

Factors Affecting Dietary Intake and Dietary Diversity Score Among Adults Living With HIV/AIDS in Uasin Gishu District Hospital, Kenya - A Cross Sectional Study

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Abstract: Despite the internationally accepted recommendation for dietary diversity as a means to provide adequate nutrient intake for a healthy diet and achieving positive health, little is known about factors affecting dietary intake and diversity score among people living with HIV/AIDS at UasinGishu District hospital Comprehensive Care Center. The objective of the study was to determine the factors affecting dietary intake in people living with HIV/AIDS at UasinGishu district Hospital and determine the factors associated with dietary diversity score. It was a Hospital based cross-sectional descriptive study involving both quantitative and qualitative methods. One hundred and sixty nine adults living with HIV/AIDS and attending comprehensive care center at the district hospital were interviewed. It was conducted in the months of June and July, 2018 and the main tool of data collection was an interviewer-administered questionnaire and a dietary diversity score tool. Interview schedule was used for focus group discussions. Qualitative data analysis was done by SPSS version 20.0 and multiple logistic regression analysis done. Thematic analysis was also done. Mean dietary diversity score was 4.99 (SD 1.37) with 62.7% of the respondents scoring at 5 and more food groups. Having no regular income and purchase of food as a main source of food posed a four and three -fold risk of having a low dietary diversity respectively (AOR 4.28 95% CI 1.53-11.98 & AOR 3.00 95% CI 1.06-8.51). More than half of the respondents had a moderately adequate dietary intake but less than 20% consume vitamin A rich foods, vegetables and fruits. Source of income and sources of food at own gardens and food support, rather than purchase, allows one to have adequate dietary intake. Nutrition counselling should therefore aim at encouraging patients to increase on variety of food groups consumed including vitamin A rich foods, fruits and vegetables. Health providers together with the clients should come up with a strategy to support clients without regular incomes and those who purchase food as main source of food to grow own gardens and access food support

Key Words: HIV/AIDS, Nutrition intake, dietary intake, dietary diversity score

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I. Introduction

Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) is chronic epidemic highly challenging to the world, particularly to Africa. Global HIV/ AIDS report 2013, indicated that globally about 35.0 million people were living with HIV at the end of 2013, and new infection had declined by 33% from 2001. About 0.8% of adults aged 15 to 49 years worldwide are living with HIV and Sub-Saharan Africa where Kenya is included was the most severely affected region in the world with about 71% of people living with HIV worldwide (WHO, 2016). Aids related deaths were estimated at 2.0 million with 1.7 adults and 280,000 children under 15 years. Nearly 67% of all people with HIV/AIDS globally live in sub Saharan Africa and about 70% of AIDS deaths in 2008 occurred in sub Saharan Africa. Over the past years the rapid expansion of antiretroviral therapy in Africa and Asia has dramatically reduced HIV related morbidity and mortality and transformed HIV into a chronic illness. However it remains a challenge to achieve the quality of HIV/AIDS care and treatment services in many low income countries with the hardest hit of epidemics (UNAIDS, 2012; UNAIDS, 2008). Kenya demographic and health surveys estimated that 7% of adults 15-64 years in Kenya are infected (KDHS, 2014). Comprehensive care center comes in handy with the increasing number of new infections. It plays a big role in supporting PLWHA and some of the services it offers include nutrition support. In 1988 the importance of nutritional support was highlighted in preventing severe malnutrition, boosting the immune response and optimizing quality of life especially in improving response to treatment (Kadiyala&Rawat, 2012; Melake, Gudina&Negesa, 2017). Nutrition is an important component of comprehensive care for the people living with HIV/AIDS (PLWHA's) and is particularly so in resource -limited

