

Determinants of Antiretroviral Treatment Interruptions among HIV and AIDS Patients
Kuwadzana, Harare

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Abstract

Introduction: Human Immunodeficiency Virus (HIV) is a retrovirus that causes Acquired Immuno deficiency Syndrome (AIDS). The introduction of antiretroviral therapy coupled with expanded coverage in patients accessing ART has improved the quality of life and survival. The treatment is complex in the sense that it requires strict drugs intake to scheduled time with no interruption and, also attending scheduled checkups. City Health Department reported that there are patients in care at Kuwadzana Polyclinic who had stopped ART for unknown reasons. An investigation was initiated to identify possible causes of ART treatment Interruption so as to institute control measures.

Methods: An unmatched 1:1 case-control study was conducted. An interviewer based questionnaire was administered to study participants so as to identify risk factors for ART treatment Interruption. A case was described as an HIV and AIDS patient between 15-49 years of age, who were on ART for at least 6 months or more, and had missed two or more doses of ARV drugs since they started treatment for more than 2 consecutive days. ART registers from April 2016 to January 2017 were reviewed. Data was analyzed using Epi Info statistical version 7.2.0.1.

Results: 156 participants were enrolled; 78 cases and 78 controls were interviewed in the study. Forgetting taking ARV drugs [Crude OR 9.66 ($p = <0.01$), Being married was a strongly protective factor for both sexes, females [OR 0.44 (95% C.I. 0.24-0.89) and males [OR 0.32, ($p=0.05$)], background of primary education or less had a higher risk of treatment interruption to ART [OR 5.13 ($p = 0.8$)]. Bad attitude of health workers was found to be also a contributing factor [OR1.04 (95% C.I. 0.56-2.86)]. Females were more likely to be associated with stigma [OR 1.27 (95% C.I.0.64-1.87)], males [OR 0.92 (95% C.I.0.36-2.56)]. Pentecostals were 1.89 times more likely to be associated with treatment interruption [OR 1.89) (95% C.I. 0.77-3.24)], than protestant members [OR 1.12 (95% C.I. 0.65-1.25)]. Too much paper work for the health staff was observed. For instance files for patients were pulled out each time patients had to come for review or for drug collection. In addition there were out patient's cards, green book and attendance register, which needed to be written by the nurse for every client.

Conclusion: This study documented good knowledge about ART, but treatment interruption still remains a major challenge. Unsatisfactory attitude of health workers, receiving drug compliance counselling from non-health workers was associated with treatment interruption. Forgetfulness, frequent travels, stock out of some ARV drugs, fear of being sacked from workplace, long waiting time and alcoholism were some of the reasons patients" missed taking their ARV drugs. The system was not able to screen patients who were missing their doses at home but keeping correct appointment dates.

Keywords: ART, Treatment Interruption, Harare City Health

Objective: To determine the factors associated with treatment interruptions to antiretroviral therapy among HIV and AIDS patients enrolled at Kuwadzana Polyclinic.

Design: An Unmatched 1:1 case control study: For every case which was enrolled in the study a control was enrolled.

Setting: The study population were HIV positive adult patients on ART who were coming for review at Kuwadzana polyclinic who had missed other doses and those who are no longer on treatment and still stay in Kuwadzana.

Materials and Methods

Determination of cases and controls

Case - HIV and AIDS patient between 15-49 years of age, who were on ART for at least 6 months or more, and had missed two or more doses of ARV drugs since they started treatment for more than 2 consecutive days.

Control - HIV and AIDS between 15-49 years of age, on ART for at least 6 months or more and had not missed more than two doses of ARV drugs since they started treatment for more than 2 consecutive days.

Data collection Instruments

Interviewer administered questionnaires were used to collect data from participants.

Checklists were used to assess resource availability.

ART registers from April 2016 to December 2016 were reviewed to check participant's information.

Files and cards of each interviewee were reviewed.

Results: This study documented good knowledge about ART but treatment interruption still remains a major challenge. Unsatisfactory attitude of health workers, receiving drug compliance counselling from non-health workers of less than three times was associated with treatment interruption. Forgetfulness, frequent travels, pill burden, side effects, stock out of some ARV drugs, fear of being sacked from workplace, long waiting time during clinic visit, confusion, smoking and alcoholism were some of the reasons patients miss taking their ARV drugs.

The church organizations like the, Seventh Day Adventist and Methodists were found to be associated with treatment interruption to ART, but was not statistically significant.

The participants who were single namely, never married, divorced and widowed were associated with treatment interruption though not statistically significant. Similarly not carrying pill boxes/containers and having DOTS supporters were risk factors contributing to treatment interruption.

Bad attitude of health workers was found to be a contributing factor to treatment interruption. The system was not able to screen patients who were missing their doses at home and keeping their correct appointment dates. There was a delay in attending to patients at the outpatients' department. This study could not confirm that the mentioned adverse drug reactions by the participants was indeed as a result of the ARV taken by the patients.

