

Full Length Research Paper

Knowledge of nutrition and health benefits and frequency of consumption of fruits and vegetables among Ghanaian homemakers

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A cross-sectional survey was conducted with the objective of assessing homemakers' knowledge of the nutritional and health benefits of fruits and vegetables and how this knowledge influenced their consumption. A systematic random sampling technique was used to select one hundred and fifty homemakers from three locations in Ghana. A pre-tested structured questionnaire was used to collect data on forms in which fruits and vegetables were consumed, reasons for consumption, frequency of consumption, knowledge of nutrition and health benefits and sources of knowledge. The chi-square test was used to test for statistical differences between categorical variables, while the independent samples t-test and one-way analysis of variance (ANOVA) were used to test differences between continuous variables. In all the tests, p-values less than 0.05 were considered significant. The results showed that although most of the respondents had a fair knowledge of the nutritional and health benefits of fruits and vegetables, it did not reflect in their frequency of consumption. Frequency of consumption was generally low especially for fruits. People with higher education tended to have more knowledge of the benefits of fruits and vegetables, and thus consumed them frequently. The respondents indicated that they consumed fruits and vegetables because they promote growth and development (47%) and also provide balanced diet (24%). Other reasons given for consuming fruits and vegetables were that they supply vitamins, give blood and boost the immune system. The mass media (mainly television and radio), health workers, literature and formal education were respondents' main sources of information on the nutritional and health benefits of fruits and vegetables.

Key words: Fruits, vegetables, knowledge, homemakers, health, nutrition.

INTRODUCTION

Health security and improvement in health outcomes are an integral part of the global commitment to poverty reduction. The development of every nation is dependent on the nutrition and health status of its population. In view of this, efforts are being made at all levels of society towards finding ways of improving the nutrition and health of the citizenry. Whilst some countries have come to terms with, and focused on other ways of attaining good health like increasing physical activities and good nutrition, other nations like Ghana, continue to concentrate on curative rather than preventive care. Good nutrition has been identified as one of the preventive ways of improving and maintaining good health. What we

health. What we eat determines to a great extent the state of health we enjoy. The direct relationship between what we eat and the diseases we suffer has been amply demonstrated (Pamplona-Roger, 2004).

Poor nutrition results in poor growth and development. It has also been implicated in the development of some risk factors and life threatening chronic diseases and deaths. Notable among these are cardiovascular diseases, stroke, hypertension, diabetes and some types of cancers. The resultant effect of poor nutrition is low productivity in industry, agriculture and many other sectors of the economy. Furthermore, poor health is a big drain on government as well as individual's financial resources and other social services (Liu, 2003). Several empirical studies have, however, shown that regular consumption of fruits and vegetables is associated with reduced risk of cancer, cardiovascular diseases, stroke,

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Alzheimer's disease, cataracts and age-related functional decline (Willett, 1994; 1995; Temple, 2000). According to the World Health Report (2002), low consumption of fruits and vegetables is estimated to cause 31% of ischemic heart diseases and 11% of stroke worldwide. In all, it is estimated that up to 2.7 million lives could potentially be saved each year if fruits and vegetables consumption was sufficiently increased. This could be due to the fact that fruits and vegetables provide essential vitamins, minerals, water and fiber that function in several ways to promote good nutrition and health (Wardlaw et al., 2004; Pamplona-Roger, 2006).

Prevention is a more effective strategy than is treatment of chronic diseases. For example, it is estimated that one third of all cancer deaths could be avoided through dietary modification (Willett et al., 1995). This and other convincing evidence suggest that a change in dietary behaviour such as increasing consumption of fruits and vegetables is a practical strategy for significantly reducing the incidence of chronic diseases. A Joint FAO/WHO Expert Consultation on diet, nutrition and prevention of chronic diseases recommend the intake of a minimum of 400g of fruits and vegetables per day for the prevention of chronic diseases and alleviation of several micronutrient deficiencies (WHO, 2003). Despite the enormous benefits of fruits and vegetables to good nutrition and health, there appears to be a dearth of knowledge on the level of awareness and knowledge of consumers on the nutrition and health benefits of fruits and vegetables in Ghana. This study therefore sought to examine homemakers' knowledge of the nutrition and health benefits of fruits and vegetables and how it influenced their consumption patterns.

