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Investigation into the Trends Consumption of Carbohydrates among Students in Second Cycle Institutions in Sunyani Municipality of Ghana

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Abstract

This paper focused on investigating into the consumption of carbohydrates among students in second cycle institutions in Sunyani Municipality Ghana. The specific objectives were to find out whether students in boarding houses have sufficient knowledge about carbohydrates, the types of carbohydrates students normally consume and the health related problems are associated with the types of carbohydrates they consume. A sample size of one hundred and twenty (120) respondents comprising of students, matrons and cooks was used. The stratified systematic random sampling procedure was used to select the sample and the study also employed the use of questionnaire as the main instrument for data collection. The results of the study revealed that, majority of the respondents have low knowledge about the types of carbohydrates and also consume more refined and processed carbohydrates foods like carbonated drinks, gari, sugar, sweets, biscuits, pastries, jam, pasta's and candies. The study recommended that sustainable capacity building should be organized for matrons and cooks in second cycle institution in Sunyani municipality.

Keywords: Trend Consumption, Carbohydrates, Second Cycle Institution, Sunyani Municipality.

INTRODUCTION

All living things cannot do without food. According to Tull (2000) food is any substance consumed to provide nutritional support to the body. Gaman and Sharrington (1981) stated that food is usually of plant or animal origin and contains essential nutrients such as carbohydrates, fats, proteins, vitamins, minerals and water. According to Ceserani et al (2011) the substance is ingested by an organism and assimilated by the organism's cells in an effort to produce energy, maintain life and stimulate growth. This shows the vital role food play's in maintaining good health throughout the life cycle.

Notwithstanding the important role food plays in the health condition of human being, if one does not consume a balance diet, make good food choices, and form good eating habits, one may have serious health problems. Food has been grouped according to the function it perform in the body .These include energy giving foods which are made up of starchy roots, cereals and fats and oil. Protective foods have been noted to provide mineral elements and vitamins.

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Examples are vegetables, fruits and body building foods which are meat and meat products, fish and pulse (Adow et al 2000).

Carbohydrate is one of the main energy giving nutrients. Gaman and Sharrington (1981) acknowledged that carbohydrates are sugar and starches which provide energy for human and animals and cellulose which make up plant structure. Mahas and Rodgers (1994) supported this assertion by stating that sugars and starches are the main sources of carbohydrate. According to Adigbo (2011), there are two types of carbohydrates, simple and complex carbohydrate. Simple carbohydrates are often found in processed and refined food such as white sugar, pasta and white bread and are used up very quickly. On the other hand complex carbohydrates which are noted to be found in unrefined and unprocessed food such as vegetables, whole grain and legumes takes longer time to digest resulting in longer lasting energy. According to Pamploma (2007), refined carbohydrates are simple carbohydrates that have been processed from grains and striped of its natural nutrition components like fiber, healthy oils, vitamins and minerals.

Gaman and Sharrington (1981) added that processed and refined carbohydrate food provide empty calories thus carbohydrate which contain no other nutrients. Consuming carbohydrates which are deprived of essential nutrients on regular basis can result in deficiency of vitamins and minerals in the body which can affect the normal bodily functions and can contribute to gradual onset of different health ailments.

According to Adigbo (2011) food taken throughout life cycle should be of critical concern as this can determined the health status of a person. For this reason, people of all ages particularly infants, children and adolescents should consume the right type of food for healthy living. Teenagers often eat food that the body does not need (Kay & Sharon 1994). They added that they often omit nutrients' that are often crucial to good health. Students in the boarding houses in second cycle institutions in Ghana are mostly adolescents. Because they are normally confined in the school community and are not allowed to cook their own food, they do not have much choice as far as food is concern. They consume whatever food provided by the school. Students in the boarding houses eat white sugar, white rice and white bread as part of their daily meals.

They also send a lot of white sugar, gari, biscuits, pasta, cakes, pastries, soft drinks and sweets to school to supplement the schools meals. As a result of this, students in boarding house consume a lot of processed and refined carbohydrate foods.

With increasing civilization, modernization and urbanization, adolescent have adopted western culture including their food and are gradually rejecting their local foods. In most poor and developing countries, 90% of the energy value of their diet is provided by their own staple food (Gaman & Sharrington 1981). In highly developed countries cheap starch staple is becoming less important with increasing influence. This situation is not different in Ghana and Sunyani municipality to be precise. The children of the affluent send a lot of these processed and refined carbohydrate foods to school and those who do not have money to buy them are seen as the less privilege. In fact it is considered as a prestige among adolescents to consume such foods. Studies have shown that sugar constitute 25 – 35 percent of the western diet and is a major reason for widespread of magnesium deficiency in our society leading to high blood pressure, heart attack, stroke and neurological problems.

