Research Article

Impact of depression on adherence to antiretroviral therapy among HIV/AIDS patients at a Kenyan referral hospital

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Background: Kenya is faced with an increasing challenge of co-morbid psychological and social factors among HIV-Infected patients which has had a profound impact on their medication adherence. A major psychosocial factor that is a barrier in adherence is depression associated with HIV. This study aimed at measuring the effect of depression on participants' own reported adherence to antiretroviral therapy.

Objectives: To determine the impact depression has had on adherence to antiretroviral therapy among HIV-infected patients at a Kenyatta Hospital.

Methodology: A cross-sectional study design was carried out at Kenyatta National Hospital, Nairobi, Kenya. Three hundred and eighty four (384) HIV infected participants were assessed for HIV related depression and adherence to ART. Levels of HIV related depression and adherence to ART were ascertained.

Results: The prevalence of depression was 23.3 %. The prevalence of mild, moderate and severe depression was 21.2 %, 1.8 % and 0.3 % respectively. The mean non adherence and average mean adherence rate were 27.9 % and 22.4 % respectively.

Conclusion: There was a minimal relationship between depression and non-adherence to antiretroviral therapy among adult HIV infected patients. Depression was not statistically significantly associated with adherence to antiretroviral therapy.

Key words: Depression, adherence, antiretroviral therapy

1. Introduction

According to a 2011 United Nations (UN) report, approximately 34 million of the World's population were living with HIV/AIDS, while the number of people who died from AIDS related causes was approximately 1.75 Million, showing a rising number of new infections and an improved access to therapy. It continues to remain a leading pandemic in the world and antiretroviral medication has been scaled up to increase efforts to suppress the HIV replication and improve the quality of life of patients**.** (Cohen et al, 2008).

The prevalence of HIV/AIDS in Kenya among adults who are 15-64 years old has been estimated to be about 6.3 %. It is higher in women aged 15-49 years, (8.0 %), compared to men of the same age bracket, (4.3 %). (Kenya Demographic and Health Survey Country Report, 2008-9).

 The number of people living with HIV/AIDS in Kenya in 2011 was estimated to be between 1,500,000 to 1,700,000**.** More than 91,000 Kenyan adults became infected in 2011, with 1 in every 200 Kenyan adults being newly infected yearly (UNAIDS 2011).

Efforts to tackle HIV/AIDS in Kenya have concentrated mainly on the creation of awareness, prevention and antiretroviral therapy.

According to some studies, the most under-addressed patient-based factor is the effect that mental illnesses has had on adherence to ARV's, with mental illnesses being associated with high risk behaviors (Goldman, 2000).

Depression that is associated with HIV/AIDS is a huge barrier in the provision of adequate treatment to HIV/AIDS. It is the most common psychosocial co-morbidity of HIV infection that will affect treatment in patients on ARV's, with a prevalence of 37% in people living with HIV/AIDS (PLWHA) in the world (Bing et al, 2001).

The current research was borne from observations that had been made of several patients who had defaulted from taking ARV's, with several of them having seemed to have given up hope despite having being on medication for a while. The study therefore aimed to find out the impact that depression may have had on adherence to ARV's by patients at Kenyatta National Hospital, Comprehensive Care Centre.

2. Methodology

2.1 Study design and site

The study design was a cross sectional study design carried out at the Comprehensive Care Centre of Kenyatta National Hospital in Nairobi, Kenya. It is the largest referral hospital in Kenya hosting the first pioneer centre for management of HIV/AIDS.

2.2 Target population

The target population was male and female adult patients aged 18 years old and above, who were HIV infected, were on ARV's and were not on any antidepressants medication.

2.3 Eligibility criteria

Both male and female adult HIV infected patients who were enrolled at the KNH CCC, were above 18 years old, on antiretroviral therapy for one month or more, were not on antidepressant medication and were ready to give an informed consent were included in the study. Participants who did not meet the inclusion criteria were excluded from the study.

