Journal of Biometrics & Biostatistics
ISSN: 2155-6180
Alii, J Biom Biostat 2015, 6:3
DOI: 10.4172/2155-6180.1000241
Review Article
Open Access

Effects of Gender and use of Supplements to the Survival Rates for HIV-Positive Patients with Low CD4 Count in Kilifi County, Kenya

Leonard Kiti Alii*
Pwani University Kilifi, Coast Kenya, Kenya

Abstract

HIV associated deaths have decreased substantially thanks to the ART treatment. However, there is still need for funding of Anti Retroviral Treatment services by donors and Ministry of health so as to prevent the loss caused by AIDS related deaths in the society. The study basically looked at the survival rates of HIV patients under ART treatment in Kilifi county. Various factors affecting the uptake of ARVs for HIV-positive patients were outlined and investigated in this study. A sample of 232 patients was considered from Chasimba health center from Kilifi county for a period of about 5 years. The analysis of the data showed that ARV uptake in females is high compared to their male counterparts. Opportunistic infections, the kind of marital status of patients and counseling session attendance by patients on ART affected their survival. Thus, the survival of patients under ART programs can be improved if we improve on the sensitization of the public on the need to access healthcare facilities and to ask the county government to set up as many health facilities as possible, to provide health services at close distance to the people. We can also bring behavioral change among HIV patients to attend counseling session and get pieces of advices on correct health measures and behaviors.

Keywords: Supplements; Odds ratio, ARVs; Logistic regression, Survival rates

Introduction

There is a direct relationship between HIV and nutrition. These two factors are intertwined. Most significantly, HIV infected patients end up with malnutrition, while those who do not feed well always have higher rates of opportunistic infections. As time goes by, the poorest parts of the world also are able to access HIV treatment. However there are critical questions which need to be addressed. Some of these questions are: How well is a drug or supplement expected to work under very poor conditions where people cannot afford to take good meals or food probably due to poverty. The role of vitamins and other supplements also hangs with a lot of uncertainity.There are lots of concerns about the effect of those drugs apart from the intended purpose. The patients suffering from HIV and their close guards are so concerned about whatever might benefit their health. There are quite a number of factors behind these concerns one being that the loss of weight could lead to increase in the use of energy. Studies have shown that HIV patients, while having a rest may burn 10% more calories compared to the uninfected people. As the infection advances (children in particular) patients spend more energy than usual. Not only is faster metabolism a problem but offsets of eating more food even with slight increase in energy expenditure. Other important reasons why people with HIV may lose weight or suffer childhood growth failure are the decrease in energy intake. When the immune system is weakened, the HIV patient is bound to have multiple infections. Some of these infections can drastically affect the appetite and ability to eat. Another reason is the loss of weight when the body cannot be able to absorb nutrients especially fat. This is because other infections (such as cryptosporidium) can damage the lining of the gut. The use of suppliments like multivitamins in HIV patients helps the patients in boosting their appetite for food. In sub-Saharan Africa, its estimated that about 90% of people who know their HIV-positive status are on treatment. 76% of the people on ART have been able to suppress the virus (UNAIDS 2014). This means that the likelihood of transmitting the virus to their sexual partners is very low. Current research indicate that there is a one percent decline in the percentage of new infections for every 10% increase in the coverage of treatment. There has been some good progress in the control of HIV in Kenya. It is estimated that 1.6 million persons are living with HIV. (1.4 million adults and 191,000 children), the Ministry of Health launched revised guidelines in June 2014 for antiretroviral therapy. These guidelines recommend that early initiation start of ART in children, adolescents and adults including all HIV positive pregnant women. Of the 1.6 million, an estimated 1.4 million will require antiretroviral therapy ART (1.23 million adults and 172,000 children aged less than 14 years), based on these guidelines. Over 773,629 patients were on ART (702,000 adults aged 15 years and 71,000 children aged less than 15 years) representing 55% coverage of those in need of ART managed in over 2000 health facilities in across the country As at February 2015. The Kenya AIDS Strategic Framework (KASF) 2014/15-2018/19 has targeted to have at least 90% HIV infected persons know their status and 90% of those who know their status access ART by June 2019. It is over three decades since the first HIV/AIDs case was reported; the world is still facing health challenges with regards to HIV/AIDs.