MATERIALS AND METHODS

Study design, area and sample

The study was a cross-sectional survey conducted at three locations in Ghana, namely Navrongo in the Kassena-Nankana District of the Northern Region; German-Quarters at Sogakope in the South-Tongu District of the Volta Region and Adenta, a suburb of Accra in the Greater Accra Region.

The target population comprised homemakers at these locations. Homemakers were considered because they are responsible for providing family meals. They shop, prepare and serve the family meals. Thus they play an important role in meeting nutritional and health needs of family members. Using the systematic random sampling technique, 150 homemakers, 50 from each survey area, were selected.

Data collection and analysis

A pre-tested structured questionnaire with both open and close ended questions was used to collect data on the objectives of the study, namely demographics, frequency of consumption and forms in which fruits and vegetables were consumed, reasons for consumption, knowledge of nutrition and health benefits, and sources of knowledge. In assessing respondents' knowledge about the nutritional and health benefits of consuming fruits and vegetables

vegetables, 8 statements were developed for use. Respondents were asked to indicate their level of agreement or otherwise on these eight statements on a 1 – 5 scale using the Likert Scale. The ratings on the scale were "5-for strongly agree", "4-for agree", "3-for neutral", "2-for disagree" and "1-for strongly disagree". The responses to the eight statements were summed up as aggregate scores denoting the knowledge level of respondents.

The food frequency questionnaire was used to assess the respondents' usual consumption pattern of fruits and vegetables. To assess consumption rate, the responses for frequency of consumption on daily and weekly basis were grouped as frequent, while responses for monthly, occasionally, seasonally and never were grouped as less frequent.

The Statistical Package for Social Sciences (SPSS Version 12) was used for data analysis. Means and frequencies were generated for continuous and categorical variables respectively. Chi-square test was used to test for statistical differences between categorical variables, while the independent samples t-test and one-way analysis of variance (ANOVA) was used to test differences between continuous variables. In all the tests, p-values <0.05 were considered significant.

RESULTS AND DISCUSSION

Background characteristics of respondents

For a better appreciation of the respondents' attitudes and behaviours towards the subject matter, some of their socio-demographics were examined. These factors were considered important as they may impact on or influence respondents' attitudes, behaviours, habits, needs and values towards consumption or otherwise of fruits and vegetables. Majority (79%) of the respondents were females. This is expected because most often, homemakers in Ghana are females. About 45% of the respondents had tertiary education while 20 and 27% had secondary and basic education respectively. Only a few (7%) had no formal education.

Frequency of consumption of fruits and vegetables

Table 1 shows the frequency of consumption of fruits and vegetables by respondents. The most frequently consumed fruits among the respondents, at least on daily/weekly basis, were orange, banana and pineapple. This finding points to the fact that these are the fruits mostly available to consumers. Mango, watermelon, pawpaw, avocado and apple were consumed occasionally/seasonally. This is consistent with the findings of a study conducted in Accra and Tema on the consumption pattern of fruits among Ghanaian adults, where it was observed that orange was the most preferred fruit, followed by banana and pineapple (Asare, 2007). Generally, the frequency of consumption of fruits was low across the three study areas.

With regard to vegetables, the most frequently consumed were onion, tomato, pepper, dark green leaves, garden eggs and okro. These vegetables form part of the main meals of most of the respondents. Cucumber, cabbage, carrot and green pepper, which were considered

Table 1. Frequency of consumption of fruits and vegetables.