Some of the suggestions made by respondents to address treatment interruption challenge include use of alarm clock as a reminder for time of drug administration, computerization of storing and retrieving medical records, ensuring punctuality of health workers to work by HIV clinic management and recruitment of more health workers especially nurses and doctors.

Some information on important variables like baseline weight, CD4 count and blood pressure readings was missing. This limited the extent of risk factor analysis on drug adverse reactions.

Introduction

Human Immunodeficiency Virus (HIV) is a retrovirus that causes Acquired Immuno deficiency Syndrome (AIDS). There are two types of HIV; HIV-1 and HIV-2. The former is generally accepted as the cause of most AIDS cases throughout the world (CDC, 2013). HIV (Human Immunodeficiency Virus) and AIDS (Acquired Immune Deficiency Syndrome) is a global problem and is one of the most destructive epidemics that the world has ever witnessed (Ayalu, Reda & Sibhatu 2012). In the absence of a cure, antiretroviral therapy (ART) is the only treatment for HIV.

The introduction of antiretroviral therapy (ART) coupled with expanded coverage in patients accessing ART has improved the quality of life and survival since about half of the people with a

CD4 count less than 350 per ml, the current threshold for initiating treatment would die within 2 years if they did not get ARV treatment (UNAIDS 2014). In response to the patients demand for treatment, Zimbabwe Government through the Ministry of Health and Child Care introduced the antiretroviral therapy (ART) programme in 2004 and since then many ART sites have been introduced throughout the country to ensure easy access to antiretroviral treatment (UNAIDS 2014). As access to ART increases, concerns have been raised on how to maintain optimal adherence to ART. To achieve effective treatment ART requires a high adherence rate of 95% and above, but the challenge now remains on how to sustain such high percentage of adherence over long term (Ayalu et. al., 2012).

Antiretroviral treatment is complex in the sense that it requires strict adherence to scheduled time and stick to dietary requirements, also attending scheduled checkups. At the ART clinic, once a patient has been considered eligible for treatment, the patient is offered counselling on the treatment regimens and importance of drug compliance, then commenced on ART. The patients are required to take the treatment as prescribed, attend monthly review where progress is monitored and is also provided with monthly supply of antiretroviral drugs. The patient is expected to comply with all the treatment instructions but sometimes it may not be possible therefore viral suppression may not be maintained (Ministry of Health and Child Care 2015).

Material and Methods

Determination of cases and controls

Case - HIV and AIDS patient between 15-49 years of age, who were on ART for at least 6 months or more, and had missed two or more doses of ARV drugs since they started treatment for more than 2 consecutive days.

Control - HIV and AIDS between 15-49 years of age, on ART for at least 6 months or more and had not missed more than two doses of ARV drugs since they started treatment for more than 2 consecutive days.

Data collection Instruments

Interviewer administered questionnaires were used to collect data from participants.

Checklists were used to assess resource availability.

ART registers from April 2016 to December 2016 were reviewed to check participant's information.

Files and cards of each interviewee were reviewed.

Data Collection Procedure

Patients were enrolled in this study from Monday to Friday during normal working hours. Patients were assured of confidentiality. Systematic random sampling for the cases was done by selecting cases in the registers. A random number was picked between 1 to 5, and sampling interval of 3 to choose cases. Interval were calculated as: $74+98= 172/83 =3$. If the client was not available a replacement with the next number 4 was done. Controls were selected from the same area a case was coming from.

Inclusion criteria

HIV positive patients who were on ART aged 15-49 years who were attending ART clinic at Kuwadzana Polyclinic who have been taking ARV treatment for at least 6 months.

Exclusion criteria

HIV/AIDS patients who were currently on ART for less than 6 months and those who were not on ART attending ART clinic at Kuwadzana Polyclinic.

Results

Demography

A total of 156 participants, 78 cases and 78 controls were interviewed in the study. Out of 78 cases interviewed 49 (62.8%) were females with mean 38.5 years and standard deviation (SD) 12.3), males were 29 (37.2%) with mean age of 42 years and SD 9.7. Of the 78 controls, 49 (62.8%) were females with mean age of 37.8 years and SD 12.7, males were 29 (37.2%) with mean age of 40.5 years and SD 8.6 (Table 4.1).

Table 4.1: Comparison of characteristics among 78 cases and 78 controls

	Cases (n=78)		Controls (n=78)	
Sex	Females	Males	Females	Males

Frequency	49	29	49	29
Percentage	62.8	37.2	62.8	37.2
Mean age (years)	38.5	42	37.8	40.5
S.D.	12.3	9.7	11.7	8.6

A comparison between cases and controls in terms of attitude and marital status are shown in table 4.2. The role of factors associated with treatment interruptions (namely forgetting swallowing ARV drugs) among patients on ART was confirmed in this study [Crude OR 9.66 ($p = <0.01$)], however, there were also confounding factors found on the association between females and males [Adjusted OR 12.12 (2.35-3.11)] and this was statistically significant.

Being married was a strongly protective factor for both females in this study with an [OR 0.44] (95% C.I. 0.24-0.89)] and males [OR 0.32, ($p=0.05$)] and these results were statistically significant.

