THE MAGNITUDE AND FACTORS ASSOCIATED WITH ANTIRETROVIRAL THERAPY DEFAULTING IN MABUTSANE DISTRICT

Article Review by Ngeleza kasongo, Botswana
(Master in Public Health, Texila American University)
Email: - kasongomatthieu@gmail.com

ABSTRACT

BACKGROUND

This study sought to analyse the magnitude and factors associated with antiretroviral therapy defaulting using the patient electronic medical record system in Mabutsane health district.

OBJECTIVES

Objectives of the study are: to establish the factors associated with defaulting ARV and to analyse the outcomes of ARV defaulter.

METHODOLOGY

A retrospective cross-sectional survey was conducted. The target population for this research is adult clients on antiretroviral therapy registered in Mabutsane between December 2011 and December 2013. Descriptive statistics, x2 test and cross tabulation was used to analyse data.

RESULTS

Mabutsaneclinic has a defaulter rate of 11.3%. .More males (64.3%) defaulted treatment than females (35.7%). Majority 13 clients (92.9%) were on treatment for more than 1 year before defaulting.

Reasons for defaulting ART are as follow: Substances abused 42.9%, side effect of drugs 21.4%, Transport 14.3%, Work 14.3% and Religion7.1%. Mortality rate among defaulter stand at 21.4%.

No significant statistic relation between social economic variables (sex, substances abused, marriage status, and employment status) and variable defaulter was found in our study.

CONCLUSIONS

Mabutsane health district has a lower defaulter rate as compared to most of the African countries; however this rate is above the Botswana one in 2013.

No significant association between social economic variables and defaulter was found.

Factors such as substances abused, work, transport etc…have been mentioned as reasons for defaulting.

Case fatality rate among defaulters was low than what was observed in most of the Sub Saharan Africa countries.

KEY WORDS

Mabutsane has a low defaulter rate.

INTRODUCTION

The study aims to inform the district of factors associated with patients defaulting ART in order to help improve systems and maintain patients in care for maximum benefit from the therapy.

THE SPECIFIC OBJECTIVES OF THE STUDY ARE

- To analyse ARV defaulter surveillance database in Mabutsane health district to identify the magnitude of ART defaulting between 2011 and 2013.
- To identify the factors associated with ART defaulting in the district
- To assess the outcomes of ART defaulting in the district
- To formulate recommendations to improve the situation in the district.

METHODOLOGY

RESEARCH DESIGN

A retrospective approach will be used to collect data on the rates of ART defaulters and factors associated with defaulting in Mabutsane health district over a two year period.

POPULATION

The target population for this research was the clients on HAART registered at Mabutsane clinic from December 2011 to December 2013.

RESEARCH SETTING

The study was be conducted at Mabutsane Infectious Disease Care Clinic (IDCC), which is an HIV clinic in a health district in Botswana. The clinic has both adults and paediatrics patients on treatment. Mabutsane, a health district in Botswana is one of the 27 health districts situated on the Kalahari basin and has a total population of 13,689 individuals according to 2011 census. The HIV prevalence in the district was 16.1% in 2009(1) (45) Mabutsane is a rural district that has 9 clinics and the main Mabutsane clinic started offering ART in 2007 before rolling out to the rest of the district. The district managed to roll out successfully ART to all clinics in the district. Many of the patients under Mabutsane Infectious Disease Control Clinic (IDCC) were transfers from the referral hospital which means many of them may have been on treatment from as early as the start of the national program in 2002. Unemployment rate in the district is very high and farming is the major activity for the local population. Alcohol intoxication is one of the biggest challenges in the district (46)

The Mabutsane IDCC operational since 2007 uses an electronic medical record system called PIMS (Patient Information Management System) and the data base has been operational since then. The electronic medical system allows clinicians to utilize it during consultation, lab requisitions, dispensing ART as well as scheduling. This means that the data base has all patient statistics as well as flagging those missing their follow ups, refills or those being lost to follow up.

SAMPLE AND SAMPLING TECHNIQUES

A simple random sample of patients will be selected from all adults (aged 18+ years) registered at the clinic between December 2011 and December 2013. The population is that of HIV positive individuals ever been on ART between the study periods at Mabutsane IDCC.

Clients will have an equal chance of being selected for the study.

There is a total of 853 who have ever been registered in the electronic data base. Currently there are 617 active patients on ART and the 19 are lost to care.

Using margin error (e) of 0.07, z score of 1.645(90%) and σ standard deviation of 0.5 our sample size will be: Sample size (n) = $(Z\sigma)^{2}$/ This gives n = $(1.645*0.5)^2 / 0.07^{2}$ 3.7 = 124 patients (20% of the population)

DATA COLLECTION

The researcher will collect data from the PIMS data base for Mabutsane Health District and from patient personal file at Mabutsane IDCC.

A questionnaire will be used to collect data with the following data points

- Age and sex of the clients
- Employment status
- Level of education
- ART start date
- Time on HAART before defaulting
- Reasons of defaulting HAART
- Outcome of defaulter clients
- The data will be entered into an excel data base for analysis

DATA ANALYSIS AND INTERPRETATION

Descriptive statistics were used to describe the demographic situation and frequencies were also calculated for some variables.

Cross-tabulations and chi-squared test will be used at a significance level of 0.05to test if there were any significant relation between social economic situation and defaulting HAART drugs .Excel and SPSS Statistical Packages for Social Science will be used to analyse data

ETHICAL CONSIDERATIONS

This study will be bound by all principles of ethics and will be approved by Texila America University Ethical Committee. Approval will be sort from the Human Research and Development Committee (HRDC) in the Ministry of Health of Botswana. Permission will also be sort from the District Health Management Team of Mabutsane health District to conduct the study.

There will be no direct contact with patients/study participants during the conduct of the study. De-identifiable information will be extracted from PIMS and patients personal files for the randomly selected sample. A master copy linking the PIMS identity and the study identity will be kept, password protected by the Investigator. The study data base (excel) will utilize only the study identifiers and no other person identifiers will be used. A waiver of consent will be sort from the HRDC in order to analyse de-identifiable data from patients registered at the clinic between 2011 and 2013.

