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Fruit and Vegetable Consumption Pattern and Health Challenges of Elderly (≥60 Years) Staff in the University of Nigeria, Nsukka and Enugu Campuses: A Case Study

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Abstract: The study was designed to assess fruit and vegetable consumption pattern in relationship with common health challenges of the elderly (≥60 years) staff of University of Nigeria, Nsukka and Enugu Campuses. One hundred and seventy (170) subjects were randomly selected for the cross-sectional study. Validated Questionnaires were used for data collection. The data was analyzed using means, frequencies, ANOVA and chi-square test. The results of the study showed that majority (72.9%) of the aged studied were between the ages of 60-70 years. Monthly incomes revealed that 69.41% were in higher than the poverty red line. Fruit consumption pattern showed that 58.95% consumed it ≤3 times/week while 59.5% consumed vegetables ≥4 times/weekly. Vegetables, fruits and combined vegetable and fruits consumptions were statistically different: according to age associated diseases ($p<0.04$, $p<0.005$ and $p<0.00$, respectively); also according to educational levels ($p<0.03$, $p<0.002$ and $p<0002$, respectively); as well as with income ($p<0.00$, $p<0.01$ and $p<0.02$, respectively). About 15% had health challenges. The prevalence of hypertension (44.7%), diabetes (31.8%), liver problem (21.2%) and kidney problem (25.9%) was high when compared to other health problems (Arthritis, Alzheimer's disease obesity, cancer, osteoporosis and cataracts). In conclusion there was poor consumption of vegetables and fruits among the University elderly compared to World Health Organization (WHO) recommendation. Hypertension and diabetes were more prevalence than other conditions, but majority did not have physical disability and were health conscious by engaging in physical activities.

Key words: Vegetable, fruit, health challenges, disease prevalence, physical disability

INTRODUCTION

The concept of aging is multifaceted. This is because its in-depth description or explanation covers diverse areas of human development. There are chronological, biological, psychological and social, functional dimensions of aging (Hoyer and Roodin, 2009; Abiodu *et al*., 2011). The chronological dimension describes the number of years that have slipped away since one's birth while the biological explains the status of vital organs of the body as an individual advances in age. The psychological dimension focuses on individual ability to adapt to environmental demands/challenges while social dimension sheds light on how an individual conforms to written and unwritten norms, roles expected of him/her by the society in he/she operates. The functional dimension measures how effective an individual is in physical and social environment when compared with other people within his/her age bracket.

The disease, physical and physiological degeneration commonly observed in older people have long been assumed to be unavoidable consequences of aging. Certainly some of the declines blamed on aging may be inevitable such as gradual reductions in cell numbers, graying hair and reduced lung capacity. However many of the so called usual degenerative age-related changes can in fact be minimized, prevented and or reversed by healthy lifestyle (e.g., eating nutritious diet, exercising regularly, getting ample sleep etc) and avoiding adverse environmental factors such as excessive exposure to sunlight and cigarette smoke. These discoveries have led researchers to introduce the concepts of usual Aging' and 'successful Aging' (Byrd-Bredbenner *et al*., 2009). Body cells age no matter what health practices we follow, however to a considerable extent, one can choose how quickly one age throughout adult years.

Hence high consumption of fruits and vegetables reduces many chronic diseases such as stroke, cardiovascular disease, metabolic disease and some cancers. They contain essential vitamins, minerals, fibers and other bioactive compounds. The World Health Organization (WHO) recommends the consumption of at least 400 g, or at least 5 servings of fruits and vegetables a day. Increasing percentage of a population who eat enough fruits and vegetables is the healthy people. To improve fruit and vegetable intake in a community, health and policy makers should identify and

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correlate fruit and vegetable consumption pattern with population at risk in order to design proper intervention programme (Sabzghabaee *et al*., 2010). Socioeconomic circumstances, physical factors and psychological well-being are factors which affect fruit and vegetable consumption. With increasing in the elderly population, successful or healthy aging has been paid enough attention in most societies (Pomerleau *et al*., 2005).

Owing to the fact that the elderly is among the vulnerable groups, who tend to suffer physical, psychological and economic problems and are particularly vulnerable to malnutrition; attempts to provide them with adequate nutrition encounter practical problems and their nutritional needs are not well defined. Malnutrition is not an inevitable side effect of ageing, but many changes associated with the process of ageing can promote malnutrition (Hickson, 2006).

The causes of aging still remain a mystery, most likely the physiological changes of aging are a sum of automatic cellular changes, lifestyle practices and environmental influences. Even with the most supportive of environment and healthy lifestyle, cell structure and function inevitably change over time. Eventually cells lose their ability to regenerate vital internal parts and they die. This unavoidable dying or deteriorating cells is actually beneficial because it likely prevents diseases such as cancer but on the other hand as more and more cells in the organ die, organ function decreases (Byrd-Bredbenner *et al*., 2009).

