

Investigation of Fruit Eating Knowledge and Practices of Student-Teachers of FOSO College of Education in the Central Region of Ghana

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Abstract: *The purpose of the study was to investigate underlining motivations for eating fruits by student trainees. The study sought to find out whether student-teachers eat fruits for its medical purpose, nutritional value or any other reason other than these, and to find out student-teachers' fruits eating pattern and mode. The design which underpins this study is the descriptive survey method. A questionnaire was used to collect data from 150 respondents. Random sampling was used to select respondents. Descriptive statistic was used to analyze the data. It was noted that, a greater number of respondents eat fruit for health reasons. About the type and nature of fruit, people eat most, it was realized that, raw fruits and oranges are mostly eaten. Health factor determines the choice of most fruits. Based upon the findings, conclusion drawn was that, even though most respondents eat fruits for health and nutritional reasons, the difference between the number of these and those who eat fruit for other reasons were not large. It was recommended that much education must be done to improve upon the eating habit of fruits.*

Keywords: Fruits, Eating habit, Health reason, Nutritional factors

1. Introduction

Ghanaian society is such that some communities will rely on some type of food available at their area which may not provide the body with the required nutrients needed for proper functioning. Others also eat more than certain type of food which provides the body with only one or two different types of nutrients at over and above the required quantity at an expense of other nutrients equally needed by the body.

Some people don't see fruit as a type of food which does a lot to the proper functioning of the body. In Ghana, we are blessed with varieties of fruits both foreign and local, but most people are not aware of what fruit is capable of doing for the body. People have different reasons for eating fruits. When you go to the rural areas, fruits available at the area are eaten when other food types are not available and as such eaten in large quantity. Others also eat fruits to supplement other food. Even though some people use other parts of fruit to treat sickness, most people don't know that eating fruits do a lot for the body's development.

In cities and urban areas where literates reside, only few people add fruit eaten to their normal diet with the correct intentions. Even at restaurants, where qualified nutritionists are supposed to handle at most time serve only food without fruit being added. It is only conferences, workshops and other official functions that fruits are normally served together with other food due to one or two reasons; the quantity served is very small.

In our schools and colleges, the situation is worse. When one compares the way food was served in the olden days to the present days, one will notice a serious difference. In our boarding schools about twenty or more years ago, fruits

were part of the menu but for the past ten or more years ago, the situation is different. Most schools or colleges do not add fruit to the menu for students. So students depend on the little fruits hawkers sell around the campus. In this regard, they depend on only one or two types of fruits. The quantity and period of eating fruit depend on their financial strength. They also eat these fruit ignorantly not considering the benefit of fruit to the human body. So before they leave school, that habit has been formed and this will extend to their families they will raise.

But according to Payne and Hahn (2002), the number of servings that are right for a person depends on age, sex, size and levels of activities. They say the Food Guide Pyramid recommends 2 to 4 servings of fruits each day. One serving includes a medium apple, one banana or orange, ½ cup of chopped, cooked or canned fruits. Nowadays, fruit juices are all over the place and people do patronize but how many of these consumers use them correctly or have the right intentions to consume them?

Payne and Hahn (2002) suggested that fruit should be served whole; in the case of large fruit like pawpaw and pineapple, you cut when about to serve to prevent the escape of vitamin C. considering the way people eat fruit, it is obvious that knowledge about fruit preventing or curing diseases is absent. William (2005), said that, over the years, epidemiologists in America have attempted to determine the relationship between diet and the development of chronic diseases. In early research, the focus was simply on the overall diet and its relationship to diseases, such as comparing the typical American diet to the Mediterranean (Greece, Italy and Spain) or Japanese diet. If a significant relationship was found between the diets of two nations, say more heart diseases among Americans compared to those consuming the Mediterranean diet, scientists then attempted

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to determine what specific foods particularly which macronutrients in these foods, may have been related to either an increased or decreased risk for heart diseases.

There are periods that one can say that, Ghanaians directly or indirectly consume better fruit and at regular periods too. These are the seasons where some fruits are fresh, abundant and cheap at the market. Fruit that is in season is likely to be cheaper and of good quality. Fruit bought from the market should be sound, with no bruises and should be free of maggots and insects. It should generally be firm to the touch and should not be over ripe or have patches of decay or mould on it. Even though canned, bottled or frozen fruit can also be used, but this is more expensive and lacks some nutrient of fresh fruit.

Ghanaians also have the habit of presenting to the sick person fruits as gift and other organizations and religious groups also occasionally visit hospitals with numerous gifts, among these gifts are fruits. This presupposes that, the idea of fruit doing some magic for the sick is there but do we have to wait to be sick before eating fruit or is it because sick person cannot eat heavy food that is why the person must be forced to eat fruit? During my course work, I realized that my knowledge on the benefit of fruits to human health was limited. I found out from colleague students about their knowledge on the benefits of fruit. Responses given were just like what I knew. So I decided to investigate into fruit eating knowledge and practices.

