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Full Length Research Paper

Evaluation of vegetable consumption in South Eastern Nigeria

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Vegetable consumption in the South East of Nigeria was evaluated with the objective of identifying the effects of cost and availability of vegetables in the areas and adequacy of consumption. A market survey was done in 9 markets spread across the zones including Anambra, Enugu and Ebonyi States. Questionnaires were used to assess 24 h vegetable consumption. The quantity of vegetable consumed was estimated indirectly from the market cost. The results show that the highest vegetable diet consumed in area is mixed vegetable soup (170.6 g/meal), followed by mixed okra/"ugu" soup (154 g/meal). The results showed that cost and availability do not affect vegetable consumption, and that the quantity of vegetable consumed in the area is lower than 400 g/day as recommended by World Health Organization (WHO). It was recommended that nurses and health educators who work with homemakers (mothers) should sensitize them on the need for increase in vegetable consumption.

Key words: Vegetable, consumption, cost, availability.

INTRODUCTION

Vegetables are edible parts of plants that are consumed whole or in parts, raw or cooked as part of main dish. The tropical and sub-tropical countries of the world are blessed with varieties of vegetables some of which are domesticated, while others grow wild and their prices are relatively affordable when compared with other food items in the areas (Uzuegbu and Eke, 2000; Okaka et al., 2010; Schippers, 2000). It is estimated that up to 2.7 million lives could potentially be saved each year if fruits and vegetables consumption are sufficiently increased (WHO, 2002). The health benefits of diet rich in vegetables have also been recognized and there is evidence that nutrient content of fruits and vegetables such as dietary fibre, folate, antioxidants, vitamins and phytochemicals are associated with low risk of cardiovascular diseases (Strandhagen, 2000; WHO, 2002).

Vegetables have a low glycaemic index and foods of low glycaemic index are associated with low risk of type II diabetes and coronary heart disease, prolonged satiety responses which leads to weight control (Joffe and Robertson, 2001; WHO, 2003). In the last four decades, there are indications of partial shifts from staple food towards vegetable, oil and sugar in low and lower middle income countries like Nigeria while there is a shift toward vegetable, oil and meat in higher income countries (FAO/WHO, 2004). WHO recommended that the consumption standard quality for vegetable is 80 g/meal and a total of 400 g/day. The actual quantity consumed tends to be less, and it was recommended that vegetable intake should be flexible and adequate in local circumstances, because of wide variability of dietary pattern, vegetable availability, food preferences and cultural consideration of food. Countries were advised to set up vegetable promotion initiative with the aim of increasing intakes to

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140 g serving vegetable per day for children and up to 400 g serving per day for adults (WHO, 2005).

The effort of vegetable promotion initiatives is to meet vegetable consumers' needs and preferences, increasing consumer awareness of the benefits of diets rich in vegetables, diversification of vegetable production, understanding consumer expectation in taste, texture, form, price convenience, quality and safety attributes (Ndie, 2010). Promoting the consumption of vegetable for health reasons also implies a need to improve vegetable supply and distribution systems to ensure their safety and qualities.

Research has shown that vegetable consumption is low is such Saharan Africa (27 to 114 kg/capita/year) which is below the WHO/FAO recommendation of 146 kg/capita/year (WHO, 2005). This study is aimed at identifying the consumption pattern of vegetable as it relate to availability and cost in the South Eastern Nigeria. South Eastern Nigeria is located at the equatorial rain forest of West Africa and is predominantly occupied by the Igbos.

Objectives of the study

The objectives of this study are as follows:

1) To identify the commonly consumed vegetables in South Eastern Nigeria.
2) To evaluate the effect of cost and availability of vegetables on the consumption pattern.
3) To assess the adequacy of vegetable consumption in the states.

Research questions

The research questions of the study are as follows:

1) What are the commonly consumed vegetables in South Eastern Nigeria?
2) What are the effect of cost and availability of vegetables on the level of consumption?
3) Is vegetable consumption of the people of South Eastern Nigeria adequate?

METHODOLOGY

Research design

A survey research design was used to elicit information on the cost and consumption pattern of vegetable in South Eastern Nigeria.