Objectives of the study: This study was designed to assess the fruit and vegetable consumption patterns and health challenges of the elderly (≥60 Years) staff in the University of Nigeria Nsukka and Enugu campuses. Specifically, was to determine:

1: Their economic status of the elderly
2: The fruit and vegetable consumption pattern of the elderly
3: The physical disabilities and health challenges of the elderly
4: The health challenges/prevalence of the elderly

MATERIALS AND METHODS

Area of study: The area of study was Enugu State, Nigeria. The study was carried out within the two campuses of the University of Nigeria, Nsukka and Enugu. The main campus of the University is located on 871 hectares of the hilly savannah in the town of Nsukka, about eighty kilometers north of Enugu, where the second campus is located. There is regular road transport between Nsukka and Enugu.

The College of Medicine and the faculties of Business Administration, Environmental studies and Law are located at the Enugu campus; other faculties are located in Nsukka campus (University Calendar, 2007-2009).

Study design: A cross sectional study was used for the study.

Study population: The study population consists of men and women from age 60 and above (the elderly) who were staff and retired staff of the University.

Sample size: The sample size was 170 subjects.

Sample selection: Purposive sample selection method was used.

Data collection

Instrument for data collection: A structured questionnaire that was validated by the lecturers in the Department of Home Science, Nutrition and Dietetics was used to obtain information on the following: background information of the respondents, socio-economic status, vegetable and fruit intake pattern and health problems of the elderly.

Statistical analysis: Descriptive data were expressed as frequency and percentages, means and standard deviation. After assessment of normal distribution, chi-square test was used to assess fruit and vegetable consumption according to some demographic and socioeconomic variables. Logistic regression analysis was conducted with fruit and vegetable consumption as the dependent variable and educational level (lower or higher than higher school) and monthly income (lower or higher than US $435).

RESULTS AND DISCUSSION

Characteristics of the respondents: As shown in Table 1, most (72.94%) respondents were in age bracket 60-70 years. Monthly incomes revealed that 69.41% were at higher than poverty red line, while 92.35% had tertiary education. Retiring age of non-academics was 60 years while that of academic staff was 65 years. Hence that was the reason for more respondents falling within the above age bracket, with age associated diseases. Since these were still in service that's why had income higher than the poverty red line.

Vegetable and fruits consumption pattern: Table 2 showed that vegetable and fruits consumption was about 56% at ≥4 times weekly. Fruit consumption showed that nearly 59%, (58.95%) consumed at ≤3 times/weekly, while about 60% consumed vegetables ≥4 times/weekly. Of special interest in the context of this study was the high prevalence of consumption of fruits <3 times/week which has not achieved WHO recommendations for fruits consumption. Even the vegetables, vegetable and fruits (combined) consumptions rate of ≥4 times may not be compared with WHO recommendations regarding fruits and vegetables daily servings (WHO, 2006) and it is far from

Table 1: Characteristics of the studied participants

Variables	F	Percentage of participants
Gender		
Male	81	47.6
Female	89	52.4
Age (years)		
60-70	124	72.94
≥71	46	27.06
Monthly income		
Lower than poverty line	52	30.59
Higher than poverty line	118	69.41
Educational level		
Non tertiary	13	7.65
Tertiary	157	92.35

F: Frequency

Table 2: Vegetable and fruits consumption pattern

Variables	F	Percentage of participants
Vegetables and fruits consumption/weekly		
≤3 times	74	43.56
≥4 times	96	56.44
Fruits consumption/weekly		
≤3 times	100	58.82
≥4 times	70	41.05
Vegetables consumption/weekly		
≤3 times	-	40.5
≥4 times	-	59.5

F: Frequency

nutritional objectives in the health guidelines (Blanck *et al*., 2008; Jaime and Monteiro, 2005). This provides alarming evidence for policy makers and health care professionals to pay more attention to improve this concern for the elderly in Nigeria.

Vegetables, fruits and vegetables and fruits (combined) consumption according to ages, gender, age associated diseases, educational levels and income were shown in Table 4. Vegetables, fruits, vegetable and fruits (combined) consumptions were statistically different according to age associated diseases ($p<0.04$, $p<0.005$ and $p<0.00$, respectively). Consuming vegetables and fruits will no doubt contribute appreciably to their vitamin C status, which performs a variety of important cell functions. It acts as a potent antioxidant by scavenging physiologically relevant reactive oxygen, chlorine and nitrogen species (Halliwel, 1996). In the eye protects it against photolytically generated free radicals. According to educational levels, vegetables, fruits, vegetables and fruits (combined) consumption were significantly ($p<0.03$, $p<0.002$ and $p<0002$, respectively) different. Also income was significantly ($p<0.00$, $p<0.01$ and $p<0.02$, respectively) different for vegetables, fruits, vegetables and fruits (combined) consumptions. There were no associations between vegetables, fruits, vegetables and fruits (combined) consumptions and age and gender.