2. Statement of the Problem

Fruits play a significant role in human nutrition, especially as sources of vitamin, minerals and dietary fibre (Quebedeaux & Bliss (1988), Quebedeaux & Eisa, (1990); Wargovich, (2000)). Fruits and vegetables are estimated at 91% of vitamin C, 48% of vitamins A, 27% of vitamin B, 17% of thiamin and 15% of niacin in the U.S. diet. Fruits and vegetables also supply 16% of magnesium, 19% of iron, and 9% of the calories. Some fruits like almond and walnut contribute about 5% of the per capita availability of proteins in the U.S. diet, and their proteins are of high quality.

Prior and Cao, (2000), Produce for Better Health Foundation (1999) said fruit in the daily diet have been strongly associated with reduced risk for some forms of cancer, heart disease, stroke and other chronic diseases. Some components of fruits are strongly antioxidants and function to modify the metabolic activation and detoxification/disposition of carcinogens, or even influence processes that alter the course of the tumor cell. (Wargovich, 2000). Prior and Cao (2000) also say although antioxidant capacity varies greatly among fruits, it is better to consume a variety of commodities rather than limiting consumption to a few with the highest antioxidant capacity. The USDA 2000 Dietary Guidelines (USDA, 2000) encourages consumers to: (1) enjoy five a day, that is, eat at least 2 servings of fruit and at least 3 servings of vegetables each day, (2) choose fresh, frozen, dried, or canned forms of a variety of colours and kinds, and (3) choose dark-green leafy vegetables, orange, fruits and cooked dry beans and peas often.

According to Produce for Better Health Foundation (1999) and USDA (2000) some fruits supply the body with some antioxidants. Fruits like guava, citrus fruits, kiwi fruit, pineapple and strawberry supply the body with vitamin C. Mango, orange, papaya, pineapple also obtain flavonoids from apple, blackberry, blueberry, grape, peach and others. Most fruits also provide the body with fibre. Potassium too can be obtained from banana, orange, apricots and lemon.

Driven by hunger, our ancestors ate whatever fruits available; some were acid, or even mildly toxic until very ripe. But the vitamin C content were often high, and sometimes extremely high. There would have been times of the year when fruit was either not available at all or scarce. Today we have good variety of fruits, and fruits that are better than just edible. On the other hand, fruit consumption has to compete well. Fruits are full of antioxidants and cancer suppressing chemicals, they are a valuable energy source, and have fibres, which health qualities are only just beginning to be discovered. Most fruits have proven medicinal qualities. For a few individuals, where times, space and inclination allow, home growing selected fruits can provide valuable adjuncts to the modern industrial diet. By selecting fruit particularly rich in vitamins plus enjoying the particular health qualities of other fruit, we can at least match and perhaps even surpass the variety, quality and quantity of fruit that was available to our ancestors.

Many people today have so many perceptions about fruits and these determine their consumption or likeness for a type of fruit. Most people never know any of the benefits of fruit to the human health and this seriously affects the demand for them even if they are cheaply sold around them. This research has become imperative as it investigates student trainee's knowledge and practices of fruit eating habit as future educators.

3. Purpose of the Study

The purpose of the study was to investigate the reasons why student-teachers eat fruits. It is to identify whether people eat fruits for its medicinal purpose, nutritional value, or any other reason other than these and to find out people's fruit eating pattern and mode, that is whether people destroy most of the nutrients before eating or eat it in excess to create problems for their body. Also, to find out what type of fruit student-teachers eat, how frequency they eat fruit and factors that determine their choice of fruit, and the quantity of fruit they eat whenever they eat fruit and finally to find out their knowledge about the benefits of fruits to human health.

Research Question

- 1) What reasons do student-teachers give for eating fruits?
- 2) What types of fruit do student-teachers eat?
- 3) What factors determine student-teachers' choice of fruits?
- 4) What knowledge do student-teachers have about the benefits of fruits to human health?

Methodology

The descriptive survey design was used. The target population for study was 945

Two hundred and ninety-eight (298) were females and the remaining 647 were males.

A sample size of 150 respondents made up of 75 males and 75 females were randomly selected. Each year group was represented by 50 trainees, 25 males and 25 females for the three year groups. The instrument developed for the study was a questionnaire. Respondents were requested to respond to each item on a four-point Likert scale.

4. Results/Discussions

Research Question 1: What Reasons do Student-Teachers give for Eating Fruits?

Table 1 shows reasons student-teachers give for eating fruits.

