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Predictors of Loss to Follow-Up for HIV Adult Patients in Dammam Medical Complex, Saudi Arabia, 2017

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ABSTRACT

Background: Antiretroviral treatment (ART) has been known to significantly enhance the result and survival rates of HIV-infected people. Many factors have been linked to the poor adherence to ART including clinical and immunological status, status at the time of loss to follow-up (LTFU) and stage of the disease.

Purpose: To determine the socio-demographic, clinical characteristics, and to identify the predictors of LTFU among adult patients in the HIV clinic in Dammam Medical Complex.

Materials and Methods: A case-control study collected data from epidemiological surveillance forms and the medical files of 210 patients who were eligible to follow up in HIV clinic. Univariate and Binary logistic regression were performed in order to identify different predictors to LTFU on ART.

Results: Univariate analysis showed that 14 different variables were significantly associated with LTFU, categorized as socio-demographic (gender, education, occupation and marital status); behavioral (practicing sexual intercourse, type of partner and narcotics use); clinical/laboratory (last known CD4 count and viral load); and treatment/past history (treatment intake, treatment duration, history of past diseases, previous exposure to infected syringes and possible source of infection). Being a male, low level of education, using narcotics, having previous disease and history of exposure to infected syringes were identified as predictors to LTFU using Binary Logistic Regression.

Conclusion: Our results are consistent with different studies outside Saudi Arabia. It is essential to determine the main factors that contribute to the inability of patients to take their medications and to emphasize regular monitoring by professional healthcare workers, clinics, as well as regimes to avoid the treatment failures.

Keywords: Anti-Retroviral Therapy, HIV/AIDS, Loss to Follow Up, Predictors.

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INTRODUCTION

Antiretroviral treatment (ART) has been considered as an essential line of treatment for living HIV patients that promotes the quality and duration of their lives through the reduction of further transmission of the virus.[1] ART might involve indirect expenses since patients may have to take time off from their careers, requiring transportation and other pocket costs in addition to the costs associated with direct therapy, which will eliminate the treatment opportunity for several people.[2] ART adherence is a strict requirement to assess the medicinal schedules of daily intake doses that may cause serious consequences in insufficient cases; resistance strains will shift the used regime from more common regimes to other more expensive ones, where as poor adherence will raise the risk of non-progressed ART, which will increase the costs for treating devious infections.[1]

Consequently, ART has typically entailed long follow-up and commitment (on the part of patients) to monitoring adherence, responses to treatment and estimating negative effects.[3] As such, complex data must be examined and recorded in each visit. Nonetheless, many ART programs have recognized the significant follow-up loss among patients, which has eroded the therapy's effectiveness while increasing the negative disease impact.[4]

The precise classification of patients as either active or LTFU presents unique difficulties.[5] Several ART programs have utilized a six-month absence from the HIV clinic in order to characterize LTFU.[4] The growing proportion of ART follow-up absences has become one of the significant challenges for the treatment success.[6] The study by Brinkhof et al. confirmed the increasing rates of the patients' absence for their ART follow-ups at almost

21%, which has exacerbated the treatment process for unreturning patients.[4]

According to previous studies, there are many factors associated with LTFU among adults; these are a combination of socio-demographic, clinical, and healthcare-related factors. In addition, lower CD4 count, poor nutritional status, advanced clinical staging, adverse drug reactions, younger age, and accessibility to services are some of the predictors reportedly associated with LTFU.[7]

It is essential to determine the main factors contributing to the patients' inability to take their medications as expected, before measures are implemented to improve adherence.[8] A number of factors impact ART adherence that have been characterized by WHO as "interacting dimensions" which have either negative or positive impacts on treatment adherence, including socio-economic factors, such as lack of money, unemployment, discrimination and stigma and long distance to access care. Health system-related factors include inconvenient appointments, inadequate knowledge by the health care provider with regard to the importance of ART adherence and the inability of health provider to plan the care with the patient. On the other hand, patient-related factors included medication fatigue, low level of education, poor self-confidence, inadequate knowledge about the medication regimen, unhelpful beliefs about the disease; disease-related factors such as difficult side effects and complicated regimens.[9,10]

The issue of follow-up in ART has remained a challenge since its introduction in the 1990s. However, there is a need to cover this issue in the context of Saudi Arabia. The lack of published data on the use of ART and predictors of LTFU in the KSA calls for more efforts to fill the information gaps in this area. Therefore, this study is aimed to determine the socio-demographic and clinical characteristics of the patients infected with HIV in Dammam Medical Complex (DMC) as well as to identify the predictors of LTFU among adults in HIV clinics in DMC.

