PHYSICAL PARAMETERS, DIETING AND BODY MASS INDEX OF ATHLETES AND THEIR RELATIONSHIP WITH SPORTING EVENTS

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Abstract
Sporting activities are quickly becoming marketable ventures in the face of modern scientific and technological advancements. This paper, therefore briefly reviews the nature of sporting activities in the olden days and how they have developed. It focuses on anthropometry and physical features of athletes (sprinters and marathoners), the place of balanced diet in sport, body mass index (BMI), physical fitness of track athletes and successful outing and anthropometric characteristics. Based on these, recommendations were made on how to bring out the best from sprinters and marathoners training coaching, dieting with favourable anthropometric characteristics.

Keywords: Physical Parameters, Dieting, Body Mass Index and Athletes.

Introduction

Physical activities in the olden days were for the purpose of recreation and livelihood. Within that period, people indulged in physical activities consciously and unconsciously as a means of survival. Then, their livelihood and survival were dependent on physical activities (Hardmnan & Stensel, 2009). They needed physical strength and power to provide the basic necessities of life such as food, shelter and protecting themselves from dangerous animals and humiliation from external aggression from neighboring communities.

In the past two decades, the olden and modern ways of participating in locomotive activities have gradually transmitted to competitive sports. Sport has become a professional venture to some national and international athletes who take sport not just as hobby, but as their occupation. In the same vein, while some have taken sport as their occupation, others have taken it as hobby. Today in the Nigerian society and other countries of the world, there is an increasing interest in competitive sport at both local and international levels. Some of the amateur athletes are even becoming more desperate to travel outside their countries to gain opportunities of becoming professional athletes. This is because they believe that as professional athletes, engagement in the developed world guarantee access to standard facilities which will eventually improve their career and performance. This no doubt is likely to improve their popularity and marketability. This paper therefore centers on physical parameters which conduce to sprinters and marathoners performances

Anthropometry and physical features of athletes

A growing body of knowledge has revealed that anthropometry is asource to identify future athletes while physica activities on athletes play an important role in reaching optimal performance in many sports. Some anthropometric profile of athletes are regarded and known to be important factor responsible for success in sport. For example, track and field performance depends on various factors when anthropometric variables are applied in training process (Solaja, Milankov, Pejakovic & Stokic, 2017).

The physical characteristics of athletes are germane to athletic victory in sports. Several studies at local and international levels have attested to this, because specific anthropometric characteristics are required to be successful in some sporting events when identifying champion athletes. There is also the need to acknowledge that there are some variations in the structure and the body composition of some sporting events in which participation in individual and team sports are developed. The task in some events such as short put or high jump are quite specific and different from each other and so are the successful physiques. The process whereby the physical requirements of a sport lead to selection of body types best suited to that sport is known as "Morphological optimization" (Bloomfield 1995 in Shafeeq, Abraham & Rapheal, 2010).

Some of the scholars who share view with the above school of thought stressed that the somatotype of elite athletes and Olympic athletes have generally shown that strength and speed dependent athletes tended to be basically mesomorphic , while long distance athletes were found to be more ectomorphic with limited amount of mesomorphic muscularity (Battinelli in Shafeeq et-al 2010). Apart from the development of body structure through regular exercise, many scholars have also traced the relativity of material wellbeing as a significant factor to the physical development of the body while on the other way, lack of material wellbeing can result in health risk to an individual. Moreover, the individual body type or structure inherited at birth can be changed with regular training, good dieting and choice of life style. (Monyeki & Toriola 1996).

These researchers believe that apart from good dieting, regular exercise, and body composition could be an advantage in some sport. There are some fundamental factors that can be responsible for good performances in competitions. Such factors that cannot be underrated are the physiological state of the muscular system (fibers), the competitors' mental alertness on the day of competition, their emotional state before and during the competition and the adequacy of their running shoes.

