Assessment of nutritional status of household members in a rural Nigerian population

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Abstract

The study assessed the intra-household nutritional status of 50 households with 202 family members in Ikwuano, Nigeria. Data were obtained through pre-tested questionnaires and anthropometry. The results indicate that 56% of food procurement was by market purchases + home grown, 22% was by market purchases only, while market purchases + home grown + gift was (22%). The mode of food distribution was mainly individually (42%), followed by collectively (32%) while individually + collectively was 26%. The largest quantity of foods in the family was consumed by fathers (36%), mothers (30%) youngest child (16%), eldest child (6%), everyone (5%) and both parents (1%). Data on nutritional status showed underweight (parent 4.8%, children 67.2%), normal weight (parents 55.4%, children 26.9%), overweight (parent 31.3%, children 5.9%) and obese (parent 8.4%, children 0.0%). The male-headed households had better nutritional status than female-headed households. The study showed that improper method of food allocation was employed by the study population with a consequent existence of double burden of malnutrition in the households.

Keywords: nutritional status, household members, rural studies

1. Introduction:

Nutrition assessment is an in-depth evaluation of both objective and subjective data related to an individual food and nutrient intakes, lifestyle and medical history (Bender and Bender, 2005). Food availability and distribution usually constitute a huge problem in developing countries. This is because a lot of social-economic-cultural factors play significant role in food issues. It is a well recognized fact that in many economically-disadvantaged populations that culture makes it possible for the male head of the family to receive the largest share of family diet in relation to other members of the family. Specifically in certain rural Nigeria society, the adult male has priority over other household members in food distribution. Culture also affects food intake through food prohibition and restriction or food taboo. Ene-Obong (2001) documented that food taboos exist to forbid certain foods by members of household or an individual by reason of such things as age and sex. Also, the number of people in a household will affect the quantity and quality of food consumed. Okaka *et al.* (2002) stated that the inability to control family sizes to a large extent is responsible for the nutritional problems in developing countries. Several studies have generated data on the nutritional status of the different life cycle stages (Matheson *et al.*, 2002; Ukwani, and Suchindran, 2003; Mariko and Hughes, 2006 and Kimani-murage *et al.*, 2011). Relatively, little information has been published on the effect of socio-economic-cultural factors on the nutritional status of all household members. Given the dietary guidelines (Ene-Obong, 2001) for the various age groups, the knowledge of intra-household nutritional status is necessary to provide appropriate nutritional advice to household members.

2. Materials and Methods

2.1 Study area This study was carried out in Umudike Community in Ikwuano Local Government Area (LGA) of Abia State, Nigeria. Umudike is one of the communities that make up the five communities in Oboro clan of Ikwuano LGA. The community is situated 8km east of Umuahia (the Abia State capital) along Ikot Ekpene road. As of 2008, the community has a population of 500 households (village chief). Umudike is a typical rural faming community although the presence of institutions like Michael Okpara University of Agriculture and Root Crops Research Institute has introduced some level of urbanization.

2.2 Study Design

2.2.1. Subject Ten percent of the total household that existed in Umudike in 2008 was purposively used for the study. Simply random sampling was used to select the 50 households (HHs) which comprises of 202 family members.

2.2.2. Study Methods The study employed a cross-sectional survey method which obtained information with the use of questionnaire and anthropometry.

2.2.3. Questionnaire Structured-interviewer-administered questionnaires were used to collect information on the demographic, socio-economic characteristics and dietary patterns of the study households.

2.2.4. Anthropometry Anthropometric measurements were taken on all subjects using the procedure outlined by Jelliffe (1966). The weights were measured in the nearest 0.1kg using a portable Salter scale. The height was also measured to the nearest 0.01 meter using a wooden height-guage. The arm circumferences were measured using a non-stretchable tape rule and skin-fold thicknesses were obtained with a Holtain skinfold caliper. The subject's body mass index (BMI) was determined as weight (kg)/height (meter)^2 to detect underweight, normal weight, overweight and obesity among and within the household.

2.3. Data analysis Descriptive statistics of frequencies, percentages, range, mean ± standard deviation (SD) were determined on the data collected using the statistical package for social sciences (SPSS) version12 software package. The relationship within the household were determined using correlation and student T-test and were considered to be statistically significant at the $P<0.01$ level.