Table 4.2 Comparison of attitude and marital status among cases and controls

1. Attitude.	Cases	%	Controls	%	OR	(95% C.I.)
Forgetting ARVs.						
Yes	15	19.2	6	7.7		
No	63	80.8	72	92.3	(9.76)	($p < 0.01$)
Total	78	100	78	100	(Adj. OR 11.02) (2.12-3.31)	

Males

Yes	4	13.8	2	6.9	(OR un identified)	
No	25	86.2	27	93.1	(p < 0.01)	
Total	29	100	29	100		

Females.

Yes	12	24.5	4	8.2		
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No	37	75.5	45	91.8	(9.26) (p < 0.01)
Total	49	100	49	100	(OR un identified)

2. Marital status all sex.

Married

Yes	43	55.1	49	62.9	(0.34) (0.19-1.24)
No	35	44.9	29	37.2	(Adj.0.6) (0.38-1.02)
Total	78	100	78	100	

Females married

Yes	12	24.5	23	47	
No	37	75.5	26	53	(0.48) (0.26-0.99)
Total	49	100	49	100	

Males married

Yes	23	79.3	20	69	
No	6	20.7	9	31	(0.38) (p=0.05)
Total	29	100	29	100	

After stratifying by marital status and gender the findings showed that being married was strongly protective for both males [OR 0.38 (p=0.05)] and females [(OR 0.48) (95% C.I 0.26-0.99)] and was statistically significant (Table 4.3).

Table 4.3 shows the results of the association of treatment interruption among patients who were never married widowed or separated with their partners. The risk of treatment interruption was likely to be 1.86 times [OR 1.86] (p= 0.06)] among patients who were never married when compared with married individuals [OR 0.34 (95% C.I. 0.19-1.24)]. Participants who were

widowed and divorced were found to be associated with treatment interruption, however, divorced individuals were found to be 1.76 times more likely to miss taking ARV drugs with an [OR 1.76 (95% C.I. 0.89-3.12)] when compared with the widowed [OR 1.14 (95% C.I. 0.68-1.82)], but this was not statistically significant. The same table shows risk factors (namely not employed) was associated with treatment interruption [OR 1.18 (95% C.I. 0.58-1.89)], however, this was not statistically significant. On religion the Pentecostals were 1.89 times more likely to be associated with treatment interruption with an [OR 1.89 (95% C.I. 0.77-3.24)], than protestant members were with an [OR 1.12 (95% C.I. 0.65-1.25)]. In contrary the results showed that Anglican Church members were likely to be protected from treatment interruption [OR 0.49 (p=0.17)], however, this was not statistically significant. Surprisingly Apostolic members were likely not associated with treatment interruption to ART in this study with an [OR 0.85 (95% C.I. 0.56-1.04)] and this was not statistically significant.

Participants who had a background of education of primary school or less were at a higher risk of treatment interruption to ART with an [OR 5.13 (p = 0.8)] than the participants who had secondary education [OR 0.79 (95% C.I. 0.68-1.09)]. The results showed that obtaining tertiary education was a risk factor [OR 1.08 (95% C.I. 0.66-2.24)], however, this was not statistically significant (Table 4.3).

Table 4.3. Comparison of Socio Demographic factors among cases and controls

	Cases (n=78) %		Controls (n=78) %		OR (95% C.I.)
1. Marital status.					
			Divorcees all sex		
Yes	13	16.7	9	11.5	
No	65	83	69	88.5	(1.76) (0.89-3.12)
Total	78	100	78	100	
Widowed females					
Yes	30	38.5	34	43.6	
No	48	61.5	44	56.4	(1.14) (0.68-1.82)
Total	78	100	78	100	

Never married

Yes	10	12.9	4	5.1	
No	68	87.2	74	94.9	(2.22) (p = 0.06)
Total	78	100	78	100	

2. Religion.

Pentecostal

Yes	14	20.3	6	11.9	
No	54	79.7	62	88.1	(1.89) (0.77-3.24)
Total	78	100	78	100	

Protestants

Yes	12	25.4	16	22.0	
No	56	74.6	52	80.0	(1.12) (0.65-1.25)
Total	78	100	78	100	

Seventh Day Adventists.

Yes	4	8.5	3	6.8	
No	64	91.5	65	93.2	(1.03) (0.59-1.68)
Total	78	100	78	100	

Apostolic

Yes	10	18.6	4	20.3	
No	58	81.4	64	79.7	(0.85) (0.56-1.04)
Total	78	100	78	100	

Unemployed.

Yes	52	69.5	46	64.4	
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No	16	30.5	22	35.6	(1.18) (0.58-1.89)
Total	78	100	78	100	

3. Level of education.

None

Yes	5	5.0	3	0.8	
No	63	95.0	65	99.2	(5.13) (p = 0.8)
Total	78	100	78	100	

Primary

Yes	9	15.3	16	13.6	
No	50	84.7	102	86.4	(1.03) (0.98-1.46)
Total	78	100	78	100	

Tertiary

Yes	10	17.0	14	12.4	
No	58	83.0	54	88.4	(1.12) (0.66-2.24)
Total	78	100	78	100	

Bad attitude shown by health workers was found to be also a contributing factor to treatment interruption with an [OR1.04 (95% C.I. 0.56-2.86)]. (Table 4.4).

