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# The Pre-Competition Meal Status of Ghana University Sports Association (GUSA) Athletes

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***Abstract:***
*Dietary practices of athletes have been found to be an essential component of training and performance. By making informed food choices, athletes will have an advantage over those who choose to ignore the role that food plays in human performance. The study sought to find the dietary practices and frequency of food consumption among students' athletes during 2012 GUSA games at Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. The study was a cross-sectional survey where 107 athletes were sampled to response to closed ended questionnaire on their dietary practices. Data on dietary pattern of athletes, sources of foods, menu planning and type of foods eaten during the completion were collected. The result showed that diets of the athletes were planned with athletes eating variety of foods. However, the meals seemed not to contain other essential nutrients like fruits and vegetables; 62-94% of the respondents did not consume fruits before and during the competition. The results also revealed inadequate consumption of fluid by athletes which might have resulted in dehydration of athletes. Adequate carbohydrates, protein and fats were consumed during the competition and this is essential since they are energy sources for athletic performance. It is therefore, recommended that coaches should form part of meal planning for athletes during subsequent competitions and adequate provision made for fluids in the form of water, fruits, fruits juice and other sports drinks especially those containing sodium. This is because the consumption of fluid replacement drinks containing sodium helps retain water in the body and aids in hydration by increasing the absorption of fluid from the intestines into the muscles.*

***Keywords****: Pre-competition meal, Dietary practices, Food intake, Student-athletes, University*

**1. Introduction**

To a certain extent we are a product of what we eat. Molecules and atoms in the food we ingest are used to build and maintain the different cells, tissues and organs in the body (Froiland, Koszewski, Hingst & Kopecky, 2004). They further posited that food is the fuel for the biological machinery of the body. The pre-competition meal is extremely important to the athlete so as to ensure optimal performance during athletic competition. It should help give the athlete the necessary energy and hydration in order to perform at a high level throughout the competition (Wall, Coughlin & Jones, 2010).

The pre-competition meal is extremely important, but will not work miracles for the athlete in terms of competition performance. The pre-competition meal and the competition performance are set up by sound nutrition habits, days, weeks, and months before the competition (Berning, 2002). The competition requirements of sprinters, jumpers and multi-event athletes (heptathletes and decathletes) often include a series of events over a day or days (American Dietetic Association, 2000). Food and fluid intake over these days should be organized to refuel and rehydrate according to the needs of the event and the environmental conditions (Maughan, 2000). The athlete should organize a nutrition plan of meals and snacks that suits the timetable of warm-up, competition and recovery.

For young athletes who compete in athletic events that take extended time such as triathlons, track meets, tennis matches and football games, mid-game snacks may be needed. Fresh fruit and sports drinks are easily-consumed foods that are appropriate for mid-competition snacks. Everyone digests foods at a different rate and tolerates foods slightly differently. Athletes who have diabetes should pay special attention to pre-competition nutrition and monitor their blood sugar levels appropriately (Pantuosco, 2006).

Nutrition plays a critical role in athletic performance, and athletes, coaches, and parents need to realize that making wise food choices can increase the chances of optimal athletic performance (Ekeh, 1986). It is easy for athletes to fall prey to nutrition misinformation and fad diets in the search for a quick fix to improve performance. It is imperative that athletes stay current on the accurate nutrition issues as they are ever-changing. By making informed food choices athletes will have an advantage over those who choose to ignore the role that food plays in human performance.

Therefore, this study sought to find the dietary practices and frequency of food consumption among students athletes during 2012 GUSA games

**2. Methodology**

*2.1. Design*

The study made use of descriptive cross-sectional survey design for the study. This is because the purpose of the research was to describe the current status of dietary practices of student athletes. The population consisted of athletes competing in 2012 GUSA competition. The athletes competed in various disciplines and had eaten from the same pantry throughout the event. The choice of the athletes was because of the role of nutrition in the life of athletes and its effects on their performance. Again, the choice was also influenced by caliber of athletes and coaches at the event, because coaches and athletes are from the universities in Ghana, therefore it is assumed they know more about nutrition and sports. Purposive sampling procedure was used to select athletes competing in the competition. However, convenience sampling procedure was use to select 107 athletes for the study.