3. Results

Table 1 presents the demographic and socio-economic characteristics of the subjects. Seventy-four percent of the households were headed by males while 26% were female headed. Most (68%) of the household heads were married. The rest although were previously married are now separated (18%) widowed (10%) and divorced (4.6%). Many (46%) of the household heads have secondary education. As much as 32% and 10% have primary and tertiary education respectively. Very few (4%) had no formal education. The major occupation was farming (78%) followed by tra<₦20,000 - >₦50,000. ding (16%). Only 2% were engaged in civil service. The income range per month was between Majority (48%) earned <₦20,000 per month, 32% earned between ₦20,000 – ₦30,000. Only 6% earned above ₦50,000 per month. Food procurement and distribution methods as shown in table 2 indicates that most (56%) households procure their food through market purchases + homegrown. An equal percentages (22%) obtain theirs through market only and market purchases + homegrown + gift respectively. Household food distribution was mainly individually (42%), followed by collectively (32%) and then individually + collectively (26%). The food consumption data of the subjects is shown on table 3. There was a high frequency of consumption of staples by all the study households. As much as 94% and 88% have daily consumption of nuts and fats and oils respectively. Very few (18%) consumed animal products daily. the overall consumption of fruits and vegetables was 56%. The quantitative distribution of family foods is shown in Fig 1. Most (36%) of the Households apportion the largest quantity of the family meals to the father, many (30%) to the mother; while 6% and 16% allocate largest quantity to the eldest child and youngest child respectively. Only 10% have equal distribution of family meals irrespective of age and sex. Fig 2a, b and c shows the specific and total BMI of parents and children. Most (63.9% males, 72.3% females) children were underweight (>18.5kg/m^2) while many (51.5% fathers, 59.1% mothers) parents were of normal weight (18.50 – 24.99kg/m^2). However, an appreciable number of the parents (33.3% fathers, 29.5% mothers) were overweight. Similarly, the mid upper arm circumference (MUAC) data (fig 3a and 3b) revealed that most (76.4% male, 91.5% female) children were malnourished (<22) while most parents (97.4% fathers, 97.7% mothers) were normal (≥22). The BMI of male-headed households was better than that of the female headed households (fig 4). The mean anthropometric parameters of male and female headed households (Table 4) revealed the mean weights as 40.38±6.12 for male-headed households and 47.90±18.63 for female–headed households. Also the mean heights were 1.31±0.32 and 1.47±0.15 for male and female-headed households respectively. The female-headed households had more weight than the male-headed households and they were equally taller than the male-headed households from the results. There were also significant difference between the mid-arm circumference of the male (22.95±7.58) and female (24.34±6.05) headed households. The total skin folds thickness for the male-headed households (48.04mm) were higher than that of the female-headed households (44.08mm). The result of the correlation between age, weight, height and body mass index (BMI) is presented in table 5. The correlation between age and weight (r=0.79) was significant (P<0.01). The correlation between height and age (r=0.71) and height and weight (r=0.87) were also significant (P<0.01). Also the correlation between BMI and age (r=0.46), BMI and weight (r=0.83) and BMI and height (r=0.42) were equally significant (P<0.01).

Table 1: Demographic and socio-economic characteristics of the subjects

| Variable	frequency	Percentages (%)
No of study subjects		
Parents		
Fathers	39	19.3
Mothers	44	21.8
Children		
Male	72	35.6
Female	47	23.3
Family head		
Father	37	74
Mother	13	26
Marital status		
Married	34	68
Widowed	5	10
Separated	9	18
Divorce	2	4
Educational status		
No formal education	2	4
Primary education	16	32
Secondary education	23	46
Tertiary education	9	18
Occupation		
Farmers	39	78
Traders	8	16
Artisans	2	4
Civil servants	1	2
Income level		
<₦20,000	24	48
₦20,000 – ₦30,000	16	32
<₦30,001 - >₦50,000.	7	14
>₦50,000	3	6

Table 2: Household food procurement and distribution methods

Variables	frequency	Percentage
Food procurement		
Market purchases (MP)	11	22
Homegrown (Hg)+ MP	28	56
Hg + MP + Gift	11	22
Food distribution		
Individually	21	42
Collectively	16	32
Individually + collectively	13	26

