DIETARY HABITS OF HYPERTENSIVE PATIENTS IN A TERTIARY HYPERTENSION CLINIC IN SOUTHERN NIGERIA.

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Abstract

Introduction: The prescriptions regarding non-pharmacological care in the management of hypertension has been carefully defined by the various practice guidelines. However, there is paucity of data on dietary practices in our environment, therefore this study set out to determine the dietary practices of hypertensive patients residing in southern Nigeria.

Methods: A cross-sectional study that utilized a semi structured questionnaire as well as a 3 weekday and a weekend food diary to document the types of food, fruits, snacks and vegetables taken. Patient's knowledge of salt containing food items, volunteered salt consumption practices was also sought. Blood pressure control was determined using present practice guidelines.

Results: A total of 509 patients were studied (M:F ratio of 1:2.2), an age range of 22-97 years. Of the total number, 392(77%) volunteered modifying their diet; mainly salt reduction in 188(47.5%), reduction in quantity of food in 72(18.2%), predominantly carbohydrate restriction in 82(20.7%), amongst others. The number of patients who ate fruits were 418(82.1%), mostly oranges 268(64.1%) and pawpaw 145(34.7%). One hundred patients (19.6%) met the recommendations stated in the guidelines of eating vegetables daily while 145(28.7%) had a vegetable meal at least 3 times a week. Patients who did not meet these recommendations displayed a trend towards poor blood pressure control.

Conclusion: The diet of hypertensive patients attending clinic was mainly carbohydrate based with inadequate intake of fruits and vegetable. They also had an incomplete knowledge of the effects of salt on hypertension. These dietary practices are likely to have in part influenced the blood pressure control.

Introduction

Hypertension is a chronic non- communicable disease that is highly prevalent in our environment, various studies, notably the Dietary Approach To Stop Hypertension (DASH) study, have demonstrated the influence of non-pharmacological strategies in reducing elevated blood pressure.

There is increasing emphasis on the importance of healthy portions of fruits, nuts and vegetables in the diet of a hypertensive patient. It has been shown that there is an increased success of treatment when active guidance or counseling of patients by their health care providers includes dietary advice.

A study carried on a section of traders in northern Nigeria discovered obesity was a predictor for hypertension with most of the traders having unhealthy dietary habits. Furthermore, a study in south-western Nigeria had found the nutritional knowledge of hypertensive patients to be

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low. Adequate knowledge of the diet and dietary habits in the hypertensive patient is essential for proper counseling. There is however limited data on this subject in hypertensive patients in the sub-Saharan region and Nigeria is a vast country with diverse ethnic groups with different eating habits.

This study investigates the eating pattern of the average Nigerian hypertensive living in the south-south region of the country and the possible effects of diet on blood pressure control.

Methods

This cross sectional study was carried out at the consultant out- patient department of the University of Benin Teaching Hospital, a 700-bed tertiary health care centre in South –South Nigeria, with a clientele from Edo and other neighboring states. The Consultant Out-Patient Department (COPD) houses the hypertension clinic and other specialty clinics. This is part of a larger study on the lifestyle practices of hypertensive patients.

The patients were recruited serially over a 6month period from September 2009 to February 2010 from the hypertension clinic.

Sample size: The minimum sample size of 382 was calculated based on a prevalence of 46% from a previous study and a sample size formula for studies of single proportions. The total number of patients who consented to the study were however 510.

Ethical approval was obtained from the ethical committee of the hospital and hypertensive patients attending the clinic were recruited into the study after written informed consent was obtained.

Data collection.
A semi structured interviewer administered questionnaire was used to collect data.

Measurement of blood pressure
Hypertension was defined according to the WHO/ISH classification using a blood pressure cut off point of greater than or equal to 140/90mmHg. The patients were seated for 5 minutes and had their blood pressure taken with mercury sphygmomanometers(Accusson®) and stethoscopes using the auscultatory method, blood pressure was taken using the first Korotkoff sound as systolic blood pressure and the fifth Korotkoff sound as diastolic blood pressure in that position. An appropriate-sized cuff (cuff bladder encircling at least 80% of the arm) was used to ensure accuracy.