*2.2. Data Collection and Analysis*

Questionnaire was designed to solicit for factual information from the respondents. Data collection was done on the last day of the competition. The instrument used had a reliability coefficient of .712 of cronbach alpha. Data on demographic characteristics; dietary pattern of athletes, sources of foods, whether they have planned menu and type of foods eaten during the completion were collected. Data collection was done by sports secretaries and senior coaches from each university that attended the competition. Data were entered and analysed using SPSS Version 16.

*2.3. Results*

2.3.1. Demographic Data

From the data on gender distribution of students athletes who participated in the research during the GUSA 2012 games, 68 (64%) were men and 39 (36%) were female. On the issues of sporting events, 39 (36%) of the respondents participated in the games while 68 (64%) participated in athletics. Again, out of the 107 participants, 2 representing (1.9%) weighed less than 40kg, 43 (40.2%) weighed 41-60kg, 60 (56.1%) weighed 61-80kg, 2 (1.8%) weighed 81-100kg and above. The results showed that majority of the respondents were in the weight range of 40-80kg. Furthermore, majority of the respondents were between the height of 1.51-1.60m as 50 (46.7%) and 1.61-1.70m 32 (29.9%) while the rest of the respondents have the height of <1.50m, 1.71-1.80m and 1.81-1.90m respectively. Majority of these students' athletes were between the ages of 18 and 23years as shown in the Table 1 with the least number of students' athletes falling in the ages less than 18 and greater than 29 years.

| Ages | Frequency | Percent |
|---|---|---|
| <18 | 1 | .9 |
| 18-20 | 30 | 28.0 |
| 21-23 | 46 | 43.0 |
| 24-26 | 16 | 15.0 |
| 27-29 | 10 | 9.3 |
| >29 | 4 | 3.7 |
| Total | 107 | 100.0 |

*Table 1: Age (years) of Students Athletes*

2.3.2. Dietary Patterns of Athletes

To determine whether athletes' meals are planned according to their sporting events, a question was asked and the response of the participants revealed that their meals were planned throughout the competition. A further question was asked to see whether there was a change in the dietary pattern during the competition. The study revealed 67 (63%) responded that their dietary pattern was changed at the time of the competition whiles 40 (37%) of respondents responded that their dietary pattern was not changed during the competition. This meant that athletes' pre-competition meals were the same as the competition.

| Statements | Yes | No |
|---|---|---|
| Are there a lot of different foods in your diets? | 76 (71) | 31(29) |
| Do you eat enough carbohydrates? | 89 (83) | 18(17) |
| Do you eat mostly complex carbohydrates | 52 (49) | 55(51) |
| Do you eat animal proteins? | 88(82) | 19(18) |
| Are the animal protein mostly red meat? | 48(45) | 59(55) |
| Mostly fish and white meat | 72(67) | 37(33) |
| Do you eat eggs? | 87(81) | 20(19) |
| Do you eat dairy products? | 71(66) | 36(34) |

| | | |
|---|---|---|
| Do you eat a variety of plants protein? | 58(54) | 49(46) |
| Are there a lot of vegetable fats in your diets? | 36(34) | 71(66) |
| Is your food mostly fresh? | 63(59) | 44(41) |
| Is your food mostly canned foods? | 18(17) | 89(83) |
| Do you drink 6 sachets or more of water a day? | 63(59) | 44(41) |
| Do you drink mostly soft drinks? | 58(54) | 49(46) |
| Is there enough fibre in your diets? | 45(62) | 42(58) |
| Is your food steamed? | 61(57) | 46(43) |
| Is your food grilled? | 37(35) | 70(65) |
| Is your food baked? | 71(66) | 36(34) |
| Is your food stir fried? | 66(62) | 41(38) |
| Is your food boiled? | 101(94) | 6(6) |
| Is your food fried? | 93(87) | 14(13) |