Table 3: Daily Food consumption of households

Type of food	No of households	Percentages
Staples(roots, tubers, legumes, cereals)	50	100
Fruits and vegetables	28	56
Animal products (meat, fish, poultry & products)	9	18
Fats and oil	44	88
Nuts	47	94
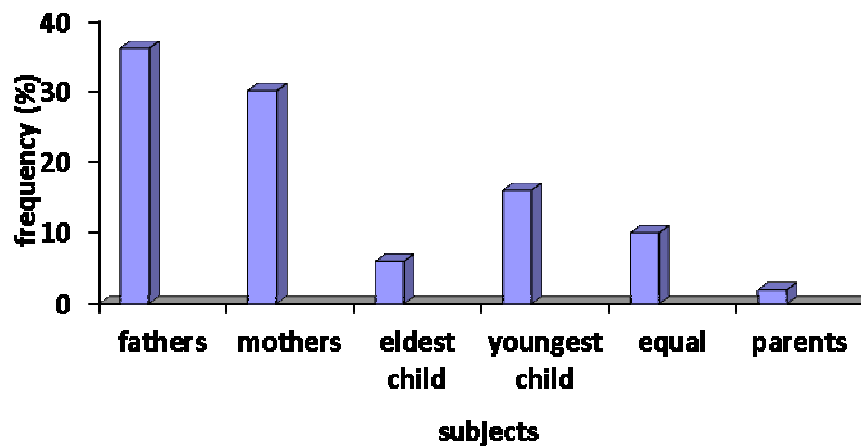
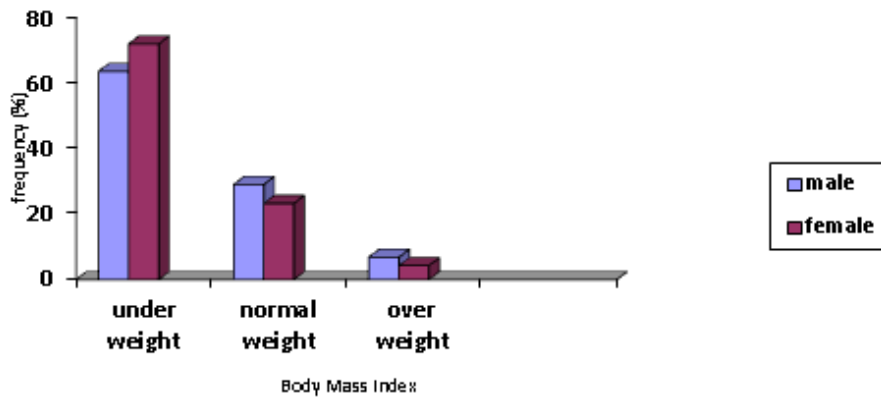**fig 1: Quantitative distribution of household meals**
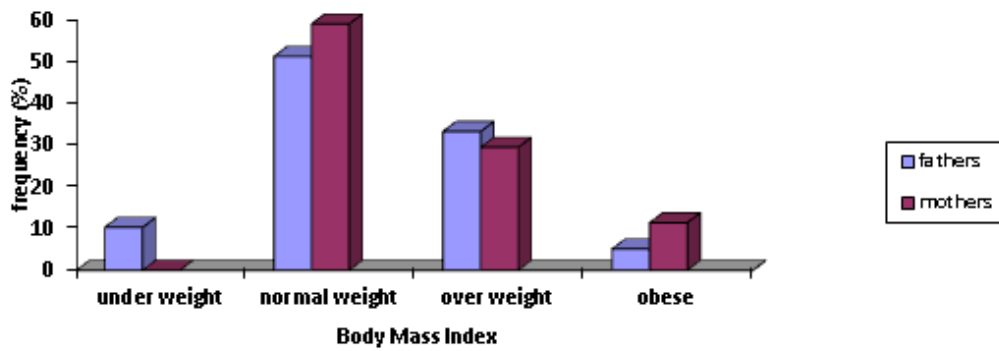
Fig. 2a Body mass index of study children

