An Investigation on Fruits Consumption among Children under 5 years: Evidence from Tarkwa-Nsuaem Municipality, Ghana.

Author's Details:
Nana Ama Boansi Boakye[1], Irene Darkwa[2], Mary McArthur-Floyd[3]
[1, 2 & 3]Department of Hospitality Management, Takoradi Polytechnic, Takoradi, Ghana.

Abstract
Nutritionist and other health professionals have long recognized the importance of establishing healthful nutrition practices during childhood and early adolescence. Diet and exercise pattern adopted during these development years set the stage for lifelong habit that can mean the difference between vitality and infirmity in later years. This purpose of the study was to assess the consumption of fruits among children in the Tarkwa-Nsuaem municipality of Ghana. The study adopted a descripto-explanatory study design covering a stratified sample of 85 drawn from 165 parents/wards of children under five (5) years in the Takwa-Nsuaem Municipality, Ghana. A self–administered questionnaire was used to collect data. The data was analyzed through descriptive statistics. The study achieved a response rate of 83.75%. From the findings, most of the respondents had knowledge on the health benefits of fruits and more than half of the respondents served fruits to their children in the form of cut, whole, juice and blended or mashed.
Key words*: Children under 5 years, fruit consumption, health, malnutrition, nutrition, stratified sampling,*

1. Introduction

Childhood and adolescence are unique periods of growth and development. In addition to maturing physically, children begin to make independent choices about when, where, and what they eat. Good nutrition during childhood and adolescence plays a key role in ensuring adequate growth and development, preventing the long-term risk of obesity and other chronic disease, and enhancing overall health and well-being (USDA 2011). Since food habits are still developing during childhood and adolescence, it is important to help young people adopt healthy eating behaviors in order to improve longer term health outcomes. Although individual factors such as food preferences play an important role (Birch & Fisher 1998), there is an increasing awareness that children's eating behaviors are influenced by environmental factors as well (Story et al. 2002). In addition to the home environment and parental influence, the school environment is recognized as contributing to the eating habits of children (Just & Price 2011; Hanks et al. 2012). Gratzer & Walter (2006) explained that nutrition is the process of nourishing the body with food to maintain life, which involves the regular consumption of proper amount of calories, protein, vitamins like; vitamin A, vitamin B1 (thiamin), vitamin B2 (riboflavin), vitamin B3 (niacin), vitamin C etc, minerals such as iron, calcium, copper, iodine, lipids, water, dietary fiber and many other nutrients in food. Good nutrition means, getting the right amount of nutrients in the right combination (WHO, 2005). A poor diet in children may have an injurious impact on health, causing deficiency disease such as scurvy, rickets and kwashiorkor. Especially in children, health threatening conditions like obesity and metabolic syndrome and chronic diseases such as cardiovascular diseases, diabetes and other which occur in later ages (Ladau, 2010). The importance of nutrition is so well recognized and supported by scientific evidence that virtually every major public health organization in the world makes dietary recommendations.

The link between good nutrition and diseases prevention is similarly strong. For instance, currently, malnutrition has been identified as the leading factor in about 50% of death in children under five year and this can be prevented simply by given children the right amount of diet and by adding enough fruit to their diets (Hearly, 2005). Nutritional recommendation for children is designed to promote optimal growth and development and therefore may not be restrictive as those for adults. Wide varieties of food rich in essential nutrients are necessary for growing bodies and form the basis for the recommendations. Such foods include carbohydrates; rich grains, fruits and vegetables necessary to supply vitamins, minerals, fiber and energy vital to good healthy (Galdston, 1996). Green (2004) mentioned that, adequate amount of proteins such as eggs, fish, poultry and lean meat; nuts and dry beans also provide nutrients that contribute to proper growth and development.

The recommended quantities vary from country to country. The actual intake is closely linked to socioeconomic status and educational level. Some guidelines are based on food groups, whereas others provide recommended nutrient intakes, sometimes including nutrient supplementation. (Estaquio et al, 2009). Although dietary recommendations have many similarities, different countries choose different strategies to divide fruit and vegetables into groups. Orange and yellow fruit and vegetables are often high in carotenoids and are placed in a separate category. Yet many dark green vegetables (that is spinach) are also high in these components. Dividing fruit and vegetables into color categories makes sense for menu planning but does not correspond with nutrient content. Certain fruit and vegetables are rich sources of vitamin C, but these rich sources (citrus fruits, strawberries, parsley, white potatoes) are spread over many fruit and vegetable categories. Other fruit and vegetables, including avocado, corn, potatoes, and dried beans, are rich in starch, whereas sweet potatoes are mostly sucrose, not starch. Fruits (except bananas) and dark green vegetables contain little or no starch. Often, dietary guidance rules place fruit juices and potatoes in separate categories, because of dietary directives to eat whole fruits and minimize consumption of foods high in fat and sodium (Slavin & Lloyd, 2012).