Fruits/Vegetables	Frequency of consumption (%)				
	Daily	Weekly	Monthly	Occasionally/Seasonally	Never
Fruit					
Orange	29	39	15	12	5
Banana	21	39	20	15	5
Pineapple	13	19	36	20	12
Watermelon	11	23	10	38	18
Apple	8	16	15	30	31
Pawpaw	7	16	30	33	14
Mango	7	4	20	57	12
Lemon	7	6	9	20	58
Avocado	5	6	20	33	36
Orange	29	39	15	12	5
Vegetable					
Onion	80	12	1	0	7
Tomato	79	11	3	0	7
Pepper	74	10	6	1	9
Dark green vegetables	33	47	7	2	11
Garden eggs	33	39	12	9	7
Okro	21	54	15	2	8
Cabbage	13	39	20	15	13
Cucumber	13	13	16	20	38
Green pepper	13	26	17	20	24
Carrots	12	26	20	25	17

Table 2. Reasons for consumption of fruits and vegetables in the different study locations.

Reason for consumption	% Response			
	Northern region	Volta region	Greater Accra region	Overall
Promote growth and development	56.4	25.4	61.0	47.5
Provide balanced diet	5.4	41.8	25.5	24.2
Supply vitamins	12.7	7.4	9.8	10.0
Give blood	14.3	9.1	0.0	8.3
Boost to the immune system	6.4	14.5	1.7	7.0
Tasty	4.8	1.8	2.0	3.0
Total	100.0	100.0	100.0	100.0

exotic, were consumed occasionally among respondents. Generally, the consumption of vegetables on daily basis was higher than that of fruits.

In terms of the forms in which respondents consumed fruits, almost all of them (93%) indicated that they consumed fruits in their raw state. This is a step in the right direction as most of the nutrients are made available to the body when fruits are consumed in their natural state. Again, a large proportion (80%) of the respondents indicated that they cooked their vegetables before consumption. This is due to the fact that these vegetables

are used as ingredients in soups and stews, which are usually cooked. Only a few consumed vegetables in the raw state, a practice which was more common among respondents in the suburban area

Reasons for consuming fruits and vegetables

Table 2 shows a summary of the reasons provided by respondents for consuming fruits and vegetables. More than 50 and 60% of the respondents in the North and Accra respectively, indicated that they consumed fruits

Table 3. Distribution of respondents' views on nutritional and health benefits of fruits and vegetables.

Statement	% Response					Total
	Strongly agree	Agree	Neutral (Indifferent)	Disagree	Strongly disagree	
Fruits and vegetables are important in human diet	85	15	0	0	0	100
Heart diseases are prevented by eating fruits and vegetables	29	45	17	5	4	100
Fruits and vegetables can slow down the development of some ailments	33	50	14	1	2	100
Fruits and vegetables are protective foods	54	45	1	0	0	100
Fruits and vegetables eaten whole can prevent constipation	54	31	9	5	1	100
Fruits and vegetables can prevent some forms of cancer	18	26	47	4	5	100
Overcooking can destroy nutrients in fruits and vegetables	67	30	1	1	1	100
Quantity of fruits and vegetables consumed is important to make one healthy and strong	47	33	13	6	1	100

indicated that they consumed fruits and vegetables because they promote growth and development, while 42% of the respondents in the Volta Region contended that they provide balanced diet. Other reasons given for consuming fruits and vegetables were that they supply vitamins, give blood and boost the immune system.

These responses indicate that the respondents are aware that fruits and vegetables are a source of body nourishment but not just to satisfy hunger. This conforms to the findings of the International Food Information Council (IFIC) Foundation Food and Health Survey (2007) on Consumer attitude towards functional foods in the U.S. In this study, consumers believed that food, including fruits and vegetables, improve heart health, immune system functioning and maintain overall health and wellness.

Consumers' knowledge on nutritional and health benefits of fruits and vegetables

The views expressed by respondents on the nutritional and health benefits of fruits and vegetables

are presented in Table 3. Generally, majority of the respondents agreed with the statements that fruits and vegetables are important in human diet (100%), prevent heart diseases (74%), slow down the development of some ailments (83%), prevent constipation (85%) and protect the body (99%). However, about half of the respondents were neutral in their responses as to whether fruits and vegetables prevent some forms of cancer. Their indecision may be indicative of an inadequate knowledge on the fact that regular consumption of fruits and vegetables can reduce the risk of getting certain types of cancer.