settings where malnutrition and food security are endemic. There is similarity in cellular effects of malnutrition and HIV on the immune system compromising it by decreasing CD4 T-cells, suppression of delayed hypersensitivity, and abnormal B-cell responses (Musumari, Wouters, Kayembe, Nzita&Mbikiyi, 2014). Providing sufficient food and nutrition to meet people's basic need for health, growth and development has been a long-standing challenge for African countries. This is further exacerbated by the emergence of HIV/AIDS (Kadiyala&Rawat, 2012; Musumari et al., 2014 and Melake, 2017). Musumari et al.(2014) and Gedle et al.(2015), also noted that dietary management of PLWHA's is key to sustaining the ability to continue participating in work force and contribute to socio economic development. They agreed that eating a diversity of food is an internationally accepted recommendation for a healthy diet, and is associated with positive health outcomes such as reduced incidence of mortality. Dietary diversity is a qualitative measure of food consumption that reflects household access to wide variety of foods, and is also a proxy of the nutrient adequacy of an individual dietary score (IDDS). It is on this basis that the study sort to determine the factors affecting dietary intake and specifically determine the factors associated with dietary diversity score

II. Material And Methods

This hospital based cross sectional study was carried out on HIV/AIDS positive adults attending Comprehensive Care Centre at UasinGishu district Hospital from June to July 2018. A total of 169 adult subjects (both male and female) aged between 18 -65 years were interviewed

Study Design: Hospital based cross-sectional descriptive study involving both quantitative and qualitative methods.

Study Location: UasinGishu district Hospital Comprehensive Care Center. This is a Government hospital located in Chepkoilel Sub-location, Chepkoilel location, Moiben Division, Eldoret East Constituency in UasinGishu County.

Study Duration: June to July 2018

Sample size: 169 patients

Sample size calculation: The Kish-Leslie formula was used to determine the required sample size.

$$n = \frac{Z^2 \alpha / 2 P Q}{\alpha^2}$$

□²

Where n = required sample size

$Z_{\alpha/2} = 1.96$ (Critical value of the standard normal distribution corresponding to error rate $\alpha/2$ at the level of significance $\sigma = 0.05$ (5%).

P = Estimated proportion of the population with inadequate dietary intake. A value of 10.3% representing the prevalence estimates of adult malnutrition, as a proxy for dietary quality in sub-Saharan African countries was used (Olalekan&Uthman, 2008).

Q = (1-P), which represents the estimated proportion of the population with adequate dietary intake

$$n = \frac{1.96^2 \times 0.897 \times 0.103}{0.05^2} = \frac{3.8416 \times 0.092}{0.0025} = 0.355$$

= 141.9

20% of the original sample size was added to cater for non-response making the sample of (141+28) respondents.

n = 169

Subjects & selection method: The study population was selected from the patients who attended the Care center daily through simple random sampling. Subjects who formed Focus group discussion were selected purposefully from the attendance register.

Inclusion criteria:

HIV positive adults aged (18-65) years attending UasinGishu District Hospital Comprehensive Care Centre during the study period who consented to participate in the study.

Exclusion criteria:

1. Respondents who were too sick to be interviewed.
2. HIV positive adults attending UasinGishu District Hospital Comprehensive Care Centre for the first time
3. Respondents whose previous 24 hour meals were unusual such as those eaten at feasts or special occasions away from home.

Procedure methodology (10 Bold)

The main tool of data collection was an interviewer-administered questionnaire and a dietary diversity score tool. Interview schedule was used for focus group discussions. The principal investigator and two trained research assistants were responsible for client recruitment and enrolment. On a daily basis, adults who came to

the hospital were identified at the reception and were brought to examination rooms set aside for the purposes of the study. Clients were assessed through triage to ensure that they fulfilled the study criteria. After obtaining informed consent, clients who agreed to participate in the study were then interviewed.

Focusgroup discussion participants were purposively selected from the client database. Once selected, the participants were contacted using their telephone numbers from the database and given an appointment to participate in the FGD's. Four FGDs were held including one for young men, young women (18 – 35 years), older men and older women (36 years and above). Each focus group comprised of six purposively selected clients.

Statistical analysis

After data collection, editing, coding and data entry in to epi data software was done. Qualitative data analysis was done by SPSS version 20.0 and Bivariate and multivariate logistic regression analyses to assess the association between outcome variable and explanatory variables was done. Qualitative data was analyzed thematically.