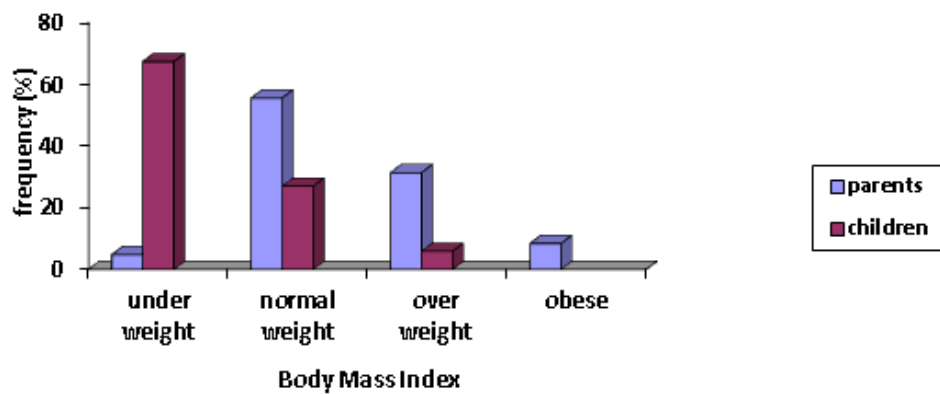Fig 2b: Body Mass Index of study parents

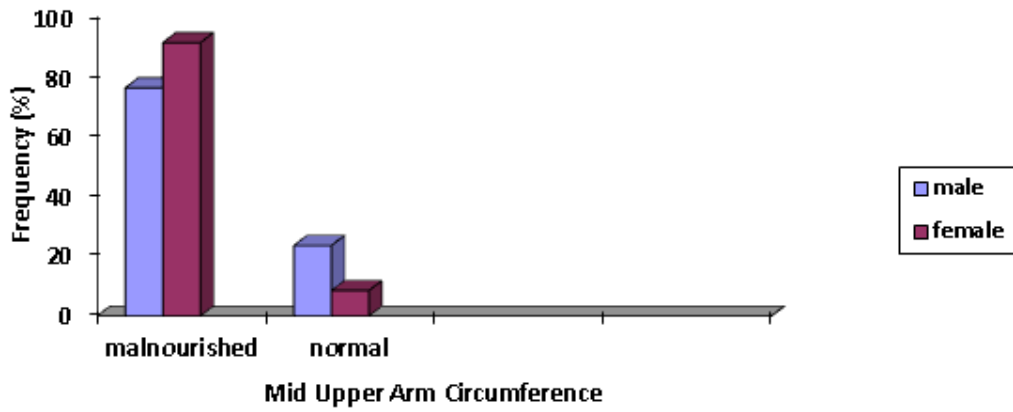Fig. 2c: Body Mass Index of study population

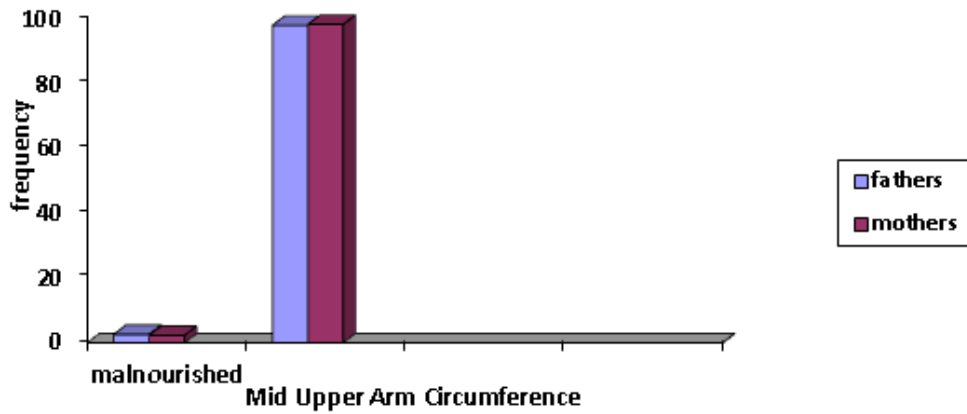Fig. 3a: Mid Upper Arm Circumference of study children

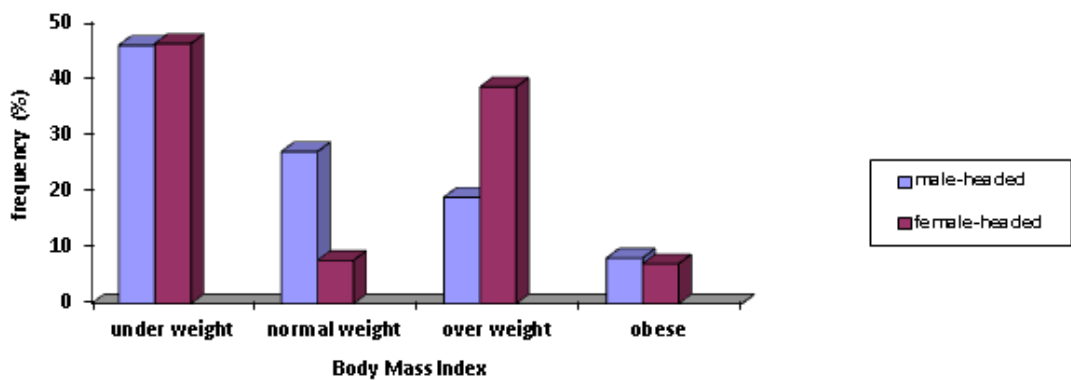Fig. 3b: Mid Upper Arm Circumference of study parents