It is an incontrovertible fact that students in the boarding houses in the second cycle institutions consume refined and processed carbohydrate foods at unacceptable high level and

are putting their health in danger. Good nutritious food gives good health, but bad or unhealthy food gives rise to several diseases. For this reason there is the need, for urgent change in their diet and practical measures taken for healthy diet to help them remain active throughout their life cycle.

Table 1: Sample of Menu for Second Cycle Institutions in Sunyani Municipality

Days	Breakfast	Lunch	Supper
Sunday	Koko and bread	Rice balls and soup	Kenkey and soup
Monday	Porridge and bread	Gari and beans	rice and palava sauce
Tuesday	Tea and bread	Waakye	Kenkey and hot pepper
Wednesday	Rice porridge & bread	Yam and beans	Rice and kontomire
Thursday	Hausa Koko & bread	Gari and beans	rice & soup
Friday	Corn grit porridge & egg	Kenkey and beans	Jollof and chicken
Saturday	Koko & bread	Rice balls and soup	Kenkey & soup

Statement Of Problem

A preliminary survey in the second cycle institutions in Sunyani Municipality revealed that students in boarding houses consume high level of processed and refined carbohydrate foods. Students in the boarding houses in second cycle institutions are mostly adolescents between the ages of 12-19 years. Most adolescent have adopted the western culture including their food. Because student's boarders are confined in the school communities, they consume the available food provided by the school. White bread, white sugar, polished maize and white rice form part of their daily meals. Apart from this, students also send refined and processed foods like carbonated drinks, gari, sugar, sweets, biscuits, pastries, jam, pasta's and candies to school to supplement the schools meals.

According to Personal Health lifestyle in (2002) every tablespoon of sugar depresses the immune system for up to 6 hours. If students' boarders in senior high schools do not consume the right type of carbohydrates to fuel the body properly they will do more harm to their health hence the need for this research. Adigbo (2011) remarked that avoiding processed foods and sugar is a huge start to longevity and good health. Consequently assessing the trends of carbohydrate consumptions among student's boarders in second cycle institutions in Sunyani municipality will reveal the type of carbohydrate foods they normally consumed, the rate at which they consume them and whether there is the need for a healthy diet plan and education.

Research Questions

The following research questions guided the study.

1. Do the students in boarding houses in Sunyani Municipality have sufficient knowledge about carbohydrates?
2. What type of carbohydrate do students in boarding houses in second cycle institution in Sunyani municipality consume?
3. What health related problems are associated with the types of carbohydrate they consume?

METHODOLOGY

Population

The population for the study comprise of three categories of people in Sunyani municipality. These were matrons, cooks and students in boarding schools in second cycle institutions in Sunyani. Sunyani is the administrative capital of Brong and Ahafo Region of Ghana. There are twelfth (12) senior high schools in the municipality. Out of the twelfth (12) SHS, two are day schools and the remaining ten (10) boarding schools were used for the study. The population

framework was made up of ten (10) matrons, ten (10) cooks and hundred (100) students totaling up to one hundred and twenty (120).

Sampling Procedure

The stratified systematic random sampling procedure was used for the study. Under the stratified sampling method, the study area was selected from many in the region. This sampling procedure was used because it ensures that certain sub-groups within the population were represented in the sample in proportion to their number in the population and has equal chance of being selected. This sampling method was used to sample the second cycle institutions is Sunyani Municipality.

Sampling and Sample Size

A sample size of one hundred and twenty (120) was used for the study which was made up of hundred (100) students, ten (10) cooks and ten (10) matrons. The sampling technique that was used for the study was random sampling. Random sampling procedure was used for the study because it allows every member of the population the chance of being selected. Again these procedures were used in order to avoid bias in the selection of the sample.

Research Instruments

Tested questionnaires were administered to the ten (10) matrons, ten (10) cooks and one hundred (100) students. Two separate questions were used, one for matrons and cooks and one for students. Questionnaire was used to collect information because it is the most common and widely used for survey research design. It is also one of the primary data collection methods and can cover wide area under the study. The main questions asked were about knowledge of carbohydrates, health implication of carbohydrates and students meals. The questions included both close ended and open ended questions.