Table 1: Student-Teachers' Reasons for Eating Fruits

Reason	Yes (%)	No (%)	Total (%)
Anytime I feel like	74 (49)	76 (51)	150 (100)
When I am hungry	18 (12)	132 (88)	150 (100)
To free bowel	63 (42)	87 (58)	150 (100)
When it is cheaply sold at the market	19 (13)	131 (87)	150 (100)
Add to diet to make up the required quantity	46 (31)	104 (69)	150 (100)
For health reasons	90 (60)	60 (40)	150 (100)
Others (for its sweetness)	1 (1)	149 (99)	150 (100)

Greater number of respondents said they eat fruits for health reasons. Those who eat fruit only when they are hungry had the least number even though one person opted for sweetness of fruit as reason for eating fruits. Considering the result critically, those who eat fruit for health reasons were many and their number was more than a half of the total respondents, and comparing it with those who eat fruit anytime they feel like, 74 of the respondents were in this group and those who eat to free the bowel were 63. One may ask that, how come people who eat fruit for health reasons may also eat fruits anytime they feel like or to free the bowel since eating fruits for health reason must be done regularly. But if the result is to be accepted the way it is, then the number of respondents who have the knowledge about the health reasons of eating fruit are quite acceptable. It is not surprising to notice that, 42% of the respondents eat fruits to free bowel. But only one person eats fruits for its sweetness are also a surprising result. Those who eat fruits at anytime they feel like happened to be 49% and this may be the true reflection, and because of the nature of respondents, the reason "when I am hungry" could not score much because most of the respondents find themselves in a community where fruits are not easy to come by for it to be eaten when hungry. Respondents are students and most of have limited financial resources to be buying fruits very often, so the number of those who eat fruits only when it is cheaply sold at the market should have been larger than this. It may also be true that 31% may add fruit to their food to make up the required, because food served at school may be inadequate and they may eat fruits sold around to add it to be satisfied. It may also be seen that, those who eat fruits as dessert all fall under this group.

Hansey (2003) and Graham (2007) agree to the fact that fruits free bowel but this happens only when it is not appropriately eaten. This is not the real duty of fruit to the body; it only does that when it is inappropriately eaten. These authorities go further to explain the nutritional and medicinal benefits of fruit to the human body.

Young (2002), Fuhrman (2003) and Graham (2007) all agree that fruit can be eaten as food substitute but make it clear that, since it digests easily and fast, one feels hungry within a short period after it has been eaten alone. They all suggest that, even though it supplies the body with the necessary nutrients it cannot stay in the stomach for a longer time. British Medical Journal (September 2001) accepts that fruit could be added to food to make up the required quantity but one must know its benefits. Also it must be combined well to achieve good result. Thompson (1999) and Martin et al., (1999) all opined, the seasonal reason why fruit is eaten, but all these agree to these reasons but they talk about the nutritional and medicinal values of fruit.

According to Fuhrman (2003), we should avoid eating a lot of fruit because it does not contain enough minerals. He recommends that we eat more vegetables instead. But does he realize that if fruit grown today has fewer minerals than it used to have, then vegetables, which are grown in the same soil, have fewer minerals too? Is he suggesting that we eat fewer vegetables too? He also claims that we should avoid fruit because it is too hybridized. According to him, hybridized fruit contains too much sugar. The process of hybridization is a natural one. What humans have done is the same as what nature had done for thousands of years. We have selected the seeds from the best-tasting fruits and planted those seeds instead of the seeds of inferior fruits. Fruits that we buy have been hybridized for hundreds of year. Problems arise when fruits are hybridized for purely commercial reasons. For example, we have witnessed the arrival of seedless fruits in the marketplace in the last few years. These fruits have been hybridized extensively solely in order to produce a fruit of inferior nutritional quality but with other qualities that the market is looking for. Those fruits are certainly or inferior quality, taste and nutritional value, not food with certain cosmetic aspects that the market seeks. We can still ensure a complete nutritional balance from the foods that we find in the stores. The fact that these fruits contain a lot of sugar is certainly not a problem, unless one decides to eat only fruit, which I do not recommend. I would not recommend that you base your diet on one fruit, such as bananas. I believe in eating a large variety of foods.

According to Southon (2000), dieticians and nutritionist around the globe emphasize the need to make fruits and vegetables an important part of our diets. They give the following reasons. The first is cancer prevention. There are abundant supplies of antioxidant substances in fruits and vegetables that are proven to be helpful in preventing cancer. These give protection against reactive substances that harm human cells and off set cancer. They are also rich in photochemical which main function is to detoxify substances leading to cancer.

Another reason is staying slim. It's proven that most vegetables contain a very low caloric count as compared to

junk food, such as a bag of potato chips or a small cookie. This leaves a person feeling fuller and wards off his hunger. In this way you will consume lesser quantities of high-calorie meats and desserts to limit the use of saturated fat and cholesterol which are found guilty of damaging the heart. Also to protect blood vessels from getting clogged with fatty deposits, provide fibre that helps lower cholesterol and generally lower the risk factors for heart diseases, you must include more fruits and vegetables in your diet as compared to meat and dairy products.

Veggies and fruits lower blood pressure. Studies have shown that, people who eat high fruit and vegetable diets control their BP levels. This is probably due to the presence of potassium and magnesium in them. Another reason is that fruit and vegetable diets can lower the risk of stroke by an amazing 25%. The high potassium content as well as antioxidants and phytochemicals contained in these may be responsible. Fruits and veggies in the diet lower the risk of contracting cataracts and macular degeneration which are the two main causes of adult blindness. They also help to prevent diabetes. They raise blood sugar less than other carbohydrate-containing food. Fibre found in fruits and vegetables can also slow down the process of sugar absorption in the blood.