As earlier mentioned, physical characteristics of athletes are germane to athletic victory in sport. Several studies at local and international levels have attested to this fact. Several authors have also classified athletes and non-athletes into three categories namely Endomorphs, Mesomorphs and Ectomorphs. They likened extreme endomorph to an obsessed person with almost no muscularity or fragility. An extreme ectomorph will be an average person according to them. Specific anthropometric characteristics are needed to be successful in some sporting events. There is also the need to acknowledge that there are some variations in body structure and composition of sport men and women that participate in individual and team sports. The tasks in some event such as short-put or high jump are quite specific and different from each other so are the physique. The process whereby physical requirements of a sport lead to selection of body types best suited to that sport is

known as morphological optimization (Bloomfield in Shafeeq et-al). Diversity and complexity in sport encompass genetic, physiological capacities and psychological skills in which morphological aptitude play a vital role. Sport is considered as a selective system by virtue of its competitive nature (Sedeaud, Marc, Dor, Shipman, Dorsey, Haida, Berthelot & Toussiant, 2014).

In running event at sub-maximal speed such as sprint and marathons, the oxygen requirement increases with any increment in body weight, that is oxygen consumption is increased due to the greater energy demand required to initiate and sustain movement of a larger weight. Previous study have revealed that athletes in all running events have less body fat compared to most other sports (Martins & Coe, 1997, Gore, 2000; Matkovic Misingoj – Durakovic, Matkovic, Jankovic, Ruzic, Leko & Kondric , 2003; & Shafeeq etal 2010).

Sprint races is a sudden explosive burst event that the participant runs vigorously with outermost speed from the beginning of the race to the end of the race. Another name for sprint races is known as anaerobic event. Sprinters have fast switch fiber type dominance when you compare them to mid/long distance runners. The fast switch fibers favors powerful muscle contraction against body weight or external overloads. Despite the importance of this event, there are scarcity of studies performing such comparisons which makes it surprising especially when it involves elite athlete (Loturco, Gil, Laurino, Roschel, Kobal, Abad & Nakamura, 2015). During vigorous activities such sprinting at top speed, sprinting of 100 or 400m at top speed within a few seconds, the running muscle requirements for oxygen may no longer be provided with enough quantity of oxygen for its muscular action. In that case, the runner is said to be operating anaerobically. So the athlete generate energy by glycolysis, leading to the accumulation lactic acid. If there is no extra ATP to resynthesize lactic acid, the runner goes into oxygen debt. so the gradual process of resynthesis of lactic acid may last over one hour with sufficient supply of oxygen after the conclusion of the race, (Power and Howley, 2012). The marathon race on the other hand involves gradual slow and consistent speed over a long period of time. It is otherwise known as aerobic pathway. The marathon runner can after some period of exercise go into aerobic glycolysis which becomes the main source of energy supply for a prolonged physical activities and athletic events (Power & Howley, 2012). Marathoners are known to be embedded with slow switch fiber types.

The place of balanced diet in sport

When we talk of balanced diet, we refer to the consumption of food that has all the food nutrients at the right proportion in which the body needs. According to Waugh and Grant (2006) "A balanced diet contain all nutrient required for health in appropriate proportion and is normally achieved by eating variety of foods." The researchers added that if any nutrient is consumed more than required or it is not taken enough, the subject health may have negative side effect. There is no doubt that balanced diet is important to successful sporting activities.

The intensity of sport competition has increased in recent time because good nutrition ensures good performance in sport competition (Ogunleye & Ekpo, 2014). A balanced diet is important in the optimal use of energy, tissue building and repair and regulation of vital body processes before, during and after strenuous physical activities. A careful selection of foods with the proper amount of nutrients, and in the right combinations is regarded as balanced diet (Anugweje,

2013). A typical balance diet contain the right amount of carbohydrate, protein, fat, essential vitamin and minerals. Such diet should provide the immediate energy needs of man, maintain energy stores and provide adequate amount of mirconutrients (vitamins and minerals), the scholar added.