Fig 4: Body Mass Index of male and female headed households

Table 4: Mean anthropometric parameters of the study population

Parameters	Male-headed households	Female-headed households
	Mean ± SD	Mean ± SD
Weight (kg)	40.38 ± 25.41	47.90 ± 18.63
Height (m)	1.31 ± 0.32	1.47 ± 0.15
BMI (kg/m^2)	20.30 ± 6.12	21.16 ± 5.43
MUAC (cm)	22.95 ±7.58	24.34 ± 6.05
Triceps(mm)	13.39 ± 6.17	12.41 ± 5.35
Biceps (mm)	8.76 ± 1.95	8.79 ± 2.39
Sub-scapular (mm)	14.35 ± 9.20	11.38 ± 4.83
Supra-illiac (mm)	11.54 ± 6.66	11.50 ± 7.76

Table 5: Pearsons' correlation coefficient between age, weight, height and BMI

	Age	Weight	Height	BMI
Age	1	0.790	0.711	0.468
Weight		1	0.876	0.830
Height			1	0.489
BMI				1

** correlation is significant at the 0.01(2-tailed)

*correlation coefficient significant (P<0.05)

4. Discussion

Most (74%) of the study households were headed by males. This is not surprising because in a typical traditional African community (a patriarchal society), households are headed by men. A typical African man is seen as the traditional head of household, a chief breadwinner whose central role is to provide for both immediate and extended family members (Extended family culture, 2012). Tempelman and Keila (2005) observed that in the concept of head of household in Africa, there is a tendency to record automatically the eldest male household member (whether usually present or not) as the head of household. This implies that the households (26%) that were headed by females might have resulted from either death of spouse, divorce or separation. It might also be due to momentous change in household structures as control over resources has shifted gradually away from men to women (Silberschmidt, 1999; 2001). The latter is supported by Bigombe and Gilbert (2012) which documented that with rampant unemployment and dwindling resources, men's central roles as breadwinners has been redefined making it impossible for most men to fulfill these roles. The data on educational status revealed that for a rural community only 4% of household-heads had no formal education. This may be attributed to the presence of two great tertiary institutions in the study community. These institutions attracted the establishment of secondary and primary schools in Umudike and environs and have thus accorded the community members basic education. Capaln (1998) in a review documented that the presence of educational institutions creates common ground that inspires members to participate, guides their learning and gives meaning to their actions. It not only fosters interactions and encourages a willingness to share ideas but makes for greater enrollment and improved learning of community members. Majority (46%) of the household heads had secondary education. Wardlaw and Hampl (2007) stated that an individual level of education affects his/her income level which can lead to under nutrition for illiterate ones. It is therefore not surprising that their occupation profile revealed mainly subsistent farmers (78%) with few traders (16%) and civil servants (2%). Interestingly, the number that engaged in business activities is very small despite the fact that the mere presence of academic institution in a community has been documented to generate considerable and reliable economic activity that strengthens the overall community condition (Caplan, 1998). However, rural households are usually known to be farming households (Amao et al., 2009). Their monthly income range is synonymous with their occupation as many (48%) earns less than ₦20,000 per month. The study also noted that majority of these low income earners were of primary school status. This could suggest that those with higher educational status were able to earn more

