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Research Article

Evaluation of HIV/AIDS Treatment Adherence in Uasin Gishu County, Kenya

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Abstract

Ninety-five percent adherence to antiretroviral drugs regimen is often needed to achieve optimal rates of viral suppression in people living with HIV/AIDS. Thus cross sectional study evaluated ARVs drug adherence among people living with HIV/AIDS in Uasin Gishu County and the impact on their health. The ages of participants ranged between 18 years and 56 years with median age of 35 years with the 95% confidence interval (32.8668, 36.7028). The mean age of the females was higher (35.4872) than that of the males (34.1). The results show that ARVs adherence status in Uasin Gishu County is low. For instance, only 26.6% of PLWHIV adhere to ARVs drugs while 73.4% do not. More males (79.73%; no=177/222) failed to adhere to ARVs intake compared to females (67.54%; no=154/228). Within the last three months prior to the interview 40.5% of the participants were hospitalized for at least a day while 59.5% were not hospitalized. Chi-square (χ^2)test showed significant association between the adherence to ARV drugs and the health of PLWHIV. Mantel – Haensel common ratio test showed that, the odds ratio of ill health of PLWHIV on ARVs adhering to the ARVs drugs is significantly different from those not adhering to the ARVs treatment. The odds of ill health of PLWHIV on ARVs not adhering to the ARVs was 2.787 times more compared to the odds of ill health of PLWHIV on ARVs for those adhering to the ARVs. The 95% confidence interval is (0.901, 8.619). A logistic regression model of adherence to the ARVs was fitted with factors leading to non-adherence as the covariates to assess the relationship between the adherence to the ARVs and the factors leading to non-adherence. The results showed most predominant factors leading to non-adherence of ARVs are lack of family support (p=0.040), violence (p=0.032), lack of time (p=0.039), family conflict (p=0.017), stigma (p=0.019), poverty (p=0.018), waiting for new drug (p=0.043), other health complications (p=0.046) and many drugs (p=0.029).

Keywords: HIV/AIDS; Treatment Adherence; Evaluation; Uasin Gishu County.

Introduction

According to [1] Poor adherence to treatment of chronic diseases is a worldwide problem of striking magnitude. Adherence to long – term therapy for chronic illnesses in developed countries averages 50%. In developing countries, the rates are even lower. It is undeniable that many patients experience difficulty in following treatment recommendations. The impact of poor adherence grows as the burden of chronic disease grows worldwide. Non communicable diseases and mental disorders, human immunodeficiency virus/acquired immunodeficiency syndrome and tuberculosis, together represented 54% of the burden of all diseases worldwide in 2001 and will exceed 65% worldwide in 2020.The poor are disproportionately affected. The consequences of poor adherence to long-term therapies are poor health outcomes and increased health care costs. Poor adherence to long-term therapies severely compromises the effectiveness of treatment making this a critical issue in population health both from the perspective of quality of life and of health economics. Interventions aimed at improving adherence would provide a significant positive return on investment through primary prevention (of risk factors) and secondary prevention of adverse health outcomes. Improving adherence also enhances patients' safety. Because most of the care needed for chronic conditions is based on patient self-management (usually requiring complex multi-therapies), use of medical

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technology for monitoring, and changes in the patient's lifestyle, patients face several potentially life-threatening risks if not appropriately supported by the health system. Adherence is an important modifier of health system effectiveness.

Health outcomes cannot be accurately assessed if they are measured predominantly by resource utilization indicators and efficacy of interventions. The population health outcomes predicted by treatment efficacy data cannot be achieved unless adherence rates are used to inform planning and project evaluation. Health systems must evolve to meet new challenges. In developed countries, the epidemiological shift in disease burden from acute to chronic diseases over the past 50 years has rendered acute care models of health service delivery inadequate to address the health needs of the population. In developing countries, this shift is occurring at a much faster rate. According to [2], antiretroviral drug resistance has emerged as a result of Human Immunodeficiency Virus (HIV) gene mutations. Multi-drug resistance HIV (MDRHIV) has drawn attention to the issue of adherence to antiretroviral (ARV) regimes. HIV can rapidly mutate at the reverse transcriptase gene and protease gene and develop resistance to standard medication. It has been stated that a 95% compliance to drug regimens results in a viralogic failure rate of 20%, with the failure rate increasing even further as compliance rates decrease. Development of resistance to one ARV drug can lead to cross resistance with other ARV medications or the class of medications, therefore greatly limiting the future choice of effective treatment.