MATERIALS AND METHODS

Study Design and Setting: The study was carried out in HIV clinic in DMC between 15 December 2017 and 30 April 2018.

A quantitative analytical unmatched case-control study was used involving study participants who meet the following criteria;: Male and female patients aged at least18 years of age who were eligible to follow up in HIV clinic in DMC, were prescribed ART, and had complete records. This study excluded patients who died or who were referred to another hospital. The sample included 210 patients following up in the clinic.

Study Participants: The case group was defined as all male and female patients who were eligible to follow up in HIV clinic and did not follow-up on their ART and appointments for at least six months; they counted 105 patients. The control group was defined as all male and female patients who were eligible to follow up in HIV clinic and regularly followed up their ART and appointments; they counted 105 patients.

Data Collection Methods: The records of patients were arranged in terms of the code number, starting from the oldest diagnosed cases in 1986 to the most recent diagnosed ones in 2017. The epidemiological surveillance forms are archived in a special cabinet in the in the clinic. Data in these surveillance forms were filled as part of routine patient treatment by health care providers who were part of the clinical care completed socio-demographic, clinical, immunological, behavioral characteristics, and classification of the disease in addition to ART use.

The data collection methods in the existing study entailed an extraction of secondary data from the epidemiological surveillance form of HIV patients and from the routine treatment files of patients. The researcher used the compilation sheet for collecting data, which saved time and reduced errors during the data extraction. The compilation form consisted of two sections; the first section aimed to collect data from the surveillance form, such as socio-demographic data, behavioral characteristics, and classification of the disease. The second section includes items with an aim to collect information from patients' medical files about clinical, immunological data and ART use.

Data Analysis: The collected data were entered into and analyzed by the Statistical Package for the Social Sciences (SPSS) version 21.0. The data were cleaned using computer facilities that are known to be helpful in cleaning data and rechecking. Frequencies and descriptive statistics were measured to summarize socio-demographic, clinical, immunological, behavioral characteristics, classification of the disease and ART use. The dependent variable was LTFU; irregular follow up of clients from presenting to the clinic for six or more months and not presenting were considered as LTFU. The predictor variables included socio-demographic, behavioral, clinical, immunological, characteristics, classification of the disease and ART use.

Univariate analysis using Chi-square test was undertaken to check for a crude association between the dependent variable (patient follow-up status) and individual independent variable. The binary logistic regression model was used to identify the independent predictors of LTFU. Analyses were considered statistically significant at the $P < 0.05$.

Ethical Consideration: The ethical approval was secured from the ethical review committee in the general directorate of health affairs in the eastern region with an IRB number: 17-461E. Code was used to maintain confidentiality of participants. The confidentially and anonymity of the participant data was ensured. The permission was taken from infectious disease consultants in the clinic to use the patients' surveillance forms and medical files.

RESULTS

UNIVARIATE ANALYSIS

Socio-Demographic Characteristics

Age: The total number of the studied population was 210, which was found to be equally distributed between cases and controls (105 each). The mean age of the entire study sample were 41.00 ±1.05 years, with a range of 65 years, with 20 years being the minimum and 85 years as the maximum **.** No statistically significant difference was found between the mean age of cases and controls (41.19±10.54 and 40.82±10.57 respectively; t=2.55, p=.531). The age was further categorized into two intervals <45 and ≥45 years, differences regarding the age were not statistically significant between cases and controls; X^2_1=1.661 p=0.197.

Gender: Most of these patients were male (91.4% among the cases and 81.9% among the controls).There was a significant statistical difference regarding gender where X^2_1=4.121, p=0.042.

Nationality: Almost all the patients are Saudi residents, with one patient out of a total number of 105 cases being non Saudi. Differences between cases and controls were not statistically

significant; X^2_1=1.005, p=0.500.

Education level: Higher percentages were met among secondary education in both cases and controls (73.3% and 67.6%, respectively). University education was found to be significantly more in controls than cases; (19.0% versus 5.7% respectively) with a X^2_4=1.005, p=0.036*.

Occupation: Almost half (49.5%) of the cases and quarter (24.8%) of controls were not working. Notably, a higher percentage (41.9% of controls) was working in the private sector. A statistical association between the occupation and LTFU among HIV adult patients was significantly met (FEt=15.599, p=0.004).