CONFIDENTIALITY

Data will be collected using an anonymous questionnaire. No identifiers will be used which have a risk of linking the respondent

RESULTS

SOCIO-DEMOGRAPHIC AND SOCIO ECONOMIC CHARACTERISTICS CLIENTS

Variables	**Category**	**Number of clients(n=124)**	**Percentages**
AGE	18-27	14	(11.2%)
	28-37	42	(33.8%)
	38-47	35	(28.2%)
	48-57	23	(18.5%)
	58-67	6	(4.8%)
	>67	4	(3.2%)
Total		124	
MEAN AGE	40 years		
SEX	MALE	49	39.5%
	FEMALE	75	60.5%
EDUCATION	ILLITERATE	34	27.4%
	NON FORMAL	2	1.6%
	PRIMARY	33	26.6%
	SECONDARY	50	40.4%
	TERTIARY	5	4%
EMPLOYMENT STATUS	EMPLOYED	64	51.6%
	UNEMPLOYED	60	48.4%
MARITAL STATUS	SINGLE	57	46%

	STAYING TOGETHER	43	34.6%
	WIDOWED	5	4%
	DIVORCED	2	1.6%
	MARRIED	17	13.8%
DISTANCE	NEAR ≤ 5KM	119	96%
	FAR > 5KM	05	4%
TRANSPORT	WALK(BY FEET)	116	93.5%
	BY CAR	8	6.5%
	OTHER	0	
SUBSTANCES ABUSED(ALCOHOL,DRUGS)	NO	70	56.5%
	YES	54	44.5%

A total of 124 clients files reviewed for the study, the majority were females 75(60.5%) and males 49(39.5%),On education status 50(40%) reached secondary school ,and 33(26.6%) primary school. 46% of our clients were single and only 13.8% were formally married**.**

CLINICAL AND BIOLOGICAL CHARACTERISTICS OF CLIENTS

Variables	**Category**	**Number of clients(n=124)**	**Percentages**
CD4 AT THE START OF HAART			
	<200	57	46%
	200-350	45	36.3%
	350-500	8	6.5%

	>500	4	3.2%
	UNKNOWN	10	8%
Mean CD4	206		
opportunistic infection prior to ART	Pulmonary Tuberculosis	11	8.9%
	Kaposi Sarcoma	2	1.6%
	Herpes Zoster	3	2.4%
	PNEUMONIA	3	2.4%

46%of clients had CD4 < 200 at the beginning of treatment and 3.2% had a CD4>500. Tuberculosis infection was the commonest opportunistic infection associated with HIV 8.9%, follows by herpes zoster and Pneumonia. Only 1 defaulter client had Tuberculosis.

TIME ON ART BEFORE DEFAULTING TREATMENT

13 clients (92.9%) were on treatment for more than 1 year before defaulting and only 1(7.1%) client defaulted before 1 year of treatment.

REASONS FOR DEFAULTING ART

REASONS	**NUMBER**	**PERCENT**
Religion	1	7.1%
Substances abuse(alcohol and drugs)	6	42.9%
Transport	2	14.3%
Work	2	14.3%
side effect of drugs	3	21.4%
TOTAL	14	

MARITAL STATUS VS DEFAULTER

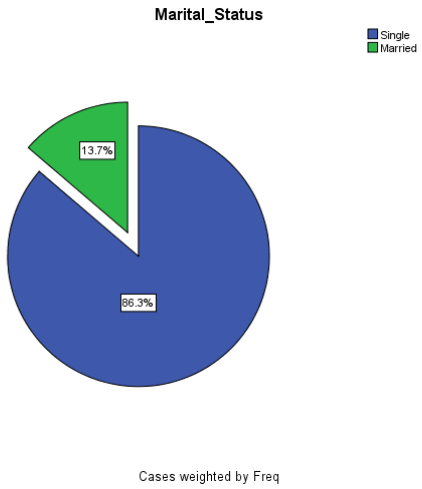
*DEFAULTER (ART ACCESS) * MARITAL STATUS CROSS TABULATION*

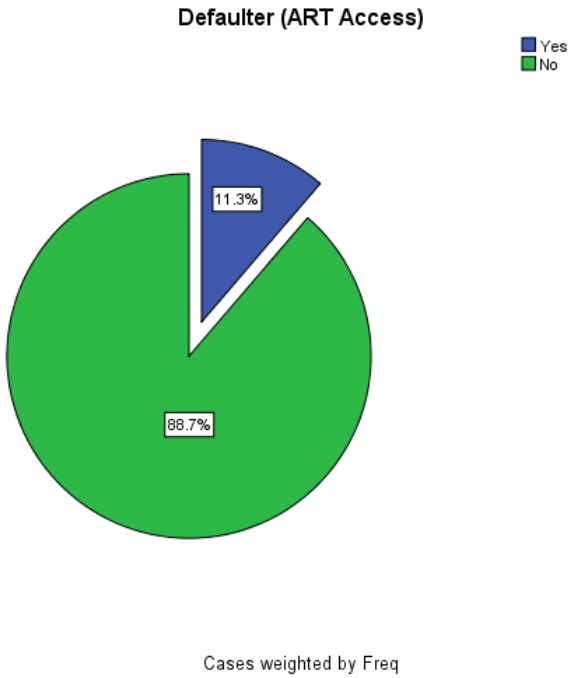
			Marital Status		Total
			Single	Married	
Defaulter (ART Access)	Yes	Count	12	2	14
		Expected Count	12.1	1.9	14.0
	No	Count	95	15	110
		Expected Count	94.9	15.1	110.0
Total		Count	107	17	124
		Expected Count	107.0	17.0	124.0