Blood pressure control was determined in patients with uncomplicated hypertension as $< 140/90mmHg$ and $< 130/80mmHg$ in diabetics and CKD patients according to the Nigeria Hypertension Guidelines which is based on the WHO/ISH guidelines.

The questionnaire collected demographic information such as age, sex, religion, educational status, occupation, marital status and average monthly income.

Other information sought included duration of therapy, co-morbidities, duration since last clinic visit. A three weekday and a weekend food diary was also administered to the patients. They were requested to give account of the meals eaten in the few days preceding the clinic visit and details of snacks or drinks (excluding frequency of snacks and drinks).

Patients were asked about salt intake, added salt to food on table, consumption of other high salt food items (which they

listed); whether they were on a structured diet and how frequently they ate fast food. They were also asked of their consumption of fruits and vegetable per week. This was documented in a chart. Patients who ate vegetables and fruits daily were regarded as being adherent to recommendations. Patients were also categorised into having a low intake of fruits if they ate fruits less than once to twice weekly, moderate: three times to five times weekly, and a high intake: six to seven times weekly. The patients were again categorised based on their intake of vegetables into no intake, low: if they ate vegetables less than once to twice weekly, moderate: three times to five times weekly, and a high intake: six to seven times weekly.

Data analysis

The data were analysed using SPSS version 16 for windows, (SPSS Inc., Chicago, IL, USA). The Mean (± two standard deviations) was computed for all continuous data. Frequencies were calculated for categorical variables.

In univariate analyses, means were compared using student's t-test. Categorical variables were compared using Chi-squared and Fisher's exact tests, as applicable. Tests of proportions, Odds ratios (with 95% confidence intervals, CI) were calculated from the 2×2 tables. Non parametric tests (Mann-Whitney) were also used. A p-value of less than 0.05 was considered to be statistically significant for all analyses

RESULTS

Response rate

Five hundred and ten patients were recruited for the study. However a patient was unable to complete the questionnaire, leaving 509 patients and giving a response rate of 99.9%.

Socio-demographic characteristics of participants

There were more females than males with a sex ratio of 2.2:1. Age ranged from 22-97years. Majority were married (75.2%). The levels of education attained by the patients were as follows: tertiary 150(29.5%). secondary 133(26.1%), primary 130(25.5%) and no formal education in 96(18.8%). Patients who earned an average monthly income of N10,000 to N19,999 (US$ 61- 121) had the highest frequency 130(25.5%), < N 5000 (14.3%),N5000-N9999(16.7%), N20,000-N49,999(22.8%), N50,000 N-99,999(13.8%), > N 100,000(6.9%).

Characteristics of hypertensive patients in the study.

The duration of treating hypertension ranged from 2 weeks to 36 years with a mean duration of 6.5±6.9 years and median of 4.0years. A family history of hypertension was present in 179(35.2%) of the population. A total of 254(49.9%) patients had co-morbid states:[1 co-morbid state- 230(90.6%), 2- 21(8.3), 3 or more co-morbid states - 3(1.2%)] as stated in the case records following earlier clinical examination and investigations. Diabetes was the most commonly associated state (27.9%), others were osteoarthritis 7.1%, gastrointestinal disorders 4.3%, respiratory diseases 2.2% amongst others.

The duration of last clinic visit ranged from 2 days to 116 weeks, (mean 10.5±10.2 weeks, and median of 10 weeks). Only 15 (2.9%) had not attended clinic in 6 months.

Dietary pattern.

A good number 392(77.0%) said they had modified their diet following diagnosis of hypertension. The modifications carried out included salt reduction in

Table 1: Dietary pattern of meals eaten over weekdays and weekends by the hypertensive patients.†