A balanced diet is required in keeping a healthy body weight and can be achieved by calculating body mass index (BMI), (Waugh & Grant 2006), They also noted that daily consumption of balanced diet needs a little amount of knowledge, planning and understanding. To them, part of the thing to be considered are the amount of energy that is needed by individual should meet individual needs. In the same vein, Anugweje (2013) advanced the relevance of balanced diet to he would be a successful athlete, when he stated that a healthy balanced diet is imperative for good performance and prevention of injuries. Carbohydrate he said are the main "menu" for energy required. Good sources of carbohydrate are yam, cereal, rice, pasta and oats contributing about 70% of total calories requirement. Protein should make up 15% of total calories for repair of tissue, and fats, another 15% to help the absorption of fat soluble vitamins in the diet and as a source of essential fatty acid (Anugweje,2013).

Body Mass Index (BMI)

Overtime, body mass index and percent fat has been used to draw conclusions and inferences. It is used as a means of correlation between groups related by general mass (Steven, Cai, Williams & Wood, 2006). Body mass index and body fat percentage has been a simple but objective anthropometric index of physical characteristics. Body mass index can be seen as a generally agreed scale to check a subject in relation to her height.

Iro (2008) defines body mass index as an acceptable indicator of a person's size relative to his height. It determines the extent to which an individual is obese by using his or her body weight and height scores. It is the measure of the size of a person obtained by dividing the weight in kilograms by the height in meters squared. The researcher said that normal BMI is in the range of 18.5 – 24.9, over weight individual have BMI in the range of 25 – 30, while BMI over 30 represent obesity. While this measure is useful in studying large samples from the general population, it is of little value when dealing with athletes and other individuals who, though healthy but have little body fat percent that surpass the recommended BMI for their height and total body weight.

Brooks, Fahey, White & Baldwin (2000) earmarked that BMI is weight/heights and is fairly closely related to amount of body fat. Although BMI is not as accurate as laboratory methods of assessing body composition, it is generally used in epidemiological research because height and weight measurement are quite within reach. Power and Howley (2012) defined BMI as the ratio of body weight (in kilograms) to height (in meters) squared.

Obesity

Obesity has been fingered to be increasing at a high rate with a lot of negative effect on the person that is obese. Olayiwola (2007) noted that obesity is growing at an alarming rate with major adverse effect on human health. Because of the threat of obesity to human health, the world health organization, (WHO 2005) identified obesity as the world epidemic in developed countries of the world, obesity is a very common nutritional disorder in which there is accumulation of excess body fat. Clinically, one can be said to be obese when the body mass index (BMI) is more than 31. This happens when energy consumed is more than energy expended as the case in sedentary persons who

exceed daily energy requirements (Waugh & Grant, 2006).

Several studies have shown that obesity can be the outcome of one or a combination of many factor such as heredity, poor diet and sedentary life style. obesity is associated with rising level of an hormone known as leptin (Moran, 2009). Leptin is a secretion from adipose tissue (fat). It is also involved in regulating food intake, energy expenditure and energy balance in human being (Whitney & Rolfes, 2002; Moore, 2003). It is also observed that in the recent time, obesity is becoming a common metabolic and nutritional disease whereas, three decades ago, obesity was not commonly seen in children. In a study carried out by Tremblay (2000), there was a 17% increase in obesity rate among boys and 15% increase among girls between 1991 and 1996.

Nieman (2004) earmarked that there are three main causes of childhood obesity, these are genetics, overeating and lack of exercise. The researcher stressed that there is need to understand that the cause of obesity is not unconnected to the three factors mentioned above. He said it is only 1% of obesity case that is traceable to hormonal cause. Overeating is also a known factor responsible for obesity. In the past two decades, the super-sized portions are increased along with super-sized kids with super-sized problems (Kempster, 2004). There is no doubt that a lot of children are now eating fast foods and consuming more calories than required. Several studies have argued that children should be protected from these damaging forces. Meanwhile, they are exposed to these fast food choice every day thereby making it difficult to support healthy eating (Kuntzmal 2004).