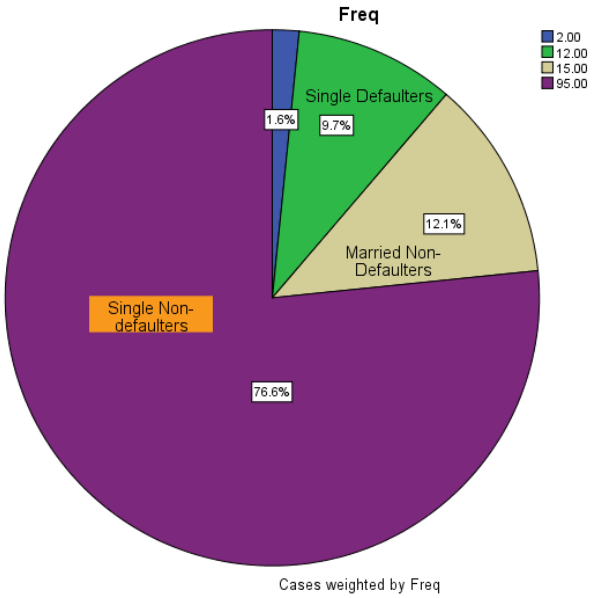
CHI-SQUARE TESTS

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.004[a]	1	.947		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.004	1	.947		
Fisher's Exact Test				1.000	.605
Linear-by-Linear Association	.004	1	.947		

N of Valid Cases	124				







In the Marital Status variable, 86.3% were Single compared with 13.7% Married. Considering the Defaulter variable of the population under study, 76.6% of the Single category were non-defaulters, with 9.7% defaulters and 12.1% of the Married being non-defaulters with only 1.6% Defaulters, giving total defaulters of 11.3%. The data was analysed using the *Chi-Square* goodness of fit test. Since the difference was not significant (χ^2=0.004, df=1, p=1.000), the null hypothesis was accepted.

DISTANCE VS DEFAULTER

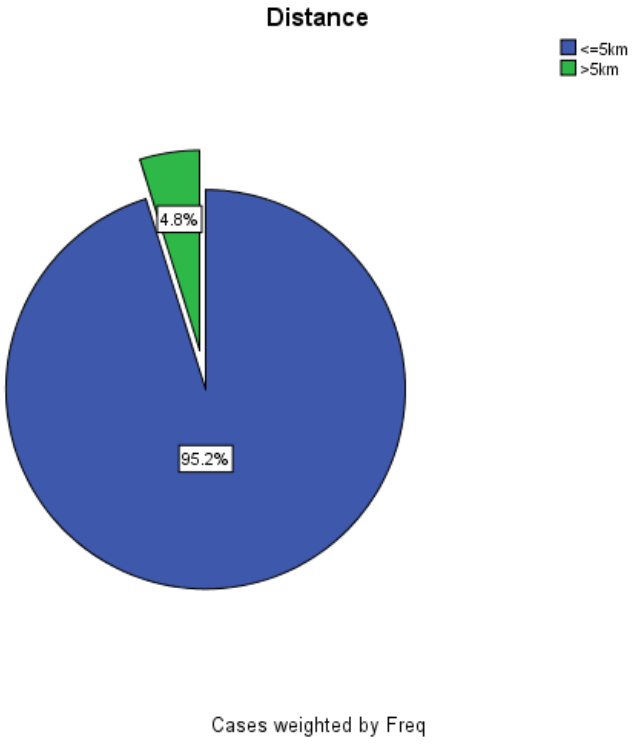
*DEFAULTER (ART ACCESS) * DISTANCE CROSS TABULATION*

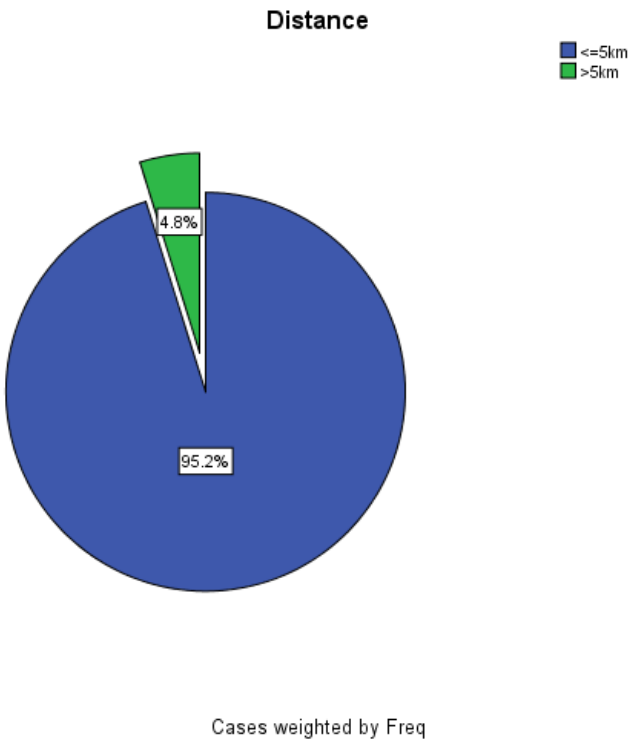
			Distance		Total
			<=5km	>5km	
Defaulter (ART Access)	Yes	Count	13	1	14
		Expected Count	13.3	.7	14.0
	No	Count	105	5	110
		Expected Count	104.7	5.3	110.0
Total		Count	118	6	124