Food products	Components of meals eaten at breakfast.		Components of meals eaten at lunch		Components of meals eaten at dinner	
	Weekdays n(%)	Weekends n(%)	Weekdays n(%)	Weekends n(%)	Weekdays n(%)	Weekends n(%)
Cereal products	407(80.0)	345(67.8)	38(7.5)	35(6.9)	78(15.3)	50(9.8)
Bread & tea	462(90.8)	213(41.8)	12(2.4)	3(0.6)	36(7.1)	22(4.3)
Bread& egg	37(7.3)	19(3.7)	-	-	-	1(0.2)
Rice & stew	174(33.8)	92(18.1)	301(59.1)	408(79.8)	271(53.3)	238(46.8)
Cassava(Eba)& soupᶦ	116(22.8)	55(10.8)	248(48.7)	122(24.0)	314(61.7)	184(36.1)
Starchy roots (fufu,semovita)	19(3.7)	7(1.4)	67(13.2)	33(6.5)	58(11.4)	25(4.9)
Yam/ plantain flour(Amala) or Wheat	27(5.4)	10(2.0)	77(15.1)	55(10.8)	146(28.7)	98(19.3)
Plantain	51(10.0)	31(6.1)	163(32.0)	72(14.1)	139(27.3)	66(13.0)
Yam (Roots & tuber)	81(15.9)	44(8.6)	203(39.9)	80(15.7)	214(42.0)	105(20.6)
Pounded yam (processed roots)	9(1.8)	75(14.7)	38(7.5)	26(5.1)	28(5.5)	58(11.4)
Beans(legumes)	59(11.6)	75(14.7)	193(37.9)	94(18.5)	122(24.0)	83(16.3)
Others*	17(3.3)	12(2.4)	58(11.4)	36(7.1)	44(8.6)	34(6.7)
No food	70(13.8)	55(10.8)	101(19.8)	54(10.6)	77(15.1)	54(10.6)

†This is an average of a 3 day food diary of meals eaten over a typical week and weekend.

* Others include noodles, fruits, garden egg, biscuit,
ᶦ Soup: melon based, palm kernel seeds based and plain vegetable.

Table 2: Food items perceived by the patients as having a high salt content (N=83).*

Food products	n/N(%)
Sausage based pies	31(37.3)
Pastries (buns,meatpie,springroll,biscuits,snacks)	16(19.3)
Sardine	12(14.5)
Sausage	7(8.4)
Corned beef	7(8.4)
Rice	5(6.0)**
Stock cubes	5(6.0)
Yam	4(4.8)**
Beans	3(3.6)**
Meat	3(3.6)**
Noodles	2(2.4)
Plantain	2(2.4)**
Bread	1(1.2)
Canned food	1(1.2)
Others(stew, soup, ice fish, ,sea food, all food)	4(4.8)

*Patients named multiple high salt containing products.

** These food items do not have a high salt content.

Table 3: Fruits eaten by hypertensive patients in the study (N= 418).*

Fruits eaten	Frequency n/N (%)
Oranges	268(64.1)
Banana	160(38.3)
Pawpaw	145(34.7)
Pineapple	90(21.5)
Apple	79(18.9)
Pear	60(14.4)
Garden egg	56(13.4)
Watermelon	38(9.1)
Guava	33(7.9)
Mango	22(5.3)
Grapes	12(2.9)

Patients may take more than one fruit in the table.

188(47.5%), reduction in quantity of food in 72(18.2%), predominant carbohydrate restriction (reduction in either rice, bread, yam or sugar) in 82(20.7%), combination of carbohydrate and protein restriction (reduction in either red meat or carbohydrates) in 11(2.8%) and fat or oil reduction (fried foods) in 43(10.9%).

The patients had breakfast comprising mainly bread and tea during the week 407(79.9%) and corn cereal (pap) 345(67.8%) at weekends. At lunchtime, the main meal eaten was rice and tomato stew 301(59.1%) during the week. This same pattern was seen at weekends. For dinner, most 314(61.7%) of the patients ate "Eba" (processed cassava) weekdays and 234(46.0%) rice at weekend. Two hundred and twenty three (43.8%) patients took snacks apart from meals. Majority 220/223 (98.7%) had pastries and soft drinks, while three (1.3%) took fruits as snacks. The other meals eaten are as shown in table 1.

Four hundred and forty eight patients (88%) indicated that they had reduced their salt intake. However a high proportion still used salt seasonings in cooking 452(88.8%), chiefly stock cubes 429/452 (95%). A proportion of the patients 24(4.7%) still added salt to food while eating.

A proportion of patients 78(15.3%) ate at fast food restaurants, of which 50/78(64.1%) visited the restaurants frequently (between daily to once monthly). Only eighty three (16.3%) patients admitted to knowing food or food products with a high salt content and they gave the following as shown in table 2 as high salt containing food or products. An incorrect knowledge of high salt containing food products was observed in 11/83(13.2%) of those who reported knowledge of high salt containing food products.