Objectives of the study

1. To determine how gender influences the uptake of ARVs for HIV patients in Kilifi county.

2. To determine survival rates by gender among the HIV patients in Kilifi county.

3. To determine the effect of supplement drugs on the rate of survival for HIV patients in Kilifi county.

Literature Review

In this section we review some previous studies about HIV/Aids

***Corresponding author:** Leonard Kiti Alii, Pwani University Kilifi, Coast Kenya, Kenya, Tel: 0722917294; E-mail: leonardalii@yahoo.com

Received July 20, 2015; **Accepted** July 27, 2015; **Published** August 03, 2015

Citation: Alii LK (2015) Effects of Gender and use of Supplements to the Survival Rates for HIV-Positive Patients with Low CD4 Count in Kilifi County, Kenya. J Biom Biostat 6: 241. doi:10.4172/2155-6180.1000241

mortality rates and its determinants. The focus is on the factors which contribute to the death of AIDS patients on ART treatment and specifically the contribution of gender and opportunistic diseases such as TB, Malaria, fungal infections e.t.c. Most studies on AIDS patients in Kenya have always focused on urban centres. The situation however is changing because 62% of the country's HIV/Aids cases are now in rural areas. For instance, studies on mortality rates of HIV patients on the causes of mortality and characteristics in Lilongwe have shown that life expectancy of HIV-infected patients primarily depended on the natural history of the HIV infection [1]. Studies on the measures of dealing with malnutrition and anemia to improve survival and curb early mortality in Kenya have shown that HIV death of HIV positive patients starting ART in rural clinics of South Rift Valley is still a challenge [2]. A logistic regression was used in a study by the World Health Organization, World Health Organization 2011 [3] on early loss of HIV-infected patients on potent antiretroviral therapy program in low-income countries to examine the association between the follow-up program and economic situation of the poor countries. The study showed that better ART outcomes which included higher programme retention rates may only be obtained in services that have smaller numbers of patients, showing that high number of patients on ART therapy has many socio-economic risks factors affecting their survival. Other reports have also shown that there is a relationship between demographic and clinical treatment on the follow-up outcomes among a cohort of HIV infected [4]. Nachega on HIV infected adults, indicated that out of 105 HIV clinic patients evaluated, 70% were not on ART, 89% had good knowledge about the cause of HIV infection, 83% knew about modes of transmission, 95% were not worried about ART side effects while 65% were in agreement that not taking the ART doses as prescribed by the doctor can lead to disease progression. 95% had disclosed their HIV sero status to 1 or more persons, but only 62% with a current sexual partner reported having told that partner their status, hence showing a greater margin on knowledge on ART and HIV/Aids. In most developing countries the epidemic is greatly embedded with age, sex, poverty and cultural issues. Similar studies have been carried out in other countries. The United State National surveillance carried out a study which showed that morbidity and mortality associated with the acquired immunodeficiency syndrome (AIDS) had reduced significantly. Data of 1255 patients, each of whom had at least one $CD4^+$ count below 100 cells per cubic millimeter was analyzed. These patients were seen at nine clinics specializing in the treatment of human immunodeficiency virus (HIV) infection in eight U.S. cities from January 1994 through June 1997. The study indicated that mortality among the patients declined from 29.4 per 100 person-years in 1995 to 8.8 per 100 person-years in the second quarter of 1997. The declines in were attributable to the use of more intensive antiretroviral therapies. Projections suggested that about 6 million people were infected with HIV by the year 2005 in South Africa and that intervention was needed, otherwise the mortality rate of HIV/AIDS would reach over 800,000 deaths per year by 2013 [5]. It is in this regard that the government of South Africa has proposed to increase access to highly active antiretroviral therapy (HAART) to alter this trend [5]. In Kenya a study was done to determine important factors that affect antiretroviral drug adherence among HIV/AIDS male and female adult patients (18 years and above) attending Moi Teaching and Referral Hospital, Eldoret. It indicated that the key factors affecting adherence are; being away from home, being busy and forgetting. The study recommended that patients should be educated on the importance of strict adherence to the prescribed doses of ARVs as a suitable measure of intervention. Beata study also recommended a multivariate analyses based on the cox proportional hazards model of the survival of HIV patients from the length the time they start chemotherapy to their death from various causes while on ART. The analyses were also conducted with the use of exact logistic regression to model the proportion of patients who were alive at the end of follow-up. The Harvard School of Public Health publication [6] on Multinomial logistic regression analyses examined the association of demographics and sexual risk behaviors across the tripartite groups. Recently studies Kilbourne et al. [7] has even focused mainly on clinical, immunological and virological data, but little is known about how opportunistic diseases influence the survival rates of HIV patients and the interventions thereof, the focus of this paper.

