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Socio-Demographic and Anthropometric Variables of Persons Living with HIV and AIDS in Uyo, South Eastern Nigeria

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Abstract: The socio-demographic and anthropometric characteristics of 290 (154 females and 136 males) Persons Living with HIV and AIDS (PLWHA) has been assessed. They were randomly selected from a total of 1280 infected persons who registered for anti retroviral therapy at the University of Uyo Teaching Hospital, Uyo, South Eastern Nigeria. The results revealed that the age group 31-43 years were the most affected, females (53.1%) were significantly ($p<0.05$) more affected than males (46.9%). The married and the tertiary educated persons were more affected than single and less educated persons. The low income earners were also more affected. The most common opportunistic infections were fever, loss of appetite and diarrhea. Most (98.2%) respondents recorded low CD_4 counts, it was lower in females (190.1±32.5) than males (205.7±47.2). This difference was statistically significant ($p<0.05$). The 24-hour dietary intake of nutrients (Vitamin C, Fat, protein and calories) was inadequate to meet the increased nutrient needs of PLWHA. Their anthropometric parameters did not reflect the clinical status of the respondents. Almost all male respondents (99.3%) and 96.8%) of females recorded normal MUAC values, while 92.6% of males and 91.3% of female respondents recorded normal BMI values. There was no statistically significant difference ($p>0.05$) in the BMI values of both males and females and MUAC values of females of the different age groups. The difference in MUAC values of males of the different age groups was statistically significant ($p<0.05$). It was concluded that anthropometric parameters alone were not a good index of the health status of PLWHA. It is recommended that effective health education programmes be instituted in tertiary institutions. Voluntary counseling and testing and antiretroviral treatment centers should be readily available and easily accessible to facilitate prompt intervention. Food supplementation programmes should be urgently incorporated into the national effort to curb the impact of the HIV and AIDS pandemic.

Key words: Socio-demographic, anthropometric, variables, HIV and AIDS

Introduction

The Human Immune Deficiency Virus (HIV) epidemic is both driven by and contributes to the factors that also cause poverty, emergencies and inequalities. HIV and AIDS remain the greatest health challenges of this age (UN AIDS, 2002). It has been stated that the AIDS phenomenon is nothing short of war on humanity. The heavy toll on human lives, large scale devastation and the emasculation of the human spirit occasioned by the scourge, attest to this (Akwa Ibom State SACA, 2005). HIV and AIDS have caused more than 20 million deaths globally, with 83% (16 million) of these deaths occurring in sub Saharan Africa; 80% of children orphaned by AIDS live in this region (Harries *et al*., 2005) and women make up more than 50% of People Living with HIV and AIDS (PLWHA). It has been said that in sub Saharan Africa, AIDS affects women disproportionately. In severely affected areas as HIV positive productive adults die, grand parents and young siblings assume the burden of caring for an increasing number of AIDS orphans (World Food Programme, 2003).

In Nigeria, the prevalence rate of HIV and AIDS is 5% (FMOH, 2003). The HIV pandemic has had a profound impact on the health and economic conditions of individuals and populations, with potential to further adversely affect the health, productivity and socio-economic conditions of the nation. In this regard, the potential of HIV and AIDS to affect health and national development commands urgent attention and response (FMOH, 2003). People living with HIV and AIDS are faced with the task of maintaining optimal health status, despite an increasing insult to their immune status (Maeyer, 2001). In Nigeria as in other affected regions, a good number of their people are living on the brink of poverty. Thus occurrence of the infection in the family further undermines the family's ability to provide for basic needs and livelihood is diminished. Traditional coping mechanisms are eroded, resulting in downward economic spiral (Piwoz *et al*., 2004).

Federal Ministry of Health (FMOH, 2005) reporting on the HIV/AIDS Nigerian situation, posited that the epidemic poses not just a health concern, but could have dire

consequences for educational achievement and the nation's ability to feed itself. This is because of the propensity of the more educated to be affected. Also there is a loss of farm workers, reducing farm produce. The loss of agricultural labour could cause farmers to switch to less labour intensive crops, which are associated with reduced profit. Socio-demographic variables affect HIV/AIDS. In Africa, girls and young men for instance, find that they have little choice and control over decisions about sex, often with older men. Sex may be in exchange for gifts, money, favour or as a result of abuse (UN AIDS, 2002).

The Nigerian Demographic and Health Survey (NDHS, 2004) documented higher knowledge of AIDS by Nigerian men (97%), than women (86%). However, the practice of its prevention was not as widespread. Regarding high risk sex exposure and condom use, 78% of men and 29% of women aged 14-25 years reported having been engaged in high risk sex in the 12 months preceding the survey, 70% of young women who are sexually active engaged in high risk sex, with only 19-25% having used a condom. In a study of 120 randomly selected PLWHA attending a dermatology/venerology clinic in Benin, Nigeria, Ozigbo-Esere and Odionyeme (2004), reported that the most affected age group was 30-39 years (41.7%) followed by 20-29 years (26.7%). Singles were more infected than married persons and the prevalence was higher among females (60.8%) than males (39.2%), with a majority having secondary education (46.7%) while 25.8% had tertiary education and 8.3% were uneducated.

