Journal of Medicine, Physiology and Biophysics
ISSN 2422-8427 An International Peer-reviewed Journal
Vol.35, 2017

Influence of Health Literacy on Antiretroviral Treatment Adherence Among HIV/AIDS Infected Adolescents in Thika Level 5 Hospital, Kiambu County

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Abstract
Young people including adolescents constitute a significant number of the people living with Human Immune Deficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) in the world today. The study sought to establish the antiretroviral treatment adherence determinants among HIV/AIDS infected adolescents in Thika level 5 Hospital. The specific objective of the study was to find out how health literacy influence adherence to antiretroviral treatment among HIV/AIDS infected adolescents, The study was cross sectional and adopted a systematic sampling study design targeting 350 active HIV/AIDS infected adolescent aged between 10-19 years. The study also targeted 25 health care providers (HCPs) delivering care and treatment services to HIV/AIDS infected adolescents in Thika Level 5 hospital. A systematic sampling design was used to get the study respondents, purposive sampling was used to select 25 HCPs . The respondents were selected based on systematic sampling and a sampling interval was calculated. A structured questionnaire and an interview schedule were used as the main tools for data collection. Quantitative data collected was coded and keyed into SPSSv20. The summaries of quantitative findings were presented using tables, figures and discussions. Qualitative data was analyzed using content analysis. Data was grouped into themes and presented in prose form. Frequency counts percentages; Chi-square test and Pearson Product Moment Correlation were used as Descriptive and inferential statistics respectively. The results of the analysis were then presented using tables, column charts and pie charts. 50% of the respondents had difficulty in taking HIV medications, (85.3%) respondents had an abnormal viral load, majority of the respondents viral load was greater than 1000 copies (89.3%).Respondents had normal CD4 counts .The study concludes that health literacy affects adherence to HIV medications among HIV/AIDS infected adolescents in Thika level 5 Hospital. The study recommends that decision-makers come up with relevant social policy to support compliance with HIV medications supplied to adolescent respondents. Majority of the adolescents are most of the time in schools and thus focus to be shifted to school by establishing school health clubs where messages on drugs adherence should be given, the stakeholders in education which includes parents, teachers and pupils and non teaching staff to be empowered on ART adherence so that they can be able to support the adolescents in schools.

Introduction:
Worldwide Kenya is considered to have the highest infection prevalence rates of HIV/AIDS, Aids remains the leading cause of death and morbidity among adolescents and young people in Kenya. 29% of all new infections in Kenya are among adolescents and young people (MOH, 2015). Kiambu County is rated as being number nine out of the 47 counties in the lead to the new HIV infections among adolescents and young people. Art adherence rates in Kenya remain inconsistent. Different studies have reported varied rates with 64% non-adherence rate in Mombasa (Munyao et al., 2005); 48% in Kibera, Nairobi (Ellis et al., 2006), and 56.8% in Eldoret (Talam et al., 2008). A current study by Wakibi et al. (2011) showed an adherence prevalence of 18% among HIV+ respondents in Kenya. The main objective of the study was to establish influence of health literacy on antiretroviral treatment adherence among HIV/AIDS infected adolescents in Thika level five hospital. The purpose of the study is to help policy makers in making appropriate health education policies, Government in developing guidelines and education materials, Government in review of health education programs for HIV positive adolescents, Thika level five in coming up with relevant measures to ensure adherence and Scholars and researchers for further studies.

Health Literacy

According to Kalichman et al, (2000) poor health literacy which includes failure to understand the prescriptions given has brought about a low rate of adherence to ART. Kalichman, Cherry and Cain (2005) saw the need for interventions in order to reduce literacy issues for adherence. Expecting ART adherence levels to rise remains difficult to co- infected patients as a result of inadequacy of involvement aimed at improving literacy on treatment among patients in Kenya.

According to WHO, (2008) young people including adolescents have the highest numbers of people with Human Immune Deficiency Virus/ Acquired Immune deficiency Syndrome (HIV/AIDS) in the world. UNAIDS 2008 estimated that those between the ages of 15-24years add up to 50% of new infection occurrence worldwide. In Kenya for instance, 3.8% of the youth aged 15-24 in 2012 were HIV positive. To reduce cases of treatment failure to ART, one is required to adhere to above 95% of prescribed doses (ibid).

There has been general focus by local studies on adherence to HIV drugs. However the studies have focused either on the general population or children. For instance, a study conducted by Arika (2011) focused on adherence to ART therapy in infected children in Thika which solely majored in the care giver factors associated with adherence. Karanja (2013) undertook a study on factors influencing a follow up of ART among patients living with HIV in Kenya.