The Zimbabwe Health System has program to teach health workers about public relation. There is a book on patient's rights called the patient charter. This regulation explains how health workers should handle patients. The patient charter explains about client satisfaction, however, one wonders why participants reported about poor attitude of health workers at this institution under study. Each health institution has a public relation officer who should always remind health workers about the patient charter.

A comparison was also done between cases and controls in terms of regimen related factors (namely skin rash, nausea and vomiting) and the results showed that these were associated with treatment interruption to ART, however, these were not statistically significant (Table 4.4).

Table 4.4 Comparison of regimen related factors among cases and controls

1. Regimen related factors.

	Cases	n=78%	Controls n=78%	OR (95% C.I.)
Skin rash				
Yes	17	21.8	10	12.8
No	61	78.2	68	87.2 (1.44) (0.68-3.06)
Total	78	100	78	100
Nausea				
Yes	7	9	11	14
No	71	91	67	85.9 (1.04) (p=0.5)
Total	78	100	78	100
Vomiting				
Yes	7	9	12	15.4
No	71	91	66	84.6 (1.88) (p=0.14)
Total	78	100	78	100
Taking ARVs on empty stomach.				
Yes	12	15.4	10	12.8
No	52	66.7	58	74.4 (0.92) (0.43-2.36)
Neutral	14	18	10	12.8
Total	78	100	78	100

Females

Yes	12	15.4	6	7.7	
No	32	41	38	48.7	(1.25) (0.46-4.25).
Neutral	34	43.6	34	43.6	(1.07) (0.31-3.67)
Total	78	100	78	100	

3. Health workers attitude.

Yes (good)	52	66.6	62	76.5	
No (bad)	14	17.9	10	12.8	(1.04) (0.56-2.86)
Neutral	12	15.4	6	7.7	(0.88) (0.26-1.98)
Total	78	100	78	100	

Table 4.5 shows factors which are likely to be associated with treatment interruption to ART (namely not carrying pill boxes [1.29 (95% C.I 0.76-2.45)], having DOTS supporters (OR 1.88) (95% C.I 0.94-2.14), not able to pay consultation fees [OR 1.34 (95% C.I. 0.88-1.64)] however, these results were not statistically significant.

Furthermore, when factors like stigma is included [OR 1.12 (95% C.I.0.63-1.96)]. The results showed that stigma is associated with treatment interruption. When stratified by sex the results revealed that females were more likely to be associated with stigma [OR 1.27 (95% C.I.0.64-1.87)] when compared with their male counter parts [OR 0.92 (95% C.I.0.36-2.56)]. However, there were no confounding factors of association found between stigma and sex [Crude OR 1.03 (95% C.I. OR 0.63-1.89) (Adj OR 1.03) (95% C.I. 0.45-1.76)], however, this result was not statistically significant (Table 4.5).

Table 4.5. Comparison of environmental related factors among cases and controls

1. Consultation Fees.	Cases (n=78) %	Controls (n=78) %	OR (95% C.I.)
Yes	33 42.3	29 37.2	

No	45	57.7	49	62.8	(1.24) (0.741-1.92)
Total	78	100	78	100	

No pill box/packet.

Yes	39	50	39	50	
No	28	35.9	35	44.9	(1.38) (0.682-1.80)
Neutral	11	14.1	4	5.1	(0.27) (0.05-1.34)
Total	78	100	78	100	

DOTS supporters.

Yes	54	69.2	49	62.8	(1.88) (0.942-1.14)
No	24	30.8	29	37.2	(Adj.1.45) (0.932-1.92)
Total	78	100	78	100	

2. Stigma

Yes	31	39.7	32	41	(1.12) (0.63-1.96)
No	38	39.7	40	51	(Adj.1.16) (0.56-1.88)
Neutral	9	11.5	6	7.7	(0.78) (0.26-1.97)
Total	78	100	78	100	

Females and stigma.

Yes	23	29.5	21	26.9	
No	24	30.8	26	33.3	(1.44) (0.61-1.99)
Neutral	31	39.7	31	39.7	(1.27) (0.64-1.87)
Total	78	100	78	100	

Males and stigma.

Yes	9	11.5	11	14.1	
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No	15	19.2	14	17.9	(0.87) (0.32-2.89)
Neutral	54	69.2	53	67.9	(0.92) (0.36-2.56)
Total	78	100	78	100	

i) Review of ART Files

Each patient had an ART file that was being kept in a well-secured record room. The records in the files showed that the system was able to capture treatment interruption of ART to patients who only missed their appointment dates by one or more days.

ii) Observation at the outpatient department

Patients were arriving at the institution as early as six o'clock in the morning to queue for different services. Each day there were over eighty to hundred patients seen at the health institution under study. Every day at eight o'clock the patients were receiving health education and a prayer from one of the counselors.