The varieties of colours of fruits and veggies like greens, reds, yellows and purples have the power to make any dish more visually tantalizing. The variety of taste and texture adds an interesting dimension to food as well as flavour. These reasons given have some relationship with those given by the respondents even though, reasons mentioned by Southon are numerous, detailed and specific unlike reasons given by respondents. The health reasons and other reasons given by respondents are more or less related to what Southon gave by quoting American Institute for Cancer.

According to WHO, fruit and vegetable consumption is essential to a varied and nutritious diet. But data shows that fruit and vegetable consumption is low in many areas of the world. Only a minority of the world population consumes the quantity recommended by the FAO and WHO. The worldwide trend toward city-dwelling has driven people away from the production of primary foods. This hinders the consumption of a varied, nutritious diet with an adequate proportion of fruit and vegetables. The poorest city-dwellers are not only remote from primary food production; they also find it harder to access healthy, varied diets. On the other hand, increased urban dwelling may support other aims, because people with enough purchasing power have wider access to a varied, nutritious and healthy diet. World food production trends and the availability of fruit and vegetables indicate that present output and consumption differ greatly from region to region. These production statistics do not include wild and native vegetable output. Consumption may be underestimated, therefore.

According to Fuhrman (2003), that it takes a bit of practice to learn how much fruit is sufficient for a meal which will satiate for several hours. It is equally true that a mental adjustment is required in order to expand one's understanding of how much fruit is actually appropriate at a meal. With sufficient experience, one's ability to consume

extremely satisfying fruit meals will grow to become ones of life's great pleasures. After all, fruit is healthy food. Anyone interested in attaining, maintaining, and gaining increased health should consider consuming fruits as their predominant food.

There is increasing evidence that consumption of whole foods is better than isolated food components such as dietary supplements and nutraceuticals. For example, increased consumption of carotenoid-rich fruits and vegetables was more effective than carotenoid dietary supplements in increasing LDL oxidation resistance, lowering DNA damage, and including higher repair activity in human volunteers who participated in a study conducted in France, Italy, Netherlands, and Spain (Southern, 2000). In another study, adding antioxidant (vitamins A, C and E) dietary supplements into the diet of cancer treatment patients, who were eating a balanced diet of fruits and vegetables, negatively impacted their radio- and chemotherapies (Seifried, 2003). High consumption of tomatoes and tomato products has been linked to reduced carcinogenesis, particularly prostate cancer, and has been thought to be due to the presence of lycopene, which gives red tomatoes their colour (Giovannucci, 2002). Similar comparative studies are needed on other constituents of fruits and vegetables and on the bioavailability of nutrients taken as dietary supplements or as foods that contain these nutrients.

Research Question 2: What Type of Fruit do Student-Teachers Eat?

Tables 2 and 3 which answer the type of fruit student-teachers eat handled this question in two folds. Table 2, shows the choice of fruits by student-teachers while table 3 indicated the state of fruits student-teachers eat. Among the choice of fruits are mango, guava, banana, pawpaw, water melon, pineapple, lime, lemon, orange/tangerine, avocado (pear) and apple. And the state of fruits also includes raw fruits, bottled or canned, raw fruit juice, frozen fruits and cooked fruits.

Table 2: Choice of Fruit Eaten by Student-Teachers

Choice of fruit	Yes (%)	No (%)	Total (%)
Mangoes	90 (60)	60 (40)	150 (100)
Guava	58 (39)	92 (61)	150 (100)
Banana	111 (74)	39 (26)	150 (100)
Pawpaw	88 (59)	62 (41)	150 (100)
Water Melon	71 (47)	79 (53)	150 (100)
Pineapple	112 (75)	38 (25)	150 (100)
Lime	29 (19)	121 (81)	150 (100)
Lemon	23 (15)	127 (85)	150 (100)
Orange/Tangerine	116 (77)	34 (23)	150 (100)
Avocado (Pear)	38 (25)	112 (75)	150 (100)
Apple	43 (29)	107 (71)	150 (100)

Table 3: State of Fruit Eaten by Student-Teachers

State of fruit	Yes (%)	No (%)	Total
Raw fruit	145 (97)	5 (3)	150 (100)
Bottled / canned	43 (29)	107 (71)	150 (100)
Raw fruit juice	49 (33)	101 (67)	150 (100)
Frozen fruit	22 (15)	128 (85)	150 (100)
Cooked fruit	7 (5)	143 (95)	150 (100)

Tables 2 and 3 are for research question 2 which seeks to find out the type of fruit student-teachers eat. Table 2 finds

out the choice of fruit they eat and table 3 investigates the state of fruit. The result realized from table 3 shows that only 3% of the respondents do not eat raw fruit. This may be a true picture because, there are others who may be allergic to fruit of any kind if it is raw and they depend on canned or bottled fruit. Looking at the result, respondents did not consider their stay on campus alone to respond to the questionnaire because some of them visit town and at times travel home. Also, looking at nature of the respondents, one may be deceived by thinking that most of them may bring canned drinks to college, but only a few of this number and some of them may take the drink only when they are at home.