Methodology

The number of HIV patients in this study was 232. Of these, 178 (76%) were female while 54 (24%) were male. The average age was 30.61. Out of this group 140 (60.3%) were not on ARVs. Some of these patients were under supplements which included Cotrimoxazole (57%), Fluconazole (21%) and Multivitamins (22%). Cotrimoxazole was given specifically to patients whose CD4 count was very low (<200 cells/ml). This was to prevent the patients from PCP (*Pneumocystis carinii*pneumonia, now called *Pneumocystis jiroveci* pneumonia). Fluconazole was given to the patients as an antifungal drug. Multivitamins drugs were also given to improve on the diet appetite of the patients. Studies have shown that the use of other supplements to ARVs increases the survival rates of HIV patients. Of the 232 patients 132 (57%) were suffering from Tuberculosis 60 (26%) were recurrent Malaria cases while 40 (16%) had other opportunistic diseases.100 (43%) of the patients were widowed, 72 (31%) were single, 37 (16%) were in polygamous families 16 (7%) were divorced and 7 (3%) were cohabiting. The mean CD4 count was 286 cells/ml. When the CD4 was transformed to a categorical variable 159 (69%) of the patients had a high count compared to 73(31%) who had a low CD4 count. The mean weight of the patients was 44.87 kg. The mean and median survival time was 564.9 days and 528 days respectively. The average number of times a patient was hospitalized was about 2 times.

A low CD4 cell count was defined as CD4 cell count<200 cells/ml based on the WHO criteria for severe immune suppression. Survival curves were used to access the survival rates of patients. In order to check whether the multivitamins had an effect in both males and females, the independent T-test was used. A Multivariate modeling approach was used to determine the variables that were independently associated with a low CD4 count. Generalized linear models were used to calculate the probability of survival of patient over the probability of death of patient. Specifically the logistic regression was used and the results of the analysis were expressed in the form of an odds ratio. Patients in the study were either on ARVs or not. In addition to this some patients were either given Cotrimoxazole, Fluconazole or Multivitamin depending on their levels of the viral load. The patients were followed for a period of five years during which their weight and CD4 count was taken. Figure 1 shows the proportion of patients who survived in the cotrimozazole, Fluconazole or Multivitamin groups.

Results and Discussion

The outcome variables were low CD4 cell count (CD4 cell count<200 cells/ml), obtained using the WHO cut-off level of 200 cells/ml which is regarded as severe immune suppression, and whether the patient was dead or alive at the end of the study. Of the 232 HIV-1 infected patients, 159 (69%) had a high CD4 count while 73 (31%) low CD4 count at enrolment. 38% of those who had High CD4 count were still alive at the end of the follow up period as compared to 21% in the Low CD4 count group who were alive. 29% of those in the high

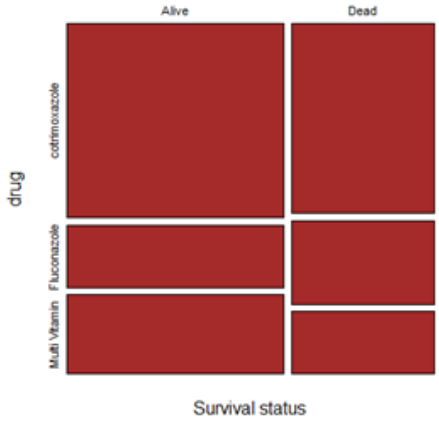

Figure 1: Proportion of patients surviving by drug.