because they must have learnt one or more improved method of farming or trading from school to boost their income. The major food procurement strategy (market purchases + home grown) revealed that although they were mainly farmers, market purchases still constitute a bigger part of their food procurement strategy. By implication, the farmers must be small scale farmers and cannot produce enough for their households and thus depends on market purchases to supplement their insufficiency. Kent and Poulton (2008) stated that small scale farmers although have farming as their major livelihood activity ,do not have sufficient assets to produce a surplus from their agricultural activities and their non-farm activities are in sufficiently reliable or remunerative for them to rely on market purchases for adequate food intake. Many of the study households distribute family meals individually. An appreciable number use collective method. The collective distributions could be due to poor economic status as poor households usually do not have enough to go round individually. So they are known to display all that is available on the table for all to eat at the same time, suggesting "survival of the fittest". Those who use both collective and individual method of food distribution may have done so to accord the male sect priority over others who now have collective meals as it is traditionally expected. The food consumption showed that staples were frequently consumed by all households. This is usual for all African communities as staples (roots, legumes and cereals) always form a base for all food consumed (World Food and Wine, 2012). There were also appreciable consumption of nuts, fats and oil. This is because these foods are readily available to farming households. Surprisingly fruits and vegetables which are usually available to farming households were not consumed as expected. This could be probably because the farming households did not produce enough to eat. The little they produced was sold to obtain income for other household needs. Their consumption of animal products was low and is comparable with animal consumption in most rural African community (World Food and Wine, 2012). This is because animal products are usually expensive and could not be afforded by most households. Thirty-five percent of the study households allocate largest quantity of family foods to the fathers. These households are typical traditional households which accord priority to the eldest male member of the household. The households where mothers consume the largest quantity of family foods could be those that are headed by females as well as those where females are the bread winners. This study revealed that the older sector of the households receives the largest share of family meals compared to the younger ones. The youngest child was slightly favored probably because he/she is the newest member of the households. The anthropometric data reflects the effect of this pattern of food distribution on nutritional status. Both parents had better nutritional status than their children (Fig 2a, b and c). There were more normal weight parents compared to the children. The MUAC data substantiated the BMI data. There were more malnourished children than parents. The nutritional status of the children based on the anthropometric data was generally bad. Although the parents had better nutritional status some were also overweight and obese. This shows that both overweight and underweight coexist in the same household and the same community and is in line with SCN (2006) document which stated that as countries develop economically, both over-nutrition and under-nutrition increasingly co-exist; at first more in the urban than rural areas, but then increasingly in the same communities and eventually even in the same households. In this study, there were more overweight fathers than mothers and more obese mothers than fathers. This is really strange. Having overweight parents (typically mothers more than fathers) and underweight children in the same household is a paradox (Doak et al, 2005). For the children, the males had slightly better nutritional status compared to the females. This pattern could also be seen between the mothers and fathers. This pattern of males having better nutritional status than females further reflected the effect of priority for males in a typical African traditional culture. The BMI of male headed- households were better than the female-headed households. This could be because males have been known to outdo females in everything including provision for families. Males have better opportunities in income generation and the practice of authority usually resides with them (Tanzina, 2010). The absence of adult male member in the family leads to a lower income of households and also increases the risk of insecurity for the female heads. It could also be due to the additional socio-economic responsibilities of women which deteriorate their condition due to absent husbands (Bigombe and Gilbert, 2012). The absence of the adult male has been known to leave the remaining women and children with fewer economic opportunities and less control over productive assets including equipment and land. Income level is directly related to nutritional status. Posel (2001) stated the female-headed households had fewer income earners, were more reliant on the income earned by women and more likely to be in lower income groups, then households headed by men. The absence of male member in the family and the lower earning power of women also lead to poverty in female-headed households (Banos, Fox and Mendonca, 199). Buvinic and Gupta (1997) stated that females as heads of household are triply disadvantaged; they experienced the burdens of poverty, gender discrimination and lack of social support. They are not only economically disadvantaged but also disadvantaged by various social and cultural factors like education, access to services and ownership of land and assets (Mannan, 2000; Mencher, 1993; and Lewis, 1993). All these evidence goes to support why the male-headed households are bound to have better nutritional status than female-headed households. The correlation between the studied anthropometric parameters was significant. This

shows that despite the level of malnutrition in the study population, their age, height and weight were still in line with the pattern "as age increases, height also increases for children and stops or decreases in adults (Kleinman, 2004). However, National Library of Medicine (2012) documented that lifestyle choices may slow or speed up changes in height. It explained that the height that is lost as age increases in due to changes in the bones, muscle and joints; but can be reduced by proper diet, physical activity and treating of a osteoporosis.

5. Conclusion

The study showed that male-headed households were more in number than the female-headed households. Although most of the study population had some form of education, education has not really influenced the socio-economic status. They were mostly subsistent farmers who rely heavily on market purchases for consumption. Their method of food distribution and quantity allocation does not actually favor the children (and women) and explains why the parents had better nutritional status than children and the existence of double burden of malnutrition in the households and community. The priority accorded to the male sector also resulted in male-headed households having better nutritional status than females. There is urgent need for nutrition education with emphasis on adequate food for all life cycle stages.

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