The number of patients who ate fruits were 418(82.1%), and most of them 115/418(27.5%) ate fruits twice a week. Majority 449(88.2%) of the patients did not meet the recommendation of eating fruits daily. The fruits mostly eaten were oranges 268(64.1%), pawpaw 145(34.7%), other fruits are as shown in table 3.

The frequency of weekly intake of fruits was found to be as follows: none-91(17.9%), low intake -228(44.8%), moderate- 127(25%) and a high intake in 63(12.4%) patients

Patients who had an average monthly income N100,000 or more, 7(20%) had the highest proportion of high weekly intake of fruits but this was not statistically significant. (^{2}= 21.487, p value= 0.158). Patients with a tertiary level of education had a high weekly intake of fruits 24(16.0%) compared with the other levels, and this was statistically significant. (^{2}= 20.408, p value= 0.016.).

Almost all the patients 506(99.4%) admitted to taking vegetable meals and this comprised mainly of green leafy vegetables, including fluted pumpkin leaf, spinach and waterleaf in 496(98.0%), others include cabbage, carrot, lettuce in 26(5.1%). Majority 145(28.7%) had a vegetable meal at least 3 times a week. Only a hundred patients 19.6% however met the recommendations stated in the guidelines of eating vegetables daily.

One hundred and seventy five (34.4%) patients were found to have a low weekly intake of vegetables while, 231(45.4%), 103(20.2%) had a moderate and a high weekly intake of vegetables respectively. Patients who had an average monthly income ranging between N20,000 and N49,999 had the highest proportion 28(24.1%) of high intake of vegetables but

this was not statistically significant. (x^2= 17.521, 0.064). Patients with a tertiary level of education had a high weekly intake of vegetables 35(23.3%) compared with the other levels, and this was statistically significant. (x^2= 13.917, p value= 0.03).

Blood Pressure Control

A total of 177(34.8%) patients had controlled blood pressure, with a value of <140/90mmHg in those with uncomplicated hypertension and <130/80mmHg in diabetic patients and patients with chronic kidney disease.

Blood Pressure Control and dietary habits

Patients who had reduced their salt intake – 156/448(34.8%) had a better control than those who had not – 21/61(34.4%). This was not however statistically significant.

A hundred and fifty three patients (33.7%) who used salt seasonings showed a trend to poorer blood pressure control when compared to those (43.6%) who did not use salt seasonings. This however, did not achieve statistical significance. Among patients with controlled blood pressure, 154(35.7%) of them who were not frequenting fast food restaurants were more than the proportion 23(29.5%) who frequented fast food restaurants. However, this was not significant. (x^2= 1.135, p= 0.287).

The highest proportion of patients who ate fruits and had controlled blood pressure was seen in those with a high intake of fruits (six to seven days weekly) 26(41.3%) but this was not statistically significant (x^2= 3.016 p= 0.232). Also the highest proportion of patients who ate vegetables and had controlled blood pressure was equally seen in those with a

high intake of vegetables 42(40.8%), this also did not reach statistical significance (x^2= 3.546 ,p= 0.697).Discussion

This study on lifestyle practices has offered some insights into the possible factors that may be influencing the overall health status of the hypertensive patient in our environment.

This study has shown that majority of the hypertensive patients felt they had modified their diet to a slightly healthier one since their diagnosis. However, there was a high intake of carbohydrate in the processed forms, as well as the intake of confectionaries as snacks and sweetened beverages which reflects an inadequate knowledge of dietary modifications and may contribute to weight gain in hypertensive patients, as suggested by previous studies.

An interesting finding in this study was the proportion of patients patronizing fast food outlets. A similar finding was observed in Kuwait, by Serour et.al where 54.5% ate fast food more than once a week. In the same study, it was discovered that 63.5% of the patients were not adhering to any diet, and the majority of the study population were obese. The identifiable barriers to adherence were unwillingness to diet, difficulty in eating a separate meal from the family, social gatherings.

The proportion that frequents these outlets serve as a source of concern in this era of increasing urbanisation with obesity fast becoming an epidemic.A poor eating habit that has been associated with urbanization is the reduction in the intake of traditional food and increased intake of food products with saturated fat, high salt and refined carbohydrate content.