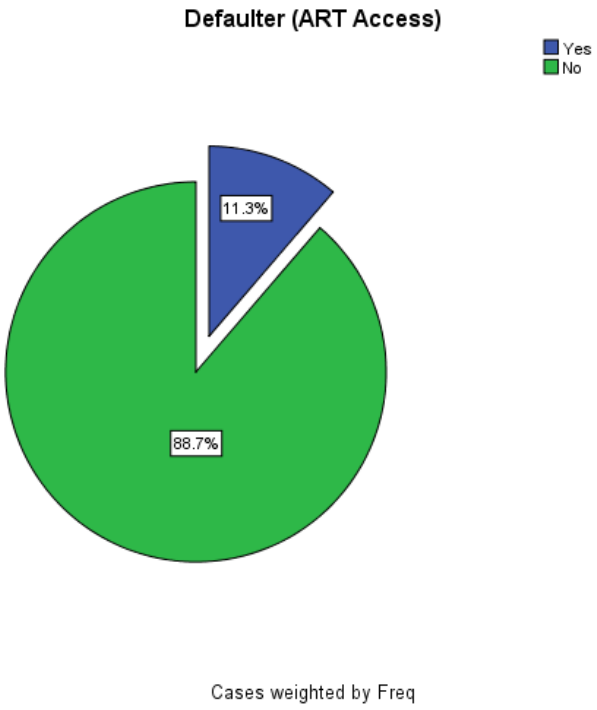
	Expected Count	118.0	6.0	124.0

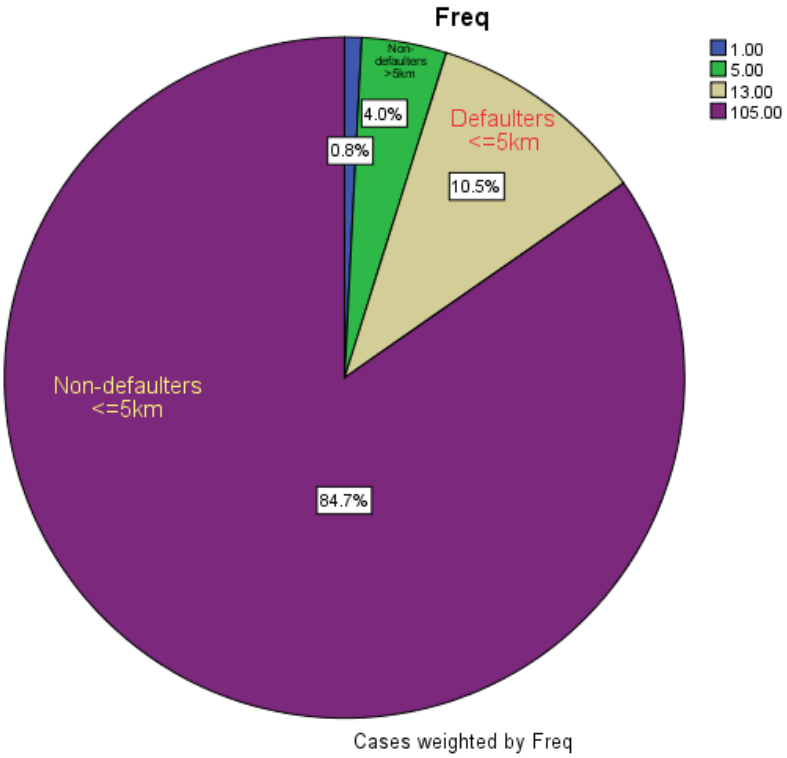
CHI-SQUARE TESTS

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.182[a]	1	.670		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.163	1	.687		
Fisher's Exact Test				.520	.520
Linear-by-Linear Association	.180	1	.671		
N of Valid Cases	124				




Distance
<=5km
>5km
4.8%
95.2%
Cases weighted by Freq


Defaulter (ART Access)
Yes
No
11.3%
88.7%
Cases weighted by Freq



Considering the variable Distance, 95.2% were within a distance of less than or equal to 5km compared with 4.8% who were more than 5km. The variable *Defaulter (ART access)* in the population under study showed that10.5% were defaulters who were within 5km compared with 0.8% defaulters more than 5km, giving a total of 11.3% defaulters. The data was analysed using the *Chi-Square* goodness of fit test. Since the difference was not significant (χ^2=0.182, df=1, p=1.000), the null hypothesis was accepted.

GENDER VS DEFAULTER

*DEFAULTER (ART ACCESS) * GENDER CROSS TABULATION*

			Gender		Total
			Male	Female	
Defaulter (ART Access)	Yes	Count	9	5	14
		Expected Count	5.5	8.5	14.0
	No	Count	40	70	110

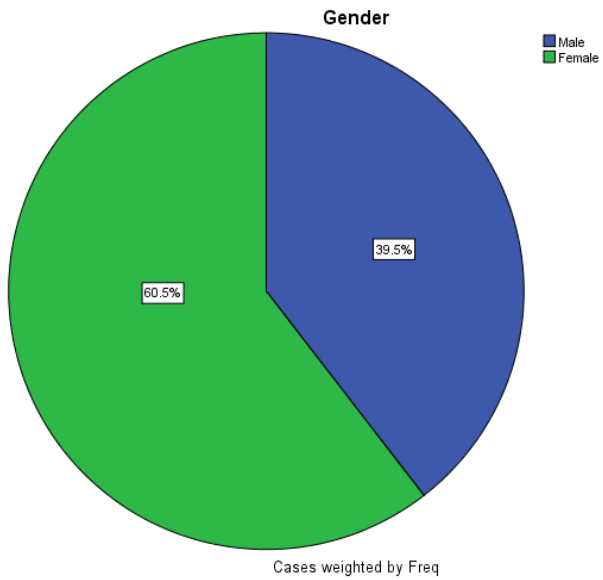
Total	Expected Count	43.5	66.5	110.0
	Count	49	75	124
	Expected Count	49.0	75.0	124.0