Eating fruits provide health benefits; people who eat more fruits as part of an overall healthy diet are likely to have a reduced risk of some chronic disease. Fruits provide nutrients vital for health and maintenance of the body. Most fruits are naturally low in fat, sodium and calories, but none have cholesterol. Fruits are sources of many essential nutrients that are under consumed, including potassium, dietary fiber, vitamin C and folate (folic acid) (Cooper et al, 2012, Hung et al. 2004) Fruits are important element of a healthy balanced diet. Be it as snack, dessert or as part of a main meal. A diet rich in fruits and vegetables is important in preventing heart disease and many types of cancer. According to the World Health Organization (2002), "Up to 2.7 million lives could be saved annually with sufficient fruit and vegetable consumption," and "low fruit and vegetable intake is among the top 10 selected risk factors for global mortality." Fruits have a high water content and low level of protein and fat. The protein is concentrated in the seeds and is resistant to digestion in the small intestine and bacterial degradation in the large intestine. Fruits are also recommended as a source of vitamin C and potassium. Traditionally, fruits, as foodstuffs were available for a limited time and, when ripe, were sometimes difficult to collect and transport. When ripe, they have a short period of acceptability before senescence intervenes. Thus, many fruits consumed in today's world are processed, frozen, canned, or dried.

Numerous authors go into the details of this topic, among them Boeing et al. (2012) report on a convincing evidence of the decreasing risk for hypertension, coronary heart disease and stroke and a probable evidence for cancer, overweight, type 2 diabetes mellitus and some other disorders as a result of increased fruit and vegetables consumption. About 15% of global disease is attributable to the effects of under nutrition and deficiencies in micronutrients. A similar amount of disease can also be attributed to diet-dependent risk factors such as: overweight, high blood cholesterol, hypertension and low intake of fruit and vegetables (Ezzati, et al., 2002). WHO reports (2002) suggested that up to 2.6 million deaths worldwide and 31 % of cardiovascular diseases may be attributed to inadequate consumption of fruit and vegetables. Many consumers, when choosing food products, pay particular attention to their health properties and concentration of bioactive substances, especially antioxidants, which are large group of bioactive food compounds, polyphenols belong to them. Phenolics are the products of secondary metabolism in plants that play vital roles in the reproduction, growth, and metabolism of the plants, act as defense mechanisms against pathological virus and fungus infections, parasites, and predators; and contribute to the color of plants. In addition to their functions in plants, Phenolics compounds in our diet may reduce the risk of chronic diseases such as cancer, heart disease, and diabetes (Liu, 2013).

Fruit and vegetables are good dietary sources of chemical bioactive compounds which protect against harmful free radicals and reduce risk of oxidative stress, and its consequences such as inflammation and chronic diseases. It has been reported that changes in dietary patterns and lifestyle, such as increasing the consumption of fruit and vegetables and more balanced intakes of meat and plant foods, are a practical and effective strategy for reducing the incidence of chronic diseases, such as cardiovascular disease, cancer, diabetes, cataracts and age related functional decline (Willett, 2002; Zhang, 2004). Food programmes and promotion initiatives have an important role to play. They have been developed worldwide, but to date, nutrition education campaigns have only been moderately successful in promoting a sustained consumption of adequate amounts of fruit and vegetables. Consumption rates of fruits and vegetables are low among children, particularly among those from lower-income families. This lower rate of fruit and vegetable consumption may be due in part to the relatively low cost of energy-dense foods (Darmon and Drewnowski 2008), though Dibsdall et al. (2003) claim that motivational and lifestyle factors have an even greater impact.

This study is therefore aimed at investigating the consumption of fruits among children between 1-5years in the Tarkwa-Nsuaem municipality of Ghana. The objectives were to identify the factors that influenced fruits consumption, assess the knowledge of mother/ caregivers on the health benefits of fruits, the forms in which the fruits are consumed and the frequency of consumption among children between one and five years. Concern about fruit choices that may have adverse effects on health is currently at the forefront of public health and is embodied in documents such as Saving Lives: Our Healthier Nation (Department of Health, 1999).