Methods/ Methodology

Study Design was Cross sectional study design and the study area was Thika Level five Hospital. The study population was 350 active HIV/AIDS infected adolescent. Sampling Design was systematic sampling design .The sampling interval was determined as follows: N/n = 350/187 = 1.871. It was rounded two. Respondents were recruited based on the systematic sampling: 2, 4, 6, 8, and $(n+2)^{th}$ to 187. Inclusion Criteria used was HIV infected Adolescents under ART for more than one year. The exclusion criteria were those adolescents who had been on ART for less than a year. Sampling Frame was HIV Clinic register. Sample Size was determined using Yamane's formula and purposive sampling done for the Health care providers. Ethical clearance and approvals was done at all levels from the department of Public health, Kenya National Commission for Science, Technology and Innovation(NACOSTI) , County Commissioner, County Director of education, County Health Research Committee and finally Thika level 5 research committee.

Data Collection Tools and Procedures:

A structured questionnaire was used to collect data from the HIV/ AIDS infected adolescents. Research assistants were trained on the study tools and piloting of the research tool was done at the Jomo Kenyatta University Hospital and thereafter subsequent collection of the main data after getting parental consent and also assents from the study participants. An interviewer schedule was used to gather in depth information from the health care providers. Quantitative data was coded and keyed into SPSSv20. Summaries of quantitative findings were presented using tables, figures and discussions. Qualitative data was analyzed using content analysis. Data was grouped into themes and presented in prose form.

Results:

Out of the sample of 187, 80.2% (150/187) filled and returned the questionnaires. The response rate was 100% for all questionnaire items.

Table 4.1: Respondents Demographic Statistics

Attributes		Number	Percent
Gender			
Male		60	40.0
Female		90	60.0
Age			
10-11 yrs		14	9.3
12-13 yrs		32	21.3
14-15 yrs		21	14.0
16-17yrs		50	33.3
18-19yrs		33	22.0
Religion			
Catholic		47	31.3
Protestant		60	40.0
Islam		17	11.3
Others		15	10.0
None		11	7.3
Education level			
Primary		53	35.3
Secondary		78	52.0
University		13	8.7
Vocational		4	2.7
Post secondary		2	1.3
Total		**150**	**100.0**
(b)Key informants			
Health care providers	Below 25 years	3	13.6
	25-35 years	4	18.2
	36-45 years	8	36.4
	46-55 years	7	31.8
	Total	**22**	**100.0**

Majority 60% of the respondents were female, Majority of these respondents (55.3%) were aged between 16 and 19 years and had attained secondary education (52.0%). In relation to religion, majority, 60 (40.0%) were Protestants. Majority 68% of the key informants were aged over 36 years.

From the findings on the marital status of the key informants, the study found that majority of the respondents as shown by 63.6% indicated that they were married while 36.4% were single. This is an indication that majority of the people taking care of the adolescents under ART in Thika level 5 hospital are married and so would take care of the adolescents with great care.

Adherence to Antiretroviral Treatment

Over 50.0% of the respondents reported that they had difficulty in taking HIV/AIDS medications on time and had ever missed a dose of HIV/AIDS in the last one month. The respondents gave the reason for having difficulty in taking medicines as did not have a watch, drugs being many, arriving late from school, , make a lot of noise when carrying, lack of food, alarm ringing and does not hear, fear telling friends about their status,

For those who had they gave reason missing drugs as forgetting, dormitories being closed, peer pressure, did not know why they were taking drugs, had travelled and forgot the drugs, about to get late to school. In relation to respondents' viral load, majority 128 (85.3%) respondents had an abnormal viral load. The findings in the table further illustrates that 134 (89.3%) respondents had normal CD4 counts

Table 4.1: Statements measuring respondents' adherence to antiretroviral treatment

Measurement of adherence	N	Yes	No
		%	%
(1) Do you have any difficulty in taking your HIV/AIDS medications on time?	150	28.7	71.3
(2) Have you ever missed a dose of your HIV/AIDS medications?	150	42.7	57.3
(3) Have you missed a dose of your HIV/AIDS medications in the last one month?	150	16.7	83.3
Laboratory measurements		**Normal**	**Abnormal**
(4) Viral load	150	14.7%	85.3%
(5) CD4 count	150	89.3%	10.7%

Figure 4.1: Respondents' viral load

As shown in Figure 4.1, out of 150 respondents who participated in the study, majority 104 (69.3%) had 1001 -2000 copies, this shows that majority of the respondents viral load was greater than 1000 copies

The researcher sought to find out respondents' CD4 count at their time of recruitment into the CCC. Presented in Table 4.4 are the results obtained. 82 (54.7%) had more than 500 cells/mm^3. This implies that majority of the respondents CD4 count was above 500.