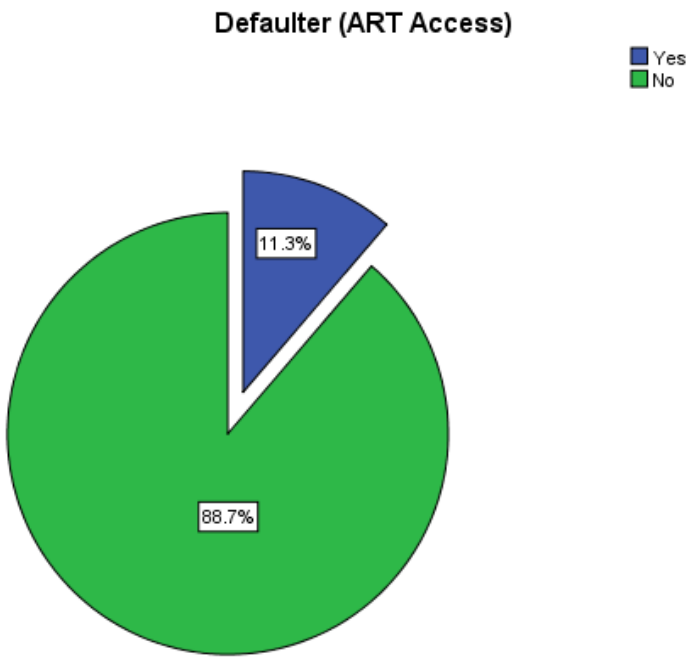
CHI-SQUARE TESTS

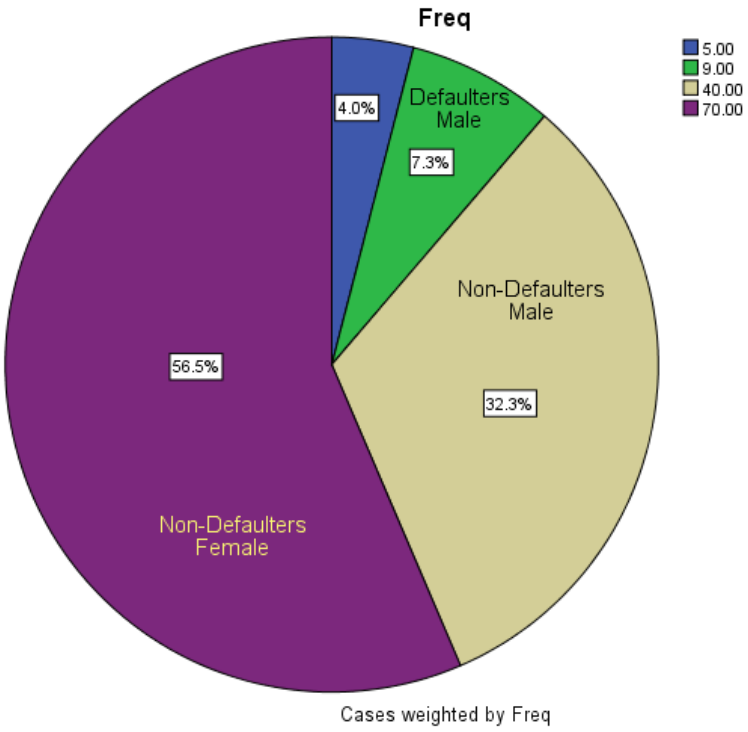
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.051[a]	1	.044		
Continuity Correction[b]	2.967	1	.085		
Likelihood Ratio	3.953	1	.047		
Fisher's Exact Test				.078	.044
Linear-by-Linear Association	4.018	1	.045		
N of Valid Cases	124				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.53.

b. Computed only for a 2x2 table




Defaulter (ART Access)
Yes
No
11.3%
88.7%
Cases weighted by Freq


Freq
5.00
9.00
40.00
70.00
4.0%
Defaulters Male
7.3%
Non-Defaulters Male
32.3%
56.5%
Non-Defaulters Female
Cases weighted by Freq

Considering the variable Gender, 60.5% were Female compared with 39.5% Male. The variable *Defaulter (ART access)* in the population under study showed that 7.3% were Male defaulters compared with 4.0% Female defaulters, giving a total of 11.3% defaulters. The data was analysed using the *Chi-Square* goodness of fit test. Since the difference was not significant (χ^2=4.051, df=1, p=0.085), the null hypothesis was accepted.

EMPLOYMENT STATUS VS DEFAULTER

*DEFAULTER (ART ACCESS) * EMPLOYMENT CROSS TABULATION*

			Employment		Total
			Employed	Non Employed	
Defaulter (ART Access)	Yes	Count	8	6	14
		Expected Count	7.2	6.8	14.0
	No	Count	56	54	110
		Expected Count	56.8	53.2	110.0
Total		Count	64	60	124
		Expected Count	64.0	60.0	124.0

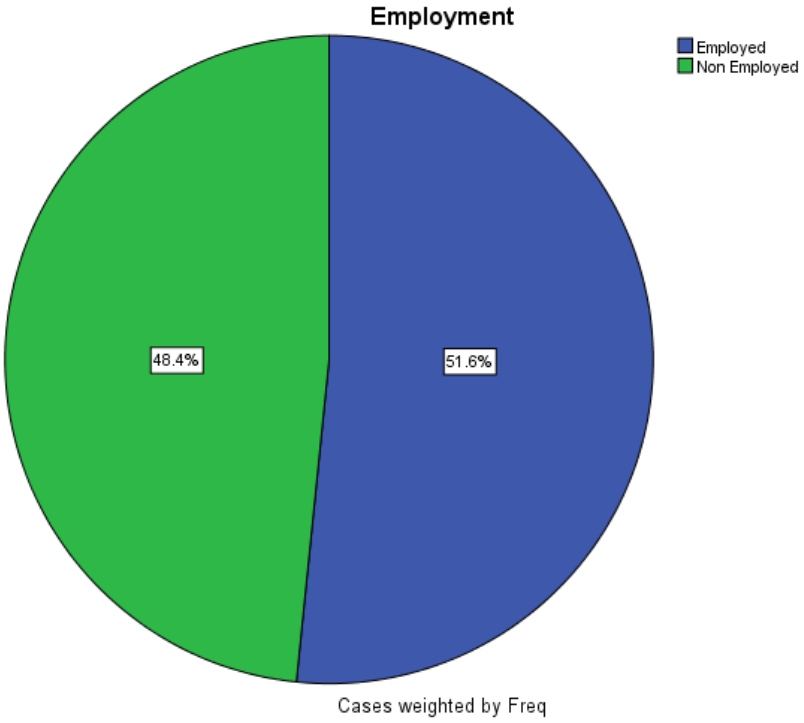
CHI-SQUARE TESTS

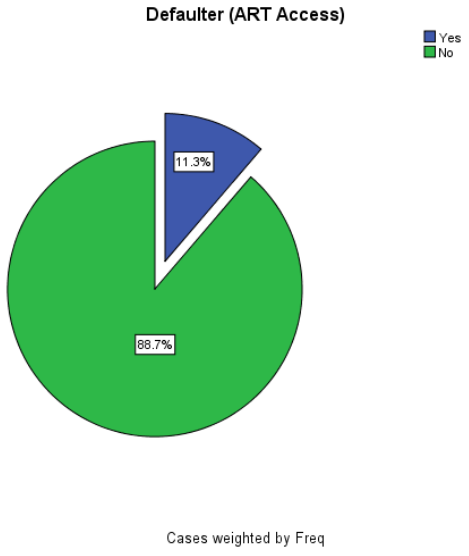
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.193[a]	1	.660		
Continuity Correction[b]	.024	1	.876		
Likelihood Ratio	.194	1	.660		
Fisher's Exact Test				.779	.439