For those with HIV, non-adherence may result in deterioration in health and lead to an increase in opportunistic diseases resulting in hospitalisation. This study evaluated the ARVs drugs adherence among the PLWHIV and the impact on their health in Uasin Gishu County. The study was a cross sectional one. According to [3] a cross-sectional study is an observational one. This means that researchers record information about their subjects without manipulating the study environment [4]. The defining feature of a cross-sectional study is that it can compare different population groups at a single point in time. Cross-sectional studies are sometimes carried out to investigate associations between risk factors and the outcome of interest [5]. The aim of this paper is to evaluate the adherence to ARVs drug and the impact of non-adherence to the health of people living with HIV in Uasin Gishu County, Kenya.

Research methodology

The study population comprised of all people living with HIV/AIDS on ARVs attending VCT clinic in Uasin Gishu. By the end of July 2015, there were 507,087 adults and 127260 children on ARVs in Uasin Gishu County. This number has significantly increased due to the awareness campaigns that are being carried out. The study is cross sectional. The information about the subjects was recorded without manipulating the study environment. The defining feature of a cross-sectional study is that it can compare different population groups at a single point in time. Cross-sectional studies are sometimes carried out to investigate associations between risk factors and the outcome of interest.

This is because such studies offer a snapshot of a single moment in time; they do not consider what happens before or after the snapshot is taken. Findings are drawn from whatever fits into the frame. The main advantage of this method is that it is fast to carry out. The study involved male and female adult patients infected with HIV and in antiretroviral therapy for at least 1 year. All patients were in treatment from January to December 2014 and attending the out-patient clinics of one of the clinics administering ARVs in Uasin Gishu County. HIV patients that reported having ingested less than 95% of the total number of the prescribed antiretroviral medication in the previous three months were considered as non-adhering and those that reported having ingested 95% or more of the total number of the prescribed antiretroviral medication in the previous three months were considered as adhering [6].

A specially designed questionnaire was used to obtain data. 450 PLWHIV were interviewed by a questionnaire guide during the clinic days in the centres administering ARVs. Inclusion criteria are characteristics that the prospective subjects must have if they are to be included in the study. In this study, interview was done to consenting PLWHIV on ARVs drug

and who are over 18 years of age attending VCT clinics in Uasin Gishu County. Exclusion criteria are those characteristics that disqualify prospective subjects from inclusion in the study. In this study, interview was not done to non-consenting, the very ill, patients infected with HIV and in antiretroviral therapy for less than 1 year and those patients who were under 18 years of age.

Sample size was determined using Taro Yamane's formula [7] $n = \frac{N}{1 + Ne^2}$

Where 'n' is the required sample size, 'N' is the total population, 'e' is the margin error (0.05) By the end of July 2015, there were 507,087 adults and 127260 children on ARVs in Uasin Gishu County.

Thus $n = \frac{507087}{1 + 507087 \times 0.05^2} = 399.68$,

approximately 400 patients. In the present study, systematic random sampling technique was used. Data was collected in the 22 health centres in Uasin-Gishu County. The number interviewed in each centre was proportional to the number of adults on ARVs being served in the centre in relation with the total number of adults on ARVs being served in all the health centres in the County. After determining the average daily flow of the people attending clinic in the centre was used to determine the sampling interval for the centre. Those who were picked were interviewed after consenting.

Results and Discussions

The box plot in figure 3 indicates a normal distribution of age of the patients interviewed and it is confirmed by the test of normality as presented in the table 6. We notice that the p – value according to Kolmogorov – Smirnov Goodness of Fit test (2.17) and Shapiro – Wilk test of normality (2.15) are both greater than 0.05 (p= 0.07 and 0.052 respectively) hence we conclude that the age distribution is normally distributed according to statistical distributions [8]. The mean age of the females (35.4872) is higher than that of the males (34.1) as shown in table 1. This is due to high number of female participants.

From the proportions presented in table 2 we see that majority of the patients interviewed were married (51.9%). The mean period in years that the patients interviewed have been on the ARVs is 3.3291years with the 95% confidence interval (2.7142, 3.9441). The median period is 2 years. The minimum and maximum period is 1 year and 15 years respectively.

Table 3 shows that the period on ARVs is not normally distributed but skewed to the right with some few outliers. From the data collected, the adherence status to the ARVs in the county is still very low. Only 26.6% of PLWHIV adhere to the ARVs drugs while 73.4% do not adhere.