A comprehensive body of scientific evidence now exists concerning the protective effect of fruit against a number of diseases, particularly cardiovascular disease and certain forms of cancer (World Health Organization, 1990). It is the job of the health professional to take this scientific information and adapt it in such a way that meaningful behaviour change may be achieved by the public. The choices individuals make around fruit determine which nutrients are consumed.

However consumers do not choose their fruits exclusively for the nutrients they provide. Eating behaviour is complex and an understanding of the impact of the factors that affect fruit choice is vital given the priority for population dietary change.

2. Research Methodology

The study adopted a descripto-explanatory research; a combination of both descriptive and explanatory research design. The design allowed detailed description and analysis of the variables under study; describing and presenting their attributes and explaining their relationships without manipulations as supported by Saunders et al (2009). The study covered a stratified sample of 85 out of a target population of 165 parents/wards of children under five (5) years in the Takwa-Nsuaem Municipality, Ghana. A semi-structured, self-administered questionnaire was used to collect data. Before administration, the questionnaire was pilot-tested and subjected to reliability test using Cronbach Alpha; resulting in a reliability coefficient of 0.969 which was above the recommended minimum of 0.7 (Santos & Reynolds, 1999). Data collected was analyzed using the statistical package for service solution (SPSS version 21). Descriptive statistics namely frequency and percentages were used to explain the variable characteristics (Twenefour et al., 2015).

3 Results and discussion

Reliability/Validity Test

A reliability test using Cronbach Alpha; resulting in a reliability coefficient of 0.969 which is above the recommended minimum of 0.7 (Santos & Reynolds, 1999) was conducted on all 31 items (variables) used in the study (see Table 1).

Table 1: Reliability Statistics

N	%	Cronbach's Alpha	Number of Items
85	100	0.969	31

It can be inferred from Table 1 that variables assigned for the study were about 97% reliable to be used for descripto-explanatory analysis of the study. The study achieved a response rate of 85.87%. Among those who responded, 82% were females while18% were males. Majority (47%) of the respondents were in the age range 21-30 years, followed by the 31-40 years (24%). In terms of marital status, 48% constituting the majority were single parents while 36% were married. 59% were Christians whereas the remaining 41 were Muslims. In relation to educational level, it was observed that 91% had attained formal education while those with no formal education were 9%. Out of the 91% formal education, 60% of them were graduates from the universities and polytechnic whereas 15% were from the junior and senior high schools (see Table 2). In relation to occupation of respondents, 47% constituting the majority were self employed, 26% were civil servants, whereas 18% were involved in agriculture. In terms of the number of children, the study findings recorded that 41% of the respondents had 1 child, followed by 23% with 2 children, 18% with 3 children and the least were 6% with more than 4 children.

Table 2: Demographic Characteristics of Respondents

Characteristics	N	Frequency	Percentage
Gender	**85**		
Male		15	18
Female		70	82
Age of respondents	**85**		
20 and below		13	15
21-30		40	47
31-40		20	24
41-50		7	8
51 and above		5	6
Educational level of respondents	**85**		
No formal education		8	9
J.H.S/S.H.S		13	15
Diploma		19	23
Bachelor		30	35
Masters		10	12
Others		5	6
Marital status of respondents	**85**		
Single		41	48
Married		31	36
Separated		8	9
Divorced		5	6
Religious affiliation of respondents	**85**		
Christian		50	59
Muslim		35	41
Occupation of respondents	**85**		
Civil servant		22	26
Self employed		40	47
Agriculture		15	18
Others		8	9
Number of children by respondents	**85**		
1		35	41
2		20	23
3		15	18
4		10	12
More than 4		5	6

Figure 1 below present's respondents' knowledge on fruits intake among children less than 5 years of age. 94% of out of the total respondents indicated 'yes' whereas 6% were 'no' indicating that parents or wards of children had adequate knowledge on fruit intake among children.

