International Journal of TROPICAL DISEASE & Health
3(4): 365-377, 2013

SCIENCEDOMAIN *international*
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Body Ailments Dietary Pattern and Nutritional Status of Elderly in Ondo State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author IOO designed and supervised major aspect of the research work. Author CAO collected the data and wrote the first draft, but author DAA supervised the entire work. Authors AM and WAOA contributed to the management of the article. All authors contributed to the work.

Research Article

Received 24th March 2013
Accepted 24th August 2013
Published 23rd September 2013

ABSTRACT

Objective: To investigate the various body ailments both communicable and non communicable diseases in conjunction with nutritional status of elderly in Ondo state, Nigeria.
Methods: This was a random sampling of 400 elderly individuals (>60 years) living in Ondo State, Nigeria. By means of Open ended and structured questionnaire, data were collected on health, diet and Sociodemographic characteristics. There was anthropometric measurement to assess nutritional status.
Results: Most of the elderly aged 60-69 years were married and have no formal education. Most of them were from monogamy and polygamy family structure. The body ailment reported consist of body pain (28%) respiratory related complications (14%) eye ailments (11%), hypertension (8%) diabetes (3%) and musculoskeletal problems (24%) such as rheumatism, cramps and arthritis. The prevalence of self reported hypertension was 26% less in male respondents than in female respondents. The dietary pattern revealed that elderly ate from major food groups with animal protein foods (74% ate daily) but low dairy products (7% ate daily). The food habit related significantly with body ailments such as skipping meals ((χ=19.2; P<0.05) and eating three times a day ((χ=8.4; P<0.05).

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The body Mass index classification showed more than half were in normal nutritional status (58%), but 20% underweight, 15% overweight and 7% were obese. The body ailments associated significantly with nutritional status (χ=55.1; P<0.05).

Keywords: Elderly common body ailments included hypertension; diabetes body pains and musculoskeletal problems like arthritis; rheumatism and cramps; more than a third are malnourished; and half are in normal nutritional status; dietary pattern relates significantly on health condition and nutritional status.

1. INTRODUCTION

Humans are living longer than ever before with several population life expectancies at birth now exceeding 80 years. Since the early 1970s, life expectancies have increased globally by about I year every 3 years. The elderly today is living almost 20 years longer than their ancestors at the beginning of the twentieth century [1,2].

The increased longer life is with lifestyle changes, better nutrition, improved health care, educational and socioeconomic improvements, as well as social support systems [1,2,3]. As we live longer, nutritional needs may change, either with 'healthy' aging or because of the advent of disease and body ailments.

Body ailments, medications, depression, dementia, chronic illness, disability, isolation and diminished senses of smell and taste may reduce the pleasure of eating, influence food choices, dietary pattern thus making elderly nutritionally vulnerable [1].

Remarkably, the numbers of elderly people who are vulnerable in developing countries and Africa now approach and will exceed those in developed countries making the health and aging a global problem [3]. For instance in 1995 the number of people aged 60+ years increased by more than 12 million people — nearly 80% of this increase took place in developing countries [3]. In Nigeria, the present population of elderly is over 5million which is perhaps the largest concentration of elderly in Africa. As a result of projection in Nigeria, the population of the elderly will be 16 million by 2030 and 47 million by year 2060 [4].

The rise in the number of older populations implies an increased demand for social services, particularly health services since the per capita consumption of health services is many times higher among older persons than among the rest of the population in Nigeria [4]. Thus elderly body ailments if not identified and controlled can diminish quality of life, raise health care cost and increase pressure on caregivers.

Issues concerning the elderly, therefore, must be addressed in the context of healthy living and nutrition.

However, the lack of reliable data on the elderly population is a serious impediment to understanding problems of the elderly and interventions needed. In this regard, this study focused on the common body ailments, nutrition and the dietary pattern of elderly. This study will generate a baseline data in prevalence of diseases common to elderly and nutritional situation, to develop a framework work in solving the elderly problems. Furthermore, the study will enable health planners to assess the status of the elderly and for improvement in access to health, social services and the promotion of productive and sustainable life.

2. SUBJECTS AND METHODS

2.1 Methodology

2.1.1 Design

The design is the descriptive survey which engrossed the study of the large population by selecting a representative sample to discover relative incidence distribution and interrelations of variables [5] for collection of data. It entails the collection, organization and analysis with facts of the variables as they exist in a natural setting without interference. The result of the representative sample can be inferred or generalized.