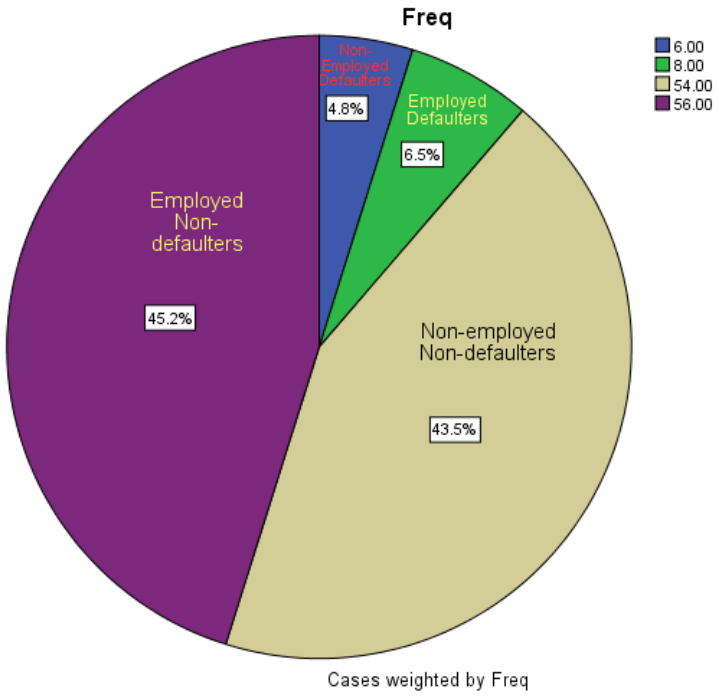
Linear-by-Linear Association	.192	1	.662		
N of Valid Cases	124				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.77.

b. Computed only for a 2x2 table







Considering the variable Employment, 51.6% were Employed compared with 48.4% Non-Employed. The variable *Defaulter (ART access)* in the population under study showed that 6.5% defaulters were employed compared with 4.8% Non-employed defaulters, giving a total of 11.3% defaulters. The data was analysed using the *Chi-Square* goodness of fit test. Since the difference was not significant (χ^2=0.193, df=1, p=0.876), the null hypothesis was accepted.

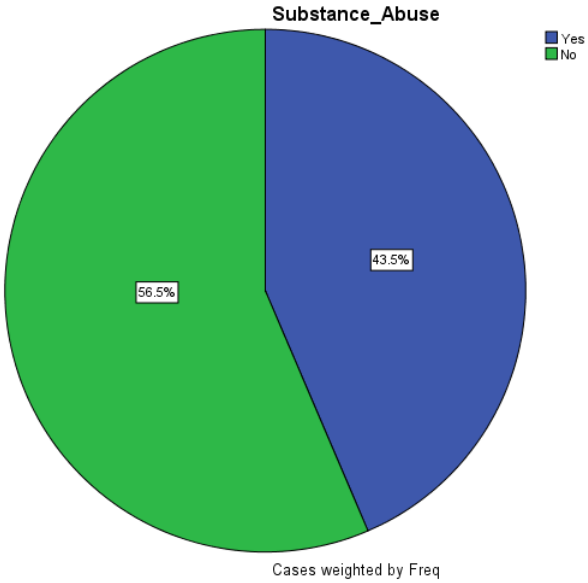
Substance Abuse Status vs Defaulter

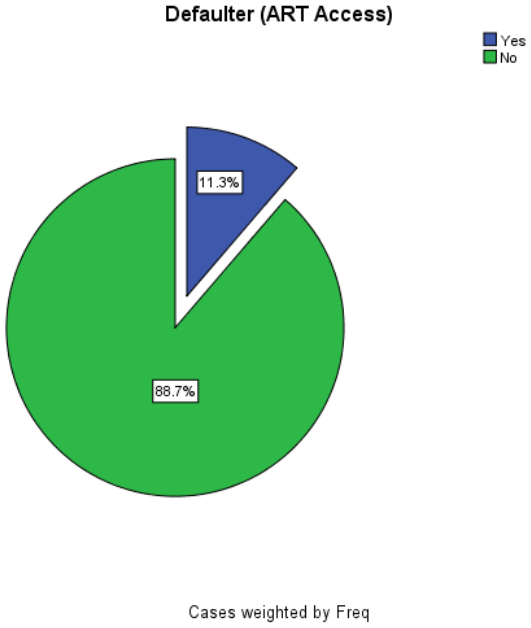
*DEFAULTER (ART ACCESS) * SUBSTANCE_ABUSE CROSS TABULATION*

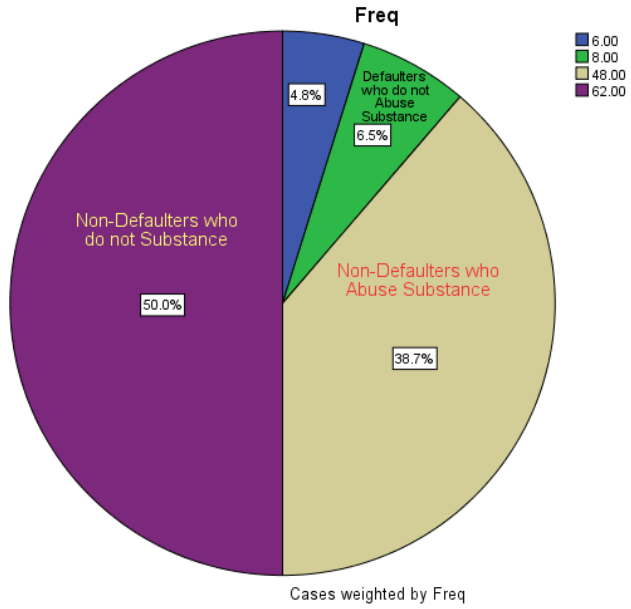
			Substance_Abuse		Total
			Yes	No	
Defaulter (ART Access)	Yes	Count	6	8	14
		Expected Count	6.1	7.9	14.0
	No	Count	48	62	110
		Expected Count	47.9	62.1	110.0