The Federal Ministry of Health (2005) reported on the implications of the epidemic on the education sector, positing that apart from the propensity of the virus to affect young people in the prime of their youth, (World Food Programme, 2003; NIMR-FMOH, 2003) the more alarming phenomenon was that the more educated were more likely to be infected. This portends great concern, as education produces skilled labour to man the country's increasing industrial base, hence a decrease in both students and teachers will make it more difficult for the country to attain its national development goals (UNICEF/UNAIDS, 1999; Bennel *et al*., 2002).

Anthropometric measurements are used in the determination of energy balance and protein status (Okoye, 1992). Weight for height and Mid Upper Arm Circumference (MUAC) are predictive of short term mortality (Beaton *et al*., 1990. From the first year of infection, PLWHA have increased protein, energy and micronutrient requirements (WHO, 2003). The outlook of the impact of infection is ominous for PLWHA in resource limited settings, associated with pre-existing malnutrition and lack of requisite medical care. HIV and AIDS pandemic is occurring in populations where malnutrition is endemic. The problems of malnutrition are becoming concentrated in sub Saharan Africa and South Asia. Together the two regions account for 70% of the world's underweight children (Administrative Committee on Coordination/sub committee on Nutrition ACC/SCN, 1997). Prevalence of stunting a human poverty index relating to life expectancy, literacy, child nutrition, access to safe water and health services, also indicate a high prevalence of adverse social conditions in Nigeria. (ACC/SCN, 1997; NDHS, 2004; UNICEF, 1999; Federal Government of Nigeria, 1995).

The advantages and limitations of BMI and MUAC as measures of adult undernutrition is well documented, (James *et al*., 1988; Ferro-Luzzi *et al*., 1992; Noppa *et al*., 1980; Norgan, 1994; Olukoya, 1990; RNIS, 2000).

It is now well recognized that health conditions including anthropometry are the result of a complex interplay of environmental conditions and behaviour choices. A good understanding of how environmental conditions including socio-demographic variables affect health status will better inform stakeholders on how to encourage and support people for better health. The aim of the study was to evaluate the socio-demographic variables associated with HIV infection as well as the anthropometric parameters of PLWHA in Uyo, Akwa Ibom State, Nigeria.

Materials and Methods

Study site: The study was carried out in Uyo, South Eastern Nigeria. The town serves as a local government headquarters of Uyo Local Government Area as well as the capital of Akwa Ibom State. It lies within the tropical rainforest belt of the country, on lat. $5^{0}20^{1}$ and $5^{0}32^{1}$ East of the Greenwich Meridian. The University of Uyo Teaching Hospital (UUTH), a tertiary health institution was the study site. The hospital was a regional center for Federal Government of Nigeria subsidized anti-retroviral treatment at the time of study 2004 taking care of four neighbouring states namely; Akwa Ibom State, Cross River State, Rivers State and Bayelsa State.

Study population: The study was conducted between November 2004 and March 2005. The study included all adult persons living with HIV and AIDS who reported for treatment at the UUTH since the established of the ARV treatment center at the hospital, this totaled 1280 at the time. Three hundred (300) of these were randomly selected for this study. Of these 160 were females and 140 males to reflect the 1.2:1 ratio of female to males.

The socio-demographic characteristics was determined through a structured questionnaire which sought the age, sex, marital status, highest educational, level occupation etc. Also determined was the impact of HIV/AIDS on their earning and work capacity. The questionnaire also sought the coping strategies that PLWHA adopted to deal with the illness. A 24-hour dietary recall was used to estimate their nutrient (carbohydrate, protein, fat and vitamin C) intake. The

Table 1: Distribution of respondents according to their age, sex, highest educational level and marital status UUTH, Uyo, 2005

Sex	No. of Female (%)	No. of Male (%)	Total (%)
Variable age			
18-30	76 (26.2)	20 (6.8)	96 (33.1)
31-43	61 (21.0)	88 (30.3)	149 (51.4)
44-56	17 (5.9)	21 (7.2)	38 (13.1)
57-69	0 (0.0)	7 (2.4)	7 (2.4)
total	154 (53.1)	136 (46.9)	290 (100)
Highest educational level			
No education	6 (2.1)	2 (0.6)	8 (2.7)
Primary	19 (6.6)	25 (8.6)	44 (15.2)
Secondary	60 (20.7)	54 (18.6)	114 (39.3)
Tertiary	63 (21.7)	55 (19)	118 (40.7)
Vocational/ Non-formal	6 (2.1)	0 (0.0)	6 (2.1)
Total	154 (53.1)	136 (46.9)	290 (100)
Marital Status			
married	57 (19.7)	84 (29.0)	141 (48.6)
divorced	9 (2.4)	6 (2.1)	13 (4.5)
separated	9 (3.1)	6 (2.1)	15 (9.1)
widowed	17 (5.9)	9 (3.1)	36 (12.4)
never married	54 (18.6)	31 (10.7)	85 (29.3)
total	154 (53.1)	136 (46.9)	290 (100)

quantity consumed was estimated and converted to grams of vitamin C, carbohydrate, protein and fat using food composition tables (Guthric and Picciano, 1995; Oguntona and Akinyele, 1995; Food Consumption and Nutrition Survey, 2001). Anthropometric variables included BMI and MUAC.

BMI was determined by the quetlet index i.e.

$$\frac{\text{Weight (Kgs)}}{\text{Height (m}^2\text{)}}$$

The weight and height measurements were obtained using a digital seca solar scale, UNICEF electronic scale 980 and a stadiometer while observing standard precautions (RNIS, 2000). The MUAC was obtained by measuring the circumference of the left arm at the mid point between the tip of the shoulder and the tip of the elbow while observing standard precautions (RNIS, 2000; Olukoya, 1990).