Table 4.2: Respondents' CD4 count at their time of recruitment into the CCC

CD4 count	Frequency	Percent
Less than 100 cells/mm3	1	.7
101-200 cells/mm3	8	5.3
201-300cells/mm3	8	5.3
301-400cells/mm3	18	12.0
401-500cells/mm3	33	22.0
More than 500	82	54.7
Total	**150**	**100.0**

A composite measure was derived from the five measures of adherence to ARVs. Table 4.5 illustrates that on overall 61 (40.7%) respondents obtained a composite score of 1 on adherence to antiretroviral treatment, 21 (14.0%) obtained an overall score of 3 while 4 (2.7%) obtained an overall score of 5.

Table 4.3: Composite score of adherence to ART

Rating	Composite score	Frequency	Percent
Poor	0	4	2.7
	1	61	40.7
Average	2	48	32.0
	3	21	14.0
Good	4	12	8.0
	5	4	2.7
Total		**150**	**100.0**

In terms of respondents' religion, the findings of the analysis revealed that among the 47 respondents who were Catholics, 19 had poor adherence to ART, 27 were averaged while the remaining 1 had good adherence to ART. Out of 17 respondents who were Islam, 7 had poor adherence to ART, 8 were averaged while 2 had good adherence to ART. Among the 50 respondents who were aged 16-17 years, 21 had poor adherence, 23 were averaged while 6 had good adherence to ART. The results of analysis therefore showed that respondents' increase in age had a great impact of adherence to ART.

Health literacy and Respondents Adherence to Antiretroviral Treatment

The objective of the study sought to find out how health literacy influence antiretroviral treatment adherence among HIV/AIDS infected adolescents in Thika Level 5 hospital. To address this objective, the researcher presented the study respondents with 5 statements measuring their health literacy level in relation to ART. Table 4.8 shows that over 70.0% of the respondents agreed with the statements that; missing doses of ART leads to HIV getting worse, once a person starts ART, he/she should take ART every day for life (86.7%) and I understand medical instructions of how ART medicines work (81.3%). However 63.3% of the respondents disagreed with the statement that HIV/AIDS can be cured with ARTs.

Table 4.4: Statements measuring respondents' health literacy

Statement	N	Strongly Disagree		Disagree		Agree		Strongly Agree	
		F	%	f	%	f	%	f	%
Missing doses of ART leads to HIV getting worse	150	11	7.3	11	7.3	26	17.3	102	68.0
Taking ART on schedule can help someone with HIV to prolong his/her life	150	23	15.3	29	19.3	34	22.7	64	42.7
HIV/AIDS can be cured with ARTs	150	38	25.3	57	38.0	35	23.3	20	13.3
Once a person starts ART, he/she should take ART every day for life	150	12	8.0	8	5.3	73	48.7	57	38.0
I understand medical instructions of how ART medicines work	150	9	6.0	19	12.7	62	41.3	60	40.0

Data presented in Table 4.5 shows that 12 (8.0%) respondents had a poor health literacy level, 67 (44.7%) were averaged while 71 (47.3%) had good health literacy.

Table 4.5: Respondents' health literacy

Ratings	Frequency	Percent
Poor	12	8.0
Average	67	44.7
Good	71	47.3
Total	**150**	**100.0**

Hypothesis Testing

$H0_1$: Health literacy does not influence antiretroviral treatment adherence among HIV/AIDS infected adolescents in Thika Level 5 hospital

To test this hypothesis, Pearson Product Moment Correlation Coefficient was conducted with an independent variable being respondents' health literacy and the dependent variable being adherence to ART. There was a significant relationship between respondents health literacy and their adherence to antiretroviral treatment($r=0.213$, $p<0.05$) according to Pearson Product Moment Correlation analysis. This indicates that there was a weak but positive correlation between the two variables. This means that respondents' increase in scores on aspects measuring their health literacy correlated with an increase in scores on their adherence to ART. The hypothesis of the study was therefore rejected and its alternate form which states that: - Health literacy influence antiretroviral treatment adherence among HIV/AIDS infected adolescents in Thika Level 5 hospital accepted (see Table 4.10).