Table 5a revealed that majority (85.9%) of the respondents did not have any physical disability while about 14.0% had physical disabilities: 2.4% were blind, 11.7% were hard of hearing. Again 21.2% of the respondents had ailments that altered their choice of food. Above average (61.2%) of the aged engaged in physical activities while (68.2%) were involved in social activities. Below average (38.2%) were involved in self medication while majority (93.5%) of the respondents went for voluntary medical checkups. Table 5b revealed that 26.5% went for medical checkups 2-4 times yearly. Regular physical activity is one of the most important things recommended for the elderly for healthy living. It can prevent many of the health problems that seem to come with age. It also helps their muscles grow stronger so as to enable them keep doing their day-to-day activities without becoming dependent on others. Hence 2 h and 30 min (150 min) of moderate-intensity aerobic activity (i.e., brisk walking) every week and muscle-strengthening activities on two or more days/week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders and arms) are recommended for the elderly ≥60 years (NIA, 2011). This agreed with the study where above average were involved in physical and social activities.

The result of the study showed that although majority of the aged had no physical disabilities, there were those with difficulties in hearing and blindness. Again it was also observed that the study group had hypertension, diabetes, kidney problem, liver problem, arthritis, cataracts, obesity and cancer, in descending order. While none of the respondents reported had Alzheimer's disease and osteoporosis. This result is in accordance with the findings of Brown *et al*. (2005) who stated that as one ages the manifestation of these debilitating diseases increases.

Table 6 revealed that 31.8% of the study population have diabetes. About 18.8% had arthritis, none of the respondents reported that they suffered from Alzheimer's disease, about 7.1% were obese, only 1.9% had cancer. Heart disease condition was suffered by 2.4 and 21.2% had liver problem; none of the respondents reported suffered osteoporosis, while 25.9% suffered kidney problem. Cataract problem was suffered by 25.9%. Below average (44.7%) suffered hypertension. Overall average of about 15% had health challenges/chronic diseases.

McKenna *et al*. (2005) posit from their work that the major chronic conditions of an aging society include: cardiovascular diseases, hypertension, stroke, diabetes, cancer, chronic obstructive pulmonary disease, muscular-skeletal conditions including arthritis and osteoporosis, mental health conditions such as dementia and depression and blindness, impaired hearing and visual impairment. Andrade *et al*. (2012) and Jagger *et al*. (2007a) noted that certain chronic conditions are particularly related to disability including stroke, diabetes, cognitive impairment, arthritis and

Table 3: Frequency of weekly fruit and vegetable consumption pattern

Vegetable/fruit	None F (%)	1-3 times F (%)	4-6 times F (%)	>6 times F (%)
Orange	13 (7.6)	78 (45.9)	53 (31.2)	26 (15.3)
Watermelon	80 (47.1)	64 (37.6)	26 (15.3)	-
Pineapple	63 (37.1)	68 (40.0)	13 (7.6)	26 (15.3)
Banana	26 (15.3)	67 (39.4)	65 (38.2)	12 (7.1)
Avocado	94 (55.3)	76 (44.7)	-	-
*Pterocarpus soyauxi** *(Ora**)* vegetable	25 (14.7)	80 (47.1)	39 (22.9)	26 (15.3)
Bitter leaf	64 (37.6)	65 (38.2)	28 (16.5)	13 (7.6)
African spinach	51 (30.0)	64 (37.6)	29 (17.1)	26 (15.3)
Pumpkin leaf	-	104 (61.2)	26 (15.3)	40 (23.5)
Tomatoes	26 (15.3)	76 (44.7)	27 (15.9)	41 (24.1)
Anara leaf	38 (22.4)	132 (77.6)	-	-

F: Frequency, *Botanical name, **Igbo name

Table 4: Fruits and vegetable consumption (isolated or combined) in different groups