Results

Socio-demographic variables: The socio-demographic variables of respondents is presented on Table 1. Majority (51.4%) of respondents were aged 31 to 43 years, of these 88 (30.3%) were males while 61 (21.0%) were females. This was followed by 33.1% aged 18-30 years. Of these 76 (26.2%) were females, while 20 (6.8%) were males. About thirteen percent (13%) of sampled persons living with HIV and AIDS in Uyo, Akwa Ibom State were aged 44-56 years. About 7% were males while 6.0% were females. The respondents aged 57 to 69 years (2.4%) were all males. More females (53.1%) than males (46.9%) persons were living with the virus in Uyo. The highest (40.7%) number of the respondents had tertiary education. This is followed by 11 (39.3%) with secondary education, 44 (15.2%) with primary education, 6 (2.1%) with vocational/non-formal education and 8 (2.8%) with no education. Majority (48.6%) of PLWHA were married, 85 (29.3%) were never married, 36 (12.4%) were widowed, 15 (5.2%) were separated while 13 (4.5%) were divorced. Majority (39.7%) of respondents were low to middle cadre civil servants (level 1-14), this was followed by 83 (28.6%) who were traders, ten percent (10%) were artisans; 21 (6.6%) were students, while 16 (5.5%) were farmers, the rest were either self employed (2.8%) or unemployed (2.1%). One hundred and forty-three respondents reported having 1-3 dependents, 85 (29.3%) reported having 4-6 dependents. Twenty-eight reported having 7-9 dependents while 14 (4.8%) reported having more than ten dependents (Table 2).

The prevalence of signs and symptoms of opportunistic infections among PLWHA in Uyo is presented on Table 3. Fever was the most occurring sign, followed by loss of appetite, diarrhea, thrush and nausea in descending order of occurrence. Only 10 (3.4%) reported having no sign or symptom that could impact on nutrient intake. The CD_4 cell count of PLWHA is also represented on Table 3. Male respondents aged 31-43 years recorded the highest CD_4 count of 241.8±30.4 (Range 20-860 cells/L). This was followed by 225.7±36.9 cells/L recorded by males aged 44-56 years. Females aged 31-43 years recorded 214.8±27.1 cells/L (range 20-670) followed by 212.6±30.7 cells/L (Range 44-600) recorded by respondents aged 18-30 years, 193.4±23.8 cells/L (range 43-420) was recorded by female respondents aged 18-30 years, 162±28.2 cells/L (range 100-300) was recorded by female respondents aged 44-56 years, while the least value 142.5±52 cells/L (range 40-300) was recorded by male respondents aged 57-69 years. Table 3.

Table 2: Distribution of respondents according to their occupation, income level and number of dependents UUTH, Uyo 2005

Sex	No. of Female (%)	No. of male (%)	total (%)
Occupation			
farming	8 (2.8)	8 (2.8)	16 (5.5)
civil servant	54 (18.6)	61 (21.0)	115 (39.7)
trading	51 (17.7)	32 (11.0)	83 (28.6)
artisan	12 (4.1)	17 (5.9)	29 (10.0)
top c/s	2 (0.7)	4 (1.4)	6 (2.1)
chief executive/ political officer holder	1 (0.3)	5 (1.7)	6 (2.1)
student	17 (5.9)	4 (1.4)	21 (6.6)
self employed	3 (1.0)	5 (1.7)	8 (2.8)
unemployed	6 (2.1)	0 (0.0)	6 (2.1)
grand total	154 (53.1)	136 (46.9)	290 (100.0)
income level per month (₦)			
less than 10,000	75 (25.9)	46 (15.7)	121 (41.7)
>10,000-30,000	55 (19.0)	59 (20.3)	114 (39.3)
>30,000-60,000	6 (2.1)	20 (6.9)	26 (9.0)
>60,000-80,000	1 (0.3)	5 (1.7)	6 (2.1)
>80,000-100,000	1 (0.3)	0 (0.0)	1 (0.3)
>100,000	2 (0.7)	2 (0.7)	4 (1.4)
no income	14 (4.8)	4 (1.4)	18 (6.2)
grand total	154 (53.1)	136 (46.9)	290 (100.0)
number of dependents			
1-3	78 (26.9)	65 (22.4)	143 (49.3)
4-6	47 (16.2)	38 (13.1)	85 (29.3)
7-9	8 (2.8)	20 (6.9)	28 (9.7)
10>	5 (1.7)	9 (3.1)	14 (4.8)
no dependent	16 (5.5)	4 (1.4)	20 (6.9)
grand total	154 (53.1)	136 (46.9)	290 (100.0)

Table 3: Distribution of Respondents according to their sex, age, and prevalence of signs/symptoms of opportunistic infections and CD_4 Cell Count UUTH, Uyo 2005