The actual services to the patients were starting between 08.30 and 09.00 hours and ended at four in the afternoon. Patients were required to pay a dollar for the card. During lunch hour most of the patients were seen lying helplessly on the loan or dozing on the benches.

Most of the delay was noticed at the office where patients pay the consultation and card fees. This study observed that there might have been too much paper work for the health staff. For instance there were files for patients to be pulled out each time patients had to come for review or for drug collection. In addition there were out patient's cards, green book and attendance register, which needed to be written by the nurse for every client.

There was evidence to suggest that there was congestion of patients who needed different services at the institution under study. For instance, new and old patients for review were seen together.

iii) Mixing of ARV drugs

In this study it was observed that some participants were mixing the ARV drugs with cotrimoxazole or paracetamol. In other instances, the patients were using paracetamol or cotrimoxazole containers to keep the ARV drugs.

Discussion

Demographic factors

i) Socio-economic factors

In a study that was done in Botswana showed that in situations where HIV positive patients on ART are required to pay for the drugs even if the health system ensures a good distribution of the drugs, treatment interruption to antiretroviral treatment will remain a constant phenomenon (Boteti, 2013). It has been documented that TB and HIV are associated with poor socio-economic group of the population in Zimbabwe. In this study it was found that paying for consultation fees was a risk factor associated with treatment interruption [OR 1.24 (95% C.I. 0.72-1.94)] (Table 4.5). The National Trust Funds (NATF) is supposed to assist the patients, who are failing to pay for consultation fees, however, this was not the case at Kuwadzana. Such assistance might contribute to the reduction of treatment interruption rate. The majority of the HIV and AIDS patients are poor and not working in Kuwadzana even though the consultation fee is a \$1, some clients will not be having the money and will not go for their supply looking for the money. The study results are similar to a study that was done in low resource settings by Bayika, 2012 in which the amount charged was as minimal as possible but some clients were not able to pay the small amount and end up having an interruption of their treatment. (Bayika, 2012).

Unemployment was found to be a risk factor contributing to treatment interruption to ART [OR 1.18 (95% C.I. 0.58-1.89)] (Table 4.3). It is noteworthy that this study found that being employed was likely associated with non treatment interruption when compared to those not working [OR 0.89 (95% C.I. 0.58-1.34)] (Byakika, 2012).

At Kuwadzana poly clinic, the Social Welfare Officer is supposed to screen those patients who are unable to pay for consultation fees. In this study the results showed that the Social Welfare Department was not assisting some patients who were not able to pay for consultation fees.

ii) Marital status

In an African culture there is overall responsibility, pride, love and care in one who is married. At managerial levels, at family levels it is known that a married individual is respected by the society and by his family.

It is possible that the spouses and children support the husband/wife and parent respectively to encourage him/her to take tablets hence a married individual is likely not to have an interruption to ART. The love for children is usually an incentive for some patients to comply with ART treatment. In studies which were done in China on TB programs they have shown that married individuals are associated with adherence to treatment because they want to live a longer life to take care of their children (Wong CK, 2013).

Quote from a couple in this study: " We stick to ART because we love our kid. We would like to see her grow and be happy".

In this study married participants were NOT likely to HAVE treatment interruption to ART [OR 0.26 (95% C.I. 0.06-1.16)] when matched with never married, divorced and widowed and this is similar to a study done in Botswana by Boteti (2012) which revealed that single participants were mostly at a higher risk of treatment interruption than married couples.

There were no confounding factors found which were associated with treatment interruption and gender [Crude OR 0.38 (95% C.I. 0.64-1.87) (adjusted OR 0.92) (95% C.I. 0.36-2.56)]. Though not statistically significant, probably due to small sample size, however, the findings were consistent with those other studies reported in Uganda which showed that gender is not a risk factor of treatment interruption to ART (Valerie E, 2011) (Table 4.5).

iii) Education/Knowledge

In a study done by WHO on scaling up therapy of antiretroviral therapy in resource-limited settings some authors have suggested that the education patients receive about ART should include the information about HIV and its manifestations, the benefits and side effects of the ARVs, how the medicine should be taken and the importance of not missing any doses should be emphasized. Peer counselors involvement and visual materials can be particularly useful in that process (WHO, 2013).

The results revealed that there was a strong relationship between non-education level and treatment interruption [OR 5.13 (95% C.I. 0.58-1.84) ($p=0.8$)]. Those who had done primary education were likely to miss their doses 1.03 times more when compared with those who had done secondary education [OR 1.03 (95% C.I. 0.98-1.46)]. The observation is consistent with one of the studies

done in Brazil that reported that participants with less than two years of formal training (education) were found to be at a higher risk of treatment interruption to ART (Nemes MI, 2011).

