Hugo, Kochlik, Kehm, Konig et al., 2017).

Water is the principal component of the body, constituting the majority of lean body mass and total body weight. Water not only provides hydration but also carries micronutrients, including trace elements and electrolytes (Popkin, D’Anci & Rosenberg, 2010; World Health Organization, 2005). Drinking water may supply as much as 20% of the daily recommended intake of calcium and magnesium (World Health Organization, 2005). Our understanding of water requirements and water’s effect on health and disease is limited, although the global increase in intake of high-calorie beverages has refocused attention on the importance of water for maintaining health and preventing disease (Popkin, D’Anci & Rosenberg, 2010).

## **Influence of Proper Nutrition on Sport Performance**

Training programs require a well designed diet for active adults and competitive athletes. Research shows a balanced nutrition should include sufficient calories and healthy macronutrients to optimize performance (Kerksick et al 2008). The role of nutrition in sport is very important, a proper nutrition must be available prior, during and post competition for student athlete. Greany and Jeukendrup (2011) stated that from fueling to recovery, muscle building, weight and optimal nutrition, an athlete's diet should be similar to that recommended for the general public, with energy divided into:

- More than 55 percent from carbohydrates
- About 12 to 15 percent from proteins
- Less than 30 percent from fats

Athletes who exercise strenuously for more than 60 to 90 minutes every day may need to increase the amount of energy they get from carbohydrates to between 65 to 70 percent (Burke & Kiens, 2004). Athletes should also aim to minimize intake of high fat foods such as biscuits, cakes, pastries, chips,

and fried foods. Whether you are a competing athlete, a weekend sports player or a dedicated daily exerciser, the foundation to an improved performance is a nutritionally adequate diet.

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 deficiencies and degenerative diseases. The six (6) nutrients are classed as essential nutrients they are: carbohydrates, protein, vitamins, fats, mineral 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, 2004).

## **Carbohydrates**

Carbohydrates are essential for fuel and recovery from sports and exercise. Carbohydrate is the primary fuel for higher intensity activity is required to replenish the liver, glycogen store and to prevent hypoglycemia (low blood sugar) during training and performance. Carbohydrate intake has been well documented to have a positive impact on adaptation to training to training,

performance and improved immune function. Noakes (1993) observed that provision of glucose in the ingested solution might be necessary to optimize performance: glucose ingestion that enhances fluid and sodium absorption in the small bowel may also prevent a progressive rise in energy consumption during exercise, thereby minimize voluntary dehydration hence, the optimum solution for ingestion during exercise should provide carbohydrate, probably at rate of about one gram per minute. In longer events, carbohydrate improves performance primarily by preventing hypoglycemia and maintaining high levels of carbohydrate oxidation. The rate of exogenous carbohydrate oxidation is limited by the small intestines ability to absorb carbohydrate (Jeukendrup, 2014).

Veena and Subapriya (2010) carried out a research on nutritional status and sports performance of adolescent female athletes and non – athletes which indicated that there was inadequacy in the dietary intake of important nutrient among both groups with a higher deficit among athletes. It was reported that higher number of the athletes were under weight and anemic when compared to non-athletes. It can be due to that their diets lack the

ability to help them cope with the increased demand of the athletic activity making them more tired easily.

Edward (2007) carried out a study on fluid and fuel intake during exercise. It was revealed that sodium included fluids consumed during exercise last longer than two hours or by individuals during any event that stimulates heavy sodium loss (more than 3-4 grams of sodium). Fluid should not be ingested in excess of sweating rate and thus body water and weight should not increase during exercise. Fatigue can be reduced by adding carbohydrates to the fluid consumed by the athlete so that 30 to 60 grams of rapidly absorbed carbohydrate ingested throughout each hour of an event. Ivy (2011) observed that muscle glycogen synthesis was twice as rapid if carbohydrates were consumed immediately after exercise as opposed to waiting several hours, and that a rapid rate of synthesis can be maintained, if carbohydrates are consumed on a regular basis. Furthermore the combination of carbohydrate and protein has the added benefit of stimulating amino acid transport, protein synthesis and muscle tissue repair and also found that athletes who were refueled with carbohydrate and

protein had hundred percent (100%) greater muscle glycogen stored than those who only ate carbohydrates and suggested that aerobic performance following recovery was related to the degree of muscles, glycogen replenishment.