Variables	Vegetable consumption (serving/week) mean±sd	p-value	Fruit consumption (serving/week) mean±sd	p-value*	Vegetable and fruit consumption (serving/week) mean±sd	p-value
Age (years)						
60-70	1.90±0.89	0.35	2.67±0.75	0.25	3.74±2.1	0.24
≥71	1.86±0.96		2.45±0.58		3.66±1.30	
Sex						
Men	1.75±0.56	0.25	2.61±0.42	0.3	3.85±1.28	0.32
Women	1.98±0.67		2.83±0.71		3.65±1.32	
Age associated diseases						
Yes	1.74±0.95	0.04*	2.61±0.47	0.005*	3.47±0.74	0.00*
No	2.81±0.56		3.13±0.21		4.72±0.12	
Educational level						
Lower than tertiary	1.98±0.78	0.03*	2.35±0.36	0.002*	3.65±1.12	0.002*
Tertiary	2.86±0.44		3.15±0.24		4.86±1.33	
Monthly income						
Lower than poverty red line	1.85±0.46	0.00*	2.81±0.21	0.01*	4.21±2.31	0.02*
Higher than poverty red line	2.54±0.65		3.92±0.12		5.12±1.24	

*p-value<0.05 was considered significant

Table 5a: Frequency of physical disabilities/health issues in the elderly in the university

*Physical/Health issues	Yes (%)	No (%)
Physical disability		146(85.9)
Blindness	4 (2.4)	-
Hard of hearing	20 (11.7)	-
Ailments that altered choice of food	36 (21.1)	134(78.8)
Physical activities	104 (61.2)	54 (31.8)
Social activities	116 (68.2)	54 (31.8)
Subjects involved in self medication	65 (38.5)	105(61.8)
Voluntary medical checkups	159 (93.5)	11 (6.5)

*Multiple response

Table 5b: Frequency of medical checkups

Frequency for medical checkups	Frequency	Percentage
None	33	19.4
Once yearly	92	54.1
2-4 times yearly	45	26.5

Table 6: Percentage responses on health challenges/chronic diseases of the aged in the university of Nigeria

Health challenges	Yes (%)	No (%)
Diabetes	54 (31.8)	116 (68.2)
Arthritis	32 (18.8)	138 (81.2)
Alzheimers	170 (100)	
Obesity	12 (7.1)	158 (92.9)
Cancer	3 (1.8)	167 (98.2)
Heart disease	4 (2.4)	166 (97.6)
Liver problem	36 (21.2)	134 (78.8)
Osteoporosis	170 (100)	
Kidney problem	46 (25.9)	124 (74.1)
Cataracts	13 (7.6)	157 (92.4)
Hypertension	76 (44.7)	94 (55.3)
Mean percentage	14.7	85.3

visual impairment. For adults with arthritis, the odds of disability rise with age, diminish with education and are higher for non-whites and non-married persons.

Majority of the subjects studied went for medical checkups yearly and above average abused drug prescription. This agrees with Culberson and Ziska (2008) work that older adults are particularly vulnerable to misuse and abuse of prescription medications and the prevalence of prescription drug abuse in older adults may be as high as 11%. Prescription drug misuse is the use of a medication other than as directed or indicated, including taking too little or too much of a drug, taking it too often, or taking it for too long, whether harm results or not. Prescription drug misuse can be either wilful or accidental. Non-adherence with a medication regimen is a broad category of prescription drug misuse. Prescription drug abuse refers to intentionally taking medications that are not medically necessary or for the experience or feeling a drug causes.

Conclusion: In conclusion some of the aged in the University of Nigeria had one aging health challenge or another. Majority (85.9%) of the aged workers did not have any physical disability, they were health conscious in that (61.8%) of the study population exercised, 93.5% go for medical checkups and majority did not abuse drugs, their poor feeding habits showed that their

vegetable and fruit consumption pattern is very diverse and that they did not consume these following WHO recommendations.

Recommendations:

1: Clearly, there is a vital need to establish a national strategy for integrating preventive measures including lifestyle modification, notably dietary changes including higher consumption of fruits and vegetables.
2: The main limitation of this study was its cross sectional nature that might reduce the strength of the significance.
3: In addition, because this analysis reports consumption according to the number of times per week that fruits and vegetables are eaten, the results may over or underestimate the calculated proportion.
4: To determine more accurate estimation of fruit and vegetable consumption in this community, a study of healthy elderly with no chronic disease and measurement of serum biomarkers related to vegetables and fruits are recommended.
5: High number of chronic disease might reduce fruit and vegetable consumption in our studied population.
6: The health problems found from this study should be brought to the notice of the University Administration, policy makers, Community Health workers, Dietitians, Nutritionist and similar research works should be advocated and promoted in other Institutions.
7: The University Administration should empower Community Health workers, Nutritionist, Dietitians to design intervention programmes to reduce the health problems and improve feeding habits through organization of workshops on Nutrition for the benefit of the elderly, home visit as well as Radio and Television Nutrition based talk shows.

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