Table 1. Tests of Normality of age distribution

Sex	Frequency	Mean	Standard Deviation	Standard Error of the Mean
F	228	34.1000	8.63446	1.36523
M	222	35.4872	8.54361	1.36807

Table 1. Marital status

Marital status	Frequency	Percentage	Cumulative Percentage
D	34	7.6	7.6
M	234	51.9	59.5
S	97	21.5	81.0
S.E	41	8.9	89.9
W	46	10.1	100
Total	450	100.0	

Table 4 presents a summary breakdown of the adherence to the ARVs drugs and the level of education. To determine if there was an association between the adherence to the ARVs and level of education we tested the hypothesis

H_0: There is no association between the adherence to the ARVs drugs and level of education.

H_1: There is an association between adherence to ARVs drugs and level of education.

In table 5, the degrees of freedom of 3 gives a signinficant value and we see that the p – values of the Pearson Chi – Square statistic 2.18, Likelihood Ratio test statistics for row – column independence (2.20) and Mantel – Haenszel test for repeated test of independence (2.21) (Linear – by – Linear Association) are all greater than 0.05. Thus we fail to reject the null hypothesis and conclude that there is no association between the adherence to ARVs drugs and the level of education. Within the last three months of the investigation 40.5% of the people have experienced at least one or more an incidence(s) of ill health while 59.5% have not. The summary of this breakdown is presented in table 28 and on the bar chart in figure 10. The code 0 represents no ill health Experience and 1 had some ill health experience in last 3 month prior to the investigation.

Table 3. displays the statistics of the period that the patients interviewed were on ARVs.

Description of period on ARVs	Statistic (in years)	Standard Error
Mean period	3.3291	0.309
Lower Bound 95% Confidence Interval for Mean	2.7142	
Upper Bound 95% Confidence Interval for Mean	3.9441	
Median	2.0000	
Variance	7.538	
Standard Deviation	2.7454	
Minimum	1.00	
Maximum	15.00	
Range	14.00	
Interquartile Range	2.00	
Skewness	2.326	0.271
Kurtosis	6.331	0.535

Table 4. Adherence and level of education Cross classification

	Level of education				
Adherence	1	2	3	4	Totals
0	11	17	28	64	120
1	35	22	95	164	330
Totals	46	39	137	228	450

Table 5. Test results on the association between the adherence and level of education.

	Value	df	asymp.sig (2 – sided)
Pearson Chi-Square	1.384	3	0.709
Likelihood Ratio	1.384	3	0.709
Linear-by-Linear Association	0.018	1	0.893

Results on table 6 the association between the Adherence Status and the Health status show that The p – value is 0.041 which is smaller than 0.05. We reject the null hypothesis and conclude that there is an association between the Adherence status to the ARVs drugs and the Health Status of PLWHIV. We also considered the Mantel – Haenszel Common Odds Ratio statistic (2.21) and tested the hypothesis.

H_0: The odds ratio of ill health of PLWHIV on the ARVs adhering to the ARVs drugs is same as those not adhering to the ARVs drugs.

H_1: The odds ratio of ill health of PLWHIV on the ARVs adhering to the ARVs drugs is different from those not adhering to the ARVs drugs.

From table 7, P – value is 0.045 which is less than 0.05. It shows that the odds ratio of ill health of PLWHIV on the ARVs adhering to the ARVs drugs was significantly different from those not adhering to the ARVs drugs. The odds of ill health of PLWHIV on the ARVs not adhering to the ARVs was 2.787 times more compared to the odds of ill health of PLWHIV on the ARVs for those adhering to the ARVs. The 95% confidence interval is (0.901, 8.619). A logistic regression model of the adherence to the ARVs was fitted with factors leading to non – adherence as the covariates. To assess the relationship between the adherence to the ARVs and the factors leading to non – adherence, the hypothesis tested is:

$H_0 : \beta_1 = \beta_2 = ... = \beta_{25} = 0$ against

$H_0 : \beta_j \neq 0$, for at least one $j, j = 1, 2, ..., 25$

Table 6. Health Status

Health status	Frequency	Percentage	Cumulative Percentage
0	330	59.5	59.5
1	120	40.5	100.0
Totals	450	100	

Table 7. Mantel – Haenszel Common Odds Ratio Estimate

Odds Ratio	2.787
ln(Odds Ratio)	1.025
Std. Error of ln(Odds Ratio)	0.576
Asymp. Sig. (2-sided)	0.045
Asymp. 95% Common Odds Ratio Confidence Interval Lower Bound	0.901
Asymp. 95% Common Odds Ratio Confidence Interval Upper Bound	8.619
ln(Common Odds Ratio) Lower Bound	0.104
ln(Common Odds Ratio) Upper Bound	2.154