Currently there are a large number of myths related which causes great confusion in general population. One of the most widespread errors is the demonization suffered by carbohydrate including the athlete population (Rodriguez Martin, & Alberto 2017). This is an error due to the importance of carbohydrate as energy substrate for the brain and central nervous system. During digestion, all carbohydrates are broken down into simple sugar (glucose), which is the body's primary energy source for anaerobic and aerobic activity. Carbohydrates are stored in the body in form of glycogen, which can be used during physical activity as a result an optimal nutrition ensures the best platform for success in any sports (Greany 2015, Jeukendrup & Cronin, 2011). Carbohydrate loading aims to maximize an athlete's muscle glycogen stored prior to an endurance exercise lasting longer than 90 minutes. Benefits of carbohydrate include delayed on set of

fatigue (approximately 20%) and improvement in performance of 2% to 3% (Hawley, Schabort, Noakes & Dennis, 1997). Current recommendations suggest that for intermittent exercises longer than 90 minutes, student athletes should consume 10 to 12 grams of carbohydrates per kilogram of body mass (BM) per day in the 36 to 48 hours prior to exercise (Burke, Hawley, Wong & Jeukendrup, 2011). In longer events, carbohydrate improves performance primarily by preventing hypoglycemia and maintaining high levels of carbohydrate oxidation (Jeukendrup, 2014). The ingestion of carbohydrate has shown to enhance performance in events lasting approximately one hour (Jeukendrup, 2014). It is recommended that for a slower student athlete exercising at a lower intensity, carbohydrate requirements will be less due to lower carbohydrate oxidation (Jeukendrup, 2014). Daily training with high carbohydrate availability has been shown to increase exogenous carbohydrate and oxidation rate (Cox, Clark, & Cox 2014).

## **Protein**

Proteins are essential for the growth of muscles and recovery in every active adult or athlete. Sufficient amount of protein per individual helps to maintain

a positive nitrogen balance in the body, which is important to the muscle tissue. Protein requirement vary significantly ranging from 8 grams to 2 grams per kilogram each day (Lonnie, Hooker and Brunstorm 2018). Protein is needed for nutrient transfer in the blood, connective tissue support and the repair of tissues in response to the duration of exercise (Clarke 2008). The consumption of protein by student athlete prior to and during endurance and resistance exercise has shown to enhance the rate of muscle protein synthesis (MPS); a recent survey found out that the ingestion of protein alongside carbohydrates during physical performance when compared with the ingestion of adequate amounts of carbohydrate alone (Van, 2014). When proteins are broken down by the body at ingestion, amino acid is formed. Student-athletes need protein majorly for the repair and rebuilding of the muscle broken down during physical activity. Exercise breaks down the muscle fiber and the body needs to immediately rebuild those fibers to further maximize the rate of muscle protein synthesis, it solely depends on the type of dietary protein sources and the timing of intake of protein rich food to increase its effect on the student athlete. Several techniques have

been proposed to stimulate protein synthesis before, during, after, and after resistance exercises: food from meat, milk (Phelpps, 2011).

### **Fats (Lipids)**

Fat (lipid) is primarily used as fuel during low to moderate intensity exercises. It is also engaged in providing to all membranes, helping in the production of hormones, lining of nerves for proper activity making it easier for the process of the absorption of fat soluble vitamins (Clarks, 2008). Dietary lipids are essential for the absorption of vitamin A, D, E and K., as well as the synthesis of cholesterol and other sex hormones (Lichtenstein, Kennedy & Banner, 1998). Some athletes believe that diet containing lipid based supplements may serve as an ergogenic effect given the limited finding suggesting supplementation, may enhance lipid metabolism by decreasing dependency on glycogen/glucose for energy metabolism (Macaluco, Barone, & Cantanese 2013).

However, dietary lipid intakes beyond 50% are not advised since this could contribute to excessive weight gain (Jequier, 2001). It is suggested that 3-7 days on a fat rich diet is detrimental to exercise performance (Karlsson & Saitin, 1971). Thus, it is evident that dietary manipulation containing “fat-loading” reduces endurance performance. An elevated lipid intake is potentially associated with the pathogenesis of cardiovascular disease (Lichtenstein, et al., 1998). The knowledge of the amount of lipid intake is particularly relevant for youth athletes, given that the origins of cardiovascular disease begins at an early age and progresses into adulthood (Bloomer, Kabir, Marshall, Canal & Farney, 2010).

### **Vitamins and Minerals**

Vitamins are required in a wide variety of bodily functions and operations, which helps to sustain the body health wise and disease free. The function of minerals is for structural development of tissues as well as the regulation of bodily process (Srilakshmi, 2003). The most common vitamins and minerals found to be of concern in all diets are calcium, vitamin D (Calciferol), vitamin B (carotene), iron, zinc, magnesium, as well as some antioxidants

such as vitamin C (ascorbic acid) (Driskell, 2006, Lukaski 2004, Volpe 2006).

The B complex vitamin has two major functions directly related to exercise. They include thiamin, riboflavin, niacin, vitamin B6, pantothenic acid, biotin, folate and vitamin B12. Thiamin, riboflavin, niacin, pyridoxine (B6), pantothenic acid and biotin are all involved in the production of energy during exercise (Driskell, 2006). Vitamin D is required for adequate calcium absorption, regulation of serum, calcium and phosphorous levels, and the promotion of bone health. Vitamin D helps in the regulation of the nervous system and skeletal muscle (Holi, 2007).