III. Result

Background characteristics of the respondents: More than a half (50.3%) of the respondents were aged between 30 and 39 years and 34.9% were aged over 40 years. The mean age of the respondents was 37.32 years (SD 8.55) with age range of 18 – 65 years. The study also showed that 78.1% of the respondents were female and that majority of the respondents (69.8%) were single, separated, divorced and widowed. More than three quarters (97.6%) of the respondents reported to have had any formal education. Only 21.9% of the respondents were in regular salaried employment. Only one of the respondents had not yet started ART and of those already in ART, 60.7% had started ART more than a year ago. The mean family size of respondents was 4.05 with standard deviation of 2.05 and above almost half of HIV positive adults (47.3%) were living in the household size of five and above. One hundred and forty two (84.0%) and 96 (25.5%) of respondents main household source of food was accessed through purchasing from market/grocery store and farm/garden, respectively

Table1 Background characteristics of respondents

Characteristics	Frequency (n=169)	Percentage
Age (Years)		
>40	59	34.9%
30-39	85	50.3%
18-29	25	14.8%
Sex		
Male	37	21.9%
Female	132	78.1%
Religion		
Protestant	44	26.0%
Catholic	65	38.5%
Born again Christians	36	21.3%
Others (Muslims, and SDA)	24	14.2%
Marital status		
Single	44	26.0%
Separated	40	23.7%
Divorced	10	5.9%
Widow	14	8.3%
Married (including cohabiting)	61	36.1%
Number of people in household		
< 5	89	52.7%
>5	80	47.3%
Type of family		
Immediate	65	38.5%
Extended	104	61.5%
Smoking cigarettes		
Yes	5	3.0%
No	164	97.0%
Taking alcohol		
Yes	38	22.5%
No	131	77.5%
Education status		
None	4	2.4%
Primary	71	42.0%
Secondary	57	33.7%
Tertiary	37	21.9%
Main source of income		
Professional (Salary earner)	37	21.9%
Trader	48	28.4%

Casual labourer	36	21.3%
Unemployed	48	28.4%
Main source of food		
Purchase	142	84.0%
Others (Own garden, food support)	27	16.0%
On ART		
Yes	168	99.4%
No	1	0.60%
Duration on ART		
≤ 1year	66	39.0%
1-2 years	24	14.8%
> 2 years	78	46.2%
Unwell within 2 weeks		
Yes	17	10.0%
No	152	90.0%

Dietary diversity scores of the respondents: The number of meals eaten per day were as follows: More than half of participants (66%) had 3 to 5 meals per day. The median number of meals was 4 with an inter-quartile range of 3-5 meals per 24 hours. Respondents in all the FGD’s noted that while it would have been desirable for them to have at least 6 meals a day including the three main meals and snacks in between, they were not able to do these due to limited funds.

“Although I would have loved to eat as many snacks between meals as possible, but it is not easy, so I ensure that I eat breakfast, lunch and supper at the minimum to stay healthy”, female FGD participant.

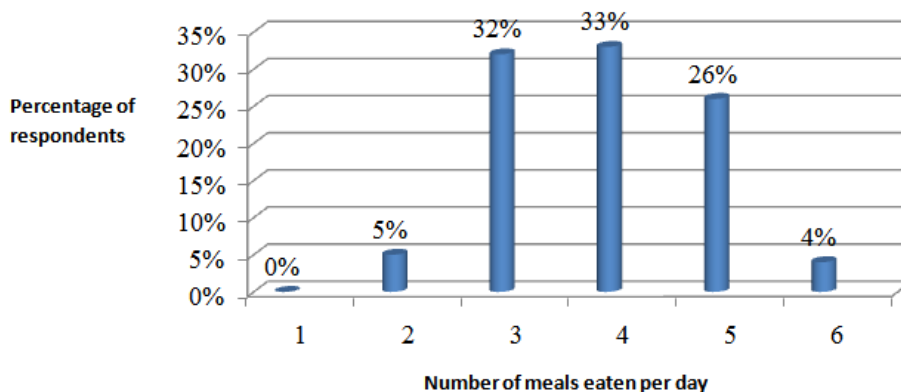


Figure 1 Number of Meals Eaten by Respondent in a Day

Majority of the respondents 162 (96%) had supper which was observed to be the most important meal as stated by one FGD participant below.