*Table 2: Meal Pattern of Athletes during the GUSA Competition*

Results in Table 2 showed that student athletes had consumed variety of meals depicting some form of a balanced diet. The result also revealed that the energy intake by the respondents in the form of carbohydrates, protein and fatty foods were high. This meant that matrons, per the African nature of meal, concentrated always on the energy giving foods which are always the driving tool of performance forgetting that other micro nutrients are essential and pivotal in performance. However, vegetables and fruits consumption were inadequate as shown in Table 2. This outcome meant that constituents of meal preparation for student-athletes did not consider importance of micro nutrient ingredients to the athletes' athletic performance. This outcome is a wake-up call to the sports administrators and coaches to make nutrition an essential part of athletes' preparation for optimum performance.

A balanced diet provides all the necessary nutrients and calories the body needs to function properly. These nutrients are carbohydrates, proteins, fats, vitamins, minerals and water. The result explained the statement of Williams (1995) that any person who engages in any type of sporting activity needs to eat well in order to provide a good supply of high-quality energy to the working muscles. The easiest way to achieve this is to eat a balanced breakfast and continue eating a variety of high-quality foods throughout the day. Optimal nutrition is an integral part of peak performance while an inadequate diet and lack of fuel can limit an athlete's potential for maximum performance. In the quest for success, many athletes will try any dietary regimen or nutritional supplementation promising a new level of physical performance. However, most often an evaluation and modification of current dietary intake is needed to help maximize peak performance.

| **Carbohydrates** | **Did not eat** | **Had eaten 3 or more times in a week** |
|---|---|---|
| Brown Bread/Wheat | 47 (43.9) | 60 (56.1) |
| Sugar Bread | 22 (20.6) | 85 (79.4) |
| Tea Bread | 24 (22.4) | 83 (77.6) |
| Maize Porridge | 38 (35.5) | 69 (64.5) |
| Millet porridge | 40 (37.4) | 67 (62.6) |
| Rice porridge | 61 (57.0) | 46 (43.0) |
| Wheat porridge | 73 (68.2) | 34 (31.8) |
| Oats porridge | 54 (50.5) | 53 (49.5) |
| Tom brown | 58 (54.2) | 49 (45.8) |
| Banku | 25 (23.4) | 82 (76.6) |
| Kenkey | 23 (21.5) | 84 (78.5) |
| Baked products | 56 (52.3) | 51 (47.7) |
| Yam | 33 (30.8) | 74 (69.2) |

*Table 3: Carbohydrate Consumption of the Athletes*

Result from Table 3 showed that adequate carbohydrate food sources were consumed by athletes during the competition. This meant that enough fuel for performance was readily available for athletes to depend on for performance. When an athlete works near or at maximal intensities, carbohydrates are the only fuel the body can use. A diet rich in carbohydrates increases endurance performance because of the extra store of carbohydrates in the muscles called glycogen. Work completed in the early 1980's by David Costill at Ball State University showed that if athletes did not consume a diet high in carbohydrates on a daily basis, they would experience chronic fatigue and poor performance. Burke (2006) posited in his work that the intake of carbohydrate may enhance performance of high-intensity events lasting about one hour. Adequate carbohydrate food supply to the athletes during 2012 GUSA Games again affirmed what Maughan, Burke and Coyle (2004) explained in their work that the intake of 30–60g of carbohydrate per hour of a prolonged event can enhance performance by maintaining carbohydrate availability at a time when body carbohydrate stores are becoming depleted. The result implies that when athletes are given carbohydrate foods before and

during the competition, enough energy will be available in the body hence, promoting higher performance. For endurance, athletes trained aerobically. It has been generally accepted and recommended frequently that a high carbohydrate diet would optimize training adaptations and athletic performance (Sherman & Wimer, 1991).