The recommended mineral for optimum performance includes calcium, iron and zinc, calcium is essential for growth, maintenance of blood level. Female athletes are in a greater risk of low bone mineral density if energy intakes are low, dairy products and other calcium rich foods are inadequate or eliminated from the diet, and menstrual dysfunction is present (Lukaski, 2004). iron requirement is for the formation of oxygen carrying proteins, hemoglobin, myoglobin, and for enzymes involved in energy production

(Volpe, 2006). Iron requirements for endurance athletes, especially distance runners are increased by approximately 70% (Whiting, 2006).

Zinc plays a vital role in growth, building and repair of muscle tissue as well as immune status. Athletes, particularly females are at risk for zinc deficiency (Micheletti, Rossi, & Rufini, 2001). Zinc deficiency has shown directly how it affects the thyroid hormone levels and protein use which in turn can negatively affect the health and physical performance (Volpe, 2006).

### **Role of Water (Hydration)**

Water makes up about 60% of the total body weight. It helps in the regulation of body temperature, transportation of nutrients and removal of wastes. Water maintains blood volume, regulates body temperature and is also involved in muscle contraction (Springer, 2011). Perspiration by the body is regulated by the autonomic nervous system, controlled unconsciously by the hypothalamus; the structure of the brain that regulates the body's status quo. The consumption of liquids replenishes the fluid lost during exercise. As a result the restoration of fluids maintains normal muscle

function, helps prevent a decline in physical performance and also reduces the risk of heat stress (Springer, 2011).

A loss of sweat equally about 2% of the body weight causes a noticeable decrease of physical and mental performance, losses of about 5% or more of the body weight during physical activity may decrease the capacity to work to about 30% (Jeukendrup, Asker & Gleeson, 2015). The purpose of fluid consumption during exercise is primarily to maintain hydration and thermoregulation, thereby benefiting performance. Evidence is emerging on increased risk of oxidative stress with dehydration (Hillman, Turner, Pearl, et al., 2013). Fluid consumption prior to exercise is recommended to ensure that the athlete is well hydrated prior to commencing exercise (Sawka, Burke, Eichner, Maughan, Montan & Stachenfeld, 2007). In addition, a carefully planned hyperhydration (fluid overloading) prior to an event may reset fluid balance and increase fluid retention, and consequently improve heat tolerance (Kristal-Boneh, Glusman, Shitrit, Chaemovitz & Cassuro, 1995). However, fluid overloading may increase the risk of hyponatremia

(Noakes, 2007) and impact negatively on performance due to feeling of fullness and the need to urinate.

Hydration requirements are closely linked to sweat loss, which is highly variable (0.5-2.0L/hour) and is dependent on the type and duration of exercise, ambient temperature, and athletes' individual characteristics. Sodium losses are linked to high temperature can be substantial, and in events of long duration or in hot temperatures, sodium must be replaced along with fluid to reduce risk of hyponatremia (Sawka et al., 2007). It has long been suggested that fluid losses greater than 2% of the body's mass can impair performance (Sawka et al., 2007), but there is a controversy over the recommendation that athletes should maintain body mass by fluid ingestion throughout an event (Noakes, 2007).

### **Diet Specific for Post Exercise**

Recovery from a bout of exercise forms an integral part of the athlete's training regimen. Without adequate recovery of carbohydrate, protein, fluids and electrolytes beneficial adaptations and performance may be impeded.

### **Muscle Glycogen Synthesis**

The consumption of carbohydrates immediately after a performance to coincide with the initial rapid phase of glycogen synthesis has been used as a strategy to get into full use of the rate of muscle glycogen synthesis. An early study found that delaying feeding by two hours after glycogen-depleting cycling exercise reduces glycogen synthesis rate (Ivy, Katzal, Cutter, Sherman, & Coyle, 1985). As a result of this, it is important to enhance the rate of glycogen synthesis with the immediate consumption of carbohydrate after exercise is valid when the next exercise session is within 8 hours of the first (Pakkin, Carey, Martin, Stoyannovska, & Febbraio, 1997). Therefore, the aim of carbohydrate loading is to maximize an athlete's muscle glycogen store prior to endurance exercise lasting longer than 90 minutes. Other benefits include a delayed onset of fatigue (approximately 20%) and improvement in performance of 2%-3% (Hawley, et al., 1997).

Another aspect that should be looked into is how much influence protein influences physical performance, sufficient protein intake is essential for muscle protein synthesis and the consequent preservation or improvement of

muscle mass and strength (Bauer, Biolo, Cederholm, Cesari, Cruz, Morly, Phillips, Sieber, Stehle, & Teta, 2013). A daily amount of 8-12% of protein intake seems to be adequate over the whole range of life appears adequate and well balanced (Agostoni, Scaglioni, Ghisleni, Verduci, Giovanni, & Riva. 2005). Due to the influence of nutrition on the demands of sports performance, it is inevitably important for young athletes to follow optimal dietary practices. Nutritional strategies should be developed with the purpose of enhancing sports performance as well as encouraging recovery and minimizing the risk of injury whilst maintaining an optimal body composition. A well balanced diet and varied diet will usually be enough to meet the nutritional needs of most physically active people (Potgieter, 2013). Recent studies have found that a well planned scientific nutritional strategy (made up of fluids, carbohydrates, sodium and caffeine) compared with a self chosen nutritional strategy helped non elite runners complete a marathon race run faster (Hansen, Emanuelson, Gertsen & Soren, 2014). And trained cyclists complete a time trial faster (Hottenrott, Kraus, Neumann, Hass, Steiner & Knechtle, 2012). It is believed that training has the greatest potential to increase performance, it has been estimated that consumption of