Marital status: The highest percentages among both cases and controls were found among single status (71.4% versus 50.5%, respectively). Married controls were found to be significantly higher than married cases (43.8% versus 15.1%, respectively) with a FEt=21.818**,** p=0.000 (Table 1).

Table 1: Distribution of the participants according to their socio-demographic characteristics

Socio-demographic characteristics	Cases		Controls		
	No.=105	%	No.=105	%	
Age/years					
20-<45	62	59.0	71	67.6	X^2_1=1.661
≥45	43	41.0	34	32.4	p=0.197
Gender					
Male	96	91.4	86	81.9	X^2_1=4.121
Female	9	8.6	19	18.1	p=0.042*
Nationality					
Saudi	104	99.0	105	100.0	X^2_1=1.005
Non- Saudi	1	0.0	0	0.0	p=0.500
Education					
Illiterate	4	3.8	4	3.8	
Can read or write	7	6.7	3	2.9	X^2_4=1.005
Primary	11	10.5	7	6.7	p=0.036*
Secondary	77	73.3	71	67.6	
University	6	5.7	20	19.0	
Occupation					
Not working	52	49.5	26	24.8	
Student	1	1.0	0	0.0	FEt=15.599
Governmental	13	12.4	18	17.1	p=0.004*
Private	30	28.5	44	41.9	
Military	7	6.7	12	11.4	
Business	2	1.9	5	4.8	
Marital Status					
Single	75	71.4	53	50.5	
Married	16	15.1	46	43.8	FEt=21.818
Divorced	10	9.5	4	3.8	p=0.000*
Widowed	4	3.8	2	1.9	

Table 2: Distribution of cases and controls according to their behavioral characteristics

Behavioral characteristics	Cases		Controls		
	No.=105	%	No.=105	%	
Practicing Sexual intercourse					
Yes	92	87.6	103	98.1	X^2_1=8.687
No	13	12.4	2	1.9	p=0.003*
Type of Partner	**No.=92**		**No.=103**		
Legal	9	9.8	12	11.7	
Illegal	64	69.4	53	51.5	X^2_2=7.198
Both	19	20.7	38	36.9	p=0.027*
Type of sex behavior	**No.=92**		**No.=103**		
Homosexual	4	4.3	4	3.9	FEt
Heterosexual	76	82.6	89	86.4	p=>0.05
Bisexual	12	13.1	10	9.7	
Use of Narcotics	**No.=105**		**No.=105**		
Yes	59	56.2	20	19.0	X^2_1=30.864
No	49	43.8	85	81.0	p=0.000*

Fig. 1: Distribution of HIV/AIDS patients according to the route of use of narcotics (n=79)