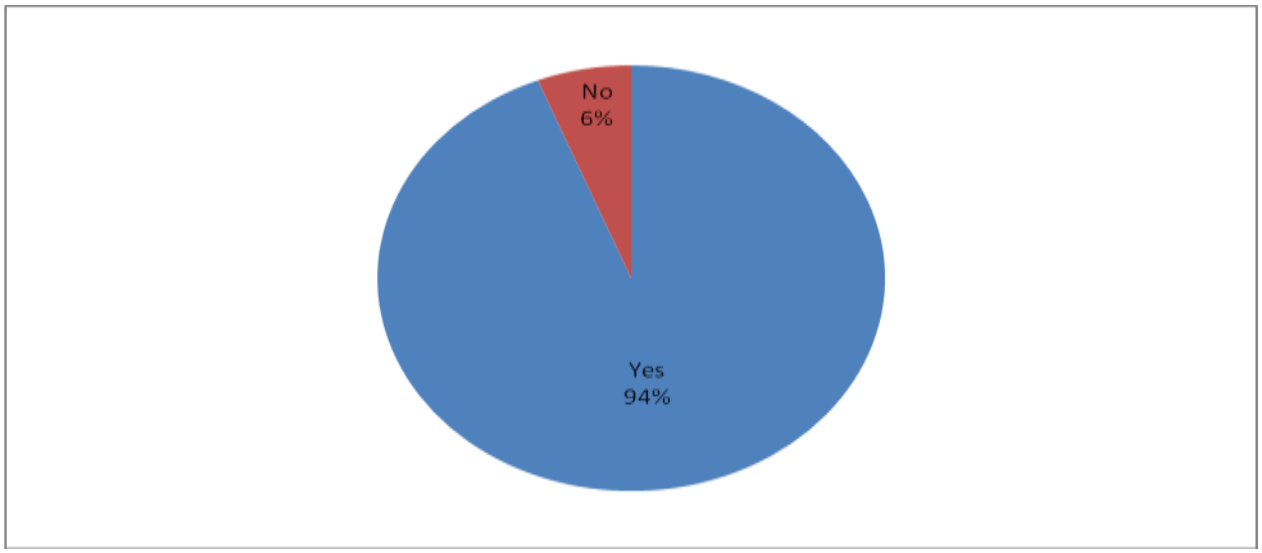

Figure 1: Respondents knowledge on Fruits Intake

Respondents further indicated that fruits are normally uncooked, sweet edible foods. They further mentioned that fruits are mostly foods that give minerals, vitamins and dietary fiber to the body such as oranges, pawpaw, watermelon, mango, apple, pineapple, banana, melon, kiwi among other collections.

Table 2: Health Benefits of Fruits

Health benefits	Frequency	Percentage
Provide nutrients	5	6
Fight and prevent diseases	50	59
Healthy growth	20	23
Prevent obesity	10	12
TOTAL	**85**	**100**

Findings from Table 2 shows that respondents were skewed towards the variable fruits fight and prevent diseases. This accounted for 59% out of the total respondent, followed by healthy growth (23%) and the least provide nutrients (6%) indicating respondents had adequate knowledge on the health benefits of fruit consumption among children under five years. Scholarly research articles have indicated that, nutritional factors contribute substantially to the burden of preventable illness and premature deaths in children (Baranowski et al, 2003). Dietary patterns with higher fruits intake are associated with treating and preventing metabolic syndrome (Kratt et al. 2000) and promoting a variety of health benefits; including certain risk of cancers (Lee et al, 2006), reduce morbidity and mortality from heart disease (Hannan et al ,2003), enhance diabetes prevention (Moffat and Galloway, 2008) and improve weight management (Elmadfu, 2009).This research, also found out that, fruits low in calories helped lower one's calorie intake as part of a weight-loss diet (Rosenbloom, 2009). Eating fruits lowers the risk of developing many chronic diseases and can also help with weight management (Hung et al. 2004). Regular

consumption of fruit is associated with reduced risks of cancer and cardiovascular disease (especially coronary heart disease), stroke. Alzheimer disease, cataracts, and some of the functional declines associated with aging (Hung et al, 2004).

Table 3: Forms of Fruits Consumption

Forms Of Consumption	Frequency	Percentage (%)
Whole fruit	22	26
Cut/Slice fruits	35	41
Fruit drink	7	8
Juice /blended	21	25
TOTAL	85	100

An assessment of forms of fruits consumption involved forms of consumption of fruits among children below 5 years. The findings in Table 3 show that fruit consumption among children in the Tarkwa Nsuaem Municipality is done by cutting or slicing them for children consumption as noted by 41% of the respondents followed by 26% who said whole fruits are given to children. However, 25% of the respondents indicated fruit intake by children is done through juice/blended whereas 8% asserted through fruit drink.