carbohydrates-electrolyte drink on relatively low doses of caffeine may improve a 40 kilometers time trial performance by 32-42 and 58-84 respectively (Jeukendrupe & Martin, 2001).

Unfortunately, nutrition is often at times referred to as sports supplement or “magical” diet. In fact, 40-70% of athletes use sports supplements without analyzing if usage is really necessary. Several factors must be considered by the athletes in order for their performances to be improved. These factors include;

### Energy Needed

For most athletes to be successful there will be need to adapt to the energy intake and energy expenditure which allows the correct functioning of athlete while trying to maintain fitness (Thomas, Erdman & Burke, 2016). The energy demand of athletes is significantly different depending on the type of sport, duration of intensity, competitive level and individual differences of each adult. So athletes should be conscious and pay attention not to their food, not only on the day of competition but their food consumption must be checked. An appropriate nutritional guideline will as

well optimize sport performance, improve recovery, and reduce the risk of injury and illness (Bernadot, 2008).

## Macro Nutrients

A well balanced and varied diet will usually be enough to meet the nutritional needs of most physically active people (Potgeiter, 2013).we get energy and mainly nutrients from the three macro nutrients namely carbohydrate, protein and fat. The following advice is based on the energy and nutrient requirements of adults involved in general fitness programs (e.g. exercising 30-40 minutes per day, three times a week), (Kersick, et al., 2018). Although the nutrient requirement (carbohydrate, protein, lipid, water, vitamins) other micro-nutrients requirement will further be discussed under the following headings:

Carbohydrate: Carbohydrate loading before, during and after performance for the student athletes, carbohydrate contains most of their meals which serves as a great source of energy. A normal diet where approximately (45-55%) of the daily calories come from carbohydrate, provides enough for most moderately active people. for example, a person weighing 70kg needs

about 210-350g carbohydrates per day (Kersick, et al., 2018). The following are examples of carbohydrate and each giving 30g of carbohydrate.

- i. A bowl of oats (45g)
- ii. 2 slices of bread
- iii. ½ serving of pasta and rice (40g)
- iv. 1 large banana (approx 145g)
- v. 1 large potato (1450g).

For very active student athletes who perform high intensity exercise regularly (e.g. 2-3 hours intense exercise per day, 5-6 times per week), there will be the need to consume extra energy and increase carbohydrate intake to 55-65% of total calories. This can be gotten from carbohydrate rich food that are low in fiber such as white bread and non-whole grain cereal product or fruit juices, smoothies and sports drink for the exact amount needed with the amount and intensity of the exercise (Kersick, et al., 2018).

Carbohydrate loading is important for athlete taking part in event lasting more than 90minutes to maximize energy stores before the event. This involves eating 10-12g of Carbohydrate per kg body weight, per day,

for 1.5-2 days before the events while resting for training (Burke & Wong, 2011).

Protein: protein is significant for the repair of muscles after exercise. Those who follow a general fitness program have the same protein needs as the general population, which is about 8.0g of protein per 1 kilogram of the body weight per day (ager, Chad, Kersick, Campbell, Cribb, Wels, Skwiat & Purpua, 2017). Be careful not to exceed the recommendation, since an excessive protein intake can have a negative effect on several organs, such as the kidney (Ko, Obi, Tortori& Zadak, 2017).

The following are examples of protein with each giving 10 grams of protein:

- i. 2 small eggs
- ii. 50g fish or chicken
- iii. 120g tofu
- iv. 150g kidney beans
- v. 200g yoghurt

Meat, fish, eggs, and milk are high quality protein sources, as they contains high levels of essential amino acids needed for protein synthesis in muscle (Phillips & Loon, 2011).

### **After Exercise**

The body needs the right food to recover and to rebuild the energy stored after exercising to build muscle (Slater & Phillips, 2011). Eating within 30 minutes after exercising (about 20g of protein and carbohydrate) is recommended (Kersick et al., 2018). Lastly water should be to maintain hydration levels for optimal endurance in humid and hot conditions during high intensity exercises. Alcohol consumption should be avoided, because consuming alcohol tends to have negative effects on hydration and decreases exercise performance (Sayed, Ali, & Zes, 2005).