2.2 Setting

2.2.1 Area of study

The study area was Ondo State Nigeria bound in the East by Edo State, in the North by Kogi State, in the West by Oyo and Ogun State and in the south by the Atlantic Ocean with Akure the State Capital.

Ondo State is of three zones, Ondo North, Ondo Central and Ondo South. (Source: Ondo State Local Government Commission, Akure, 2009). Agriculture (including fishing) constitutes the main occupation of the people of the state. It is the leading cocoa producing state in Nigeria. Other agricultural products include yam, cassava and palm produce [6]. The state consists of both literates and non literates.

The greater part of the citizens live in urban centers. It is a multi-ethnic state with the majority being Yoruba.

2.2.2 Total population in Ondo state

The National Population Census of 2006 showed that, there is a total of three million, four hundred and sixty thousand eight hundred and seventy seven (3,460,877) people in the state, (Federal Republic of Nigeria Official Gazette 2009).

2.2.3 Proportion of the elderly in Ondo state

There are two hundred and one thousand and sixteen (201,016) elders (60 years and above) in Ondo State (National Population Commission, 2009). The percentage of the elderly is 5.80.

2.3 Sample and Sampling Techniques

Yaro Yamane Formula [7] employed to draw the sample for the descriptive survey research. This formula reduces the standard error that would have occurred. That is every subject has an equal chance of sampling as this was at 0.05 level of significance. The sample drawn is sufficient to represent the entire population based on the formula. By Yaro Yamane formula [7], 400 samples were drawn from the total population.

$n=N/1+N(e)$

Two Local Government Areas was randomly selected by balloting from the six Local Government Areas in each of the three zones for the sample.

Elders were selected based on the population of the elderly (male and female) in each zone and local government areas as follows:

$$\frac{No.of\ elders\ in\ the\ local\ government\ area\ (LGA)}{Total\ number\ of\ elders\ in\ the\ 2\ LGA}\ X\ sample\ for\ the\ zone$$

$$\frac{No.of\ Males\ in\ the\ LGA}{Total\ no\ of\ elders\ in\ the\ LGA}\ X\ \ sample\ for\ the\ LGA.$$

By means of balloting from wards, towns and villages in each local government area elders were selected.

2.4 Research Instrument

Open ended, and structured questionnaire was for the descriptive survey research aspect of the study. The questionnaire consisted of two sections: Section A consisted of items that sought information on Demographic and socio-economic status of respondents. Section B consisted of items that determined their meal pattern and food frequency.

2.5 Questionnaire Administration and Collection

Four hundred questionnaires administered through personal contact by the researcher and research assistants. Five research assistants aided in the data collection.

2.6 Validation of Instrument

Three experts in human nutrition validated the questionnaire they validated so that it will be the right one for gathering data, measuring the variables; that the items covered the content of the questions raised for the study and removed (or reframed) ambiguous words that will confuse the respondents. There was a pilot study in a different location to determine whether there is a need to modify the questionnaires.

2.7 Reliability of the Instrument

There was a test re-test method to determine the stability and consistency of the instrument by pilot test. Cronbach's coefficient alpha was 0.80.

2.8 Method of Data Collection

Validated questionnaires (four hundred) were administered through personal contact to the elders in the selected areas. The items measured were demographic characteristics socioeconomic, health condition [8,9] and dietary pattern. Elderly was tested for memory by the use of simple test such as wedding dates, and anniversaries or festivals dates within the community.

There was anthropometric data collection using locally produced height meter for height and electronic scale for body weight. The classification of nutritional status followed WHO Standard, 1995.

Blood pressure measurement of respondents was in triplicate and categorized in to Normal ((120-139 mm Hg); Mild (140-160 mm Hg); Moderate (160-180 mm Hg), and severe (>=180 mm Hg) for systolic and 60-80mmhg for normal diastolic.

The body 'ailment' (an illness that is not very serious) and in various categories of non communicable from self reports.

The self report covered:

- ✓ -Those with good memory; under medical management; dietary management and self care at home.
- ✓ -These were restricted to physical signs and symptoms and categories as specified by the doctors.

2.9 Method of Data Analysis

(1) SPSS (Statistical Package for Social Science) Version 17. Percentage, Mean (X), and Standard Deviation (SD)
(2) An estimation of dietary pattern scores. BMI with self-reported ailments by chi-square and correlations.