“I rather miss lunch or any other meal but not supper, otherwise I will fail to sleep at night”, male FGD participant (36-65 years).

Only 26% of the respondents reported to take a snack in the night and this was confirmed by one participant in the FGD. *“After supper, I just go straight to bed. I therefore do not need to have a snack in the night. It would also be difficult for me to keep awake just to be able to eat a snack at night”*, male FGD participant.

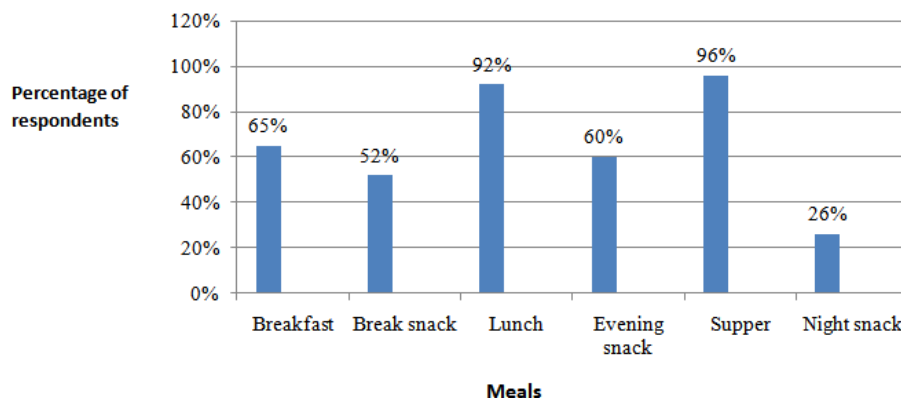


Figure 2: Frequency of taking in 24 hours

Variety of foods eaten by respondents: Most commonly eaten foods were grains/staple foods 163/169 (96%), pulses, legumes and nuts 123/169 (73%) with oils and fats 130/169 (77%) and the least eaten foods were mainly vegetables at less than 20%.

Dietary Diversity within 24 hours

Most respondents (46/169) 65% ate at least 6 food types and (63/169) 37% ate less than 5 food types. The mean number of types of food eaten was 4.99 (SD1.37) with a range of 1 – 8 food types.

Majority of the respondents were in the high IDDS group and only 12.4% of the respondents were in the lowest IDDS tercile as shown in the table below.

Table 2 Individual Dietary diversity scores in terciles

Tercile	Frequency	Percent
Low IDDS (1 – 3 food groups)	21	12.4
Medium IDDS (4 – 5 food groups)	88	52.1
High IDDS (6 or more food groups)	50	35.5
Total	169	100

Data was further summarized to obtain two categories of individual dietary diversity scores (low and high IDDS), where 63 (37.3%) individuals were found with a low IDDS (1 to 4 food groups) category while 106 (62.7%) individuals had a high IDDS (5 and more food groups). Respondents reported that it was customary that different types of food stuffs would be eaten at different meals as stated below. *“What I eat for breakfast or as snack is usually different from what I eat for lunch or supper”*, Male FGD participant.