It is important to note from the results (table 4.5) that being a former secondary student is protective [OR 0.58 (C.I. 0.56-0.59)]. I believe that the school dramas on HIV and AIDS in secondary schools might be contributing to secondary school students to be aware of HIV and AIDS. Dramas always remind the secondary school students of the impact of HIV and AIDS even after the students leave school. Hence, that situation will contribute to reduction of treatment interruption of ART.

iv) Religion

It is a well-known fact in our society that most apostolic church members and Pentecostals are against treatment of any disease using medication but prayers and drinking the so-called anointed water.

It is also a known fact among our society that those who are affected and infected with HIV and AIDS are likely to be discriminated by the society.

The first port of call when one is ill among these religions is either a prophet or traditional healer and they only go to the hospital at a later stage. These two religions are typically characterized by poor health seeking behaviours among the followers, strong beliefs in faith healing, practicing in undesignated places making it difficult for health workers to disseminate relevant health information. However, such individuals seek spiritual assistance from the so-called prophets. The fact that someone goes to a church and comes out openly to accept that she/he is HIV positive means that the individual has accepted his/her HIV status and is not stigmatized (WHO, 2013). Hence will stick to ART.

The fear for death, the love for children and the support from the family and friends are other factors this study revealed as possible contributing factors to treatment interruption to ART by some patients. Most of the churches in Zimbabwe preach about HIV and AIDS. That also could have had an impact on church members like the Anglicans who were likely to comply with ART [OR 0.58 (95% C.I. 0.75-1.68) (p= 0.9)].

However, in this study the Roman Catholic members were more likely to be associated with non-treatment interruption to ART when compared with the apostolic and Anglican Church members [OR 1.89 (95% C.I. 0.77-3.24)]. In Zimbabwe the Catholic Church is against use of condoms and abortion. The Roman Catholic Church is a respected organization among the Zimbabwean society.

Most probably these aspects may influence the church members not to freely come out in public and talk about their HIV status hence treatment interruption to ART. Likewise the Seventh Day Adventist Church is one of the church organizations that follow strictly the rules of the bible. Most members of the Seventh Day Adventist Church are vegetarians and strictly pray and do not work on Saturdays. Mostly people from the Church are convinced that HIV is contracted when an individual is promiscuous and the members are free from HIV infection and AIDS since they are Christians and do not practice such behaviour. Probably this situation may stigmatize those HIV positive individuals to come out openly in the church. Hence it was discovered in this study that being a Seventh Day Adventist Church member is likely to be associated with treatment interruption to ART in Kuwadzana [OR 1.03 (0.59-1.68)] (Table 4.5).

It was noted that religious beliefs reversed the gains that had been achieved towards ART treatment interruption. Findings concur with Maokisa (2011) that religious beliefs had an influence in ART treatment interruption hence need to address the religious belief and practices during counselling sessions. A study by Mbirimtengerenji et al (2013) also revealed that most Christians complied with ART than other religions whilst treatment interruption was also noted in some strong religious believers who believed that God had supernatural powers and heals HIV and AIDS and discontinued treatment.

5.2.2 Environmental related factors

The majority of the respondents were not working and had not reached seventh grade in education, they were not able to pay for consultation fees.

It is an established fact that TB and AIDS are diseases associated with poverty hence the study which was done in Costa Rica confirmed the statement (Stout BD, 2012).

Health care factors

i) Stigma

According to WHO (2014) there are reports which indicate that the involvement of relatives, friends and/or community members in support of the adherence to drugs is vital in reducing treatment interruption rate.

However, there was some contradictory evidence in this study to suggest that having DOTS supporters increased risk of treatment interruption [OR 1.88 (95% C.I. 0.94-2.14)], however this

was not statistically significant. There was an association between stigma and treatment interruption that was also noted in this study [Crude OR 1.12 (95% C.I. 0.63-1.96)] (Table 4.5).

Kuwadzana Polyclinic has a unit of counsellors for health education. I believe that this situation should contribute to the reduction of stigma among the patients.

In contrary, this study found that having a DOTS supporter was likely to be associated with treatment interruption [OR 1.88 (95% C.I. 0.94-2.14)]. I assume that it is very difficult that someone can continue watching a patient taking ARV for life. The schedules for taking these drugs are evening and morning these hours are regarded as sleeping and resting moments for the patients. Hence they (patients will be in bed rooms where it is difficult for someone other than spouse or a minor child to enter. The issue of confidentiality plays a role when we involve DOTS supporters.

In this study females were more likely associated with stigma and treatment interruption [OR 1.44 (95% C.I. 0.61-1.99)] than their counter parts (males) [OR 0.87 (95% C.I. 0.32-2.89)]. However, there was no confounding factors of the association between stigma and gender [Adjusted OR 1.16 (95% C.I. 0.56-1.88)] (Table 4.5).

According to African tradition it is accepted that a man can have more than one partner. In the Shona culture we talk of women as sex workers and as promiscuous, we do not talk of men as paymasters of sex workers. Some men are polygamists like the apostolic members. In a study done by Mbirimatenji et al (2013) in Zimbabwe the Tonga tribes in Binga, Gokwe South and North communities have tradition, which allows polygamy. Hence, it is possible that being a male is protective from stigma. A woman who is publicly known to be having a second partner is regarded in our society as promiscuous.