Variable	Female	Male	Total
fever	73 (25.2%)	65 (22.4%)	138 (47.6%)
Diarrhea	17 (5.9%)	28 (9.7%)	45 (15.5%)
Thrush	8 (2.8%)	15 (5.2%)	23 (7.9%)
Loss of appetite	32 (11.0%)	32 (11.0%)	64 (22.1%)
Nausea	3 (1.0%)	7 (2.4%)	10 (3.4%)
No sign and symptom	5 (1.7%)	5 (1.7%)	10 (3.4%)
Grand total			290 (100.0%)
CD_4 Count			
Age in years	Female	Male	
18-30	193.4±23.8 range 43-420; n = 70	212.6±30.7 range 44-600; n = 16	
31-43	214.8±27.1 range 20-670; n = 52	241.8±30.4 range 20-860; n = 62	
44-56	162±28.2 range 100-300; n = 12	225.7±36.9 range 20-800; n = 28	
57-69	Nil	142.5±52 range 40-300; n = 6	
x±SD	190.1±32.5	205.7±47.2	

Impact of HIV/AIDS on earning/Work capacity of PLWHA: Four percent (4%) of respondents reported spending N2,000-N5,000 on HIV/AIDS related medication and medical care every month. Thirty percent reported spending N6,000-N10,000.00 monthly while 6% reported spending more than N10,000.00 monthly on HIV and AIDS related medication and medical care. Regarding impact on work capacity, 40% reported being able to continue their usual work with occasional absenteeism due to ill-health 50% reported being unable to continue with their pre-illness occupation, while 10% reported being able to continue their usual work with frequent absenteeism. Fig. 1 shows that majority (48%) of respondents sometimes lack money to feed to their satisfaction. This is followed by 20% who reported rarely lacking money to feed, 95 reported always lacking money to feed to their satisfaction, while 23(%) reported never lacking money to feed to their satisfaction. Fig. 2 reveals that majority of respondents (52%) sometimes lack money to buy prescribed drugs, 3% reported always lacking money to buy prescribed drugs, while 35% reported never lacking money to buy prescribed drugs.

Coping strategies adopted by PLWHA: Coping strategies adopted by respondents to deal with the economic impact of HIV and AIDS included majority who borrowed money from friends, this is followed by those

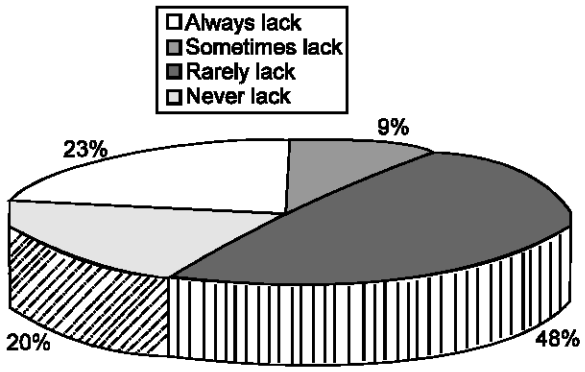

Fig. 1: HIV/AIDS and lack of money to feed to satisfaction UUTH, Uyo, 2005

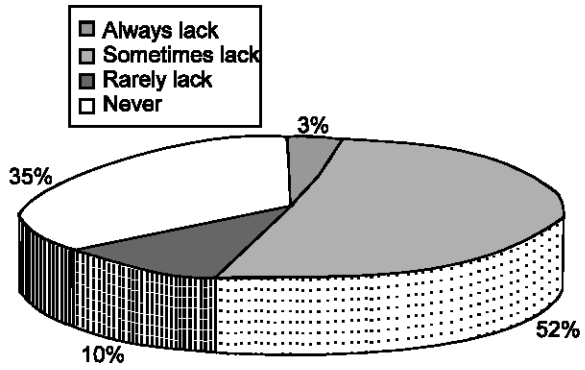

Fig. 2: HIV/AIDS and lack of money to buy prescribed drugs, UUTH, Uyo, 2005

who borrowed money from relations, cutting down on food intake and borrowing from church in descending order of frequency. The least frequently adopted strategy was omitting taking prescribed drugs.

24-hour nutrient intake: The 24-hour dietary recall, was evaluated for the nutrient content and the result is presented on Table 4. The male respondents aged 57-69 years recorded 116.7±22.3 gms (range 80-180 gm) daily intake of vitamin C, this is followed by 95.8±19.2 gm recorded by males aged 31-43 years, 75.1±18.9 (range 20-150 gm) and 68.3±20.9 gm (range 40-120 gm) recorded by males aged 44-56 years and 18-30 years respectively. Female respondents aged 18-30 years recorded a 24-hour vitamin C intake of 76.1±20.2 gm, followed by 72.7±27.6 gm (range 10-140) and 63.5±20.3gm (range 20-100) recorded by those aged 31-43 years and 44-56 years respectively. There difference in intake of vitamin c between males and females was not statistically significant ($p>0.05$). Though males recorded a higher intake with 78 (59.1%) ($n = 133$) meeting the normal RDI for non-infected persons of the same age. The 24-hour fat intake of respondents is also presented on Table 4. Male respondents aged 44-56 years recorded the highest 24-hourly dietary fat intake of 47.6±9.4 gm (range 18-58 gm). This was followed by 38.3±10.7gm recorded by male subjects aged 31-43 years, 34.1±8.7 gm and 24.9±8.1 gm recorded by male respondents aged 18-30 years and 57-69 years respectively. Among female PLWHA, the respondents aged 18-30 years recorded a 24-hourly dietary fat intake of 27.1±6.4 (range 10-48 gm), followed by 25.7±6.9 gm and 24.6±16.1 gm recorded by respondents aged 44-56 years and 31-43 years respectively. Males recorded a higher intake with 68 (51.1%) meeting their RDI while 56 (37.6%) of females met the RDI of non-infected persons of the same age. Table 4 also shows the daily dietary protein intake of respondents. Female respondents recorded an intake of a little more than 42 gm daily. Male respondents aged 57-69 years recorded a daily protein intake of 38.8±6.2 gm (range 36-44). This was followed by 36.5±6.1 gm (range 20-56) recorded those aged 44-56 years, the least value of 34.8±6.4 (range 20-44) was recorded by male respondents aged 18-30 years. Seventy-nine per cent of females and 70% of males met the RDI of protein for non infected persons of the same age. The difference in protein intake between males and females was statistically significant ($p<0.05$).