Total	Count	54	70	124
	Expected Count	54.0	70.0	124.0

CHI-SQUARE TESTS

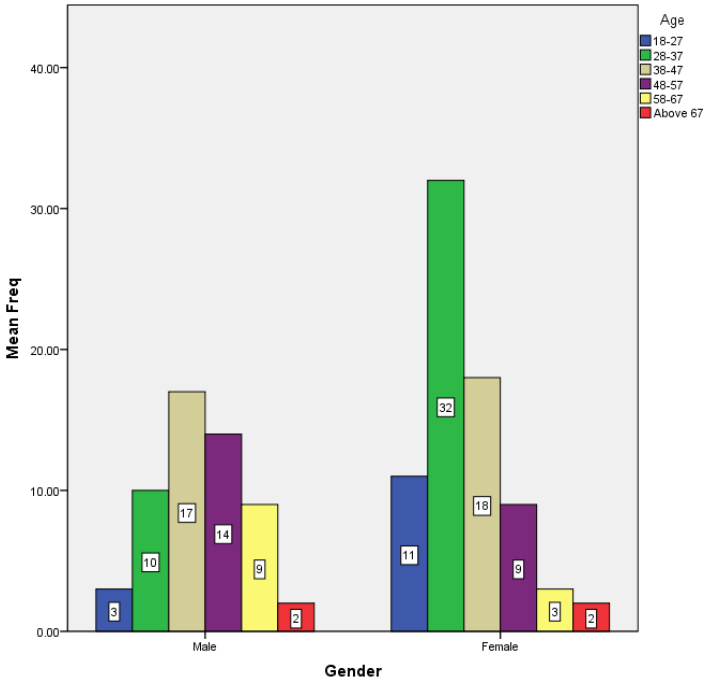






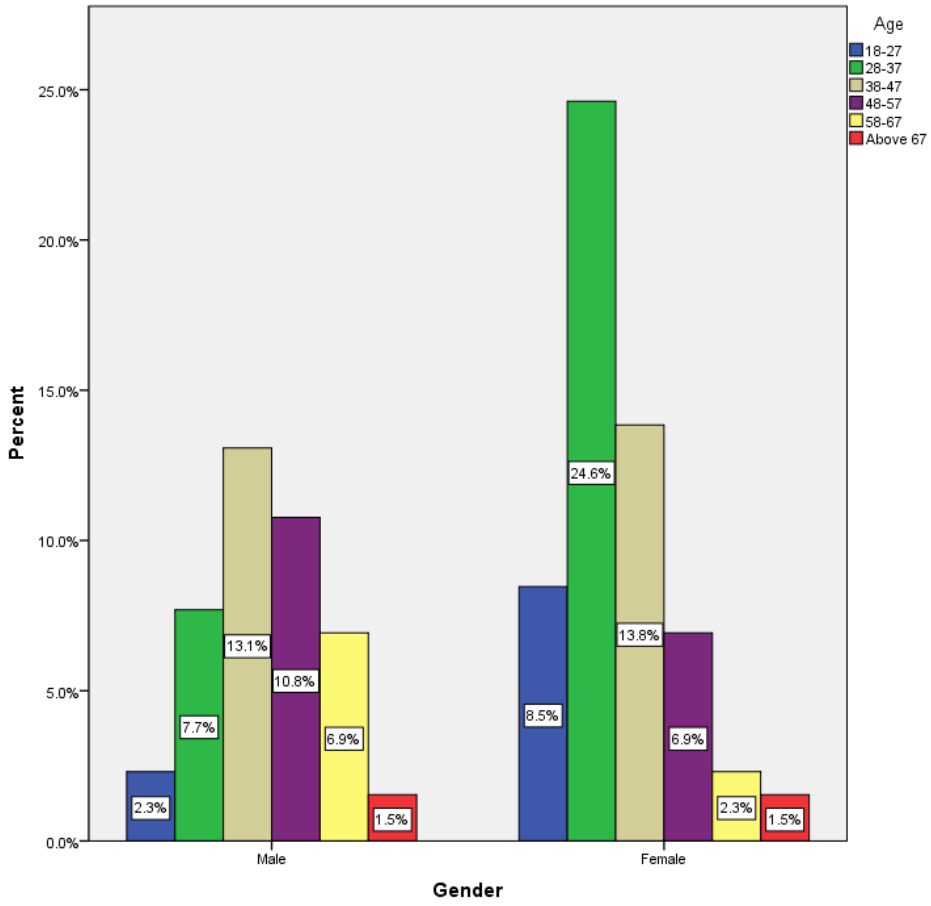
Considering the variable Substance_Abuse, 56.5% were Non Abusers compared with 43.5% Abusers. The variable *Defaulter (ART access)* in the population under study showed that 6.5% defaulters were do not abuse substance compared with 4.8% Substance Abusers who are defaulters, giving a total of 11.3% defaulters. The data was analysed using the *Chi-Square* goodness of fit test. Since the difference was not significant (χ^2=0.003, df=1, p=1.000), the null hypothesis was accepted.

GENDER VS AGE BAR GRAPH (FREQ. DISTRIBUTION)

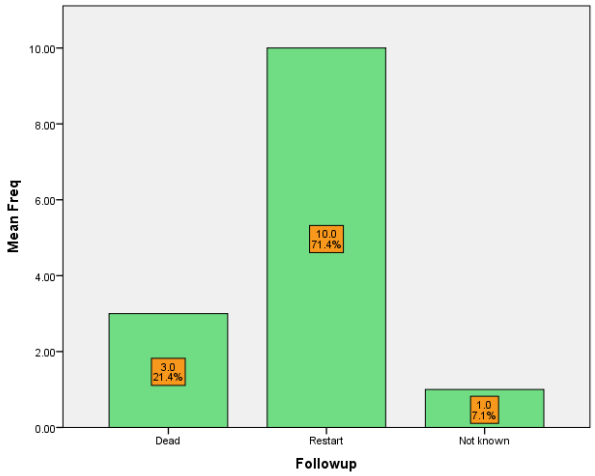


More females than males are on ART treatment and females enrolled at early age than males and the picked of age is between 28-47 years

GENDER VS AGE BAR GRAPH (% DISTRIBUTION)



DEFAULTER OUTCOMES GRAPH



After follow up 71.4% clients were restarted on ART and 21.4% died.