DATA ANALYSIS

Data analyses were mainly descriptive. The data collected were edited and analyze by computer, using the statistical package for the social sciences (SPSS). The results were presented in a frequency, and percentage distribution tables.

RESULTS AND DISCUSSION

The discussions of the study were made in respect of two categories of respondents; Respondent A and Respondent B. Respondent A deals with the discussions of students' knowledge about carbohydrate, the type of carbohydrate they consume and its health and academic implications. Respondents B is mainly concerned about Matrons and cooks, cookery practices, their knowledge of carbohydrates and the kind of carbohydrate foods used in meal preparation for students.

Table 2: Students Knowledge of Carbohydrate

Response	Yes No %	Yes No %
Knowledge of types of carbohydrates	60 (60)	40 (40)
Complex carbohydrates have less health risk	46 (46)	56 (56)
Fiber has the ability to prevent colon cancers	12 (12)	88 (88)
Carbohydrate is good for the brain	14 (14)	86 (86)
High consumption of refined carbohydrate is harmful to health	56 (56)	44 (44)

Table 2 results show that, a greater number of respondents 60 (60%) indicated that they know the types of carbohydrate while the remaining 40 (40%) respondents said they did not know the types of carbohydrates. Again 46 (46%) of the respondents said complex carbohydrate

have less health risk, 54 (54%) also indicated that complex carbohydrate does not have less health risk. In a similar context minority 12 (12%) of the respondents said fiber has the ability to prevent colon cancer whiles the remaining 88 (88%) respondents which is the majority said fiber does not have the ability to prevent colon cancer. With regards to the statement carbohydrate is good for the brain, the results obtained showed that 14 (14%) of the respondents indicated that they know that carbohydrate is good for the brain while 86 (86%) said they did not know that carbohydrate is good for the brain. The survey also revealed that 56 (56%) of the respondents know that high consumption of refined carbohydrate is harmful to health compared to 44 (44%) who said high consumption of carbohydrate is not harmful to health.

Although minority of the total respondents surveyed 40 (40%) did not know the types of carbohydrate, it is still significant in a sense that basic knowledge about carbohydrate will help to identify the benefits and problems associated with its consumption and help make informed choice. We eat to live but not live to eat. This ignorance could result in health problems associated with higher consumption of certain the type of carbohydrate. According to caserani et al (2012) you are what you eat. It is also clear from Table 2 that, majority of the respondents (54) 54% did not know that complex carbohydrate has less health risk. The study again revealed that 44 (44%) of the respondents had no knowledge about the harmful effect of higher consumption of refined carbohydrate on health. The findings reveal a higher percentage of ignorance among the respondents with regards to carbohydrate. If students who study Integrated Science as a core subject, Home Economics and Food and Nutrition lack knowledge of the benefit and problems associated with the consumption of the types of carbohydrate, then there is a course to worry. This is a clear indication that students learn for examination and they do not apply what they learn to life. According to Benion et al (2001) complex carbohydrate takes longer time to digest resulting in longer lasting energy and less of insulin reaction in the body. On the other hand the body breaks down simple carbohydrate more easily. An interest in health including recognition of nutrition as an important part is a good start to longevity.

This ignorance could lead to malnourishment, malnutrition and diet related diseases such as hypertension, diabetes, stroke and obesity. It is important that students take interest in maintaining their health and recognize nutrition as an important factor of health improvement process. The results of the study again showed a higher level of ignorance as majority 88 (88%) respondents said they did not know that fiber has the ability to prevent colon cancer and a total of 86 (86%) also lack knowledge about carbohydrate being good for the brain. Students should take practical steps in maintaining good health by studying and taking interest in health issue and apply them to life. According to Mehas and Rodgers (1999) fiber binds foods that have the potential to cause cancer, thereby preventing it from being absorbed into the blood stream. Fiber also speeds up the transit time of food. This helps reduce exposure to cancer causing substance.

Adigbo (2012) also supported this view by stating that adult and adolescent should consume 25-309 of fiber each day for good digestive health. This ignorance implies that students could fail to appreciate the important role fiber plays in the diet and may not take steps to include them frequently in their diet.

From Table 3, 20 (20%) of the respondents indicated that they normally consume chips as snacks, 30 (30%) said they consume turnovers, 22 (22%) said they consume bread and margarine, 10 (10%) indicated biscuits as snack they consume, 12 (12%) also said they consume banana and ground nut and the remaining 6 (6%) said they consume popcorn.