Table 4.6: Respondents' health literacy and their adherence to ART

Variables	Pearson Product Moment Correlation	Overall scores on adherence	Overall scores on health literacy
Overall scores on adherence	Pearson Correlation	1	.213*
	Sig. (2-tailed)	.	.009
	N	**150**	**150**
Overall scores on health literacy	Pearson Correlation	.213*	1
	Sig. (2-tailed)	.009	.
	N	**150**	**150**

The researcher conducted a further analysis using a Chi-square test to find out whether health literacy influences respondents adherence to ART. The findings of this analysis are as shown in Table 4.11.Chi-square test results revealed that respondents' health literacy had a significant influence on their adherence to antiretroviral treatment, at $p<0.05$ level of significance. In particular, the results presented in Table 4.11 indicate that among the 12 respondents who had poor health literacy level, 9 had poor adherence to ART while 3 were averaged. Of the 67 respondents with averaged health literacy, 33 had poor adherence to ART, 29 were averaged while 5 were good. Among those with good health literacy level, 24 had poor adherence to ART, 36 were averaged while 11 were good.

Table 4.7: Respondents' health literacy versus adherence to ART

Health Literacy	Adherence to ART			Total	Chi-square statistics
	Poor	Average	Good		
Poor	9	3	0	12	$\chi^2=9.803$
Average	33	29	5	67	
Good	24	36	11	71	df=4
Total	**66**	**68**	**16**	**150**	Sig.=0.044*

***Significant at $p<0.05$ level**

Discussion of Study Findings

5. Health literacy and Respondents Adherence to Antiretroviral Treatment

The findings of the analysis indicate that of the 150 respondents, 60 (40.0%) were male while 90 (60.0%) were female. This shows that most of the adolescents under antiretroviral treatment were female. Among them, majority of these respondents (52.3%) were aged between 16 and 19 years and had attained secondary education (52.0%). In relation to religion, 47(31.3%) were protestants, 60 (40.0%) were Catholics while 17 (11.3%) were Islams. The results in the table further illustrates that most of these respondents had used ARV's for more than 6 years.

From the findings on the marital status of the key informants, the study found that majority of the respondents as shown by 63.6% indicated that they were married while 36.4% were single. This is an indication that majority of the people taking care of the adolescents under ART in Thika level 5 hospital are married and so would take care of the adolescents with great care.

In terms of respondents' religion, the findings of the analysis revealed that among the 47 respondents who

were Catholics, 19 had poor adherence to ART, 27 were averaged while the remaining 1 had good adherence to ART. Out of 17 respondents who were Islam, 7 had poor adherence to ART, 8 were averaged while 2 had good adherence to ART. This implies that respondents' religion did not influence their adherence to antiretroviral treatment. With regard to respondents' age, results in the table shows that there was a significant association between respondents age and their devotion to ART, at $p<0.05$ level significance. Of the 14 respondents aged between 10 and 11 years, 9 had poor adherence to ART whereas 5 were averaged. Among the 50 respondents who were aged 16-17 years, 21 had poor adherence, 23 were averaged while 6 had good adherence to ART. The results of analysis therefore showed that respondents' increase in age had a great impact of adherence to ART. This implies that respondents' between the age group of 16 and 19 years more likely adhered to ART than their counterparts aged between 10 and 13 years.

Chi-square test results revealed that respondents' health literacy had a significant influence on their adherence to antiretroviral treatment, at $p<0.05$ level of significance. The study found out that respondents with high literacy on health adhered more to ART compared to those of lower health literacy level. This is because respondents' higher level of education leads to better understanding of the medical instructions given on drug handling. These in turn increases adherence. These findings were supported by Kalichman et al., (2000) who recognized that poor health literacy has been linked with low levels of understanding of medical instructions and adherence to HIV medications. However, a study by Wolf *et al*. (2004) established that there is no association between health literacy and adherence to antiretroviral treatment. This differs with the findings on this study since it was found that there was weak but positive correlation between the two variables.

Conclusions

i. Majority of the respondents were female, aged between 16 to 19 years, Protestants and had been o ART for more than six years.
ii. Majority are in secondary schools, had a higher viral load while majority had normal CD4 count
iii. Very few respondents were adhering to antiretroviral treatment due to lack of a watch to remind them, dormitories being closed, did not know why they were taking drugs, forgetting, did not have food and also peer pressure
iv. Respondents' health literacy had a significant influence on their adherence to antiretroviral treatment. Respondents with higher health literacy were more likely to adhere to ART compared to their counterparts with lower health literacy level.

Recommendations for the Study

Arising from the study findings, the following recommendations were made:-

i. Policy-makers should develop appropriate social policy to promote adherence among ART prescribed adolescents.
ii. Since majority of the respondents are in schools and most of the time spend their time there, focus should be shifted to schools through formation of the school health clubs where messages on adherence to ART should be disseminated. Formation of adolescent psychosocial support groups should be established.
iii. Empowering the stakeholders in schools who should include parents, teachers and pupils and other non-teaching staff on importance of drug adherence so that they can be able to assist the adolescents who may forget, do not have a watch among others

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