| Fruits | Did not eat | Had eaten 3 or more times in a week |
|---|---|---|
| Orange | 66 (61.7) | 41 (38.3) |
| Guava | 101 (94.4) | 6 (5.6) |
| Banana | 80 (74.8) | 27 (25.2) |
| Mango | 86 (80.4) | 21 (19.6) |
| Water melon | 88 (82.2) | 19(17.8) |
| Apple | 98(91.6) | 9 (8.4) |
| Grapes | 100 (93.5) | 7 (6.5) |
| Fruit Juice | 99(92.5) | 8(7.5) |

*Table 4: Fruit as part of the Meal for the Athletes*

From Table 4, the result showed that fruits consumption was extremely low during the competition. This meant that fruits supply to the athletes was not part of the menu, however fruit is essential for athletes' performance since it replenishes water lost through dehydration and also serves as catalyst for quick digestion of carbohydrates and immediate release of energy (Evans, et al., 2000). To completely refill energy in the muscle, fruits and vegetables should be consumed within 30 minutes after exercise and then eat small meals two hours and again at four hours after the workout. A dehydrated athlete has a decreased volume of blood circulating through the body, and consequently; the amount of blood pumped with each heart beat decreases, exercising muscles do not receive enough oxygen and exhaustion sets in and the athlete's performance suffers (Fahey, et al., 2001). It is now believed that fluid replacement drinks and fruits containing between 6-8% glucose and sucrose are absorbed into the body more rapidly than water, but unlike water, fruits can provide energy to the working muscle but water cannot (Duchan, et al., 2010). They further posited that a growing body of evidence suggests that consumption of a fluid replacement drink containing 6-8% carbohydrate can delay fatigue and possibly improve performance. It appears that athletes who consume fluid replacement drink and fruits can maintain blood glucose levels at a time when muscle glycogen stores are diminished (Burke & Maughan, 2007). This allows carbohydrate utilization and energy production to continue at high rates. However, the study showed that majority of the athletes did not consume fruits and fluid replacements drinks during the competition. The implications of low intakes of fruits and replacement drinks include becoming easily susceptible to the effects of fatigue, muscle recovery damage and impaired/suppressed function of the immune system all of which can have detrimental effects on training before a competition and performance during a competition (Watson et al., 2005). This explains that consumption of adequate fruits and replacement drinks are essential for athletics performance, hence, should be an epitome of athletes' dietary practices before and during competitions.

| Vegetables | Did not eat | Had eaten 3 or more times a week |
|---|---|---|
| Carrot | 68 (63.6) | 39 (36.4) |
| Lettuce | 66 (61.7) | 41 (38.3) |
| Cucumber | 72 (67.3) | 35 (32.7) |
| Sweet Pepper | 77(72.0) | 30 (28.0) |

*Table 5: Vegetable Consumption during Competition*

The result also revealed that the consumption of vegetables were absent as majority of the respondent attested that their intake of vegetable was very low during the two weeks competition. The outcome affirmed Farajian et al. (2004) study that many athletes consume insufficient amounts of fruits and vegetables. Vegetables are essential for growth as they provide the body with vitamins and anti-oxidants for training and staying healthy. Farajian et al. (2004) further explained that a varied diet that meets energy needs and is based largely on nutrient rich choices such as vegetables, fruits, beans, legumes, cereals, lean meats, fish and dairy foods should ensure an adequate intake of all the essential vitamins and minerals. Anti-oxidant nutrients and phytochemicals in plant foods are important in helping protect the body's tissues against oxidative stress. Despite these benefits of vegetables, the outcome of the study reveals that consumption of vegetables during the competition under study were inadequate as shown in Table 5.