The daily calorie intake of respondents is presented on Table 4. The highest intake of 2440±132.7 Kcal (range 1300-3,000 kcal) was recorded by male respondents aged 18-30 years, while the least 18245.6±78.9 kcal was recorded by female respondents aged 44-56 years. The difference in intake by males and female respondent was statistically significant ($p<0.05$).

Anthropometric variables: The anthropometric parameters of respondents is presented on Table 5. The highest BMI of 25.3±3.6 (range 16.5-35.4) was recorded by male respondents aged 31-43 years. 7 (8.0%) of these were underweight including 3 (3.4%) grade 1 and 4 (4.5%) grade II underweight (James *et al.*, 1988; Ferro Luzzi *et al.*, 1992; RNIS, 2000). This was followed by 24.1±2.4 (range 20.5-39) recorded by males aged 44-56 years and the least value of 22.5±2.9 (range 16-27.4) was recorded by males aged 57-69 years. Further statistical analysis revealed no significant difference ($p>0.05$) in BMI values of the different age groups. Among female respondents, the highest value 25.1±5.8 (range 15.2-47.6) was recorded by those aged 31-43 years, including 8 (13.4%) who were underweight. This was followed by 25.0±4.1 (range 18.0-31.9) including 2 (12.5%) who were underweight and 23.4±3.8 (range 15.5-32.9) including 5 (6.7%) who were underweight, recorded by the females aged 44-56 and 18-30 years respectively. The difference in BMI values of the different age groups was not statistically significant ($p>0.05$).

Table 4: Distribution of respondents according to age, sex, and 24-hour mean dietary nutrient intake (gm) UUTH, Uyo, 2005

		Female				Male			
Nutrient		Vitamin C	Fat	Protein	Calories	Vitamin C	Fat	Protein	Calories
Age category									
18-30		76.1±20.2	27.1±6.4	42.1±9.3	1893±151.3	68.3±20.9	34.1±8.7	34.8±6.4	2440±132.7
	Range	30-180;	10-48;	10-60	1000-2800;	40-120;	18-48	20-44	1300-3000;
	n	75	75		20	20	20	20	20
31-43		72.7±27.6	24.6±6.1	43.4±12.5	1881±140.3	95.8±19.2	38.3±10.7	35.9±8.2	2397±115.1
	Range	10-140	10-40	20-60	900-2800;	20-180;	18-56;	20-56	1400-3600;
	n	58	58	58	58	86	86	86	86
44-56		63.5±20.3	25.7±6.9	42.5±4.8	1824±78.9	75.1±18.9	47.6±9.4	36.5±6.1	2245.1±100.3
	Range	20-100	10-38	20-40	800-2700;	20 -150;	18-58	20-56	1200-3100;
	n				16	20		20	20
57-69		Nil	Nil	Nil	Nil	116.7±22.3	24.9±8.1	38.8±6.2	2179.2±150.3
	Range					80-180	18-50	36-44	1000-3000;
	n					6	7	7	7
*No. that met RDI		101 (67.8%) NS	56 (37.6) S	79 (53.0) S	120 (80.5) S	78 (59.1)	68 (51.1)	70 (52.6)	110 (82.7)

NS-Not Significant, S-Significant, *RDI-Recommended daily intake (for non infected persons of same age and sex)

Table 5: Distribution of respondents according to age, sex, BMI and MUAC (cm), UUTH, Uyo, 2005

	Female						Male					
	BMI			MUAC			BMI			MUAC		
		Range	n		Range	n		Range	n		Range	n
18-30	23.4±3.8	15.5-32.9	75	26.2±3.1	18.8-32.8		23.0±1.8	17.8-2.6	20	25.5±2.3	21.5-31	20
31-43	25.1±5.8	15.2-47.6	58	27.3±4.7	17.5-55.3	58	25.3±3.6	16.5-35.4	88	26.8±3.1	17.5-35.4	84
44-56	25.0±4.1	18.0-31.9	16	26.1±4.3	18.2-31.9	16	24.1±2.4	20.5-39	20	27.4±2.4	24.0-31	20
57-69	Nil			Nil			22.5±2.9	16-27.4	7	28.1±2.0	25-31.3	7
	NS			NS			NS			S		

BMI-Body Mass Index, MUAC-Mid Upper Arm Circumference, NS-Not significant, S-Significant

The Mid Upper Arm Circumference (MUAC) of respondents is presented on Table 5. The highest value of 28.1±2.0 cm (range 25-31.5cm) was recorded by males respondents aged 57-69 years, this was followed by 27.4±2.4 cm (range 24.0-31) and 26.8±3.1 cm (range 17.5-35.4) recorded by males aged 44-56 years and 31-43 years respectively. The least value for males was 25.5±2.3 (range 21.5-31) recorded by those aged 18-30 years. Among females, the highest MUAC value 27.3±4.7 cm (range 17.5-55.3 cm) was recorded by these aged 31-43 years, including 3 (5.2%) who had moderate undernutrition i.e. < 18.5 (Ferro-Luzzi *et al*., 1992; James *et al*., 1988). The lowest MUAC value 26.1±4.3 cm (range 18.2-31.9) was recorded by those aged 44-56 years. The difference in MUAC values of female respondents was not statistically significant ($p>0.05$), while the difference in MUAC values of male respondents of different ages was statistically significant ($p<0.05$).