Population and sampling method

Simple random sampling method was used to select Anambra, Enugu and Ebonyi from five states of South Eastern States of Nigeria. A convenient sampling method was used to select 10 households from each of the three senatorial zones of the three states. A total of 90 households representative samples were used for each state.

Estimate of vegetable consumption

The quantity of vegetables consumed by the individuals in the family was estimated indirectly using the following method.

Market survey

The weight of the edible part of different vegetables costing one hundred Naira (N100) were gotten from main markets of the nine senatorial zones of the three states: Anambra, Enugu and Ebonyi. The market survey was done from January to December, 2009.

The homemakers' (mostly mothers) in the 90 selected families in each state were asked the cost of various vegetables they use in preparing different foods for their families, from these costs the weight of the vegetable consumed were estimated by dividing the weight by the number of plates served from the food prepared.

Vegetable and recall

Vegetable food (24 h) recall was conducted using questionnaires to collect information on vegetable contained in the food served to the family within 24 h from the homemakers. The questionnaires were based on United Kingdom National Diet and Nutrition Survey (UK NDNS, 2002) modified to suit the environment and was first used in a pilot study. The amended copy was used for the study.

Statistical analysis

Data were collected and analyzed statistically using Statistical Packages for Social Sciences (SPSS) computer package. Calculation of mean vegetable consumption per day was also obtained.

RESULTS

The commonly consumed vegetables and their 24 h recall frequency in South Eastern Nigeria is shown in Table 1. The result show that *Telfairia occidentalis* (ugu leave), *Vernonia amygdalina* (bitter leave), *Pterocarpus soyauxii* (ora), *Amaranthus* species (Green Amalant) and *Abelmoschus esculentus* (okra) are with consumption rate of 68 to 86% daily in South Eastern Nigeria. The other vegetables that are consumed in the area at moderate rate are "Uzuza" (25 to 35%, *Solanum melongena* (anara leave), curry and "nchuanwu". "Okazi" and water leaves are consumed sparingly (11 to 18%). The means fluctuation in cost and consumption of vegetable in South Eastern Nigeria in 2009 is shown on Table 2. The results show that the cost of vegetables is low between April and September which corresponds to the rainy season and high between October and March which corresponds to the dry season. The only exception to this pattern of cost is *P. soyauxii* (ora) which is cheap between October and March. The results also show that

Table 1. Commonly consumed vegetable and their consumption frequency (%) in South East Nigeria per day.

Vegetable	Anambra		Enugu		Ebonyi	
	n	%	n	%	n	%
Telfairia occidentalis (ugu)	78	86.6	75	83.3	72	80
Vernonia amygdalina (bitter leave)	78	86.6	72	80	72	80
Pterocarpus soyauxii (ora)	75	83.3	72	80	72	80
Amaranthus spp. (green amaranth)	72	80	70	78	70	78
Abelmoschus esculentus (okra)	61	68	66	73	63	70
Uzuza	35	39	32	35	29	32
Solanum melongena (Anara leave)	27	30	25	28	27	30
Water leave	15	17	11	13	14	15
Curry leave	27	30	29	32	27	30
Nchuanwu	29	32	27	30	27	30
Okazi	14	15	18	20	11	13

Table 2. Mean fluctuations in cost and consumption by weight/meal of vegetable in South East Nigeria.

Vegetable	Jan.-March		April-June		July-Sept.		Oct.-Dec.	
	Cost (g/N100)	Gram/ meal	Cost (g/N100)	Gram/ meal	Cost (g/N100)	Gram/ meal	Cost (g/N100)	Gram/ meal
Telfairia occidentalis (ugu)	450	73.3	500	80	800	80	850	76
Vernonia amygdalina (bitter leave)	150	78.3	450	80	500	80	250	78.3
Pterocarpus soyauxii (ora)	400	71.7	100	70	80	70	300	72
Amaranthus spp. (green amaranth)	500	84.3	800	80	1000	89	600	84
Abelmoschus esculentus (okra)	150	60	160	61	500	65	500	61
Uzuza	20	5.8	20	5.8	50	6.1	30	5.5
Solanum melongena (Anara leave)	75	46.3	74	45.8	74	45.8	76	46
Water leave	100	62	1800	63	2000	64	1500	62
Curry leave	25	5.5	30	5.5	50	5.5	30	5.5
Nchuanwu	25	10	25	10	50	9.4	40	9.8
Okazi	40	30	50	35	50	35	40	35

Table 3. Main vegetable diet of South Eastern Nigeria.