Majority of the respondents 70 (70%) who had ever consume snack showed that they eat their snacks with carbonated drinks, 18 (18%) said they eat their snack with cocoa drink and 12 (12%) said they consume their snacks with fruit drink.

It was also revealed from Table 3 that, 67 (67%) of those who consume sugar on daily basis consume 50-100g, 20 (20%) consume 100-150g, 10 (10%) consume 10-50g compared to 3 (3%) who do not consume sugar daily. With regards to the consumption of brown rice, all the respondents 100 (100%) said they do not consume brown rice.

Table 3: Students Preference of Carbohydrate

Items	Frequency	Percentage
Snaks Consumed		
Chips	20	20%
Turnovers	30	30%
Popcorn	6	6%
Bread and Margarine	22	22%
Banana and Groundnuts	12	12%
Biscuits	10	10%
Consumption of Snaks with Drinks		
Fruit Drink	12	12%
Carbonated Drink	70	70%
Cocoa Drink	18	18%
Quantity of Sugar consumed in a Day		
10-50-G	10	10%
50-100g	67	67%
100-150g	20	20%
150-200g	-	-
None	3	3%
Preference of Rice		
Brown Rice	-	-
White Rice	100	100%

Table 4: Health Implications

Respondents	Frequency	Percentage%
Disease Experienced		
Candida	55	55%
Dental Carries	88	88%
Diabetes	16	16%
Hypertension	12	12%
Overweight	15	15%

The results from Table 4 shows that majority of the respondents 88 (88%) had experienced Dental carries, 55 (55%) experienced Candida, 16 (16%) experienced Diabetes, 12(12%) also had hypertension and the remaining 15 respondents were overweight.

Table 5: Cookery Practices of Matrons and Cooks

Responses	Yes No%	Yes No %
The use of bicarbonate of Soda in meal preparation	20 (100)	-
The use of stock in meal preparation	10 (50)	10 (50)
Required time for boiling of egg	5 (25)	15 (75)

All the respondents 100% said they use sodium bicarbonate in the preparation of meals for students. Half of the respondents (50%) indicated that they use stock in meal preparation whiles the other half 50% said they do not use stock in preparing meals for students. Majority

of the respondents 75% indicated that they did not know the required time for cooking egg compared to 25% of the respondents who said they know the required time for cooking egg.

Table 6: Students Meals

Responses	Yes No %	Yes No %
The use of brown rice in schools meals	-	20 (100)
Wheat porridge as part of schools' meals	-	20 (100)
Serving of fresh fruits	-	20 (100)
Serving of fresh vegetables	-	20 (100)
Serving of white bread	20 (100)	-

From Table 6, all the respondents indicated that they do not use brown rice in students' meals. In another context all the respondents 100% said white rice is expensive than brown rice. In another similar context all the respondents 100% said they do not serve wheat porridge as part of students' breakfast meals. Again all the respondents 100% said the reason for not serving wheat porridge is that it is expensive. All the respondents said they serve white bread in students' breakfast meals daily.

The information presented in Table 7 shows the kind of food served to students and the frequency at they are served. All the respondents 100% said they serve rice 5-8 times in a week. In a similar context all the respondents said they serve milk in students' breakfast meals.

All the respondents again said the quantity of milk serve to student is 15ml. All the respondents 100% listed main dishes served with carbohydrate dishes as kontomire stew, beans stew, tomato sauce, okro stew and soup, tomato stew and ground nut soup. All the respondents 100% indicated that they do not serve fresh vegetable in students' meal. In another similar context all the respondents 100% indicated that do not serve fresh fruits in students meals.

Table 7: Food Served to Student

Responses	Frequency	Percentage %
Frequency of rice dish on students menu		
2-5 times	-	-
5-8 times	20	100
8-10 times		
Quantity of milk served		
15ml	20	100
30ml	-	-
45ml	-	-
Main dish served with carbohydrate		
Kontomire stew	2	10
Tomato sauce	2	10
Okro soup	-	-
Groundnut soup	4	20
Sauce (gas)	12	60
Frequency of meat service on student menu		
Once a week	20	100
Twice a week	-	-
Thrice a week	-	-
Frequency of egg service on student menu	20	100
Once a week	-	-
Twice a week	-	-
Thrice a week	-	-

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The Use of Sodium Bicarbonate in Cookery

The survey recorded that all the respondents 20 (100%) use bicarbonate of soda or alkaline medium in meal preparation for students. This is worrying because matrons and cooks who are trained to use cookery processes that conserve food nutrients are themselves using alkaline medium in cooking to destroy valuable nutrients needed to maintain good health. Although sodium bicarbonate preserves the green colour of vegetables and shortens cooking time, it destroys valuable nutrients such as water soluble vitamins. (Vitamin B and C). According to Adow et al (2009) the principles of vegetable cookery is to preserve colour, maintain texture and conserve food nutrients. Ceserani et al (2010) also supported this assertion by stating that vitamin B and C can even be lost through moist cooking and improper storage.