Discussion

Socio-demographic characteristics of study participants: This study has shown that majority (51.4%) of PLWHA were aged 31-43 years, while the age group with the least number were aged 59-69 years (2.4%). The age profile of persons living with HIV/AIDS has been studied and documented. Ozigbo-Esere and Odionyeme (2004), reported that majority of PLWHA, attending a dermatology/venerology clinic in Benin, Nigeria were aged 30-39 years, followed by those aged 20-29 years. Similarly NIMR-FMOH (2003); WFP (2003); FMOH (2005), observed that the most productive age group (young adults), were the most affected by HIV/AIDS. The present study, observed that more females than males reported for treatment at the study center, though it was not ascertained that this is the pattern of infection in the community. However, the phenomenon of more female than male prevalence of HIV/AIDS has been previously observed (UN AIDS, 2002; NIMR-FMOH, 2003; WFP, 2003; Ozigbo-Esere and Odionyeme, 2004; Harries *et al*., 2005).

Majority (40.7%), of study participants had tertiary education. This was followed by 39.3%, who had secondary school education. The least number 6 (2.1%), had vocational/non-formal education. This apparent positive association between educational level and prevalence of HIV/AIDS has been extensively reported on. Federal Ministry of Health (2005), reported that the more educated are more likely to be infected with HIV/AIDS. Similarly Hargreaves *et al*. (2002), observed that higher socio-economic status (including higher education) was associated with increased risk of infection in younger males. However, they reported no association between HIV infection and educational attainment in women. Glynn *et al*. (2004), also reported no association between schooling and HIV infection in

men or women in Kisumu in Kenya and Ndola in Zambia, while they observed that in Cotonou in Benin and Yaounde in Cameroon, men and women with more schooling were less likely to be infected and that less risky sexual behaviour was associated with more schooling. Pam *et al.* (2003); Glynn *et al.* (2004), concluded that the more educated, may be responding more readily to health education programs hence their higher number in health facilities utilization.

The present study, observed that majority (48.6%) of study participants were married, while 85 (29.3%) were never married. The least number 13 (4.5%) were divorced. This is in contrast to the findings of Ozigbo-Esere and Odionyeme (2004) that more single individuals, were infected than married persons. Regarding the occupation and income of PLWHA. It was observed that more (39.7%) study participants were junior or middle cadre civil servants. One hundred and fourteen (39.3%) reported earning less than N10,000.00 per month. This finding, highlights that of Piwoz and Preble (2000), that families where a member has HIV/AIDS, enter a downward economic spiral, which poor economic situation was further exacerbated by added cost of HIV/AIDS illness and higher nutritional needs. The dire economic situation referred to is further elucidated by the observation in the present study, that 143 (49.3%) of study participants had 1 to 3 dependents to cater for, 85 (29.3%), reported having 4 to 6 dependent, while 28 (9.7%), reported having as much as 7-9 dependents.

These findings of poor economic situation, is congruent with the position of NIMR-FMOH (2003); NDHS (2004), that HIV/AIDS has deleterious impact on the economic conditions of individuals and populations.

It was observed that majority (47.6%), of study participants, reported having fever, loss of appetite, diarrhea, thrush and nausea. These findings are in agreement with those of Murray *et al.* (2002); NIMR-FMOH (2003); Piwoz *et al.* (2004), that these signs and symptoms are indicative of an overwhelmed immune response which occurs in PLWHA. Furthermore the overall CD_4 cell counts of sampled PLWHA was low, indicating an overwhelmed immune response and that they reported late for treatment.

The poor immune status of PLWHA is well established. Schrimshaw *et al.*, 1968; Tomkins and Watson, 1989; Fishman *et al.* (2004), posit that severe infection and malnutrition have a synergic negative impact on the immune status. Thus signs and symptoms of opportunistic infection such as Herpes simplex, Candidiasis, Pnuemocystis carinii occur. These signs and symptoms of opportunistic infections such as diarrhea, loss of appetite, nausea are also side effects of anti-retroviral therapy (Hsu *et al.*, 1998; Piwoz and Preble, 2000; Bonnard, 2002; Castleman *et al.*, 2003). To ameliorate these signs and symptoms that may negatively impact nutritional status, Pronsky *et al.* (2001); Bonnard (2002), advocate individual specific food and nutrition intervention to deal with these signs and symptoms of opportunistic infections and/or side effects of anti retroviral therapy.

Regarding the finding of low CD_4 cell count in this study, way below the normal of more than 1,500 cell/µl (NIMR-FMOH, 2003). Meshack (2004), also reported a low level of 230 cells/µl in HIV-positive adults in Lagos. He also reported that highly active anti retroviral therapy produced a consistent increase in CD_4 cell count, a situation not observed in this study, though the CD_4 cell count was not analyzed in respect of length of time study participants had spent on HAART. This was because, most CD_4 cell count noted values were values recorded by PLWHA before commencement of anti retroviral therapy. Akanmu *et al.* (2004) reported that malaria parasite reduced the CD_4 cell count of PLWHA. Inyang *et al.* (2004) reported a mean CD_4 cell count of 232±79 cells/µl (range 88-470 cells/µl).