| Proteins | Did not eat | Had eaten 1 or more times in a week |
|---|---|---|
| Beans/peas/agushie | 46 (43.0) | 61(57.0) |
| Groundnut | 75 (70.1) | 32 (29.9) |
| Beef/Pork/Mutton | 53 (49.5) | 54 (50.5) |
| Chicken Meat | 25 (23.4) | 82 (76.6) |
| Sausage | 32 (29.9) | 75 (70.1) |
| Internal organs | 36 (33.6) | 71 (65.4) |
| Fish (herrings/tuna) | 30 (28.0) | 77 (72.0) |
| Sardines | 30 (28.0) | 77 (72.0) |
| Milk/milk products | 23 (21.5) | 84 (78.5) |

*Table 6: Protein Consumption during the Competition*

From the result, the consumption of protein was very high as majority of the respondents agreed to eating protein from all kinds of sources. This means that the worn out of muscle tissues of athletes due to training would be built and replenished with the protein (can only infer). Protein has always been a popular nutrient for athletes because of its role in building and maintaining muscles (Maughan, 2000). Athletes need to consume a wide variety of high-quality protein foods in their diet. Maughan further explains that protein requirements may be higher for athletes. However, most athletes are already consuming more protein than the body can process. Burke (2006) suggests that the total amount of protein consumed by the athlete is not as important as the timing of intake in relation to training. The consumption of protein before and after a resistance workout has been shown to enhance protein synthesis and net protein balance in response to the training stimulus; this enhancement is still evident in the 24-hour picture of protein balance. This strategy should be integrated into the athlete's recovery eating programme.

| Fluids | Did not eat | Had eaten 1 or more times in a week |
|---|---|---|
| Water (sachet/bottle) | 56 (52.3) | 51(47.7) |
| Soft Drinks | 53 (49.5) | 54 (50.5) |
| Energy Drinks | 59 (55.1) | 48 (44.9) |

*Table 7: Water and Energy Drink Consumption during the Competition*

From Table 7, we can conclude that adequate water was not taken in by the athletes during the competition. This result means that athletes do not know the importance of water during sports performance. However, consumption of soft drinks and energy drinks seem to be high. Energy drinks are frequently consumed by athletes prior to competitions with the belief of improving their performance (Astorino, Matera, Basinger, Evans, Schurman & Marquez, 2011). This Oteri et al. (2007) indicated that energy drink usage has become widespread among college students and more particularly among students and elite athletes and who are both under increased cognitive and physical performance demands. This assumption is possible considering the fact that the term energy drink conveys a message which has a connection to physical activity; therefore, the uninformed consumer may assume that some benefits are derived after consuming these beverages (Paddock, 2008). Paddock further postulated that the drive to improve athletic performance and exhibit one's athletic skills could power student-athletes in particular to consume energy drinks at a relatively high level compared to that of the general student population. This means athletes prefer drinking energy and soft drinks to water. As an athlete trains or competes, fluid is lost through the skin through sweat and through the lungs while breathing. If this fluid is not replaced at regular intervals during practice or competition, it can lead to dehydration. A dehydrated athlete has a decreased volume of blood circulating through the body.

Research has repeatedly shown that dehydration, as little as 2% of body weight, can adversely affect athletic performance. For example, if a 150-pound athlete loses 3 pounds during a workout or competition, their ability to perform at peak performance due to dehydration is reduced. Proper fluid replenishment is the key to preventing dehydration and reducing the risk of heat-injury in athletes engaged in training and competition. The best way to prevent dehydration is to maintain body fluid levels by consuming plenty of fluids before, during, and after a workout or competition. Often, athletes do not realize that they are losing body fluids or that they are impacting their performance through dehydration (Food and Nutrition Board 1990; Grandjean 1995; Reimers, Ruud & Grandjean, 1996; Sherman & Wimer 1991).

In events of greater than one hour duration, there is both an opportunity and need to consume fluid and carbohydrate during exercise to promote optimal performance. The loss of fluid and electrolytes through sweating leads to a reduction in body water.