2.4 Sampling

Sample size was calculated using the Fischer's formula. The desired sample size of 384 was identified through simple random sampling.

2.5 Data collection

A researcher designed socio demographic questionnaire to assess the patient details and PHQ-9 was employed in the study to assess the levels of depression. Adherence rates to ARV's were assessed using pill count; the number of unused pills in patient's possession plus no of missed days in a week**.**

The Patient Health Questionnaire (PHQ) is a new instrument for making criteria-based diagnoses of depressive and other mental disorders commonly encountered in primary care. It is half the length of many other depression measures, has comparable sensitivity and specificity, and consists of the actual 9 criteria upon which the diagnosis of depressive disorders is based. (Spitzer et al, 1999)

As there is no gold standard for measurement of adherence, the prevalence of mean adherence to ARV's over one month and mean adherence rate over three months were investigated in order to rule out instances of recall bias. Adherence to ARV's was set at 95 % adherence as this level is required to be able to achieve optimal viral suppression.

2.6 Data quality control

Three pre-test participants were recruited and a test interview was conducted. The Management Sciences for Health tool for antiretroviral drugs dispensing (MSH-ARV) was pre-tested and data compared with sampled physical data to ascertain its validity.

The MSH-ARV tool is a software tool that stores data on the quantities of drug doses dispensed to HIV infected patients. Participants who were non-adherent to their medication were identified using the data stored in the tool.

A perusal of the pill count records from the MSH-ARV dispensing tool was done and those who had missed their appointment dates were identified and percentage adherence rates (ADR %) calculated.

2.7 Variables and Case definitions

Depression associated with HIV was the independent variable while adherence to antiretroviral drugs was the dependent variable.

Adherence was defined is the extent to which a person's behaviour while taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider.

Depression was defined as any mental state or chronic mental disorder characterized by feelings of sadness, loneliness, despair, low self-esteem, and self-reproach; accompanying signs include psychomotor retardation (or less frequently agitation), withdrawal from social contact, and vegetative states such as loss of appetite and insomnia.

2.8 Data analysis

Filled questionnaire forms were accessible only to the investigator and were kept safely and later analysed using the SPSS 17.0 software and the results were presented in the form of tables, pie and bar charts.

Measures of central tendencies for the socio-demographic data were calculated. Statistical significance will be set at p values of ≤0.05.

2.9 Ethical considerations

The study commenced upon approval from the UON/KNH ERC vide approval number **KNH-ERC/A/199**. The researcher further sought permission before commencing the research from the hospital management and the KNH CCC in-charge. Informed written consent by the participants prior to administering the study tools was obtained. One participant (was diagnosed to suffer from severe depression) and 7 participants (diagnosed to suffer from moderate depression) were referred to mental health workers for further treatment.

Table 1: Socio demographic characteristics of research participants

Demographic characteristics	Frequency (n)	Percent (%)
Gender		
Male	153	39.8
Female	231	60.2
Age category		
21-30	37	9.4
31-40	146	37.2
41-50	146	37.2
51-60	53	13.5
≥ 61	10	2.6
Marital status		
Single	59	15.1
Married	234	59.8
Separated	32	8.2
Divorced	9	2.3
Widowed	57	14.6
Number of children		
0	27	6.9
1-2	186	47.5
3-4	128	32.6
5-6	39	10
≥7	12	3.1
Highest level of education		
None	6	1.5
Primary	96	24.6
Secondary	187	47.9
College	74	19
University	23	5.9
Other	4	1
Religion		
Muslim	12	3.1
Christian	379	96.7
Traditional African	1	0.3
Employment		
Yes	356	42.3
No	33	8.4
Self employed	193	49.2
Monthly income range(Kshs)		
< 5000	97	27.3
5000-10000	97	27.3

3. Results

3.1 Socio demographic characteristics

A total of 384 adult HIV/AIDS infected participants who matched the inclusion criteria were recruited in the month of August-September 2013 for the study.