A typical diet (American and European) is high in calories and sodium and low in fibre, calcium, other minerals and vitamins. The prevailing diet in sub-Saharan Africa and Nigeria in particular, comprises mainly of complex carbohydrates, saturated fatty foods, high fibre and low in protein.

The recommendation in the sub-Saharan guideline on lifestyle measures was for patients to have 'balanced' diets low in saturated fats (avoiding coconut oil, butter lard and limiting palm- oil), salt and sugar. They also recommended an increased intake of food high in fibre, unrefined carbohydrates, fruits and vegetables as well as increased intake of fish.

This study revealed that most of the patients had white bread for breakfast during weekdays and other cereal products on weekends. This is not in line with the recommendation to have more of unrefined carbohydrates, bread is also quite high in calories and salt. Also it was shown in this study that there seems to be high intake of carbohydrate in the form of processed roots and tubers for lunch.

The use of salt seasonings especially stock cubes in cooking, as well as adding salt to food on table while eating revealed poor knowledge of the contributions of a high salt intake to poor blood pressure control. The use of stock cubes may translate into using more salt than that prescribed at 85mmol/day or less than 5g/day. An earlier study had shown that the main source of dietary salt in a typical African diet is from salt added to preserve food. Therefore, adding salt to food on table, using salt seasonings to cook will further increase dietary intake of salt. In addition, a relatively high (52% in rural areas and 56% in semi-urban areas) use of stock cubes was found in same study.

Most patients are not aware of increased salt consumption by their intake of fast foods, canned foods, stock cubes and processed foods such as bread. The amount of salt in these processed food have been noted to be high. The proportion of patients who had incorrect knowledge of high salt containing food products in this study, also further buttresses the incomplete knowledge the patients have regarding dietary measures in managing hypertension.

Structured diet sheets are not routinely given to hypertensive patients and this may account for many patients not being aware of the processed and preserved foods containing more sodium than adding salt to food on table.It has therefore been recommended that patients and those who cook for them, should be given both verbal and specific written advice to ensure real reduction in salt intake and not only refraining from adding salt to food at table.

The recommendation in the DASH diet promoted for healthy living may not be applicable in sub-Saharan Africa as the means for carrying out changes in preparation especially in meal preservation, may not be readily available to this set of patients.

Fruits and vegetables

Intake of fruits and vegetables especially as demonstrated by the DASH diet is encouraged in hypertensive patients. However, the expected frequency of daily intake was not seen in this study as more patients ate fruits less than twice a week and ate leafy vegetable three times a week. This is similar to what obtained in another study where the respondents also ate vegetables 3 days of the week on the average. These findings suggest that the patients do not appreciate the benefits

derivable from intake of fruits and vegetables in the management of hypertension. Furthermore, this may reflect the knowledge of the contribution of fruits and vegetables as conveyed during clinic attendance or hospital stay.

A Cochrane review had shown that printed advice on dietary intake as well phone calls had improved the intake of fruits as per recommendations. Absence of similar outlined instruction in this setting may have also accounted for the poor intake of fruits in this study. However, the more educated patients in this study appeared to have a better understanding of the needs for fruits and vegetables. The fruits commonly eaten were however rich sources of potassium. A study which reviewed the effects of high fruits (pineapple, banana, grape fruits, tangerine and pawpaw) and vegetables intake in Nigerian hypertensives, also discovered that these measures reduced blood pressure and decreased plasma sodium. This study however buttressed the importance of adopting a high fruit and vegetable diet in the Nigerian hypertensive.

The effects on blood pressure control can be seen with the trends showing a slightly better control in those who had modified their diet. Though this trend though did not reach statistical significance it may buttress earlier work done which revealed better control of blood pressure with a higher intake of fruits and reduction in salt intake.

Limitations
The limitations of this study include a reliance on self report and patients' ability to recall data. It also did not address methods of food preparation.

Conclusion
The study has demonstrated that the staple diet of the average hypertensive living in the south-south region of Nigeria is more carbohydrate based with little inclusion of fruits and other vegetables. Further studies may need to be carried out to educate the patients further on need to incorporate more fruits and vegetables in the diet.

There is also a need to improve the awareness of salt containing products through regular educational programs and educational reading materials to reinforce the knowledge.

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