Fluid deficits of as little as 2% of body mass can impair performance, particularly in hot weather, with the impairment increasing in ratio to the size of the fluid deficit. Fluid intake during a race should be undertaken in consideration of the athlete's likely sweat rates balanced against the practicalities of the time lost in grasping and consuming the supplies at an aid station, and the risk of gastrointestinal problems (Maughan, Burke, & Coyle, 2004).

| Oils | Did not eat | Had eaten 1 or more times in a week |
|---|---|---|
| Vegetable Oil | 27 (25.2) | 80 (74.8) |
| Palm Oil | 42 (39.3) | 65 (60.7) |

*Table 8: Fat and Oil Consumption of Athletes*

From Table 8, it shows clearly that enough fat and oil form part of the athletes dietary consumption during 2012 GUSA competition since fats and oils are essential food nutrients for high energy demanding activities, however not a master fuel for aerobic activities. Fat is the major if not most important fuel for light to moderate intensity exercise.

Although fat is a valuable metabolic fuel for muscles during endurance exercise and performs many important functions in the body, no attempt should be made to consume more fat. A recent study looked at muscle biopsies of elite rowers who consumed either 40% of their calories from fat or 20% of their calories from fat, and also compared the power output and speed of the rowers (Earnest, 2002). The following is a summary of the results: the rowers who consumed the low-fat, high-carbohydrate diet had more muscle glycogen, the rowers on the high-fat, low-carbohydrate diet had moderate levels of muscle glycogen but were still able to complete the workout sets, then it came to power output and faster speeds, those rowers who consumed the low-fat, high-carbohydrate diets had significantly higher power and speed, this has significant implications for athletes in muscular endurance sports that require a burst of power, such as rowing, swimming, gymnastics, figure skating, judo, boxing, baseball, basketball or soccer, to have energy generated aerobically. It is important to recognize that there are many sources of hidden fat in foods (Maughan, 2000). Athletes should consume 20% - 30% of their calories from fat. Aside from decreasing overall calories, limiting consumption of dietary fat is the first step toward losing excess body fat. Doing so eliminates excess calories, but not nutrients. Following a low-fat, high-carbohydrate diet is also important for health reasons, because diets high in fat have been associated with cardiovascular disease, obesity, diabetes and some types of cancer.

## 3. Findings

The research found that diets of the athletes were planned with athletes eating variety of foods. However, the meals seemed not to contain other essential nutrients like fruits and vegetables. The results also revealed, enough fluid was not consumed by athletes which might have resulted in dehydration of athletes. Adequate carbohydrates, protein and fats were consumed during the competition and this is essential since they are energy sources for athletic performance.

### *3.1. Conclusion*

Based on the findings we can conclude that though diets were planned for the athletes and athletes were routinely fed, but because of lack of knowledge on sports nutrition on the part of the matrons and their inability to consult coaches on the diet for their athletes, essential elements nutritious foods like fruits and vegetables, and adequate fluids were not supplied to the athletes during the competition. Inadequate consumption of fruits and vegetables could lead to lack of stamina and endurance during since fruits and vegetable consumption impact endurance and stamina.

### *3.2. Recommendations*

We therefore recommend that;

- Expert advise to be sought from dieticians to help matrons plan athletes' meals during subsequent competitions
- Adequate fluids in the form of water, fruits, fruits juice and other sports drinks especially those containing sodium should be consumed in large proportions by athletes since the consumption of fluid replacement drinks containing sodium helps retain water in the body and aids in hydration by increasing the absorption of fluid from the intestines into the muscles.
- Planning meal must take consideration of individual events, body size and intensity of the events such that throwers meals will differ from that of sprinters and distance runners respectively.
- Adequate education is also necessary for both coaches and athletes on the best dietary practices to devise appropriate training methods to the meal intake of athletes.

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