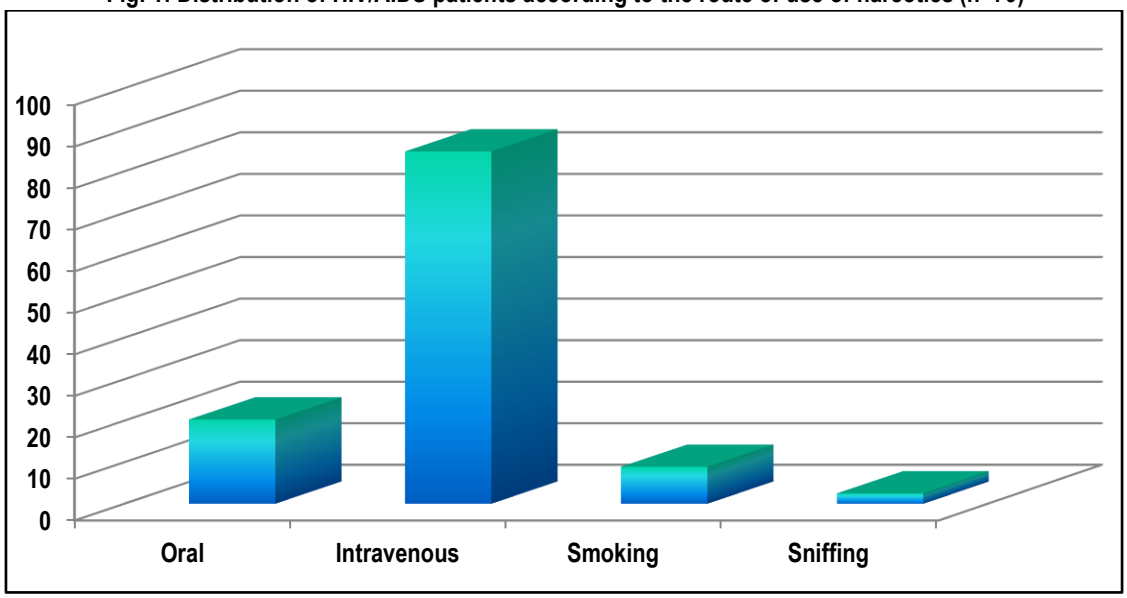

Table 3: Distribution of cases and controls according to their clinical laboratory characteristics

Clinical characteristics	Cases		Controls		
	No.=105	%	No.=105	%	
Baseline CD4 count per µL					
≤ 200	14	13.3	16	15.2	
200 - 349	23	21.9	27	25.7	X^2_2=0.73
≥ 350	68	64.8	62	59.1	p=0.694
Last known CD4 count per µL					
≤ 200	5	4.8	6	5.7	
200 - 349	13	12.4	12	11.5	
≥ 350	63	60.0	83	79.0	X^2_3=17.156
Unknown	24	22.8	4	3.8	p=0.001*
Viral load at baseline copies/mL					
≥100,000	28	26.7	27	25.7	FEt
10,000 – 99,999	48	45.7	52	49.5	p= >0.05
< 10,000	27	25.7	25	23.8	
Unknown	2	1.9	1	1.0	
Last known viral load copies/mL					
≥10,000	14	13.3	14	13.3	
500 –9,999	29	27.6	13	12.4	X^2_3=27.968
< 500	42	40.0	75	71.4	p=0.000*
Unknown	20	19.0	3	2.9	

Behavioral Characteristics

Practicing Sexual Intercourse: Practicing sexual intercourse was found to be significantly higher among controls than cases (98.1% versus 87.6%, respectively) where X^2_1=8.687, p=0.003.

Type of Partner: Among those who were practicing sexual intercourse, the highest percentages were accounted for by illegal partners in both cases and controls with a statistically significant difference where X^2_2=7.198, p=0.027.

Type of Sex Behavior: Among those who were practicing sexual intercourse, heterosexuality was found to be the most common type among both cases and controls (82.6% and 86.4%, respectively). Differences in terms of the type of sexual behavior were not deemed statistically significant (FEt, p=>0.05).

Use of Narcotics: The use of narcotics was significantly different between cases and controls where more than half of the cases (56.2%) as compared to nearly one-fifth of the controls (19.0%) were using narcotics. X^2_1=30.864, p=0.000 (Table 2).

Routes of Use of Narcotics: Among the ones who reported using narcotics n= 79, the highest percentage was accounted for by those using intravenous narcotics (84.8%), while only 20.3% were using oral narcotics. Lower percentages were observed among smoking and sniffing (8.9 and 2.5, respectively) (Figure 1).

Clinical/Laboratory Characteristics

The baseline CD4 count: Table 3 illustrates that no statistically significant difference was found between cases and controls regarding baseline CD4 count, X^2_2=0.73p=0.694.

The last known CD4 count: The last known CD4 count was found to be significantly higher among controls at the level of ≥ 350, 79% versus 60% among cases. X^2_3=17.156 p=0.001.

The baseline viral load: There was no statistically significant association between the baseline viral load and the LTFU. p= >0.05**.**

The last known viral load: Almost three-quarters of controls (71.4%) and 40% of the cases had less than 500 copies/mL viral load. This association was found to be statistically significant, X^2_3=27.968, p=0.000 (Table 3).

HIV/AIDS detection

Figure 2 depicts the distribution of sample according to the manner in which HIV was detected, where the most common method was through Prisoners Screening (27.6%) followed by Pre-marital Screening (22.4%) and Presence of suggestive symptoms (11.0%) (Figure 2).

CDC 1993 Classification

According to the CDC 1993 Revised classification system, Fig. 2 illustrates that the highest percentage (40.0%) encountered among the patients were classified as 1A, whereas those classified as 1B was 33.8% (Figure 3).

Treatment/Past Characteristics

Treatment intake: Table 4 shows that most of the controls (86.7%) were regular in taking their treatment as compared to 15.2% of the cases. Differences regarding treatment intake were statistically significant; FEt=117.778, p=0.000.