The median age was 31.5 years, with most participants in the middle age groups of 31-40 years (37.2 %) and 41-50 years old (37.2 %), as illustrated in **Table 1**. More females, 60.2 % (n=231), participated in the study compared to 39.8 % (n=153) males, giving a female: male ratio of 3:2. This was because more females were willing to fill the consent form and respond to the questionnaires compared to the males who were reluctant to participate in the study.

3.2 Prevalence of depression

As per the PHQ-9 assessment, the proportion of patients who had depression was 23.3%. Of these, the distribution between mild, moderate and severe depression is as depicted in **Table 2**.

3.3 Prevalence of adherence to ARV therapy among participants

The mean adherence rate over a period of one month was 71.2 % of the participants while 27.9 % were found to be non-adherent. Similarly, the average mean adherence rate over a period of 3 months was observed to be 76.3 %, while 22.4 % were found to be non-adherent indicating that the number of non-adherent patients after using antiretroviral drugs for three months decreased compared with those who used the drugs over a period of one month

3.4 Association between depression and socio-demographics

There was a significant association between gender and depression, (χ^2=8.857, p value=0.031), with more women, (73%), being depressed compared to men, (27%).

A significant association (χ^2= 19.995, p=0.01) between a patient's marital status and the level of depression was observed indicating that married HIV infected patients are more likely to suffer from lower depression levels compared to unmarried patients. There was no significant association between the level of depression and the other socio demographic factors

3.5 Association between adherence and socio-demographic factors

There was a significant relationship, (χ^2= 8.558, p=0.03), between the employment status and the mean adherence rate over 1 month and the average mean adherence rate over a period of 3 months, (χ^2= 5.712, p=0.017).

The income range and mean adherence had a significant relationship, (χ^2= 6.476, p=0.039), for the average mean adherence rate over 3 months. More participants who were employed were adherent to their medication compared to unemployed participants.

Both the mean monthly and average mean adherence over three months showed statistical significance (χ^2= 9.797, p=0.044) and (χ^2= 9.161, p=0.057) respectively, for the age category respectively. A majority of the patients (74.4%) were in the reproductive age group of 21-50 years old, suggesting that they are more aware of their treatment regimens and HIV/AIDS status.

This suggests that middle aged patients are more adherent to ARV's compared with young and senile patients, who are more likely to suffer from stigmatisation and senility respectively.

3.6 Relationship between depression and mean adherence rate

Depression and mean adherence over one month did not have a statistically significant relationship (χ^2= 9.161, p=0.057).

Similarly, there was also no statistically significant relationship (χ^2= 9.161, p=0.051) between depression among HIV infected participants and the average mean adherence rate over 3 months.

Table 2: Prevalence of depression among HIV infected participants

Score	Frequency	Percent	Cumulative Percent
0-4 (No depression)	301	**76.8**	76.8
5 - 9 (Mild depression)	83	**21.2**	98
10 – 14 (Moderate depression)	7	**1.8**	99.7
>= 15 (Severe depression)	1	**0.3**	100
Total	**392**	**100**	

4. Discussion

This study on the impact of depression on ARV's has demonstrated that depression symptoms are minimally associated with suboptimal adherence to ARV therapy.

The results indicate that a proportion of adult HIV - infected participants who were on antiretroviral therapy do not adhere to their drugs as required due to several factors that includes incidences of depression which threatens efforts to achieve adequate suppression of the AIDS virus, with similar findings having been observed in previous studies done in the United States of America (Kacanek et al, 2010).

4.1 Association between depression and socio demographic factors

Gender and marital status significantly influenced depression among the recruited participants with more women than men participating in the study. Previous studies have indicated that 59 % of women in sub-Saharan Africa are HIV infected (Kacanek et al, 2010).

Women bear a greater social responsibility and are more likely to seek medical assistance in case of HIV infection. More women also have been observed to suffer from depression associated with HIV compared to men (UNAIDS 2008).