Table 2 of this question realized a whole lot of intersections. The result realized is a true picture because of availability of fruits around. Lime, lemon and pear had least number of respondents who eat them. There are so many reasons assigned to this. Mangoes did not record as high number as orange, banana and pineapple because of its seasonal nature. Unlike mangoes, orange, banana and pineapple all have their seasons but when the season is off, you can find some at market. This may be the reason why orange, banana and pineapple had high number of respondents. Some fruits like watermelon and apple are very expensive so student-teachers cannot afford to buy and that may contribute to their low consumption as compared to orange, banana and pineapple. Guava too is not found to be plenty in the market even during its season as compared to orange, banana and pineapple but lime, lemon and pear are also as available as orange, banana and pineapple but only few respondents said they eat them. It is also possible that those who chose lemon and lime chose them not that they consumed it raw but they take canned or bottled fruit drink which contains either lime or lemon. Few others may add it to other herbs for treatment. Others take them with the intention to reduce weight and burn fat. Apples also did not record high number because other local brands are not easy to come by. The foreign type too is very expensive so it will be difficult to rely on apples too much hence its low consumption.

Hansey (2005) asserted it clear that, lemon is one of the nature's fruit gift to man. She said it is useful in treating asthma, cold, cough, sore throat, diphtheria, influenza, heartburn, liver complaints, scurvy, fevers and rheumatism. She further stated that, medically, lemons act as an antiseptic, an agent that prevents infection or putrefaction. They also prevent scurvy. They assist in cleaning the system of impurities. Lemon is a wonderful stimulant to the liver and it is also a solvent for uric acid and other poison. It liquefies belies and is very good in cases of malaria. Sufferers from chronic rheumatism, rickets, tuberculosis and gout will benefit by taken lemon juice as well as those who have the tendency to bleed or have uterine hemorrhages. During pregnancy, it helps to build strong bone in the child. We find that the elements which are in lemon help to build a healthy system and nerve cells. Its calcium strengthens the bony structure and makes healthy teeth.

Table 3 clearly shows that, raw fruits are eaten more than any state of fruit. Since this is the cheapest as compared to other states, most people normally don't cook fruits before eating nor extract the juice or put it in the refrigerator before

eating, that may be the reason why raw fruit eaters are the largest group. Pineapple also recorded a high number of respondents; this may not be true in every part of the country because the region within which the research was carried out is a pineapple producing area. Mangoes couldn't attract many respondents because of its seasonal nature unlike orange, banana and pineapple. Watermelon also had a quite number of respondents but not as large as orange, banana and mango because it is expensive than orange, banana and mango. Cooked fruits recorded least number of respondents; this may be that most student-teachers know the effect of damage that can be caused to cooked fruits hence the practice of raw fruit eating is high. Frozen fruits also recorded low number of respondents and this may be that student-teachers don't store fruits for future use. They may only take frozen fruits when they are canned or bottled. Even though raw fruit juice recorded the second largest respondents, the number is very low as compared to respondents who eat fruit raw. This may be that student-teachers don't have a means to extract juice from the raw fruit; instead they will eat the fruit raw together with the fibre. And if they extract the juice, they have to keep it in a refrigerator for future use and this may not be ideal since they may not have access to refrigerators.

Williamson and Monach (2005) said recent research has focused on a specific type of oligosaccharides: fructo-oligosaccharides or FOS. These are short chains of fructose linked by 2-1 β -glucosidic bonds with a terminal D-glucosyl unit linked by an α -1-2 bond, present in some cereals and vegetables (including asparagus and onion). FOS are non-digestible carbohydrates, because the human intestine lacks enzymes capable of breaking down its bonds. This chemical feature lends FOS attractive physiological properties, such as low caloric value (about 2 kcal per g), sweetness, low capacity for causing caries, and effects similar to those of dietary fibre. They are viewed as prebiotics for their ability to modify colon flora by fostering the selective growth of groups or individual species of bacteria that discourage the settlement of pathogenic bacteria; in addition, FOS fermentation acidifies the environment, thus reducing carcinogen production.

They continue to say that indoles and isocyanates are also important, present in cruciferous vegetables (broccoli, cauliflower and cabbages), which help prevent cancer; the antioxidant resveratrol in grapes and grape by-products; and organic sulphurs, which help prevent cancer and heart disease, present in garlic and onions. Fruit and vegetables also contain organic acids responsible for their smell and taste, such as citric acid (present in a wide variety of fruit and vegetables), tartaric acid (grapes) and malic acid (apples). Other substances present in some leafy vegetables can act as anti-nutrients, such as oxalic acid, which has a chelating effect on the absorption of divalent minerals, including iron and calcium. Fruit and vegetables are thus complex foods and provide significant quantities of carbohydrates (especially sugars), low quantities of protein and fat, and are essential in the human diet. They provide water, dietary fibre, numerous vitamins and minerals and bioactive substances with major health benefits.