3. RESULTS

The demographic characteristics of the sample elderly revealed that there were more male respondents than female, and many were of 60-69 years the minimum age was 60 while the maximum was 100 years. Most of the elderly were married and had no formal education.

The common body ailments reported include hypertension (8%) eye problem (11%), Musculoskeletal (rheumatism, cramps, arthritis) (24%) Malaria (7%) diabetes (3%), asthma (2%).

Elderly report on Alimentary/Digestive problem (4%), body pains (28%), and respiratory problems (14%). There was Information on malnutrition such as Obesity /overweight (22%) causing other body ailments and few others (5%) reported ailments such as epilepsy, cancer and sickle cell anemia (Table 1).

The prevalence of self reported hypertension was 26% less in male respondents than in female respondents. The prevalence of eye problem was 61% higher for male respondents than female respondents. The prevalence of musculoskeletal (rheumatism, cramps, arthritis) was 26% less in male than in female respondents while diabetes were 57% less in male respondents than in female. Respondents reporting asthma as health impairment was 27% higher in male than in female and alimentary/digestive problems was 6.6% higher for male than female respondents (Table 1). Males had high mean systolic (157.33 ± 31.04 mmHg) and diastolic (85.53 ±17.05 mmHg) blood pressure.

Table 1a. Prevalence of self reported ailments among the elderly in Ondo state

Ailments	Total n= 230(%)	Male n = 120(%)	Female n = 110(%)	Prevalence ratio (male vs. female)
Hypertension	19(8.3)	8(6.7)	11(10)	0.74
Eye problem	27(11.3)	17(14.2)*	10(8.2)	1.61
Musculoskeletal (rheumatism, cramps, arthritis)	55(24.3)	25(21.7)	30(27.3	0.74
Diabetes	6(2.6)	2(1.7)	4(3.6)	0.43
Asthma	8(3.5)	5(4.2)	3(2.7)	1.27
Alimentary/Digestive problem	9(3.9)	5(4.2)	4(3.6)	1.06
General body pains	65(28.3)	33(27.5)	32(29.1)	0.97
Respiratory problems (chest pain, cough)	26(14.3)	20(16.7)	13(11.8)	1.31
Other ailments (epilepsy, cancer, sickle cell anemia, etc)	15(4.8)	6(5.0)	5(4.5)	1.02
Total	230	120	110	

**P<0.05.*

NB: remaining 170 elderly did not report any body ailments.

Table 1b. Socioeconomic rating of elderly and body ailments

Variables		High blood pressure (hypertension)	Muscle skeletal	Eye problem	General body pains and symptoms	Respiratory	Others	No diseases	Total
Economic rating	High	4	3	3	7	4	11	17	39
	Moderate	15	25	11	27	0	0	86	166
	Low	10	41	18	47	4	0	67	195
Total		29	69	32	81	8	0	170	400

Chi square: $X^2 = 43.7$; P<0.05.

Additional health problem reported by the elderly was poor eyesight under medical management. Eyesight is suitable for about three quarters of the elderly while a quarter has a problem although they were unable to give the physiological details. Good eyesight is vital to life, food selection and improves functional ability at old age.

The prevalence of respondents reporting body pains were 3% less in male than in female respondents. The other respiratory problems were 31% higher in male than in female, but other ailments were 2% higher in male than in female respondents.

The socioeconomic environment of the elderly revealed that education level decreased with age and hospital attendance. However body ailment increases with age ($r= 0.10$; $p<0.05$). The economic rating using income per month related significantly with body ailments ($X^2=43.7$; $p<0.05$) (Table 1b).

The dietary pattern revealed that elderly ate from the main food groups such as roots tubers cereals legumes (cowpea and nuts), meat, fish and eggs group as well as dairy and milk products (Table 2). There was high consumption of animal protein as majority ate these food groups on a daily basis. Other food groups such as tubers legumes and cereals were in moderate consumption most elderly consumed legumes on a weekly basis, at least once a week. The dairy and vitamin A rich food group were consumed less than once a week (Table 2).