Factors associated with dietary diversity of respondents

Socio-demographic characteristics

Table 3 Relationship between socio-demographic characteristics and dietary diversity score

Characteristics	Dietary diversity			Crude Odds ratio (95% CI)
	Total N=169 (%)	Low N = 63	High N =106	
Age				
>40	59(34.9)	21	38	1.00
30-39	85(50.3)	31	54	1.04(0.52-2.08)
18-29	25(14.8)	11	14	1.42(0.55-3.69)
Gender				
Female	132 (78.1)	43	65	1.00
Male	37(21.9)	14	23	1.03(0.48-2.19)
Marital status				
Married	61(36.1)	20	41	1.00
Single	108 (63.9)	43	65	1.36(0.70-2.63)
Education status				
Secondary +	94(55.6)	29	65	1.00
None & Primary	75(44.4)	34	41	1.00(0.98-3.53)
Religion				
Christian	58	93	1.00	
Others	18(10.7)	5	13	0.67 (0.22-2.00)
No. of people in household members				
<4	89(52.7)	33	56	1.00
≥5	80(47.3)	30	50	1.02(0.54-1.90)
Type of family				
Immediate	65(38.5%)	26	39	1.00
Extended	104 (61.5%)	37	67	0.83(0.44-1.57)
Smoking cigarettes				
Yes	5 (3.0%)	1	4	1.00
No	164(97.0%)	62	102	0.42(0.04-3.80)
Taking alcohol				
Yes	38(22.5%)	10	28	1.00
No	131(77.5%)	53	78	0.53 (0.23-1.18)

* Statistically significant finding at $p=0.05$

There was no statistically significance association between demographic characteristics and IDDS

Socio-economic characteristics

Only 21.9% of the respondents in this study had full time employment and therefore had a regular source of income as clearly evidenced by the phrase below.

Some of us who were previously employed either abandoned work or were laid off due to poor health. We therefore have to improvise with casual labour whenever we feel better. But it is not easy". "It is easier to get a job if you are strong physically than if you are sick all the time", Male FGD participant (36-65 years).

Table 4 below shows that respondents who had other sources of income such as traders, casual labourers and unemployed, other than a regular income (salary) were three times more likely to have a low dietary diversity score as evidently put by an FGD participant. Persons who purchased food as their main source were twice more likely to have a low IDDS than those who had own gardens or food support as their main source of food

Table 4 Relationship between socio-economic characteristics and dietary diversity

Characteristics	Dietary diversity			(Crude Odds ratio 95% CI)
	Total N=169 (%)	Low n = 63	High N =106	
Main source of Income				
Salary Others (Traders, Casual Labourers and unemployed)	37 (21.9)	7	30	1.00
	132 (78.1)	56	76	3.15(1.27-7.87)*
Main source of food				
Others (Own garden, food support)	27 (16.0)	6	21	1.00
Purchased	142 (84.0)	57	85	2.35(0.88-6.25)

* Statistically significant finding at p=0.05

Source of income and source of food were significantly associated with dietary intake. The other characteristics that have been found in previous studies to be associated with dietary intake like age, gender and counseling were not found significant.

Table 5: The strength of association of socio-demographic/economic/health characteristics in logistic regression

Variables	Coefficient Estimate (β)	AOR (EXP β)	95% CI
Constant	-2.83		
Age (1=> 40 years)	0.20	1.23	0.74-2.02
Gender (1=Female)	0.03	1.03	0.46-2.30
Counseling (1=Yes)	1.81	6.09	0.73-50.60
Main source of income(1= Salary)	1.24	3.46	1.35-8.88*
Main source of food (1= Others)	1.09	2.97	1.08-8.21*

*Statistically significant finding at p=0.05

Having main source of food as purchase and having no regular source of income (casual labourers, traders, unemployed) were more likely to have a low individual dietary diversity score AOR 3.46; 95% CI (1.35-8.88) and AOR 2.97; 95% CI (1.08-8.21) respectively.

Table 6 below shows comparison between crude and adjusted odds ratios for variables included in the final logistic regression model.