A good diet can provide enough energy that which the student-athlete needs to finish a leisure or sport activity. Every student –athlete needs to use proper diet before, during and after an activity. Lack of proper diet not only adversely affects the performance of an athlete but it significantly affects the

over-all functional capacity of the body of the athlete (Hoch, Gossen,& Kretschmer 2008).A balanced diet should ensure adequate caloric, macro and micro- nutrient (Meyer, O'Connor& Shirreffs 2007). A diet adequate in energy especially in terms of carbohydrate content, iron, fruits, vegetables and fluid would help increase fitness level. Carbohydrate diet the primary source of fuel for high-intensity activity is needed to refuel the liver and glycogen stores to prevent hypoglycaemia (low level blood glucose) during training and performance. Noake (1993) observed that the provision in the ingested solution might be necessary to optimize performance: the ingestion of glucose that enhances fluid and sodium absorption in the small bowel, they also prevent a progressive rise in oxygen consumption during exercise and found that sweetened carbohydrate containing drinks may also increase fluid intakes during exercise, thereby minimizing voluntary dehydration.

### **Influence of Nutrition on Physical Fitness**

Physical fitness to the human body is what fine tunes an engine. It refers to a set of attributes that people have or have achieved .The U.S

Department of Health and Human Services separates physical fitness into two categories: health-related fitness and performance-related fitness. Health-related fitness is the amount of physical training required to reduce the risk of disease or injury. Performance related fitness is the amount of physical training required to achieve a physical goal, such as playing a sport or climbing a mountain.

Physical fitness is one of the core preconditions of health; we cannot imagine a person to be healthy without being physically fit. Physical fitness therefore needs to be appreciated in full measure. The common perception of physical fitness is the absence of ailments and diseases. Physical fitness can be defined as the “ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and to meet unforeseen emergencies (Park 1989). The most frequently cited components of physical fitness fall into two groups namely: the health related fitness and the skill related that pertains more to athletic ability (Plate, 1983). The health-related components of physical fitness are;

- a) Cardio-respiratory endurance

b) Muscular-endurance

c) Muscular- strength

d) Body composition, and

e) Flexibility

- Cardio-respiratory endurance: Cardio-respiratory fitness (CRF) refers to the capacity of the circulatory and respiratory systems to supply oxygen to skeletal muscle mitochondria for energy production needed during physical activity (Ross, Blair, Arena, Church, Després, Franklin, Levin & Lavine, 2003; Caspersen, Powell & Christenson, 1985).
- Muscular Strength: This is the ability of a muscle or a group of muscles to produce a force against an external resistance (Moir, 2012).
- Body Composition: This is described as the percentage of bone, water and muscle in the human body (Encyclopedia, 2016).
- Flexibility: flexibility according to Kraus & Hirschland (1954) referred flexibility as muscle fitness component associated stiffness and tension.

The five health-related components of physical fitness are more important to public health than the components related to athletic ability; therefore, we limit our discussion to the aforementioned. Even with proper food that is readily available, optimal nutrition and fitness will not be achieved unless student-athletes and coaches make healthy food choices. For example, to reap the health benefits associated with regular intake of fruits and vegetables, these foods must be consumed in sufficient quantity (Steinmetz & Potter 1996; Ness & Powles, 1997). Likewise, energy intake in excess of daily requirements leads to weight gain, increased adiposity, and the adverse health consequences associated with excess body fat (Haslam & James, 2005). A poorly designed diet and inappropriate use of dietary supplements can negatively impact human performance and health outcomes (Haslam & James, 2005).

### **Health Implications of Poor Nutrition on Student-athletes**

According to World Health Organization (WHO) Nutrition is a fundamental pillar of human life, health and development across the entire life span. Proper food and good nutrition are essential for survival, physical growth, mental development, performance and productivity, health and well-being. It is an essential foundation for human development. Healthy eating in childhood and adolescence is important for proper growth and development and to prevent various health conditions. Nutrition also indirectly impacts academic performance (Popkin & Adair, 2012). The proper amount of food play a crucial role in the complete health status of individuals, the food consumed provides the body with nutrient, energy, protein, essential fats, vitamins and minerals to live, grow and function properly. We need a wide variety of different foods to provide the right amounts of nutrients for good health. Enjoyment of a healthy diet can also be one of the great cultural pleasures of life.

The fundamental world health organization (WHO) goal of health for all means that people everywhere, throughout their lives, have the opportunity to reach and maintain the highest attainable level of health. This is

impossible in the presence of hunger, starvation, and malnutrition. Basic nutrients, such as carbohydrates, fats, and proteins, are the basis of all life activities. These constitute the carbon skeleton of numerous useful molecules, and deliver energy through oxidative decomposition. Poor eating habits such as insufficient intake or high intake both have adverse effects on health (Brown, Beardslee & Prothrow, 2008). These problems include obesity, high blood pressure, high cholesterol, heart disease and stroke, type-2 diabetes, osteoporosis and so on. Poor nutrition leads an individual to illness or lead to headaches and stomachaches (Brow, Beardslee & Prothrow, 2008).