DISCUSSION

Adherence to ART is the key for a successful treatment and survival of HIV patients on treatment.

Mabutsane ART clinic has a defaulter rate of 11.3% which is lower than what was recorded in Ethiopia 21.4 %(34).

A Nigeria, study showed 36% of the study population defaulted treatment. (19)

However this rate is higher as compared to the Botswana national defaulter rate 7.345% (17)

Lower defaulter rate in our study in comparison to other studies conducted in Africa may be justified by the provision of antiretroviral treatment free through the public health service (14) and easy accessibility to ART services as all health facilities in this district are providing ART services.

More females than males were on ART treatment in our study and females started ART treatment at an early age as compared to males., but more males (64.3%) defaulted treatment than females (35.7%) this difference was not significant in our study.

This finding is in consistence with what was observed in Ethiopia, (56%) men and (44%) women respectively defaulted treatment.(34). And no association was observed between gender and adherence in Botswana study. (18)

The Majority 13 clients (92.9%) were on treatment for more than 1 year before defaulting this differed from the Ethiopian study where Akulaaddis found that for all lost to follow-ups the median time between start of ART and date of default was three months (34)

46% of client had a low starting CD4, bellow 200, and the mean cd4 was 206 this is high than what was found in Ethiopia.(34)

Tuberculosis was the most common opportunistic infection associated with HIV in our cohort but only 1 client out of 14 defaulters had Opportunistic infection; however these findings were inconsistence with findings in Cameroon. CDC stage B patients and specially CDC stage C patients had higher risk of pharmacy non-adherence than asymptomatic patients (36).

Reasons for defaulting ART in Mabutsane are as follow: Substances abused (alcohol and drugs) 42.9%, side effect of drugs 21.4%, Transport 14.3%,Work 14.3% and Religion7.1%

But in the Nigeria study Major reasons for default includes: opting for spiritual/faith/alternative healing (8%), loss of interest in the programme/financial (7%), movement to home town of

origin (6%), changed address(5%), untraceable home address or name (5%), side effects of ART (2%), widowhood rites (1%).(19)

Joyce Kgatlwane et al ,2004 in semi- urban villages in Botswana reported that the most common reasons cited for missing medication were: forgetfulness (18%),costs and logistics (13%), work and home duties (12%), stigma (7%), lack of support (4%), lack of food (2%) and alcohol abuse (2%)()

The differences on the reasons for poor adherence with our study may be due to the fact that our work was done in a rural area with high unemployment rate were alcohol is the major entertainment.

The major activity here is farming; men have to migrate for work reason in hard to reach area.

13.7% of our clients were officially married other were either single or in a non-formal relationship, there was no significant association between marital status and ART defaulter in our study, this is in consistence with study in Ethiopia where 38% of clients were married but there was no significant relation between marital status and ART defaulter. (34)

Considering the variable Distance, 95.2% were within a distance of less than or equal to 5km compared with 4.8% who were more than 5km, but clients living near health facility defaulted more than those who are fare, the difference was not significant.

These findings are in consistence with the Ethiopian study of which 71.5% were within ≥5 km radius but the was no significant relation between variable distance and defaulter rate. (34)Distance to facility, and cost of transport do not have significant association with adherence(18)

51.6% were Employed as compared to with 48.4% Non-Employed and more defaulter observed among the employed as compared to the non-employed but the difference was not significant. These may be explained by the low level of education of most of employed clients which is also most comparable to the level of education of non-employed clients.

But Botswana study in 2004 found a significant association between employment status and adherence, suggesting that people who are employed are more likely to adhere to treatment.(18)

The mortality rate among defaulter clients in our study stand at 21.4%, and 71.4% were successfully traced and restarted on ART, In Nigeria, the study showed that18% had died while 46% were alive and well. A study from Malawi also demonstrated that 50% of the patients who had been lost had died. (19)

The difference with the Malawi study may be due to the fact that most our client started HAART with a high cd4 and took long on treatment before defaulting. (32)

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Mabutsane health district has a lower defaulter rate as compared to most of the African countries; however this rate is above the Botswana one in 2013.

Increased access by scaling up ART services in the district has helped to improve the retention rate among client on ART in Mabutsane.

Despite increasing access defaulter phenomena remains a threat for the ART Program in Mabutsane and Botswana in general as it is associated with increased treatment failure, increased mortality etc.

No significant association between social economic variables and defaulter was found in our study due probably to small sample size of our population.

Factors such as substances abused, work, transport etc…have been mentioned as reasons for defaulting and might have a big impact on ART adherence in this district.

Most of defaulter successful restarted treatment, and case fatality rate among defaulters in our study was low than what was observed in most of the Sub Saharan Africa countries.

Improving living conditions in this district may help to reduced defaulter rate.

Addressing the major concerns of patients on treatment as well as effective patient tracing mechanisms to truck those defaulters constitute among the major intervention needs.

RECOMMENDATIONS

1. Improved follow up of patients on HAART by regular home visit and close monitoring of clients with poor adherence.
2. Improved record keeping by regular update of the register and regular feeding the computer system (PIMS) with information.
3. Intensify anti-alcohol campaigns in the district through talk shows, mass education etc..
4. Government to improve living conditions in the district by creation of more jobs in partnership with the private sector.
5. Conducted another study with larger sample size, triangulation of data collection methods to improve the quality of data and comparison with an urban setting.

LIMITATIONS OF THE RESEARCH

This study was conducted in just one health district in Botswana which has a rural background.

The sample size was small and no significant statistical association was found between variables.

Limited data collected due to poor record keeping.

No qualitative analysis was done for this research due to limited data.

This research utilized one data collection approach and richer data could be obtained by triangulation of data collection methods

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