Table 6: Comparison between crude and adjusted odds ratios for variables included in the final logistic regression model

Variable	COR	95% CI	AOR	95% CI
Age				
>40	1.00		1.00	
30-39	1.04	0.52-2.08	1.17	0.54-2.53
18-29	1.42	0.55-3.69	1.67	0.59-4.71
Gender				
Female	1.00		1.00	

Male	1.03	0.48-2.19	1.13	0.50-2.58
Counseling				
Yes	1.00		1.00	
No	7.19	0.87-59.05	5.97	0.72-49.62
Main source of income				
Salary	1.00		1.00	
Others	3.15	1.27-7.87*	4.28	1.53-11.98 [#]
Main source of food				
Others	1.00		1.00	
Purchased	2.35	0.88-6.25	3.00	1.06-8.51 [#]

COR indicates Crude Odds ratio, AOR Adjusted Odds Ratio.

Significant findings before adjustment at p=0.05

Significant findings after adjustment at p=0.05

IV. Discussion

Finding of this study reveal that about majority of HIV positive adults had low dietary diversity, the result was consistent with study conducted in Jimma. (Bukusuba, Kikafunda& Whitehead 2010; Gina, Maylis Terri & Marie, 2010). This could be related to poor dietary habit and poor household food security status of HIV positive adults. But it is also true that the dietary habit of other segments of the community in developing country is based on monotonous, energy dense but poor micro-nutrient source of starchy staples. In this study, the majority of the respondents were found to consume a diversity of foodstuffs ranging from 5 to 8 food groups. Factors that were found to have a statistically significant association with a high dietary diversity score were a regular source of income (salary), having own garden and food support as main sources of food.

The study showed that most of the respondents were female. This finding is similar to observations from other studies where women were observed to have better health seeking behaviours and better at utilizing available health services than men (Kadiyala&Rawat, 2012; Melake et al., 2017; Musumari et al., 2014). No statistically significant association was observed between gender and dietary diversity (OR: 1.03 95%CI 0.48-2.19) contrary to findings from other studies which found that women were always more food insecure than men (Melake et al., 2017; Musumari et al., 2014). This variance maybe explained by the fact that other studies focused on household food security and micronutrient intake rather than individual dietary diversity.

In this study population it was established that the majority of the respondents had a high dietary diversity score (5 or more food groups) and majority of the respondents had more than 3 meals per day. This study was conducted in the months of June and July, which is a season of harvesting beans and so the increased number of meals was not surprising. The most commonly consumed foods were staple foods/grains like githeri, beans and millet, fats and oils, peas, beans or lentils/legumes. This is supported by the fact that githeri, maize and other grains are Kenya's staple foods and are consumed at many of the meals but also lentils/legumes are cheaper to have. This is slightly contrasting to findings from a survey carried out in Tanzania by Kinabo et al. (2006), which found that the frequency of consumption of meals was two to three meals per day during the wet and dry seasons respectively and the most commonly consumed foods were legumes and vegetables. The findings at The UasinGishu District Hospital's Comprehensive Care Centre are similar to findings from a Kenyan study which found that the most commonly eaten foods were grains at 95.5% and Oils and fats at 96.8% (Karanja et al., 2010). This similarity could be explained by the possibility that study respondents mostly grow the same foods that are influenced by the same East-African geographical location. This is also further supported by the fact that in Kenya, most of the households usually use oils/fats during food preparation.

The study also noted that consumption of legumes which are generally cheaper was higher than animal products such as meat and fish. Dietary intake of vegetables was poor with only a small proportion of respondents (13.3%) eating vegetables in the 24 hours prior to the study. Within the nutrition department of Mildmay, PLWHA are often counselled on increased intake of vegetables although based on these findings; the dietary information is not translated into action. The other reason for this could be that most clients do not have regular sources of income (salary) and will normally eat a staple and legume at main meals other than vegetables and animal products. This was supported by one of the FGD participants. In this study a large proportion of the respondents (63%) had a fairly adequate dietary diversity score of 5 or more food groups consumed in the previous 24 hours. This contrasts with finding from other studies which observed that more than a half of adults with HIV have an inadequate dietary intake (Woods et al, 2002). This contrast maybe explained by the fact that nearly all of the respondents in the study were already on ART therapy and therefore

probably had better health than patients studied in the other studies. The other studies could also have comprehensively looked at the dietary intake of the PLWHA for longer periods of time compared to the 24 hour period that was used in this study. The other difference could also have been created because of geographical variations as well as timing of the studies.