Research Question 3: What Factors Determine Student-Teachers' Choice of Fruit?

Table 4 describes factors that determine student-teachers' choice of fruits. It presents the following suggested determinants; religious factors, health factor, special like for it and abundance in the community factor.

Table 4: Determinants of Student-Teachers' Choice of Fruit

Factors	Yes (%)	No (%)	Total
Religious factor	2 (1)	148 (99)	150 (100)
Health factor	105 (70)	45 (30)	150 (100)
Special like for it	58 (39)	92 (61)	150 (100)
Abundance in the community factor	15 (10)	135 (90)	150 (100)

Obviously, more than half of the respondents said health reasons determine their choice of particular fruit. Since most student-teachers' choice of fruits are determined by health factor, it is a good indication that they know the benefit of food to human health. Even though student-teachers have various reasons for eating fruits but as to what fruit to eat because of what they can derive from it determines what type of fruit to eat. Also since eating raw fruits is the best and most respondents eat raw fruits than any other state of fruit indicates their reasons and determinants of their fruit eating. Looking at the number of respondents who selected health reasons as their reason for eating fruit and the number of respondents who said, health factors determine their choice of fruit, the difference is quite large. Ninety (90) as against a hundred and five (105). But the difference can be deduced by considering those who add to diet to make up the required quantity and those who eat fruit to free their bowel as part of those who this time said they eat fruit for health reason, it is clear that they eat fruit due to health factors. Also, there is a link between those who eat fruit only when they are hungry, anytime they feel like and when it is cheaply sold at the market and those who select a type of fruit because of their special like for it.

According to the result, fifty-eight (58) out of a hundred and fifty (150) choose a particular fruit because of their special like for it and fifteen (15) selected a particular fruit when it is abundant in the community. Adding the two together and comparing it to response in research question one, one can conclude that, there is a relationship between the responses for the two questions.

No respondent chose other factor and only two respondents said their choice of fruit is determined by religious factors. Page, Cole & Timmreck (1995) refer to the experiment James Lind conducted on the treatment of scurvy that, Lind took 12 patients suffering from scurvy on board at sea. The patients laid together in one place being proper apartment for sick in the fore hold and had one diet common to all. Later, some were grouped and were given different or additional food. Six days under this course, he noticed a remarkable improvement in a group. Lind was able to conclude from the result of his experiment that eating citrus fruit successfully treated scurvy and that consuming these fruit would also prevent the occurrence of scurvy. In Ghana, some fruits become abundant during a particular season. Fruits like mango, guava and orange are sometimes got free and this situation forces eaters to either increase their quantity or how often they eat them. At times student-

teachers cannot afford to buy some fruits during lean season. It is also clear that some student-teachers may not eat a particular fruit until that fruit can be obtained easily and this can only be possible when that fruit is in its season.

Hao et al., (1998) confirmed the health factor behind the choice of fruit. They said that, fruit consumption results in reduced triglyceride level in the blood, a risk indicator for heart disease and reduces hypertension while increasing the level of high density lipoprotein (good) cholesterol.

These intake bands consider fruit and vegetables for their energy value rather than their nutrient content. This approach takes account of the fact that the health benefits of fruit and vegetables cannot be attributed to a sole nutrient or mix of nutrients and bioactive substances, but to fruit and vegetable consumption as a whole. Hence fruit and vegetables are listed as a food category, instead of the individual nutrients. Tuber (e.g., potato, sweet potato and manioc) should not be included among fruit and vegetables. Recommendations on total fat intake consider countries where intakes are commonly high (above 30%) or very low (below 15%). An intake of at least 20% total fat in the diet is compatible with good health. In countries with a highly active population and a diet rich in fruit, vegetables, pulses and wholegrain cereals, total fat intake can be up to 35% without risk of harmful weight gain. High intake of simple sugars detracts from the nutritional quality of the diet, because it provides energy lacking in nutrients to the detriment of other foods of high nutritional quality. After drinking a very sugary drink, in fact, it has been shown that the compensating reduction in food intake is less than for other foods of the same energy content.

So this condemns the idea of eating fruit only when it is abundant in the community and also supports it because if there are a number of fruits in a community and some are seasonal, then, when the season of a particular fruit is due then it will be abundant and people will eat them but when the season is off then they stop eating fruit. Taking the number of respondents into consideration, only two respondents said they eat fruits because of religious reasons. It is good for people to follow what their religion teaches them to do.

According to the Quran, Surai 5 verse 4, there is an emphasis on the eating of fruit but not specific type. The Holy Bible generalizes the eating of plant food. Since the Quran mentions fruit as some of the good food to eat, one may be right to say that, his choice of fruit is determined by religious reasons.