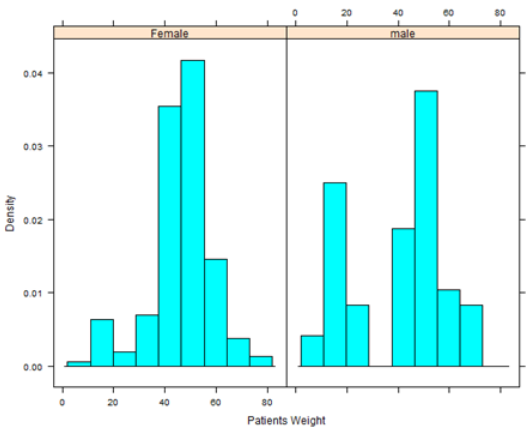

Figure 2: Patients weight by gender.

CD4 group had died. Figure 1 shows that Cotrimoxazole increased the rate of survival among the patients. HIV-positive people are at increased risk of getting PCP (*Pneumocystis carinii* pneumonia, now called *Pneumocystis jiroveci* pneumonia), if their CD4 cell count falls below 200. HIV treatment is recommended if your CD4 count falls below 350, but if your CD4 count is below 200, it is also recommended that you take medication to reduce the risk of PCP until your CD4 cell count increases. This kind of treatment is called prophylaxis, which means it is to prevent infection, rather than to treat it.PCP is a potentially fatal illness which used to be the most common cause of death for people with AIDS. However, it is now less common as a result of effective HIV treatment, the use of PCP prophylaxis, and better treatments for people who do develop PCP. Cotrimoxazole is the most effective drug at preventing PCP, especially for people with CD4 counts below 100. It also reduces the risk of toxoplasmosis, an infection that can affect the brain. The most common dose for prophylaxis is one double strength (960 mg) tablet every day. An alternative dose is one tablet three times a week. The high rates of death however could have been attributed to the fact that most patients were kept on cotrimoxazole if there viral load was very low and patients seemed to be at high risk of death. Patients on ARVs had an odds ratio of 2.1 (95% CI 0.61-1.87) as compared to those Not on ARVs count. Out of the 232 patients followed up 77% were females compared to 23% of males. 28% of the females were on ARVs while 48% were either on Cotromoxazole, Fluconazole or Multivitamin. On the other hand only 11% of the male were on ARVs and 12% were on the either on Cotromoxazole, Fluconazole or Multivitamin. During the follow-up time, the patients weight was measured at baseline and during follow-up times. The average weight was taken for each subject. Figure 2 shows the weight for both males and females.

In order to check whether there was a significant weight gain in the patients an Independent T-test was carried out. Females had a significant higher weight gain compared to males, (t=2.344. p=0.022, 95%v CI of 0.93-11.65) A survival model was fit to see if there was significant difference in the survival times among the male and female patients. Figure 3 shows that females generally have higher survival times compared to males from zero upto 1000 days while males have better survival times between 1000 to 1500 days of follow up. A logistic regression was used to investigate the effect of gender on the survival rates. The model revealed that males had lower odds of survival compared to the females (OR=0.9625, 95% CI=0.5089-1.7921).