Hence, if a woman is HIV positive she will be stigmatized if the public happens to be aware of that. However, if one involve friends, relatives or community at large in support of treatment interruption to ART it is possible to reduce treatment interruption rate among the patients (WHO, 2013).

Change of area of residence was cited by 40% of participants who had travelled before that they have challenges of accessing services at other health facilities in the country if they do not produce transfer letters or at least a national HIV care and treatment card as they can only get one supply and have to go back to their centers for the rest of the supply. Zimbabwe should embrace

technology in this area through designing electronic client identification and a tracking system to allow easier access to HIV care and treatment services at any health facility in the country.

ii) **Health education**

There is evidence to support that the pre and post counselling given to patients at this institution under study provides knowledge to patients on drug compliance.

Hence acquiring knowledge by patients on ART was found to be protective [OR 0.43 ($p = 0.05$)].

The availability of trained counsellors who are not nurses might contribute to the high rate of patients with knowledge on ART programs. Unlike nurses, the non-nurse counsellors do concentrate on health education only (NDTPAC, 2014).

However, the length of time spent at the institution under study by most of the patients during review or collection of drugs was between two hours to six hours. There was evidence to suggest that there was a delay in giving services to the patients as many patients could be seen lying helplessly on the hospital lawn during lunch hours.

There is likelihood that such poor services might contribute to treatment interruption to ART because some of the patients are working and might not continue to be given a day off by their employers every month to spend at the ART clinic.

The study raised a concern about the long six o'clock in the morning to four o'clock in the evening queue by the patients at outpatients' department. It can be speculated that could have contributed by too many activities at the outpatients' department. Patients have too many papers to be completed by the nurses. The patients go to the counselors and the drug room for some drugs. In a study to evaluate the ART program in Harare Central Hospital, Zimbabwe, Chibanda D et al (2015) found similar results.

The actual magnitude of the problem of treatment interruption at this institute under study could have been under estimated. The data in the ART registers showed that of the 78 cases who were enrolled in this study, about half were found to be registered as defaulters and were followed up whilst the rest were just indicated as loss to follow up, with no further investigations done which was indicated. That low rate of detecting treatment interruption could have been a tip of the iceberg and was a worry to this study

There could be a possibility that non counting of pills during review dates was contributing to problem of patients not carrying their pill boxes as it is supposed to be, even those with the pills it seems the nurses were too busy to count the pills. The non-carrying of tablets by patients was associated with treatment interruption as one can just lie about how many tablets they were left with [OR 1.46 (95% C.I. 0.72-1.28)] (NDTPAC, 2014).

The ARV drugs used by this program are very safe as evidenced by few cases of adverse drug reaction which were referred (NDTPAC, 2014). Hence there was no rationale of patients being sent to referral centers to be seen by the doctor especially if they (patients have no problems) after three months of treatment hence no transport challenges.

Considering the ethical obligation, this study intervened by letting the matron and the sister in-charge know about the delay of patients to receive services in time.

There was too much paper work and unnecessary procedures like withdrawing the patient file each time the patient was being reviewed. In TB program, which is considered by the Ministry of Health and Child Welfare as an integral program of AIDS, patients have DOTS cards that carry all the required information for the patient. Patients on TB treatment would only require DOTS card and collection of drugs until and unless it is necessary, would the patient see a doctor. Hence there is no delay of TB patients at the outpatient department. The system was able to capture as "defaulters" those patients who were missing appointment dates for one day or more or abscond. This definition was similar to the study definition of treatment interruption.

iii) Reason for getting better

The answers from the interviewees suggest that getting better was associated with Non Treatment interruption. It is a known fact that the HIV has affected every family in Zimbabwe, hence I believe that situation attributes to adherence to ART among patients. The fear of death drives patients to adhere to ARVs.

These findings concur with Mbirimtengerenji et al (2013) that patients on ART who noted improvement of their general health status were motivated to comply with antiretroviral treatment, they keep all the appointments and did not miss a dose as they could see that ART made a difference in their quality of life. The same results were also reported by Ayalu et al (2011) who reported that a change in health status of a client had influence on adherence to ART and if there

is improvement in health the influence is positive and a negative influence if there is deterioration in health status.

iv) Practice

In a study that was done in Costa Rica showed that taking drugs on an empty stomach was associated with treatment interruption to ART (Stout BD, 2011). This study reported contrary findings. In this study the results showed that taking of ARV drugs on empty stomach was protective [Crude OR 0.78 (95% C.I. 0.42-1.89)]. These results have been reported in a study done in Uganda Byakika et al 2012 treatment interruption of ART in HIV Uganda patients purchasing therapy. However, when stratified by gender the results showed that females were likely associated with treatment interruption when taking ARV on an empty stomach. Smoking (marijuana) was found to be anti-nausea hence associated with treatment interruption in a study done in Jamaica (de Jong, 2013). May be few women in Zimbabwe do smoke, probable that might be the reason why being females was associated with treatment interruption because of possible nausea. In most families in Zimbabwe women do the cooking, hence they are likely to take meals (food) before taking ARV drugs. More men than women in Zimbabwe drink beer or smoke. Most of the time males drink beer or smoke cigarettes on empty stomachs hence have no problem of doing the same with ARV drugs. I presume that beer and cigarettes have addictive effects like marijuana.