In table 8 p-value is 0.011 which is less than 0.05. We reject the null hypothesis and conclude that at least one $\beta j \neq 0$. According to Nagelkerke R Square statistics (2.14) that the model explains 62.1% and Cox & Snell R Square statistics (2.13) for regression model 42.6% of the reasons why PLWHIV do not adhere to the ARVs drugs. Further results indicate that the most predominant factors leading to non-adherence of ARVs are lack of family support (0.040), violence (0.032), lack of time (0.039), family conflict (0.017), stigma (0.019), poverty (0.018), doctors strike (0.052), waiting for new drug (0.043), other health complication (0.046) and many drugs (0.029).

The other factors which include relocation, side effect, arrest, region, community criticism fear, forgotten, denial, herbal alternative, hostility of health officers, felt better needed a break, doctor recommendation, waiting for new drug, lack of patience, alcoholism, distance from centre and revenge were not significant [9]. The logistic regression model of the adherence to the ARVs considered is [10] as shown in eq. 1.

Table 8: Test results of Model Coefficients.

	Chi – square	degrees of freedom	sign (p-value)
Step 1 Step	43.819	25	0.011
Block	43.819	25	0.011
Model	43.819	25	0.011

$$Log\left[\frac{\pi(x)}{1-\pi(x)}\right] = 60.130 + 4.206x_1 + 1.114x_2 + 3.570x_3 - 5.521x_4 - 0.536x_5 + 0.396x_6 - 13.133x_7$$
$$- 5.079x_8 - 3.511x_9 - 6.841x_{10} - 2.633x_{11} - 10.435x_{12} - 0.823x_{13} + 0.44x_{14} - 7.202x_{15} - 1.645x_{16}$$
$$- 0.786x_{17} - 4.406x_{18} + 4.326x_{19} - 8.863x_{20} - 4.064x_{21} + 1.693x_{22} + 2.076x_{23} - 1.464x_{24} - 5.828x_{25} \ldots(1)$$

Where $x_i\,(i = 1, 2, 3, ...,25)$ are lack of [7] family support, arrest, religion, violence, community criticism fear, forgotten, family conflict, lack of time, denial common disease, stigma, herbal alternative, poverty, hostility of health officers, doctors strike, relocation, felt better needed a break, doctors recommendation, side effects, waiting for new drug, other health complication, lack of patience, alcoholism, distance from centre, revenge and many drugs as shown in eq. 1.

Conclusions

Health providers can have a significant impact by assessing risk of non-adherence and delivering interventions to optimize adherence. To make this practice a reality, practitioners must have access to specific training in adherence management, and the systems in which they work must design and support delivery systems that respect this objective. For empowering health professionals an "adherence counselling toolkit" adaptable to different socioeconomic settings is urgently needed. Such training needs to simultaneously address three topics: knowledge (information on adherence), thinking (the clinical decision-making process) and action (behavioural tools for health professionals). For the effective provision of care for chronic conditions, it is necessary that the patient, the family and the community who support him or her all play an active role. Social support, i.e. informal or formal support received by patients from other members of their community, has been consistently reported as an important factor affecting health outcomes and behaviours. There is substantial evidence that peer support among patients can improve adherence to therapy while reducing the amount of time devoted by the health professionals to the care of chronic conditions. A stronger commitment to a multidisciplinary approach is needed to make progress in this area. This will require coordinated action from health professionals, researchers, health planners and policy- makers. There is no single intervention strategy, or package of strategies that has been shown to be effective across all patients, conditions and settings. Consequently, interventions that target adherence must be tailored to the particular illness-related demands experienced by the patient. To accomplish this, health systems and providers need to develop means of accurately assessing not only adherence, but also those factors that influence it. Despite evidence to the contrary, there continues to be a tendency to focus on patient-related factors as the causes of problems with adherence, to the relative neglect of provider and health system-related determinants. These latter factors, which make up the health care environment in which patients receive care, have a major effect on adherence. The ability of patients to follow treatment plans in an optimal manner is frequently compromised by more than one barrier, usually related to different aspects of the problem. These include: the social and economic factors, the health care team/system, characteristics of the disease, disease therapies and patient-related factors. Solving the problems related to each of these factors is necessary if patients' adherence to therapies is to be improved.

Conflict of interest

Authors declare there are no conflicts of interest.

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