Table 2. Percentage distribution of consumption pattern of food groups by elderly

Food list	Daily	Weekly	Occasionally (<1x/month)	Remarks on level of consumption
Animal protein(meat, fish, egg)	73.8	25	1.2	High
Tuber/roots(cassava, yam)	34	63	3	Moderate
Legumes(beans)	10	62	28	Moderate
Cereals(maize etc)	11	75	15	Moderate
Fruits	24	58	18	Moderate
Dairy Products	7	46	47	Low
Vitamin A rich foods (liver, carrots)	7	33	60	Low

The food habit such as favorite foods skipping meals and eating street foods correlates significantly with body ailments. Specifically hypertension correlates with scheduling meals ($r=0.02$; $p<0.05$) while diabetes correlates with habit of eating more than three times a day ($r=0.10$; $p<0.05$), Habits such as skipping meals ($r=0.17$; $p<0.05$) Correlates with body pains (Table 5).

The frequency of certain food correlates with body ailments. The animal protein foods correlate with body pain and diabetes correlates inversely with green vegetables cereal consumption correlates with hypertension ($p<0.05$) (Table 6).

Self-reported ailments showed significant association with food habits, such as eating thrice daily ($\chi^2= 8.4$; $p<0.05$) and skipping meals ($\chi^2= 19.2$; $p<0.05$), as well as with economic status ($\chi^2= 43.7$; $p<0.05$). Specifically digestive problems associated with the skipping of meals. ($\chi^2=33.2$; $P<0.05$).

The self reported body ailment of various categories relate significantly with nutritional status ($X^2 = 55.1$; $P<0.05$) (Table 3).

Table 3. Self reported ailments and nutritional status cross tabulation

Self reported ailments * BMI (Kg/m2) cross tabulation						
		BMI(Kg/m^2)				Total
Variables	**Ailments***	**Underweight (< 18.50 kg/m^2)**	**Normal (18.50- 24.99 kg/m^2)**	**Overweight (25.00 - 29.99 kg/m^2)**	**Obese (30 kg/m^2 and over)**	
Self reported ailments	High blood pressure	2	10	0	7	19
	Musculoskeletal (rheumatism)	17	26	9	3	55
	Eye problem	5	16	4	2	27
	General body pains	11	41	12	1	65
	Alimentary problems/cramps	4	9	0	0	13
	Chest pains	3	12	5	2	22
	Asthma	2	4	1	1	8
	Diabetic	1	4	0	1	6
	Others (Impotence. headaches. Cancer	2	10	2	1	15
Total		47	132	33	19	230

** Chi square. $X^2 = 55.1$; $P<0.05$.*

Table 4. Percentage Distribution of nutritional status by body mass index

		Frequency	Percent	Valid percent
Valid	Underweight(< 18.50 kg/m2)	79	19.8	19.8
	Normal(18.50- 24.99 kg/m2)	233	58.2	58.2
	Overweight(25.00 - 29.99 kg/m2)	60	15.0	15.0
	Obese(30 kg/m2 and over)	28	7.0	7.0
	Total	400	100.0	100.0

Table 5. Correlation of food habit and body ailments of the elderly

	Food habits	Scheduled meal times	No. of meal times/day	Skipping meals	Have favorite foods	Daily fruits	Eat street food/ vendor	Eat between meals	Eat more than 3x/day
1	Prevalence of Body ailments	0.11*	0.04	-0.10*	0.01	0.01	0.1*	-0.03	0.12*
2	Hypertension	0.02*	0.02	- 0.12	-0.13	0.06	-0.00	-0.05	0.05
3	Diabetes	0.02	0.01	-0.04	0.04	0.10	-0.07	0.02	0.1*
4	Body pain	-0.1*	-0.10*	0.17*	0.01	-0.05	0.03	0.01	-0.1*
5	Muscle/skeletal problems.	0.11	0.11	0.06	0.00	-0.10	0.1	-0.03	0.02
6	Respiratory problem	0.04	0.04	-0.01	0.06	0.10	-0.03	-0.1	-0.03
7	Eye problem	-0.06	0.02	-0.05*	0.05*	0.06	-0.06	0.06	-0.06

**P<0.05*

Table 6. Correlations of food frequency and body ailments

Food frequency/ailments	Root /tubers	Animal protein	Dairy products	Legumes	cereals	Green vegetables	Vitamin A rich foods
General body pains	0.00	0.13*	0.02	0.06	-0.03	-0.12*	0.01
Hypertension	0.00	0.04	-0.03	0.01	-0.i7*	0.04	0.00
Diabetes	-0.01	-0.03	0.04	-0.05	0.01	-0.12*	-0.15
Muscular and Skeletal problems	0.04	-0.10*	0.08	0.05	0.07	0.01	0.02
Respiratory	0.04	-0.04	-0.01	0.01	0.02	0.02	0.04
Eye problems	0.01*	-0.07	0.03	-0.11	0.02	-0.04	0.01
Other body ailments	0.01	-0.11*	0.05	-0.02	0.00	0.11*	-0.02

**P<0.05*

The body Mass index classification showed more than half were in normal nutritional status (58%), but 20% underweight, 15% overweight and 7% were obese (Table 4).