It can thus be concluded that study participants had poor immune status on entry into the present study, a phenomenon that has been studied and reported. It is possible that poor access to health services or the stigmatization associated with the disease, as reported by FMOH (2005), prevent prompt seeking of medical intervention. Another reason may be the knowledge, attitude and practice of PLWHA which might have influenced their health seeking behaviour (Allen *et al.*, 1993). Hence lack of knowledge or poor attitude to health concerns may cause a delay in people seeking medical attention. Similarly the health belief model of health seeking behaviour proposed by Maiman and Becker (1974), may be applicable. In this case, PLWHA may delay seeking medical attention, until there is a cue to action that is a worsening of their health condition. Jiamton *et al.* (2003) studied the impact of micronutrient supplementation on CD_4 cell count of PLWHA. They reported a statistically significant decrease in the mortality of those with CD_4 cell count less than 200 cell/µl, while there was no statistically significant decrease in mortality among those PLWHA, with CD_4 cell counts of more than 200 cells/µl.

This study revealed that 64% of study participants reported spending N2000-N5,000 on HIV related medication and medical care monthly. While 30% reported spending N6000-N10,000.00 monthly. The importance of this finding is elucidated by the fact that many (39.3%) of the study participants reported earning less than N10,000.00 a month and majority (78.6%) had 1-6 dependents. This finding is in agreement with the position of NIMR-FMOH (2003); NDHS (2004), that HIV/AIDS had deleterious effect on the economic condition individuals and populations. The finding also agrees with Piwoz *et al.* (2004), who stated that families, where a member has HIV/AIDS go into a downward economic spiral.

This study also revealed that the earning and work capacity of PLWHA is jeopardized by frequent illness and absenteeism. Other negative socio-economic effects, include that many (48%) of sampled PLWHA, sometimes lack money to feed to their satisfaction and majority (52%) sometimes lacked money to buy prescribed drugs. This finding underscores the opinions of the researcher that PLWHA in resource-limited settings, are facing a threatre of death, occasioned by the synergic pressure exerted by poverty, malnutrition and disease.

It was revealed that coping strategies included borrowing from friends and/or relations, cutting down on food intake, borrowing from church, or omitting taking prescribed drugs, in that order of descending frequency. This finding highlights the importance of offering community based support to PLWHA and PABA. Community based support could include non discrimination in employment opportunities, increased access to required health services, as well as applied food and nutrition programmes.

Twenty four-hour vitamin C intake: This study observed that only female respondents aged 44-56 years recorded an inadequate mean 24-hour vitamin C intake (56.6±25.4gm), while male respondents recorded about double (123.3±23.6 gm) of recommended daily allowance of 60 gm (Okoye, 1992; Guthric and Picciano, 1995; Chatterjea and Shinde, 2002). However some study participants recorded very low intakes (10-40gm). The reason for this may be due to a fear in PLWHA that intake of fruits, will trigger diarrhea. The importance of Vitamin C in severe infections such as HIV/AIDS is well established (Thurnham, 1994). The need for Vitamin C by PLWHA, derives from the fact that, as a versatile antioxidant, vitamin C play an important role in combating oxidative stress, which enhances and characterizes HIV infection as other severe infections. For this reason, it has been recommended by (Cathcart, 1985; Food and Nutrition Library, 2004), that daily dietary intake of Vitamin C for PLWHA should be up to 1000mg. Kubler and Gesher (1970); Graumlich *et al.* (1997), posit that intakes above 1000mg produces adverse intra-intestinal events and hyperoxaluria and that potential toxicity of Vitamin C relates to intakes above 2-3gm/day. It can be inferred that the dietary intake of Vitamin C by study participants on entry into the present study (range 10-180mg/day), was inadequate to meet their increased needs.

Twenty four-hour fat intake: This study observed that majority of male respondents (54.5%) met their recommended daily intake of Fat. WHO (2003), recommends that PLWHA, should consume the same RDI of fat as for persons of the same age and sex. The energy provided by fat should be about 20% of their daily energy needs (Guthric and Picciano, 1995) and it should be preferably of plant origin or fish oils. It has been recommended that PLWHA reduce intake of fatty foods in cases of anorexia, nausea, vomiting and diarrhea (Bonnard, 2002; WHO, 2003).

Twenty four-hour protein intake: This study observed that majority of male respondents (57.8%), met their recommended daily intake of protein i.e. 55gm (Guthric and Picciano, 1995). More than 60% of female respondents also met their recommended daily intake of protein i.e. 45gm (Guthric and Picciano, 1995). WHO (2003), posits that though the protein needs of PLWHA is increased, there was no evidence that an increase in RDI would produce better clinical outcomes. Thus WHO (2003), recommends that PLWHA maintain the RDI of protein for healthy persons of the same age and sex. It is pertinent to point out that this recommendation applies to PLWHA in food secure settings, who have no preexisting malnutrition. However the findings that many sampled PLWHA failed to meet their RDI is in agreement with the position of the Federal Government of Nigeria(1995), that 36% of Nigerian households are food insecure and that those with low income, rural and semi-urban adults, consumed less than 40% of their protein needs. It is also in agreement with the position of WFP (2003); Piwoz *et al.* (2004); FMOH (2005), that household food security is threatened by occurrence of HIV/AIDS in the family. The low level of protein intake recorded by study participants is a very undesirable situation. This derives from the fact that the protein needs of PLWHA is actually increased by acute and negative acute phase reactions to infection (Tiez, 1986). Schrimshaw *et al.* (1968); Tomkins and Watson (1989), described a synergic vicious cycle of malnutrition and infection, with the occurrence of malnutrition, increasing the likelihood of infection, which in turn elevates the individuals susceptibility to more severe infection. The finding of this study is that many of sampled PLWHA did not meet their recommended daily intake of protein.