Due to poor nutrition of student-athlete, the student -athlete suffers a poor nutrition and dietary habits and it affects how they feel, look, think and act. A bad diet results in lower core strength, slower problem solving ability and muscle response time and he is less alert (Ajimera, 2017). Malnutrition adversely affects the student -athlete's health as well as impairing their neural development leading to lower intelligence quotient (I.Q) in human beings. Malnutrition is related to a decline in general functional status and a

decreased bone mass, immune dysfunction, delayed post surgery recovery, high hospitalization and readmission rates, and increased mortality. ( Ahmed & Haboubi, 2010).

Obesity is a serious health problem and a very huge number of people nowadays are facing the problem of obesity. There are so many factors responsible for this problems but the over nutrition is the one among the main factors caused obesity among the masses (Sturm, 2005). Obesity is fast growing problem throughout the world. Obesity may cause of Type II diabetes because it causes insulin resistance and is associated with physical inactivity. A person become obese when he gets too much energy and does not utilizes it properly. According to World Health Organization Diabetes mellitus (DM) is a series of a metabolic disorder associated with high glucose level due to either defect in insulin secretion, insulin action or both Tuomilehto, Ericsson & Lindstorm (2001). The major causes of death, illness and disability in which diet and nutrition play an important role include coronary heart disease, stroke, hypertension, atherosclerosis, obesity, some forms of cancer, Type 2 diabetes, osteoporosis, dental caries, gall

bladder disease, dementia and nutritional anemia's. The Infant Feeding Guidelines and Australian Dietary Guidelines assist us to eat a healthy diet and help minimize our risk of developing diet-related diseases (Ensminger & Esminger, 1993). Balance or healthy diet refers to the diet maintain and promote health It estimated that 80% of all cardiovascular disease, 90% of all type 2 diabetes and 30% of all cancer could be prevented eating a healthy diet, increasing physical activity and avoiding smoking (World Health Organization, 2000).

### **Measures and Solutions to be used in Promotion of Proper Nutrition among Student-athletes**

The importance of nutrition on the overall health and wellbeing of athletes cannot be overlooked. There are various strategies that can be adopted by coaches to fuel the student- athlete nutritionally to reach optimal performance. These strategies provide several ways to incorporate nutrition, diet and healthy living into competitions as well as ways to teach nutritional choices. Schools and other education settings have long been considered a

primary target to deliver nutrition education. Along with the role of schools in providing education in general, this is based on the rationale that proper nutrition is essential for physical and mental development of children and adolescents; school children are at the phase of life when they are acquiring habits that will last a lifetime; and children are an important link between school and home and community Olivares,Stella & Mcgrann (1998).Consistent with the themes indentified by Torres et al. (2010) and Long et al. (2011), student-athletes are under educated about proper nutrition, making healthy choices and how nutrition impacts their performance.

One mistake coaches often make is to focus solely on in-competition nutrition. Instead, nutrition should be a focus year-round. One way to focus on nutrition year-round is to learn and promote the principles of healthy nutrition. These principles include variety, moderation and balance and are explained in detail in the Dietary Guidelines for Americans (Dietary Guidelines Advisory Committee, U.S. Department of Agriculture, U.S. Department of Health and Human Services, 2019).

Moderation should also be taught and encouraged. With respect to nutrition, moderation can be defined as not consuming too much or too little of anything (Boyle, 2019; Insel, Ross, McMahon, & Bernstein, 2017). Most athletes have foods they prefer or desire that are not necessarily considered “healthy options.” therefore, teaching moderation means not having these foods every day or in large amounts. Examples might include sweets, desserts or foods high in sodium (salt). Achieving nutritional balance involves considering portion sizes as well as nutrients (i.e., fats, carbohydrates, proteins, vitamins, minerals and water) in a meal and throughout the day. An example of nutritional balance has been provided by My Plate, which suggests that half of an individual’s plate should be filled with fruits and vegetables (Dietary Guidelines Advisory Committee, U.S. Department of Agriculture, U.S. Department of Health and Human Services, 2015).

Another key player that should be encouraged for the promotion of promotion amongst student-athlete is hydration. Hydration is a key component for success in athletics. Previous research has determined that

fluid loss as little as 1% to 2% body weight can hinder athletic performance (McArdle, Katch & Katch, 2013; Montain, 2008; Sawka, Burke, Eichner, & Montain, 2007). A strategy for coaches to determine the hydration level of their athletes is to weigh them before and after training or competition to determine weight loss. Typically, the recommendation is that for every pound lost during training or competition, athletes should replace it with 2 to 3 cups (16 to 24 ounces) of fluids (Fink & Mikesky, 2018; McArdle et al., 2013).