The Duration of Treatment in Months: An association was found between the duration of treatment and LTFU among HIV adult patients; X^2_2=16.973, p=0.000*, where the highest percentages for both cases and controls were encountered in the period more than six months duration of treatment.

Previous Diseases: Significant higher percentages were observed among cases than controls complained of previous diseases; (40.0% versus 22.9%, respectively); X^2_1=7.159, p=0.007.

Previous Surgical Operation: Almost all HIV/AIDS patients had never undergone a surgical operation.

Previous Exposure to Infected Syringes: Nearly half of the cases (47.6%) compared to only 15.2% of controls reported previous exposure to infected syringes; differences were of statistical significance; X^2_1=25.543, p=0.000.

Previous Blood Transfusion: Table 4 shows that the majority of HIV/AIDS patients had never had a blood transfusion before.

The Possible Source of Infection: the most common possible source of infection was sexual contact, where nearly half of the cases and more than three-quarters of the controls conceded that sexual contact is their possible source of infection, (48.6% versus 81%, respectively). Differences with regard to the different possible sources of infection encountered between cases and controls had a statistical significance: FEt= 28.782, p=0.000. In terms of previous exposure to organ transplantation, dental operation or exposure to hemodialysis; neither cases nor controls were previously exposed (Table 4).

Fig. 2: Distribution of the sample 210 patients according to how HIV was detected