Further analysis demonstrated that muscle problems significantly correlated with body weight ($r=0.13$; $p<0.05$) and body water ($r= 0.52$; $p<0.05$), and age significantly correlated with frequency of cereals ($r=0.14$; $p<0.05$) and legumes($r=0.10p<0.05$) as well as body ailments ($r=0.1$; $p<0.05$). In addition, age correlated negatively with the level of education ($r=0.18$; $p<0.05$) and anthropometric indices such as BMI ($r=0.12$; $p<0.05$) bone mass ($r=0.41$; $p<0.05$), muscle mass ($r=0.11$; $p<0.05$), and hip circumference ($r=0.10$; $p<0.05$).

4. DISCUSSION

In this study, the socio demographic variables influence the health condition of the elderly. Age correlates significantly with body ailments such as musculoskeletal problems. This is not a surprise since some people tend to deteriorate in health when they grow old. For example in Nigeria, the rate of functional capacity decreased with age [4]. The elderly studied are of low education and economic status. This also affected their state of health and nutritional status. This condition is common to most elderly in Nigeria [9] and even in Africa [3]. Nutrition-related non-communicable diseases (N-NCDs) are the most frequent cause of morbidity and mortality in most developing countries particularly cardiovascular disease, diabetes, and cancer [3].

In this study health of elderly correlate with dietary habits. Thus, significant relationship that exist between dietary pattern and body ailment such as a habit of skipping meals, eating more than thrice a day and scheduled meal times have an impact on elderly health conditions.

Many of elderly in Nigeria especially southwest have food habit that relates significantly with body ailments [9].

Research has shown that food variety and nutritional status have a prominent role to play in the prevention of onset of diseases such as hypertension diabetes, and overall health condition [1,2].

A varied diet, ideally containing 20-30 biologically distinct foods a week, is beneficial in the prevention of certain disease states in the elderly [3,9]. The correlation of dietary pattern and health conditions such as hypertension diabetes observed in this study is documented in the literature [2,3,9]. The world health organization has observed that, without preventative measures, the number of deaths by these non communicable diseases will increase by 17% on a global scale over the next ten years.

Specifically, there is an association between increased food variety and lower glycemic response for both insulin-dependent and non-insulin-dependent diabetes mellitus [1,2,3]. Greater dietary diversity has also been found to be predictive of less morbidity and greater longevity in people aged over 70 years [1]. The nutritional status of the elderly in this study is not too far from what obtains with others in Nigeria [9].

The significant interaction of diet to obesity, hypertension, asthma and diabetes in this study is in agreement with most findings in nutrition of the elderly [10,11,12,14,15].

Overweight and obesity are common problems in the aged, not because they are an inevitable part of growing older, but because of the associated sedentary lifestyle. The obesity can aggravate chronic diseases such as diabetes mellitus and hypertension.

Blood Pressure correlates strongly with BMI in International Study of Salt and Blood Pressure (ITERSALT) study [9]. Other workers also found a significant increase in prevalence of hypertension with increasing BMI. In a study conducted by Kumar et al. prevalence of hypertension is high among the overweight patients. Surrounded with the risk factor of hypertension is dietary intake. Dietary diversity is crucial to the adequacy of a certain nutrient in the elderly. The intake of tubers, legumes and cereals relates significantly to hypertension in this study. In Nigeria, the most available foods are tubers cereals and legume seeds especially cowpea. It is not unexpected for the elderly to consume cereals and tuber based diet [9]. Although, this diet may not be adequate in micronutrient and that means elderly should still continue to take vitamin and mineral supplement.

Furthermore, the Nigeria food based dietary guideline recommends that elderly eat diets that are prepared from a variety of available foods e.g. cereals, tubers, fruits, vegetables, etc.; Increase consumption of fish and fish-based diets; eat more of fruits and vegetables and eat more frequently.