### **Ways to Enhance Physical fitness and Sport Performance**

The field of sports nutrition continues to grow at a rapid rate, and various strategies are now being employed to help student-athlete reach peak performance. Nutrition is recognized as a major component of optimal sporting performance, with both the science and practice of sport nutrition of sports nutrition developing rapidly (Burke, Meyer & Pearce, 2012). There are different methods adopted by the coaches and student-athletes to enhance physical fitness and sports performance which includes: sustaining aerobic

energy to help athlete who produces a large amount of lactic acid at a given speed of running, swimming, or cycling who cannot continue to perform at that pace for as long as the athlete who does not accumulate as much lactic acid. An athlete who has the ability to exercise at a high intensity before blood lactic acid begins to accumulate is said to have a high lactate threshold (Coyle, Coogan, Hopper & Walters 1988; Holloszy & Coyle, 1984). An athlete's lactate threshold seems to be a better indicator of endurance performance lasting 30 minutes to 4hours than does the  $VO_2$  max (Coyle, 1988, 1991). This is because the lactate threshold is a better index of the athlete's ability to sustain a high rate of energy expenditure for the duration of the competition. Also role of Nutrition also play a determining factor for the enhancement of physical fitness amongst student-athlete two nutrients, carbohydrate and water.

Carbohydrate and water are the dietary constituents that have repeatedly shown to be most important for optimizing endurance performance. Muscles obviously cannot produce energy without fuels derived from nutrients obtained in the diet, and carbohydrate is an obligatory fuel for high-caliber

sport performance. It is well established that dietary carbohydrate consumption before, during, and after exercise can make an important contribution to performance. Carbohydrate consumption acts primarily by increasing the body's stores of glycogen in muscles and in the liver before exercise and by increasing the availability of glucose for use by the muscles during exercise (Coggan & Swanson, 1992; Costill & Hargreaves, 1992; Coyle, 1991; Williams, 1993). Fluid intake during prolonged exercise is also required to counteract the debilitating effects of exercise and heat on cardiovascular function and on body temperature regulation. When dehydration reduces blood volume, oxygen delivery to the muscles by the blood can be compromised, and this reduces the ability of the muscles to produce energy aerobically. Dehydration also compromises the ability of the body to regulate its temperature, resulting in eventual lethargy and potential heat illness, both of which adversely affect the athlete's ability to sustain a high rate of energy production. Carbohydrate–electrolyte beverages are advocated as the most effective way to supply both carbohydrate and fluid to the body during exercise (Coggan & Swanson, 1992; Gisolfi & Duchman, 1992).

## **Summary of Reviewed Related Literature**

Individual food choices are influenced not only by the food itself, but also by individual, cultural, and environmental factors. Food factors include portion size, appearance, labeling, packaging, presentation, variety, and sensory-specific satiety. Individual factors include age, gender, and ethnic or cultural influences. Other individual factors include the influence of marketing and education, personal food attitudes, commensality (e.g., non-obese versus obese), and interaction between foods and an individual's mood or emotions. Environmental factors include location, meal appropriateness for time of day.

Student-athletes should always look for avenues to improve sports performance as well their physical fitness level; there are ranges of dietary strategies available. Nonetheless, dietary recommendation should be individualized for each student-athlete and their sport provided by an appropriately qualified professional to ensure optimal performance. Dietary supplements should be used with caution and the need for the student-athlete

to consume energy giving food during periods of high intensity or long duration training to maintain body weight and health to maximize training effects.

Low energy intake can result in loss of muscle mass, menstrual dysfunction, loss of or a failure to gain bone density, an increase risk of fatigue, injury, illness and a prolonged recovery process. Lastly, student-athletes should do away with alcohol consumption as it impairs athletes motor skills, reduces their strength, power as well as coordination.

## **CHAPTER THREE**

### **METHODOLOGY**

This chapter describes the procedures that were used in carrying out this study, which comprises of the following:

- Research design
- Population of the study
- Sample and sampling technique
- Research instrument

- Administration of instrument
- Validation of instrument
- Reliability of the instrument
- Method of data collection
- Method of data analysis

### **Research Design**

The research design for this study is a descriptive survey involving the use of questionnaires. The design allows for researchers to easily describe the situation and provide understanding of the phenomenon understanding through descriptive statistics.

### **Population of Study**

The population of the study consists of all undergraduate student-athletes in the University of Benin (UNIBEN) who train at various sports facilities within the University of Benin, Ugbowo main campus. According to the data from UNIBEN sports center, the population of the eligible student-athletes in the University of Benin is estimated to be 3,244. The distribution

of the student-athletes population across all facilities in University of Benin is shown on the table below

<b>S/N</b>	<b>Faculties</b>	<b>Population of the student-athletes</b>
1	Agriculture	255
2	Arts	290
3	Basic and medical science	210
4	Dentistry	103
5	Education	303
6	Engineering	245
7	Environmental sciences	215
8	Law	175
9	Life science	245
10	Management science	275
11	Medicine	185
12	Pharmacy	195
13	Physical science	271

14	Social science	277
<b>TOTAL</b>		<b>3,244</b>

### **Sample and Sampling Technique**

A sample size of the study is 344 student-athletes of the University of Benin. In order to guarantee a representative sample, the simple random technique was adopted in selecting the sample of the study. 60%percent of the size was considered to ensure that all stipulated numbers of students were duly represented.