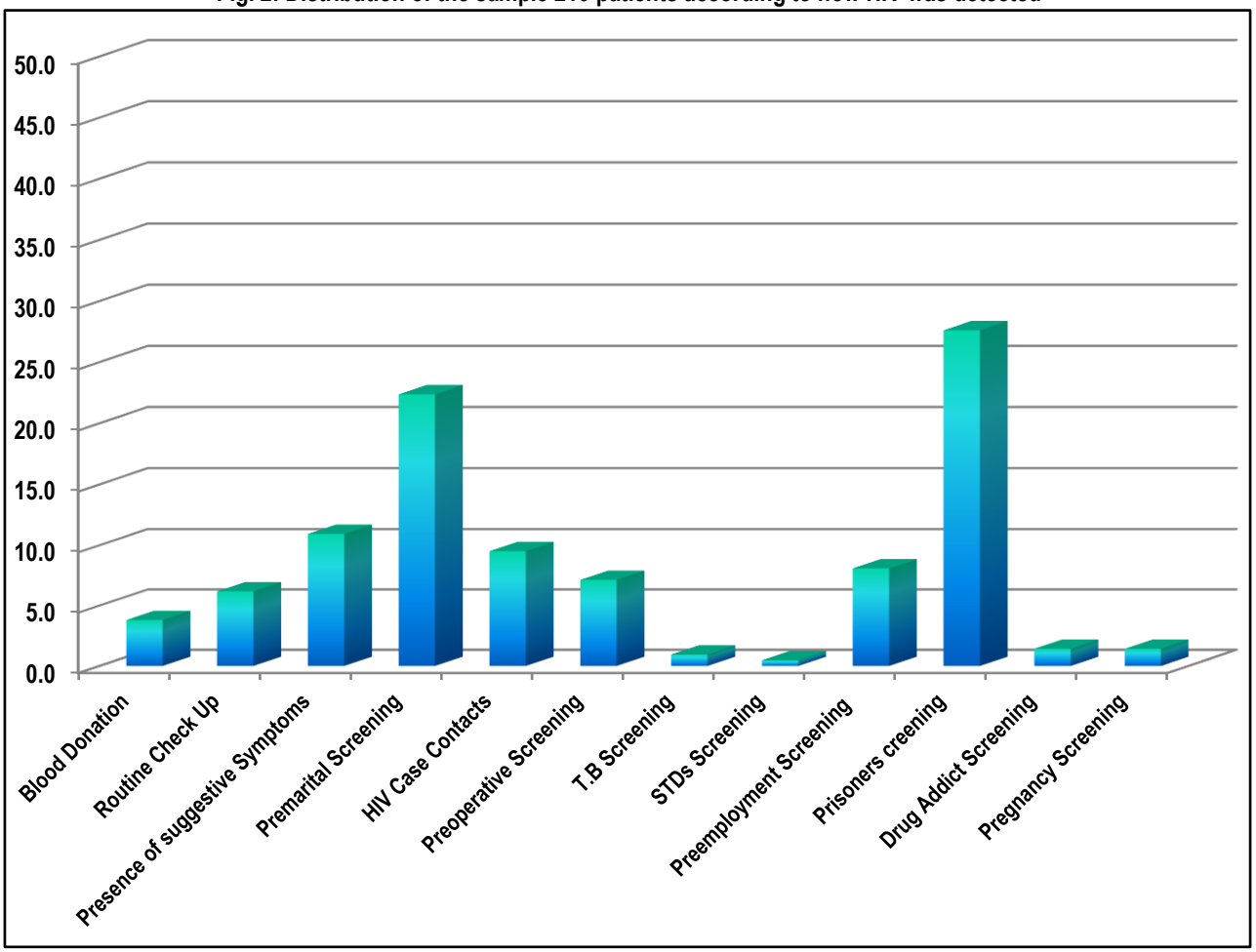

Fig. 3: Distribution of HIV sample 210 according to the CDC 1993 Revised classification system

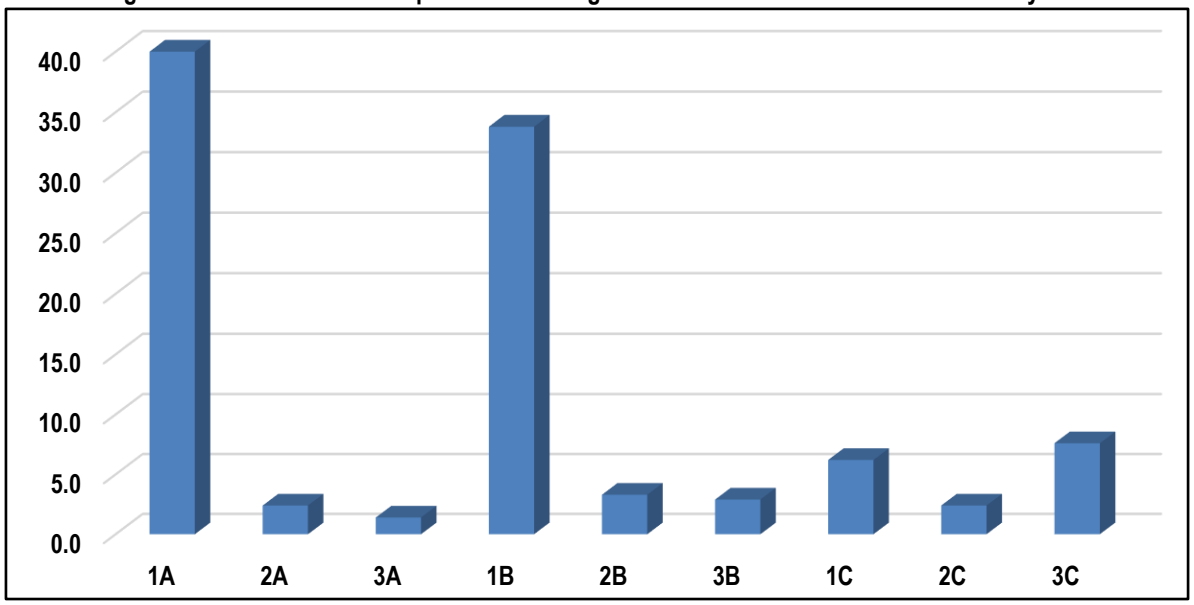

Table 4: Distribution of cases and controls according to their treatment and past history characteristics.

Treatment characteristics	Cases		Controls		
	No.=105	%	No.=105	%	
Treatment intake					
Regular	16	15.2	91	86.7	
Irregular	65	61.9	13	12.3	FEt=117.778
Not taking	18	17.2	1	1.0	p=0.000*
Unknown	6	5.7	0	0.0	
Duration of treatment in months					
< 3	11	10.5	0	0.0	X^2_2=16.973
3- 6	12	11.4	4	3.8	p=0.000*
> 6	101	78.1	82	96.2	
Previous disease					
Yes	42	40.0	24	22.9	X^2_1=7.159
No	63	60.0	81	77.1	p=0.007*
Previous Surgical Operation					
Yes	1	1.0	0	0.0	FEt
No	104	99.0	105	100.0	P=>0.05
Previous Exposure to infected syringes					
Yes	50	47.6	16	15.2	X^2_1=25.543
No	55	52.4	89	84.8	p=0.000*
Previous Blood transfusion					
Yes	2	1.9	6	5.7	FEt
No	103	98.1	99	94.3	p=>0.05
Possible Source of infection					
Blood Transfusion	0	0.0	2	1.9	FEt
Sexual Contact	51	48.6	85	81.0	= 28.782
Drug Addiction	9	8.6	2	1.9	p=0.000*
Both Drug addiction and sexual contact	41	39.0	14	13.3	
Unknown	4	3.8	2	1.9	

BINARY LOGISTIC REGRESSION

Among the different studied independent variables, univariate analysis showed that 14 different variables were significantly associated with LTFU. Table 5 illustrates that LTFU were being predicted by binary logistic regression different independent factors.