In the current study elderly complain of alimentary canal/digestion problems. The problem of GIT and nutrition in relation to morbidity and health of elderly is well known in literature [13, 14,15,16].

Problem with the intestinal tract can encourage low food intake and consequently poor nutritional status. The intestine loses strength and elasticity with age; this slows motility and increases the risk of developing constipation (which is four to eight times more common in the elderly than in younger adults) [1,14]. Also, these changes in the stomach can impair digestion and absorption of nutrients, especially vitamin B12, biotin, calcium and iron [13,14].

5. CONCLUSION AND RECOMMENDATION

The elderly common body ailments include malaria hypertension, diabetes body pains and musculoskeletal problems like arthritis, rheumatism and cramps. More than a third are malnourished (both underweight and obese), and half are in normal nutritional status. Dietary association of nutritional status reveals that obese relates significantly with hypertension and asthma among elderly in Nigeria. It is recommended that, more work should be carried out to establish optimal dietary pattern and food combinations, which are most effective in preventing diseases, in the elderly.

CONSENT

Informed verbal consent was from all subjects with witness and formally recorded.

ETHICAL PROCEDURE

The conduct of the study was according to the guidelines laid down in the Declaration of Helsinki. The Department of Nutrition and Dietetics Ethical Review Committee of the Federal University of Agriculture Abeokuta Nigeria approved all procedures.

LIMITATION

The inability of some elderly to read and write is a limitation for data collection. The report was from those with unfailing memory.

CONFLICT OF INTERESTS

Authors have no conflict of interest to declare.

REFERENCES

1. Gibney MJ, Marino E, Ljungqvist O, Dowsett J. Public health Nutrition. The Nutrition Society. Text book Series. (1st ed). 2005;365-366. Blackwell NS. UK.
2. Solomon NW. Health and Ageing. In Lores R, Gillepsie, S. editors. Health and Nutrition: emerging and re-emerging issues in developing countries. Washington D.C. International Food Policy Research Institute. 2001;3.
3. ACC/SCN News Administrative Committee on coordinator. Sub- committee on Nutrition, Switzerland Nutrition and Healthy Ageing. 1999;19:45.
4. National Population Commission/Macro. Nigeria Population. The Elderly. Abuja, Nigeria. Chapters 5 and 7. Federal office of statistics (Abuja); 2006.
5. Olaitan SO, Ali A, Eyoh EO, Sowande KG. Research Skills in Education and Social Sciences. Bauchi: League of Researchers in Nigeria; 2000.
6. NgEx . History: Ondo State Nigeria Exchange; 2006.
   Available: www.ngex.com/nigeria/places/states/ondo.htm.
7. Uzoagulu AE. Practical Guide to Writing Research Reports in Tertiary Institutions. Enugu: John Jacobs classic Publisher, Ltd. 1998;66.
8. Subramanian SV, Huijts T, Avendano M. Self-reported health assessments in the 2002 World Health Survey: how do they correlate with education?' Bulletin of the World Health Organization. 2010;88(2):131-8.
9. Aboaba IO. Assessment of Nutritional status of the Elderly in Ogun State, Nigeria. Ph. D. Thesis, University of Ibadan; 2004.
10. Dyer AR. Body Mass Index Versus Height and weight in relation to Blood pressure. Amer J.of Epidemiology. 1990;131:589-596.
11. Ulasi CK, Ijoma, Onodugo OD. A community-based study of hypertension and cardio-metabolic syndrome in semi-urban and rural communities in Nigeria, BMC Health Services Research. 2010;10:71.
12. Kumar P, Desai VK, Kosambia JK. Prevalence of Hypertension amongst the Employees of a Mega-Industry of South Gujurat. IJCM 2002; 27:1
13. Bowman BA, Russell RM. Present Knowledge in Nutrition.. (8th Edition) ILSI. Washington DC; 2001.
14. Morley JE. Decreased food intake with ageing. J Gerontol A Biol Sci Med Sci. 2001;5681–88.
15. Alam M, Anoop Karan. Elderly Health in India: Dimension, Determinants and differentials. Working Paper No. 3, Building Knowledge Base on Ageing in India, Institute for Social and Economic Change, Bangalore; 2011.

16. Olayiwola IO. Diet, Health and Socioeconomic status of Yoruba Elderly in Southwest Nigeria. Journal of Nutrition. 2008;2:112-117.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history.php?iid=257&id=19&aid=2048