For a maximum attainable total score of 40 computed from the eight statements, respondents scored between 26 and 40 with a mean score of 32.9. This assessment suggests that majority of the respondents were knowledgeable about the nutritional and health benefits of fruits and vegetables. An analysis of the association between mean knowledge scores and study location, gender and education (Table 4) showed that there were no significant differences between knowledge and study location ($p=0.886$) as well as knowledge and gender ($p=0.188$), though the

mean scores for males was slightly higher than females. However, it was observed that knowledge about nutritional and health benefits of fruit ($p=0.188$), though the mean scores for males was slightly higher than females. However, it was observed that knowledge about nutritional and health benefits of fruits and vegetables was significantly related to the level of education (Table 4). As the level of education increased, knowledge on the benefits of fruits and vegetables also increased ($p = 0.003$). In a research conducted in the United States by Lin et al. (2003) on fruits and vegetable consumption, it was reported that with higher educational attainment, consumers are equipped with better dietary knowledge and thus consume more fruits and vegetables. The results of a further analysis to assess whether having a high knowledge about the nutritional and health benefits of fruits and vegetables translates into frequent consumption are presented in Table 5. Testing of mean scores on knowledge between frequent and less-frequent consumers of fruits revealed that for most of the selected fruits, the frequent consumers recorded higher scores though the differences were not

Table 4. Mean scores on knowledge by selected characteristics of respondents

Characteristic	N	Mean score	p-value*
Study location			
Northern region	50	33.76	0.886
Volta region	50	33.58	
Greater Accra region	50	33.97	
Gender			
Male	32	34.55	0.188
Female	118	33.67	
Education			
No formal education	11	30.73	0.003**
Basic	41	32.02	
Secondary	29	33.83	
Tertiary	68	34.69	

*p-values were derived from one-way ANOVA tests. **mean values significantly different at 5% level.

Table 5. Relationship between respondents' knowledge of nutrition and health benefits and frequency of consumption of fruits and vegetables.

Fruit	Frequency of consumption	Knowledge mean score	p-value
Orange	Frequent	33.8515	0.703
	Less frequent	33.6042	
Mango	Frequent	35.0588	0.126
	Less frequent	33.6061	
Pawpaw	Frequent	34.6286	0.116
	Less frequent	33.5088	
Pineapple	Frequent	33.9608	0.653
	Less frequent	33.6735	
Banana	Frequent	34.5000	0.111
	Less frequent	33.9718	
Avocado	Frequent	35.9375	0.012*
	Less frequent	33.5113	
Watermelon	Frequent	34.4583	0.117
	Less frequent	33.4455	
Lemon	Frequent	35.3158	0.150
	Less frequent	34.5462	
Apple	Frequent	35.2222	0.006**
	Less frequent	33.3097	
Vegetable			
Cucumber	Frequent	34.5500	0.118
	Less frequent	33.4862	

Table 5 .Contd.

Dark green leaves	Frequent	33.8908	0.434
	Less frequent	33.3000	
Tomato	Frequent	33.8345	0.715
	Less frequent	32.9000	
Onion	Frequent	33.8345	0.440
	Less frequent	32.9000	
Garden eggs	Frequent	34.1667	0.133
	Less frequent	33.7317	
Okro	Frequent	33.9381	0.331
	Less frequent	33.2500	
Pepper	Frequent	33.7540	0.890
	Less frequent	33.8696	
Cabbage	Frequent	34.1282	0.217
	Less frequent	33.3803	
Carrots	Frequent	34.3088	0.044*
	Less frequent	33.1152	
Green pepper	Frequent	35.2881	0.000**
	Less frequent	32.7778	

**p<0.05; **p<0.01.

statistically significant. Significant differences were observed only for avocado and apple. This revelation could be due to the role of other intervening socio-economic variables than education, such as income, availability and preference, among others, that could affect the frequency of consumption.

With regard to vegetables, again in the frequently recorded higher scores for almost all the selected vegetables, significant differences were however observed for carrot and green pepper. As mentioned earlier, these vegetables are exotic and expensive to the average Ghanaian, thus only people with higher knowledge about the nutritional and health benefits consume them frequently. This assertion was reiterated by Pollard et al. (2002) who reported that a belief in the health benefits of fruits and vegetables may well increase consumption and that an individual's concern about nutrition is positively related to his/her behaviour.