In this study clients of older age group (> 30 years) had a higher diversity score especially those above the age of 39 years (OR: 1.23 95%CI 0.74-2.02). This contrasts a study done in Southern Africa which found that older adults consumed low food variety (Theron, 2008). This finding could be explained by the difference in study populations in the studies. Majority of respondents in this study were in the middle age, mean age of 36 years yet the other study had geriatric respondents who were above 60 years of age with unknown HIV status.

No statistically significant association was observed between educational status with dietary diversity. This finding contrasts to findings from other studies which established that higher education is associated with the regular consumption of a wider variety of foods (Clausen et al, 2004 & Holcomb et al, 2005). This difference can be explained by the fact that the study populations of the latter studies were of unknown HIV status unlike this study whose respondents were all HIV positive. This could also be further explained by the fact that the PLWHA at the UasinGishu District Hospital's Comprehensive Care Centre are often provided with nutrition education and counseling as they seek services at the centre regardless of their educational background and this has improved the basic nutrition knowledge.

Respondents who had irregular income were four times more likely to have a low dietary diversity as noted from the FGD's. This finding is similar to several studies done in West Africa and other parts of the developing world which found that dietary diversity was higher among those living in better socioeconomic contexts (Hadgu, Worku, Tetemke & Berhe, (2013). Lower income respondents have been found to experience food insecurity. The most probable reason for these findings could be that respondents with a regular income are more likely to have access to food and have adequate food security resulting in a more diverse diet. This study also found that there was a statistically significant association with source of food (purchased or not) and dietary diversity. This finding is similar to findings from a study by Tiyou, Belachew, Alemseged, & Biadgilign, (2012). which found that households with farms and gardens have greater food security than those without. This could be explained by the fact that people with other sources of food have easy food source alternatives to supplement their food purchasing power and are more likely to have a diversified diet.

Employment status was the other factor significantly associated with dietary diversity. HIV positive adults who had their own work (i.e., employed) were less likely to have low dietary diversity than unemployed HIV positive adults. Finding of this study was in line with the study conducted Bukusuba, Kikafunda and Whitehead (2010) among adults (≥ 40 years) in which employment status was associated with dietary diversity. This might be explained as unemployment status would result in greater economic constraint to purchase Variety of food and in losing economic capacity for food access at large. This negative economic impact as a result of unemployment status increases likelihood of having low dietary diversity. However, this finding is not in line with the finding In India Debashis, Naveet, NitinSajan and Madhu (2010), in which employment status is not associated with dietary intake. This discrepancy may be due to difference in socio-economic status between the two study areas and presence of better social and financial support for peoples with HIV in India.

Poor dietary habit and poor household food security status might result in feeding monotonous food group which ultimately affects dietary diversity. The condition worsens among people living with HIV because of poor food access as a result of multi-dimensional socio-economic impact of HIV/AIDS. As evidenced by other studies, there was more than 50% decrease in an average monthly household income among HIV affected households than non HIV affected households because of HIV related mortality coupled with high medical expense and higher dependency ratio. Even though this study addressed very important variables related to food diversity, information related to serving size of food and nutritional related biochemical parameters was not included, as a result findings could not directly tell us adequacy of micro-nutrient intake of an individual. Even though using 24 hour food recall method minimizes recall bias, it only provides a snap shoot of information rather than trend of dietary habit. This study is also not independent of the limitation of cross sectional study design like indicating temporal relationship.

V. Conclusion

Mean dietary diversity score was 4.99 (SD 1.37) with 62.7% of the respondents scoring at 5 and more food groups. More than half of the clients consume a moderately adequate diversity of foods and number of meals per day but less than 20% inadequately take vitamin A rich foods, vegetables and fruits. No socio-demographic characteristic was found to be associated with dietary diversity score. Regular source of income (salary) and other sources of food such as own garden and food support other than purchase allow one to have increased dietary diversity.

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