This suggests that students are being served with meals deficient in vitamin B and C and these could further lead to malnourishment. A malnourished student cannot learn properly and this can affect them academically. This is because deficiency in vitamin B especially thiamin could lead to metal confusion and even death. (Adigbo 2011). This therefore means that the use of alkaline medium such as sodium bicarbonate in the preparation of beans stew, okro soup, waakye (rice and beans) and other foods that contains vitamin B and C are less nutritious. If such foods are served with an accompaniment like boiled white rice which is also strip of its vitamins and minerals then a logical conclusion could be drawn that students' meals are not balance.

Cooking of egg

It was also noticed that 75% of the respondents (15 out 20) did not know the required time for boiling egg. This implies that over cooked egg could be served in some of the second cycle's institutions. This further suggests that some of the matrons and cooks do not have in-depth knowledge about the effect of heat on egg. While people are becoming aware of the relationship between health and food, matrons and cooks who have the requisite qualification are either over looking on these things or refusing to do the right thing. According to Tull (2002) when eggs are over-cooked the sulphur and iron component are released to form a blackish ring around the yolk and the result is bad odor and development of gas. Anybody who eats such egg will be filled with gas and will fluctuate a lot. Again protein in the egg becomes indigestible. A student who eats such egg will fluctuate and will not feel comfortable to sit in class and study thus affecting academic work.

The use of brown rice and whole wheat in student's meals

One significant revelation of the study is that all the respondents 20 (100%) do not use brown rice in students menu. In the similar context all the respondents 20 (100%) stated that brown rice is less expensive than white rice. Again all the respondents 20 (100%) indicated that they do not serve whole wheat porridge as part of breakfast menus for students. The respondents 20 (100%) again said the reason for not serving wheat porridge for breakfast is that it is expensive. Brown rice and whole wheat are complex carbohydrate that is healthy for the body. They have all their nutrients intact because they have not been processed. According to Kanika (2010), whole wheat grain comprises of essential minerals like magnesium, healthy oils like vitamin E, health enhancing insoluble fiber and many other important vitamins. Eating a serving of whole grain cereals such as whole wheat is more filling and gives a longer lasting energy than a bowl of polished cereals due to the way the body processed and uses carbohydrate. Benion (2001) also stated that complex carbohydrate of which brown rice and whole wheat grain are typical examples take longer time to digest, resulting in longer lasting energy and less of an insulin reaction. This implies that eating the right type of carbohydrate

will help fuel the body properly. W.H.O recommended that 55-75% of dietary energy should come from complex carbohydrate.

CONCLUSION

There is no doubt that carbohydrates are the main fuel in humans. However, the low knowledge of carbohydrates among students, matrons and cooks can lead to higher consumption of processed and refined carbohydrates among students and this could pose serious threat to health and academic work of students. The poor cookery practices and processes used by cooks and matrons and poor selection of ingredients strip food of its essential nutrients which adds up to make it a balance diet. Thus depriving students of the nutrients they need to maintain the normal functioning of the body, healthy life and good academic performance.

RECOMMENDATIONS

1. Based on the findings of the study, the following recommendations were made:
2. Sustainable capacity building should be organized for matrons and cooks in second cycle institution in Sunyani municipality. This should include the conservation of nutrients, proper diet planning and quality points for purchasing foods.
3. Ghana Education Service should liaise with Ghana Standard Board, and Food and Drugs Authority for frequent supervision and nutritional test of meals serve to students. This will put matrons and cooks on their feet to do what is expected of them.
4. Corn and brown rice bread should be introduced into student's breakfast meals.
5. Moringa leaves, all highly nutrition's leaves and dandelion multipurpose leave should be introduce as fresh vegetable dish in students meal to enhance the nutritive quality of the meals. Schools should plant moringa and dandelion on their land for continuous supply of these leafy vegetables to cut down cost.
6. Continuous awareness creation should be made among matrons, cooks students and parents on the benefits of consuming complex carbohydrate and problems associated with the high consumption processed and refined food. This will help to make informed choice.
7. Students should read on the labels of food to find out the calorific content before consuming them.

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