There was a significant association between a patient's marital status and the level of depression with more participants being married while the rest were single, separated, divorced or widowed. Previous studies have indicated that married HIV infected patients are likely to suffer from lower depression levels compared to unmarried patients. (UNAIDS 2008).

This may suggest that married patients are more likely to support one another in the management of HIV/AIDS hence have a lower likelihood of suffering from depression instances.

4.2 Association between adherence and socio demographic factors

A significant association between the age category of a patient and the mean adherence over one month and three months was observed. A majority of the patients (74.4%) were in the reproductive age group of 21-50 years old, suggesting that they are more aware of their treatment regimens and HIV/AIDS status. This agrees with another study carried out in Central Province, Kenya, on the impact of psychosocial factors impact on adherence whereby 50 % of patients in the age group 30-39 years were adherent to medication (Nyambura, 2011).

This suggests that middle aged patients are more adherent to ARV's compared with young and senile patients, who are more likely to suffer from stigmatisation and senility respectively.

More participants who were employed were adherent to their medication compared to unemployed participants. This may be explained by the fact that employed study participants are more likely to afford transport and manage to attend clinic appointments regularly compared with the unemployed participants.

4.3 Prevalence of depression among adult HIV infected participants

Among People Living with HIV/AIDS (PLWHA) in the United States of America (USA), it was observed that clinical depression has an estimated range of prevalence at 22-32 % (Orlando et al, 2002). Other studies have shown that depression among people living with HIV and AIDS in the world has a prevalence of 22 % (Komiti et al, 2003). This is a percentage which is close to the findings in this study. These figures are almost approximate with the findings in this study, whereby the prevalence of depression as measured by the PHQ-9 was found to be 27.9 % and 23.3 % for mean adherence rates of 1 month and 3 months average respectively.

The depression levels have dropped from a high of 47.25 % in 2011 to 23.3-27.9 %, with most patients who were depressed registering a moderate depression score of 1.8 % in 2013 compared to 25.25 % in 2011 according to a similar study carried out at the CCC in KNH in 2011 to find out the prevalence of anxiety and depression. The overall prevalence of depression, although measured with a different instrument, the BDI, was then 47.25 %, with mild, moderate and severe depression accounting for 9.75 %, 25.25 % and 12.25 % respectively. This may suggest that efforts were done to address depression among PLWHA at the KNH CCC during this two year period (Ng'ang'a 2011).

4.4 Prevalence of adherence

As there is no gold standard for measurement of adherence, the prevalence of mean adherence to ARV's over one month and mean adherence rate over three months were investigated in order to rule out instances of recall bias. Adherence to ARV's was set at 95 % adherence as this level is required to be able to achieve optimal viral suppression. (Paterson et al, 2000)

The findings in this study (71.2 %-76.3 % adherent; 22.4 %-27.9 %). A similar study had findings of 74 % and 26 % for mean adherence and mean non adherence rates respectively. These findings are relatively similar to adherence findings in this study (Nyambura, 2011)

4.5 Impact of depression among participants on antiretroviral adherence

The relationship between depression and non-adherence was not statistically significant. The presence of depressive symptoms of poor appetite, fatigue and insomnia may be as a result of the antiretroviral therapy side effects or other psychosocial factors like stigma that may impact on a HIV patient's access to antiretroviral medication.

Finally, it is imperative to note that one participant (was diagnosed to suffer from severe depression) and 7 participants (diagnosed to suffer from moderate depression) were referred to mental health workers for further treatment.

5. Conclusion

The findings of this study provide evidence of a minimal relationship between depression and non-adherence to antiretroviral therapy among adult HIV infected

patients. There may be a need to integrate mental health treatment programs in the management of HIV/AIDS. There may also be a need to ensure regular screening for depression among patients on ARV's in comprehensive care centres based on the findings in this study.

Conflict of Interest Declaration

The authors declare no conflict of interest.

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