The third factor identified as responsible for obesity is none participation in regular physical exercise. There has been a decline in the development of grass root sport and general reduction in physical activities during and after school hours that is mapped out for physical activities (Anrig, 2013). There is relationship between physical in-activity and obesity. Tremblay and Williams (2003) also identified a link between physical inactivity and obesity.

Physical fitness of track athlete and successful outing

The physical fitness and structure of a marathoner may differ from the physical fitness of a sprinter due to their structure of event. Marathon is also known as long distance race or endurance event in secondary school and tertiary institution. Physical education is referred to as branch of sport which requires high stamina, strength and tough periods of training. In sprinting, strength is a requirement because it is a race in which sprinting before the finished line is of no relevance or importance to regular increasing tempo and stamina which determines success of an athlete (Mehmet, Goktepe & Hayri-Aygodan, 2016).

The researchers continued that considering the fact that marathon and sprinting are held between 6,000 – 42,195 meters and 100 – 400meters respectively, this may be a point to hold unto as the reason for the differences in fitness level of these categories of athletes. Following this consideration, the method of preparation would be different due to different structure of context and focus as this would be purely on the need to be successful in the course of competition.

Fitness level of athlete could be as a result of the amount of training invested on oneself. Since gaining high level of fitness involves quality exercises and exercise has to do with body movement in one form or the other. It can be said that fitness has a relativity with motor fitness. However, motor fitness which is defined as the capacity of efficient body movement with force over a reasonable length of time

without undue fatigue is said to be the primary determinant factor of an athlete performance (Loveleen & Amadeep, 2016). These means that the performance of an athlete in a competition is determined by his/her motor fitness which is built as a result of regular exercise.

In the same vein, Mehmet et al (2016) also pointed out that the amount of training sessions carried out by professional athletes vary and this have a long way to go in their fitness level and performance. They also mentioned that the cause of inadequate training sessions between professional athletes could be as a result of constraint in business, family and their social lives. In the light of this, the amount of training session an athlete is exposed to is a strong determinant factor to the athlete fitness level and performance.

Anthropometric characteristics

It is believed that high performance in athletics depends on various anthropometric factors as well as in the training level of the subject. Some anthropometric characteristics of individual athletes are believed to be among the determinant factor for success in sport and games. Performance in track and field event depend on many factors as well as anthropometric factor in the training process. Solaja et al, (2017) noted that morphological characteristics, such as skinfold thickness, body fat percent (BFP), Limb girth and length, body weight, body height and body mass index (BMI) have an impact on athletic performance especially in running. The resesarchers stressed further that the body fat percent (BFP) has been identified as the most important factor for sprinters and marathoners running success, apart from the running speed during the training process. Studies from the late 90^{s} by Hetland, Harbo and Christiansen (1998 in Solaja et al, 2017) have revealed that the regional and total body fat are inversely proportional to performance in runners, especially in the disciplines where the body leaves the ground (i.e in jumping events) or in event where there rapid acceleration above the ground (i.e sprinting and huddling) and where there specific relation with the body height, fat tissue and lower limb girth. Barbier, Zaccagni, Babic, Racovac, Misigoj-Durakovic and Gyaldi-Russo, (2014) stated that studies in kinantropometry has discovered that optimal performance in sport need specific anthropometric characteristics depending on practiced discipline.

Recommendation

Based on the literature reviewed on the work of several researchers, It is generally agreed that physical attributes, good dieting for sprinters and marathoners, regular physical exercise and adequate anthropometry suitable for different events are necessary indices and therefore recommend these for upcoming athletes at local, state, national and international levels. We also recommend that sport coaches, trainers, physical education teachers, game masters, etc. should be guided by these factors in advising athletes on event choices. Again, grass-root sport need to be revisited by both private and public primary and secondary schools in Nigeria.

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