Research Question 4: What Knowledge Do Student-Teachers Have About The Benefits Of Fruits To Human Health?

Table 5 seeks to present student-teachers' knowledge on the benefit of fruits to human health. The suggested benefits for this study were; prevention of diseases, for body growth, supply of nutrients to the body and to free the bowel.

Table 5: Student-Teachers' Knowledge About the Benefits of Fruits to Human Health

Benefits of fruit	SA (%)	A (%)	U (%)	D (%)	SD (%)	Total (%)
Prevention of disease	69 (46)	61 (41)	16 (11)	2 (1)	2 (1)	150 (100)
For body growth	94 (63)	40 (27)	4 (5)	9 (6)	3 (2)	150 (100)
Supply of Nutrient to body	108 (72)	36 (24)	4 (3)	2 (1)	0 (0)	150 (100)
Free Bowel	101 (67)	38 (25)	7 (5)	2 (1)	2 (1)	150 (100)

Considering the response for benefits of fruit to human health, only 1% each disagree or strongly disagree respectively that fruits prevent disease and only 11% were undecided whether fruit can be used to treat ailment or not. If this response is compared to their reasons for eating fruit, there is a contradiction, because 87% strongly agree and agree to this benefit but does not reflect the way they eat fruit.

The percentage of those who strongly agree and those who agree that fruits build the body is quite high that is 90%, so this knowledge should have reflected in their reasons for eating fruit or regularity of eating fruit. This means, when comparing their reasons for eating fruits and how often they eat fruit, one can conclude that, some do not practice what they know to be good. In the same way, 96 total percentage of the respondents either strongly agree or agree that fruits supply the body with nutrient and this does not go in line with their reasons for eating fruits or the frequency at which they eat fruits. Even though the highest number of student-teachers who eat fruit are those who eat fruit on health reasons and those who eat fruit daily and every other day but the percentage is not as large as it should be if respondents have these knowledge about fruits. Quite a large number of respondents have the belief that fruits free the bowel but don't have the idea that it does that only when it is not eaten at the appropriate period.

Results gathered from research question one, which sought to find out reasons student-teachers gave for eating fruits, 90 out of one 150 responses collected said they eat fruit for health reasons. This figure is the highest and confirms the responses on their knowledge on benefits of fruits to human health on fruits being used to prevent disease. Also, about the factors that determine their choice of fruit also recorded that highest number, a hundred and five for those who said health factor determines their choice of fruit. But looking at the types of fruits that have high medicinal values and the student-teacher's type of fruit they eat, those which have high medicinal values are rather less consumed. Martin et al (1999), Hansey (2003) and (2005) mention some types of fruit like lime and lemon and their medicinal values, even though other fruits also have medicinal values but when the amount of fruits eaten is compared, it is clear that, lime and lemon recorded the lowest quantity. So it is clear that student teachers have the knowledge that fruits prevent disease.

Considering their knowledge on the benefit of fruit to build the body, sixty-one percent (61%) strongly agreed and twenty-six percent (26%) also agreed. This is a clear

indication that about ninety percent of the respondents have the knowledge that fruit build the body. Thompson (1999), Joseph, Sunkist, Hale et al., (1999) and Hao et al., (1998) all stated what fruits can do to help the body grow well. They clearly said what most fruits are capable of doing to build body. Some authorities also said a lot about what fruits are capable of supplying to the body in terms of nutrients. Seventy-one percent (72%) strongly agree to the fact that, fruits supply nutrients to the body and twenty-five percent (24%) also agree to the same fact indicating ninety-five percent (95%) of the respondents. Almost every authority in this study mention what can be derived from every fruits mentioned in this study. It is clear that fruit supply nutrients to the body so the fact that fruits supply nutrients means that, fruits build the body.

The last benefit of fruit the study sampled which is the ability of fruit to free bowel. Sixty-eight percent (67%) strongly agree and twenty-five percent (25%) agree to this. Even though fruit free bowel it has been clearly said that, it does this only when it is not eaten at an appropriate time. Hansey (2003) and Graham (2007) all confirm that fruit can free bowel but if not well eaten.

Carpenter (1986) said scurvy, a serious deficiency of vitamin C that has caused tremendous human suffering throughout history, was first described by ancient Egyptians, and then by the Greeks and Romans. For hundreds of years, scurvy was a scourge of long-distance sailors, soldiers, explorers and the poor in many countries where there was a lack of access to fresh fruits and vegetables. However, it was not recognized that scurvy could be prevented and cured by consuming citrus fruit until the eighteenth century. And it would be another 200 years before vitamin C was isolated and its deficiency identified as the cause of the disease.

The lesson from this is still important today; people do not need to understand everything about individual nutrients in order to consume nutritionally adequate and well-balanced diets. Even though deficiencies, there is still much that is not known, and probably never will be known, about the relationships between diet and health. Fortunately, however, with a bit of common sense, people can still be well nourished even though the understanding of nutritional science may be incomplete.