### **Research Instrument**

Information was obtained through self-constructed questionnaire forms which were used to elicit information concerning the influence of proper nutrition and diet on physical fitness and sporting performance of student-athletes of University of Benin. The questionnaire contained three sections A and B. with section “A” containing questions which elicited responses on the respondent’s demographic information. While section “B” contains questions based on the research questions generated in chapter one. There

are twenty-three items in all. The questionnaire was constructed in such a way that it provided information about the influence of proper nutrition and diet amongst students-athletes.

### **Validity of Instrument**

The instrument for data collection was subjected to face validity by the researcher's supervisor and two other experts from the department of human kinetics and sports science (HKS), University of Benin, who scrutinized the questionnaire and modified it and their corrections and suggestions, was incorporated into the final draft of the instrument.

### **Reliability of Instrument**

In order to determine the reliability of this instrument, a test retest method was used. The instrument was administered to 100 athletes outside those that will be used for the study. After an interval of two weeks, the same instrument was administered to the same group of athletes. The scores obtained from both administrations would be subjected to analysis using

Pearson's product moment correlation coefficient (PPMC). A reliability coefficient of 0.84 was obtained showing that the instrument was reliable.

### **Method of Data Collection**

The researcher personally visited the sports complex in University of Benin. The questionnaires were administered to the respondents and also waited for their responses to be completed; thereafter it was collected to ensure that all copies were intact.

### **Method of Data Analysis**

Numerical data was gathered and presented in tabular forms in analyzing the data, the appropriate procedure was used. The questionnaires were first sorted and then. The simple percentage method was adopted for easy understanding and breakdown of results that is number of particular responses  $\times 100$ .

**APPENDIX 1**  
**DEPARTMENT OF HUMAN KINETICS AND SPORTS SCIENCE**  
**FACULTY OF EDUCATION**  
**UNIVERSITY OF BENIN**  
**BENIN CITY**  
**QUESTIONNAIRE**

Dear Respondent,

I am a final year student of the above named department carrying out a research on the “Influence of Diet and Nutrition on Physical Fitness and Sports Performance amongst Student-athletes of the University Of Benin”.

Kindly spare few minutes of your time to complete this questionnaire to the best of your knowledge. Your response will be given utmost confidentiality as your name is not required.

Resear  
cher

**Edu16**  
**03262**

**SECTION A: Demographic Information**

**Sex:** Female [ ] Male [ ]

**Age:** 18-20 [ ] 21-24[ ] 25-28[ ] [ ]

**SECTION B:**

**Instruction:** Please kindly tick [√] in the correct option that best describes your opinion using the following scales: **Strongly Agree= SA; Agree= A; Disagree=D; Strongly Disagree=SD** where appropriate

S/N	ITEMS	SA	A	D	SD
	<b>RQ1: Influence of proper nutrition on sports performance on University of Benin student-athletes</b>				
1.	Consumption of carbohydrate can help influence sports performance				
2.	Consumption of rice and beans can help boost performance				
3.	Carbohydrate loading prior to sporting activity can be used to influence performance				
4.	During sports performance I prefer eating fish and beans to meat				
5.	There is a relationship between proper nutrition and athletic performance of student-athletes				

S/N	ITEMS	SA	A	D	SD
RQ2	<b>Influence of proper nutrition on physical fitness of University of Benin student-athletes</b>				
6.	Consumption of vegetables can influence physical fitness of University of Benin student-athletes				
7.	Eating fruits and vegetables can influence physical fitness of University of Benin student-athletes				
8.	The consumption of calorie dense meal can influence physical fitness				
9.	Consumption of proteins can help repair and build the muscle				
RQ3	<b>Health implications of poor nutrition on student-</b>				

	<b>athletes</b>				
10.	The excessive consumption of fat can result to obesity amongst student-athletes				
11.	As a result of poor nutrition, student-athletes can suffer cardio-vascular diseases				
12.	Malnutrition can lead to deterioration of the health of student-athletes				
13.	Poor nutrition can lead to muscle fatigue and tiredness				

S/N	ITEMS	SA	A	D	SD
	<b>Measures and solutions that can be used in the promotion of proper nutrition amongst University of Benin student-athletes</b>				
14.	The excessive consumption of starchy food like rice, bread and pasta should be discouraged				
15.	Hydration should be encouraged to promote proper nutrition				
16.	Having a nutritional strategy can help promote proper nutrition				
17.	The avoidance of non-nutritious beverages like coffee, carbonated drinks and tea should be left out of the nutritional plan				
<b>RQ5</b>	<b>Ways in which student-athletes can enhance their physical fitness and sports performance</b>				
18.	Encourage the student-athlete to be physically active at least 150 minutes per week will enhance physical fitness and sports performance				
19.	The creation of a healthy environment (gym house) will help enhance physical fitness and sports performance				
20.	Dedicating enough time for recovery will help enhance physical fitness and sports performance				
21.	Student-athlete should fuel their body in the right way to enhance physical fitness and sports performance				