A number of studies have found cut or slice fruits to be the most common form of fruit intake or consumption among children in Europe. Sensory factors were noted to be among the most influential in determining fruits intake among children less than 5 years. In a pan-European survey, looking at forms of fruits consumption among children when parents were asked, indicated slice fruits as the most common way of giving fruit to children (Institute of European Food Studies, 1996)

Generally, respondents gave mottled opinion with respect to the frequency of fruit consumption among children under five years. According to the results (Table 4), 38% of the respondents indicated their children or wards take in fruit occasionally, 33% avowed to monthly whereas 23% said weekly. When interrogated, parents indicated that availability (shopping facilities, eating out); time constraints (preparation and consumption and the perishable nature of some fruits); familiarity (habits, cultural and traditions and food neophobia) were the main cause contributing to the trend of regularity of fruit intake among children.

This finding (Table 4) support a recent national data which showed that school-age children consume only 40% of recommended fruits and vegetable intake, and have low levels of intake of vitamins A and C, potassium, and dietary fibber, and high levels of intake of saturated fat and sodium (IOM 2010).

Table 4: Frequency Fruit Consumption among Children under 5 years

Frequency Of Intake	Frequency	Percentage
Daily	5	6.0
Weekly	20	23
Monthly	28	33
Occasionally	32	38
Total	85	100

Recent studies indicated that children were not meeting the recommended level of fruits consumption. (Casagrande et al., 2007 and Larson et al., 2007) (Casagrande et al. 2007) found no statistically significant increase in fruits intake among children between the years 1988-1994 and1999-2002, whilst (Larson et al., 2007) actually found a mean daily decrease in consumption among children. This research had indicated that, according to Lathan (2006), most children do not get the recommended five or more servings of fruits a day

Table 11: Factors Affecting Fruits Consumption among Children

Factors	Frequency	Percentage (%)
Price	35	41
Taste	16	19
Appearance	19	22
Availability of fruits	11	13
Storability	4	5
TOTAL	85	100

The study required respondents to indicate the factors affecting fruits consumption among children. In general, 41% of the respondents established that price is the main factor affecting fruit intake. 22% were appearance, taste (19%), availability of fruits (13%) and the least was storability (5%). The factors were measured through a number of statements on various aspect of factors in which respondents gave their assertions. Fruit intakes are distinct between social classes.

The results are consisted with the survey conducted by Pollard et al (2002) which revealed that fruit choice intake, familiarity and habit, social interactions, monetary cost of fruits, storability, personal ideology, health, price, taste, availability of fruits, social interactions were the main factors affecting fruit intake among children in Africa. Southgate (1991) who list the following as factors determining food choice: *1*) availability; *2*) sensory preferences; *3*) satiety; and *4*) social transmission. It is generally accepted that the preference for sweet tastes is instinctive and the avoidance of bitter tastes would protect against the consumption of plant foods containing toxic alkaloids or other bitter plant constituents

Conclusion

The study review shows just how complex the fruit choice process can be when taking into account issues such as price, taste, availability, habit, social interactions, media and advertising, time constraints and health. When considering fruit and vegetables in the context of fruit choice we can see that all of these issues, either consciously or unconsciously, will affect whether or not a mother decides to purchase fruit and vegetables at any particular time or meal event. It can be seen that some of these issues will be more influential than others but that different individuals, educational level, work done by parents/wards will have different influences on their food choice motivations. Consideration of the food choice process in relation to fruit is particularly important when trying to put into effect coherent and practical dietary advice for children's parents. Any advice has to be realistic and must take into account, and try and deal with, any personal influences on factors affecting fruit intake and choice decisions. Some practical techniques and ideas for health promotion strategies to come from the present review include supermarket fruit and vegetable promotions and taste sessions and more sophisticated and trendy advertising and marketing campaigns for fresh fruit. More generally, individual's parents need to be made aware of their wards personal consumption levels of fruit in order for health promotion messages to be considered personally relevant.

Although this paper has provided a number of useful findings, it is clear that there is more research that can be carried out on fruit. Policymakers should both consider the quantity and the quality of the fruits being provided to children and how it may affect their decision to eat a desirable amount of fruits for them to grow healthy in life.

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