Type of diet	Vegetable	Gram/meal
Bitter leave soup	Bitter leave	84.9
Ugu soup	Ugu/Uzuza	70.1
Ora soup	Ora	84.00
Mix vegetable soup	Ugu/Okazi/Water leave/Uzuza	170.6
Mix okra/ugu soup	Okra/Ugu/Uzuza	154.1
Boil yam/green	Green amaranth	80.1
Rice/green amaranth	Green amaranth	81.1
Tapioca/Anara leave	Anara leave	48

the cost of vegetable varies.

The results show that water leave is the cheapest (1000 to 2000 g/N100) in the states followed by *Amaranthus* spp. (green amaranth, 500 to 1000 g/N1000). Most consumed vegetable by weight per meal is *Amaranthus* spp. (80 to 89 g/meal). This is followed by *T. occidentalis* (78.25 to 80 g/meal), veronica amygdaline (78 to 80 g/meal) and the least consumed are curry and "Uzuza" (5 to 10 g/meal). The results show that the consumption rate increases as the cost is lowered but this increase is not statistically significant ($P \geq 0.05$).

The common vegetable diet of South Eastern Nigeria is shown in Table 3. The results show that the highest quantity of vegetable is in mix vegetable soup (170.6/meal)

followed by mix okra/ugu soup (154 g/meal). The least is "tapioca/anara" leave (48 g/meal).

DISCUSSION

It may be inferred from this study that the quantity of these vegetables consumed are constant irrespective of the change in the cost. This may be explained by the fact that there is a maximum quantity needed for a particular size of the diet being prepared, and when this quantity is not reached or exceeded, the taste of the food is affected negatively (Ndie, 2010). This study indicates that the low consumption of vegetable is not due to low production or high cost as stated by Hodder (2004) and Bondoin (2004), because even when the vegetable is cheap and available the consumption rate did not increase significantly. This phenomenon probably informed WHO's fear that some countries that presently consume less than the recommended 400 g/day may never increase their consumption rate to meet this recommendation level even if availability of vegetable is increased and the cost reduced.

The main vegetable diet of South Eastern Nigeria is shown in Table 3. The results show that South East diet is low in vegetable intake per day. For example, an individual who consumed a mixed vegetable soup for lunch and boiled rice or yam with vegetable at dinner has consumed 250 g per day. This is still lower than 400 g/day recommended by WHO (2005).

It may be concluded from this study that varieties of vegetable are available all the year round in the South Eastern States of Nigeria and at affordable price too. The availability and cost do not influence significantly the quantity of these vegetables consumed per meal over the year. This may be due to the fact that the quantity of vegetables in a diet as a recipe is pre-determined by the type of diet. The results show that vegetable is added mostly in soups in South Eastern diet. To encourage vegetable consumption in the area, the people should be encouraged to increase their soup consumption rather than the accompanying pounded yam or garri or cassava fufu. Consumption of mix vegetable soup should also be encouraged.

Conclusion

Availability and cost do not significantly affect the consumption of vegetable since the quantity that needs to be added into a particular diet is predetermined by the quantity of the dish being prepared and taste attached to the diet by cultural food habit.

RECOMMENDATION

It is recommended that the homemakers in the area should be advised to increase the amount of soup ration served to the family to help improve the quantity consumed.

IMPLICATION TO NURSING

Nurses who understand the need of vegetable in diet and who from time to time are called to give health education to homemakers (mothers in Antenatal clinics and other maternity services as well as infant welfare clinics) should use these findings to educate mothers on the need for increase in vegetable consumption since the vegetables are available and also affordable in South East, Nigeria.

LIMITATION OF THE STUDY

A major limitation of the study was the sample size which limited the generalization of the result when compared with the populations of the households in the area.

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