- Gender: Being a male had a 2.357 times greater risk than female to be a LTFU.
- Education: In reference to education, having a university education had a 3.615 higher probability to be LTFU, whereas secondary education had a likelihood of 5.238.

- Occupation: in reference to the non-working state, occupation was not found to be a significant predictor of LTFU.
- Practicing Sexual Intercourse: Table 5 illustrates that practicing sexual intercourse was a protective predictor (diminished risk to LTFU); it had the probability of 0.137 than those who do not practice sexual intercourse.
- Type of Partner: having an illegal sex relation was found to be a significant predictor to LTFU. It had the negative risk of 0.115 to LTFU.
- Use of Narcotics: using narcotics was a significant predictor to LTFU where users had 5.451 times the risk to LTFU.
- Last CD4 Count: in reference to ≤ 200, both ≥ 350 and 200 – 349 CD4 counts was found to have a protective risk of (0.181 and 0.139 respectively) to LTFU.
- Last viral load was an insignificant predictor to LTFU, except the last viral load at the level of 500–9,999 which was protective (at risk of 0.150) to LTFU.
- Neither treatment intake nor its duration was found to be significant predictors of LTFU.
- Having a previous disease was a significant predictor to LTFU, where those with a history of previous diseases were at a risk of 2.250 to LTFU.
- Previous exposure to infected syringes: this factor was a significant predictor to LTFU, being previously exposed to infected syringes had a risk of 5.057 to LTFU (Table 5).

Table 5: Binary Logistic Regression results for independent factors predicting a loss to follow-up of antiretroviral treatment.

Independent Variable (Parameter)	B	SE	Wald	p Sig.	Exp B	95% CI for Exp B	
						Lower	Upper
Gender							
Male	0.857	0.431	3.955	0.047*	2.357	1.012	5.485
Female	Reference						
Education							
University	1.285	0.494	6.776	0.009*	3.615	1.374	9.514
Secondary	1.656	0.671	6.088	0.014*	5.238	1.406	19.519
Primary	2.051	0.832	6.073	0.014*	7.778	1.522	39.754
Can read or write	1.204	0.847	2.023	0.155	3.333	0.634	17.518
Illiterate	Reference				1.00		
Occupation							
Business	0.377	0.962	0.154	.695	1.458	0.221	9.617
Military	0.533	0.876	0.376	0.540	1.705	0.310	9.370
Private	0.591	0.912	0.419	0.517	1.806	0.302	10.796
Governmental	22.119	4.019	0.000	1.000	4.039	0.000	0.000
Student	1.609	0.870	3.419	0.064	5.00	0.908	27.536
Not working	Reference				1.00		
Practicing Sexual intercourse							
Yes	-1.985	0.773	6.593	0.010*	0.137	0.030	0.626
No	Reference				1.00		
Type of Partner							
Illegal	-2.159	0.878	6.046	0.014*	0.115	0.021	0.045
Legal	Reference				1.00		
Use of Narcotics							
Yes	1.696	0.317	28.628	0.000*	5.451	2.929	10.145
No	Reference				1.00		
Last known CD4 count per µL							
≥ 350	-1.712	0.672	6.483	0.011*	0.181	0.048	0.674
200 – 349	-1.974	0.811	5.919	0.015*	0.139	0.028	0.681
≤ 200	Reference				1.00		
Last known viral load copies/mL							
< 500	-1.095	0.703	2.423	0.120	0.335	0.084	1.328
500– 9,999	-1.897	0.725	6.840	0.009*	0.150	0.036	0.622
≥10,000	Reference				1.00		
Previous disease							
Yes	0.811	0.306	7.019	0.008*	2.250	1.235	4.100
No	Reference						
Previous Exposure to infected syringes							
Yes	1.621	0.335	23.471	0.000*	5.057	2.625	9.742
No	Reference						