The major sources of information for respondents were the media (mainly radio and television), health workers, school and books (Table 6). According to IFIC Foundation Food and Health Survey (2007), the mass media and health workers are top sources of information on health and nutrition in the United States. An appreciable proportion of the respondents in rural communities in the North (27.4%) and Volta (25.0%) regions received information about fruits and vegetables from health

workers. Health workers can therefore be used as change agents, especially in the rural areas, to deliver more personalized nutrition messages to people in their communities.

CONCLUSION AND RECOMMENDATIONS

Based on the results of the study, it was concluded that generally the frequency of consumption of fruits and vegetables was low across the three study areas though the rate of consumption of vegetables was higher than that of fruits. The frequency of consumption of fruits and vegetables improved with the level of education attained, as people with higher education tended to have more knowledge of the benefits of fruit and vegetables, and thus, consume them frequently. Although respondents had a fair knowledge about the nutritional and health benefits of fruits and vegetables, this did not reflect in inconsistency between knowledge and rate of consumption could be attributed to the role of other intervening factors other than education, such as income, availability and preference that could affect consumption rate. The mass media, mainly television and radio, as well as health workers were the main sources of information on the nutritional and health benefits of fruits and vegetables among respondents in the three study areas.

Table 6. Sources of information to respondents by study location.

Source of information	% Response			
	Northern region	Volta region	Greater Accra region	Overall
School	6.6	19.2	12.5	12.8
Books	11.3	10.6	18.8	13.1
Health workers	27.4	25.0	10.0	21.7
Media	32.1	24.1	41.3	31.7
Peers	7.5	4.8	1.3	4.8
Parents	5.7	1.9	6.3	4.5
Internet	0.0	1.9	8.8	3.1
Other	9.4	12.5	1.0	8.3
Total	100.0	100.0	100.0	100.0

Since education appeared to have a positive influence on the knowledge and consumption rate of fruits and vegetables, it is recommended that more attention be given to nutrition education programmes. There is the need for intensive education on increased consumption of fruits and vegetables through the mass media and health workers. These actions will not only reinforce current consumption patterns but also contribute to raising the level of awareness of those outside the current consumption brackets.

REFERENCES

- Asare AA (2007). Fruit consumption among Ghanaian adults. Unpublished Dissertation. Department of Nutrition and Food Science. University of Ghana, Legon.
- IFIC Foundation Food and Health Survey (2007). Consumer Attitudes towards Functional Foods/Foods for Health. <http://www.ific.org/research/foodandhealthsurvey.cfm>.
- Lin BH, Jayachandran N, Variyan JA, Cromartie J (2003). Food and Agricultural Commodity Consumption in the U.S.: Looking Ahead to 2020. USDA/ERS, AER-820.
- Liu RH (2003). Health benefits of fruit and vegetables are from additive and Synergistic combinations of phytochemicals. *Am. J. Clin. Nutr.*, 78(3): 517S-520S.
- Pamplona-Roger GD (2004). Encyclopedia of foods and their healing power. A Guide to Food Science and Diet Therapy. Education and Health Library, Editorial SAFELIZ, Madrid, Spain.
- Pamplona-Roger GD (2006). Healthy Foods. First edition, Editorial SAFELIZ, Madrid, Spain.
- Pollard J, Kirk SFL, Cade, JE (2002). Factors affecting food choice in relation to fruits and vegetable intake. *Nutr. Res. Rev.*, 15(2): 373-387.
- Temple NJ (2000). Antioxidant and disease: More questions than answers. *Nutr. Res.*, 20: 449-459.
- Wardlaw GM, Hampl JS, DiSilvestro RA (2004). Perspectives in Nutrition. 6th edition. McGraw-Hill, New York, pp. 375-376.
- World Health Report (2002). Reducing Risk, Promoting Healthy Life. WHO, Geneva.
- Willett WC (1994). Diet and health: what should we eat? *Science*, 254: 532-537
- Willett WC (1995). Diet, nutrition and avoidable cancer. *Environ. Health Persp.* 103(8): 65-170.