Twenty four-hour dietary calorie intake: The present study observed that male respondents aged 18-30 years recorded the highest mean daily calorie intake (2680±157.2 Kcal) normal is about 2200-2650 Kcal/day depending on normal activity pattern, this is consistent with their age and sex. The least intake was recorded by female respondents aged 44-56, this is also in agreement with reduced energy needs with increasing age. This study also observed that majority of sampled PLWHA (77.6% to 87.9%) met the recommended daily energy intake for healthy persons of same age and sex. This is higher than the position of Federal Government of Nigeria (1995), that the poor, rural and semi-urban adults consumed less than 60% of their energy needs. However WHO (2003); recommend a 20-30% increase

in energy intake for symptomatic PLWHA, over the RDI for healthy persons of the same age and sex. WHO (2003); Piwoz *et al.* (2004); Food and Nutrition Library (2004), recommend that PLWHA consume energy dense foods and fish oil in order to meet their increasing energy requirement. Ojofeitimi and Fakande (1998), posited that the endemicity of Protein Energy Malnutrition (PEM) coupled with high prevalence of HIV/AIDS infection, should be of great concern to all stakeholders. Thus he opined that preventing and controlling PEM would definitely lessen and prevent wasting, which is a common cause of death in PLWHA (Ojofeitimi and Fakande, 1998; Piwoz *et al.* (2004). The finding of this study was that sampled PLWHA did not meet their increased energy requirements.

Body Mass Index (BMI): It was observed that male respondents aged 31-43 years, recorded the highest mean BMI by the end of the study. Other male respondents recorded a mean BMI of between 24.1±2.4 and 22.5±2.9. There was no statistically significant difference in BMI by male respondents of different ages. Most female respondents recorded normal BMI values. Some (15) were underweight while others recorded very high values indicating gross overweight.

Changes in body weight of PLWHA has been extensively studied and reported. Piwoz *et al.* (2004), reported that wasting was a major and disturbing sign of HIV/AIDs, which was also predictive of mortality. Ojofeitimi and Fakande (1998), Daniel (1998) and Malomo and Fakande (1998), achieved a gain in Weight by PLWHA, using nutritional counseling, food demonstration and soya bean milk. Furthermore, the present study observed that majority of respondents, recorded an adequate BMI i.e. 18.5-22 (Ferro-luzzi *et al.*, 1992). This observation elucidates the fact that many PLWHA, maintain a normal weight. In this regard, Maeyer (2001) recommends the use of Usual Body Weight (UBW), in order to capture the weight loss by PLWHA, who had a BMI above the normal range before becoming infected with HIV. The finding of this study, appears to justify the use of UBW, rather than BMI, in order to reflect the degree of wasting in PLWHA. Jiamton *et al.* (2003) made similar findings of normal BMI in PLWHA. The finding is however in contrast to those of Ojofeitimi and Fakande (2003), who reported severe PEM (i.e. BMI<18.5cm) in majority of PLWHA they studied in Ijesha, Nigeria.

Mid Upper Arm Circumference (MUAC): This study observed normal MUAC values by majority of both male and male respondents. Only 5 female and 1 male were underweight i.e below 18.5cm. It has been proposed that ART improves nutritional status (Bonnard, 2002; Castleman *et al.*, 2003) hence the observation in this study that MUAC was mostly normal or above normal (Ferro-Luzzi *et al.*, 1992; James *et al.*, 1998).

This finding is in consonance with one of the limitations of MUAC as an index of under nutrition, since it does not reflect ethnic variation in MUAC and also does not differentiate acute from chronic energy deficiency. Collins (1996), posits that Africans for instance, may loose a lot of weight and be very ill and still record an MUAC value that falls within the normal range. It can be concluded therefore that MUAC had limited applicability in sampled PLWHA, as it failed to reflect their state of health (as indicated by their low CD_4 count and presence of opportunistic infections) and the degree of weight loss, especially those who were not in stage 4 clinical category of AIDS (NIMR-FMOH, 2003).

It is recommended that aggressive health education programmes should be instituted in tertiary institutions, using appropriate models, to stem the apparent propensity of HIV and AIDS to infect the tertiary educated individual. It is also recommended that degree of weight loss and biochemical parameters rather than BMI and MUAC should be used to assess nutritional status of PLWHA. Much effort is needed to encourage people to become aware of their HIV status through voluntary counseling and testing so that they access existing interventions early enough. There is need to reduce sundry costs associated with accessing retroviral therapy and to increase the number of ART centers to make it more accessible to those who need it. There is urgent need to incorporate food supplementation programmes into the national effort to curb the impact of the HIV and AIDS pandemic.

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