It was also of interest to see whether being on ARVs would alter the proportions of those surviving. This was purposely done to access the impact of the supplements that were given to the patient. Figure 4 shows that the survival rate at different times were almost the same. This could be attributed to the fact that patients were given Cotrimoxazole to reduce the risk of opportunistic infections as well as Multivitamins to improve on their appetite for food irrespective of whether there CD4 count was below 200 cell/ml or not. In addition patients who were found to suffer from any fungal infection were given Fluconazole. A logistic regression revealed that the odds of survival when using Fluconazole were 37% higher than the odds of using Cotrimoxazole (OR=1.37, 95% CI=0.70-2.68) while using the odds of survival while using Multivitamins were 20% lower than the odds of using Cotrimoxazole (OR=0.80, 95% CI=0.40-1.57). Given that this study was done in the rural areas where the economic status of the patients is low, the type of diet taken could have contributed to the poor performance of the multivitamins.

Conclusion

Our study reveals that Gender significantly influences the decision for uptake of ARV in HIV patients. The use of supplements like Cotrimoxazole, Fluconazole and Multivitamin also improved the rates of survival among the patients. Patients who had a low CD4 count (<200 cells/ml) had their survival rates improved by the use of Multivitamins.

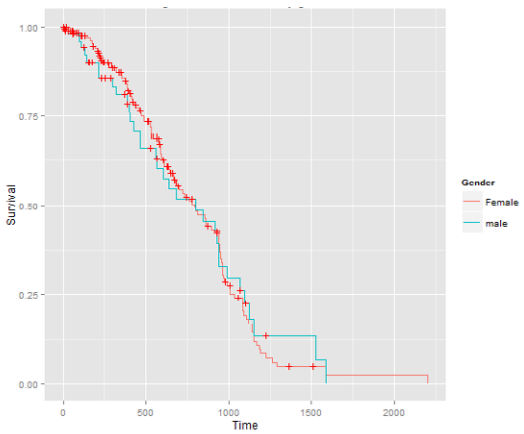

Figure 3: Survival curves by gender.

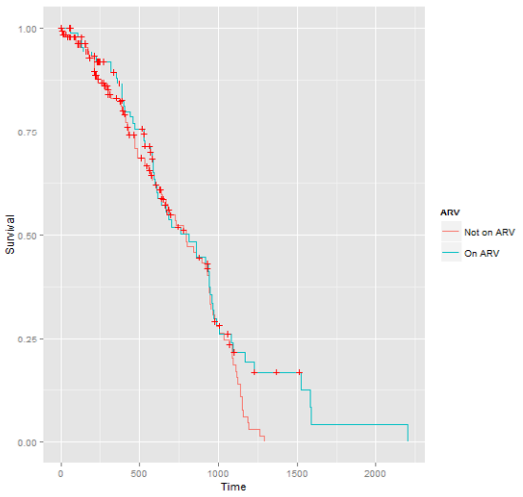

Figure 4: Survival curves by ARV uptakes.

The Independent T-test showed that there was a significant weight gain among the female patients as compared to the male patients. There is the need to sensitize the community towards early routine HIV counseling and testing not only in health facilities in the cities but also in smaller towns and rural communities, so as to reduce the frequency of late HIV diagnosis with its potential implications.

References

1. Akinkuotu A, Roemer E (2011) In-hospital mortality rates and HIV: a medical ward review, Lilongwe, Malawi. Int J STD AIDS 22: 465-470.
2. Yegon PK (2008) Predictors of early mortality in HIV infected patients starting 1st line ART. Tropical Medicine and International Health 13: 904913.
3. World Health Organization (2011) Bull World Health Organ.
4. Chao-Ying JP (1974) An Introduction to Logistic Regression Analysis and Reporting. Indiana University, Bloomington.
5. Dorrington R, Bourne D, Bradshaw D (2002) HIV/AIDS data in South Africa. Lancet 360: 1177.
6. Harvard school of public health (2006) HIV/AIDs and Gender-based violence (GBV) literature Review program on international health and human rights. Harvard school of public health August.
7. Kilbourne AM, Justice AC, Rollman BL, McGinnis KA, Rabeneck L, et al. (2002) Clinical importance of HIV and Depressive Symptoms among Veterans with HIV Infection. J Gen Intern Med 17: 512-520.