Most respondents were likely to forget taking their doses [Crude OR 5.98 ($p < 0.04$)]. When we stratified by gender, both females and males were strongly associated with forgetting taking ARV drugs. Females [OR 8.66 ($p < 0.03$), males ($p < 0.03$)] (Table 4.5). I believe women forget taking tablets because of the nature of their socio-family commitments. For instance, women cook, wash clothes, care for children and the husbands, and hence there are possibilities that women are likely to forget their doses. When one walks through the streets in the densely suburb of Kuwadzana the common people in the informal sector are women. As early as 3 o'clock or 4 o'clock in the morning these women will be at the market squares ready to buy farm products from the farmers. The selling will take the whole day.

The process repeats every day. However, other women may decide deliberately not to take ARVs at particular time especially when they are breast-feeding or pregnant this is similar to a study done by Wong CK, 2012 on Compliance with Tuberculosis treatment in Haliaen aborigines. However, this study did not take maternal history of the female patients.

On the other hand I believe there are factors which contribute to males to forget taking ARV drugs. Some of the contributing factors to non-adherence to ART by males are; nature of work like going to work and back early and late respectively. Most men do drink beer and sometimes sleep late. This study revealed that missing doses were related to travelling, and the nature of work and the results are similar to a study done by Chesney et al 2013, University of California.

5.2.4 Regimen related factors

i) Drug adverse reaction

This study findings agrees with the other authors that adverse drug reaction is likely associated with treatment Interruption. Nevirapine, according to the national guideline for ARV drugs, may cause skin rash. However, the HIV infection on the other hand may cause any type of skin condition including skin rash and itching. Though skin rash was found to be likely associated with treatment interruption, this study could not conclude that the rash was related to ARV drugs.

Side-effects can make one susceptible to treatment interruption as some patients' discontinued ARV treatment when they experienced severe side-effects (Maokisa 2011). Sometimes patients may not have a clear understanding of side-effects and tend to associate any illness that occurs to them whilst on treatment side-effects as side-effects of ARVs. Do (2011) also reported side-effects from antiretroviral medication as one of the most common factors that contributed to ART treatment interruption. Contrary, findings from this study revealed that some individuals did not discontinue ARV treatment when they experience severe side-effects as they had adequate information on what to do if they experience side-effects.

Conclusion

This study documented good knowledge about ART but treatment interruption still remains a major challenge. Unsatisfactory attitude of health workers, receiving drug compliance counselling from non-health workers of less than three times was associated with treatment interruption. Forgetfulness, frequent travels, pill burden, side effects, stock out of some ARV drugs, fear of being sacked from workplace, long waiting time during clinic visit, confusion, smoking and alcoholism were some of the reasons patients" miss taking their ARV drugs.

The church organizations like the, Seventh Day Adventist and Methodists were found to be associated with treatment interruption to ART, but was not statistically significant.

The participants who were single namely, never married, divorced and widowed were associated with treatment interruption though not statistically significant. Similarly not carrying pill boxes/containers and having DOTS supporters were risk factors contributing to treatment interruption.

Bad attitude of health workers was found to be a contributing factor to treatment interruption. The system was not able to screen patients who were missing their doses at home and keeping their correct appointment dates. There was a delay in attending to patients at the outpatients' department. This study could not confirm that the mentioned adverse drug reactions by the participants was indeed as a result of the ARV taken by the patients.

Some of the suggestions made by respondents to address treatment interruption challenge include use of alarm clock as a reminder for time of drug administration, computerization of storing and retrieving medical records, ensuring punctuality of health workers to work by HIV clinic management and recruitment of more health workers especially nurses and doctors.

Some information on important variables like baseline weight, CD4 count and blood pressure readings was missing. This limited the extent of risk factor analysis on drug adverse reactions.

Recommendations

1. The Director City Health to facilitate the ART program at the institution under study to acquire a health information computer, health information personnel with skill in health information, computer and statistics.
2. Patients who have proof of going outside the country especially the informal sector workers, should be given drugs equivalent to their length of stay there.
3. Recruitment of more health workers especially doctors, pharmacy and nurse to support implementation and ensure compliance of research's recommendations.
4. Religion plays an important role in the health searching behaviour. Most clients who interrupted their treatment belonged to either Pentecostal, or Traditional religion. HIV care and treatment sites should look at innovative strategies of engaging these significant religions such as outreach services and holding sensitization meetings

5. There is need explore the feasibility of electronic medical cards for all clients in HIV care. This system will allow clients to access services at any clinic without the need to produce paper trail documents recognizing that Zimbabwean population at large moves from one area to the other in search of bread and butter.
6. Director City Health should develop information education and communication materials targeting alcohol and substance abuse among ART clients as a significant number of clients were engaging in substance abuse whilst on ART.



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