For example, research efforts exploring the possible protective effects of phytochemicals against various forms of chronic diseases have often shown an association with the consumption of various foods rich in these compounds, but not with specific phytochemicals themselves. There are several possible explanations for this, including; the specific phytochemicals being investigated may not be the ones that have an effect; the effects of individual phytochemicals may be additive; and it may be the interaction of two or more phytochemicals and nutrients that produce an effect. Since the understanding of nutrition science and complex functions and interactions of the many vitamins, minerals, macronutrients and phytochemicals contained in food is still so incomplete, it is important that a rational and time-tested approach be taken to the promotion of good nutrition. It is also important to continue emphasizing the benefits of nutrient-dense foods, such as citrus fruits, and to recognize

that the consumption of whole foods and natural juices is preferred over the consumption of individual nutrients that have been isolated from food and then consumed as dietary supplements. Focusing on single nutrients, instead of foods and the total diet, does not constitute a healthful approach to good nutrition.

Putnam and Allshouse (1997) said the health benefits associated with citrus consumption are clear. Citrus fruits are nutrient-dense foods that can be good sources of carbohydrates, including dietary fibre, and many vitamins and minerals. Citrus fruits are equally valuable among populations who need to overcome and prevent micronutrient deficiencies as well as those concerned with problems of over nutrition, obesity and diet-related chronic diseases. For example, citrus is an ideal component of low-fat, sodium-restricted diets. As nutritionists and public health specialists learn more about the relationship between diet and health, the importance of balanced and varied dietary intakes becomes ever more evident. Accordingly, there is an increasing emphasis on promoting high levels of fruit and vegetable intakes among most population. Citrus consumption has a considerable potential to expand as part of this overall recommended increase in fruit and vegetable consumption. While the supply of citrus is a problem in some areas, a greater obstacle is often the lack of effective demand for citrus. Addressing both the supply and demand problems, as appropriate, will require that a range of issues, such as agriculture and trade policies, food and nutrition policies, dietary guidance and nutrition education, and marketing, are addressed effectively and in a comprehensive manner. In many countries, a multifaceted approach that brings together, as appropriate, representatives of producers, processors, importers, retailers and consumers with nutritionists and public health specialists can have a significant impact on citrus consumption. Given that increasing the consumption of citrus benefits both producers and consumers, building effective partnerships to that end should not be difficult and would be an invaluable investment in the nutritional well-being and health of the population.

Fruits, nuts and vegetables play a significant role in human nutrition, especially as sources of vitamins [C (ascorbic acid), A, thiamine (B₁), niacin (B₃), pyridoxine (B₆), folacin (also known as folic acid or folate) (B₉), E], minerals, and dietary fiber (Craig and Beck, 1999), Quebedeaux and Bliss (1998), Quebedeaux and Eisa (1990) and Wargovich (2000). Their contribution as a group is estimated at 92% of vitamin C, 48% of vitamin A, 30% of folacin, 27% of vitamin B₆, 17% of thiamine, and 15% of niacin in the U.S. diet. Fruits and vegetables also supply 16% of magnesium, 19% of iron, and 9% of the calories. Legume vegetables, potatoes, and tree nuts (such as almond, filbert, pecan, pistachio, and walnut) contributes about 5% of the per capita availability of proteins in the U.S. diet, and their proteins are of high quality as to their content of essential amino acids. Nuts are a good source of essential fatty acids, fiber, vitamin E, and minerals. Other important nutrients supplied by fruits and vegetables include riboflavin (B₂), zinc, calcium, potassium, and phosphorus. Fruits and vegetables remain an important source of nutrients in many parts of the world, and offer

advantages over dietary supplements because of low cost and wide availability.

Dietary supplements, while advantageous for conditions where specific nutrients are needed in abundance such as with iron deficiency, may be poorly absorbed, and many are derived chemically rather than from natural sources. Climatic conditions, particularly temperature and light intensity, have an especially strong effect on the nutritional quality of fruits and vegetables oxidation (Mozafar, 1994).

5. Conclusions

Most respondents think that, fruit free bowel. The research made it clear that, fruit does not when it is properly eaten. That is, eaten before meals which is the appropriate way of eating fruit. Raw fruits are popularly eaten because they are readily available and are cheapest. Orange, pineapple and banana are mostly eaten; this is because the community within which the research was carried out is an area where these fruits can be got throughout the year. Even though most respondents claim to have had knowledge that fruit has impact on man's life, most respondents eat fruit at anytime they feel like. It is obvious that respondents don't add fruits to their diet to make up the required quantity. They either eat it more or less as required by the body.

6. Recommendations

Sufficient education must be done. Also some fruits like lime and lemon have been relegated to the background yet their importance to health is very great.

The perception that fruit is used to free the bowel should be taken away since fruits naturally do not do that but do it only when it is wrongly eaten. This is because when someone eats fruits correctly but with this intention and does not get the result, the person may stop eating fruits.

The crusade of fruits being eaten daily must also be fought. This is because the study revealed that most people don't eat fruit daily but rather occasionally and every other day.

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