DISCUSSION

The Use of HAART in clinical practice has resulted in a significant decline of morbidity and mortality among the subjects infected with HIV. However, some HIV-infected individuals refuse treatment and spontaneously interrupt the prescribed drugs for shorter or longer periods of time, as many factors contribute to LTFU among HIV/AIDS patients.[11]

The Socio-Demographic Characteristics of the Participants

According to the current study, age was not associated with LTFU, which was consistent with the results of studies in lower-income countries,[4,12,13] while young patients in Ethiopia were more likely to be LTFU in the treatment as compared to those aged > 55 years.[14]

The loss of follow-up in male HIV-infected patients in this study was similar to several studies carried out in Malawi, Tanzania, Cameroon, and the Middle East,[12,13,15-17] where a significant statistical difference was found in gender regarding LTFU. Being a male had posed a 2.357 times greater risk than female to be a LTFU, whereas studies done in the rural areas of Tanzania and India showed no significant relationship between gender and loss of follow up.[18,19] This could be attributed to the differences between studies in term of sample size, follow-up time, countries and study setting.

In this study, university education was found to be significantly more in controls than cases (19.0% versus 5.7% respectively); this might be attributed to the care of well-educated patients to health care and the severity of disease. As per a study by Deribe et al., there was no statistical association between education and LTFU.[11] In an agreement with our results, a study conducted among 3,159 HIV infected patients who initiated ART between 1 January 2007 and 4 November 2011 within an HIV cohort study in India revealed that the risk of LTFU lowered with the level of education.[19] As shown in logistic regression, in reference to illiterate education, having a university education had a 3.615 greater probability to be LTFU, with secondary education having the odds of 5.238 to be a LTFU. In our study, almost half (49.5%) of the cases and quarter (24.8%) of controls were not working; a statistical association between the occupation and LTFU among HIV adult patients was significantly met. It was mentioned that unemployment was a factor which contributed toward the loss to follow-up in ART among Tanzanian HIV/AIDS patients.[20]

Marital status of the studied patients was significantly associated with LTFU. Married controls were considerably higher than married cases (43.8% versus 15.1%, respectively). These results were consistent with the findings from other studies in different countries which showed that 80 % of South African HIV/AIDS patients had no committed partners,[21] and in India about two-thirds of HIV/AIDS patients were married.[19]

The Behavioral Characteristics

Controls patients engaging in sexual intercourse was significantly higher than cases patients (98.1% versus 87.6% respectively). The highest percentages were accounted for by illegal partners in both cases and controls with a statistically significant difference. Among the ones who were practicing sexual intercourse, heterosexuality was the most common type among both cases and controls (82.6% and 86.4%, respectively). Importantly, differences in the type of sexual behavior were not statistically significant. According to a report in the countries of MENA, the predominant route of infection seemed to be sexual transmission and heterosexual sex was the most common suggested mode of HIV transmission amongst men in Tunisia (44.4%), UAE (50.0%), Syria (54.5%), Jordan (66.7%), Morocco (81.9%), Kuwait (100%), and Palestine (100%).[22] The main difference between this study's results and some of the previous studies is primarily attributed to different moral, ethical or religious factors. In our research, binary logistic regression showed that practicing sexual intercourse was indeed a protective predictor; its odds stood at 0.137. On the other hand, having an illegal sex relation was a significant predictor to LTFU. It had a negative risk of 0.115 to LTFU. Our study, similar to other studies which revealed that being single is a risk factor for becoming LTFU, found that patients who did not have a partner were at a greater risk of becoming LTFU. The result suggests that having a relationship is a protective factor against being LTFU.[19, 21] Meanwhile narcotics use can cause complications in the treatment of HIV patients as these patients are generally considered to be difficult to enroll and retain in care.[23] The use of narcotics in our current study was significantly different between cases and controls where more than half of the cases (56.2%) as compared to nearly one-fifth of the controls (19.0%) were found to be using narcotics. Using narcotics was a significant predictor to LTFU, where users had 5.451 times greater risk to LTFU. Among the subjects who reported using narcotics, their intake of drugs was routed via several routes. Intravenous narcotics had the highest percentage (84.8%), while only 20.3% were using oral narcotics. Lower percentages were encountered among smoking and sniffing 8.9 and 2.5, respectively. The use of narcotics is illegal in almost all known countries. The i.v. use of drug pertains to the risk for LTFU, as mentioned by different studies.[23-25]

In a systematic review, extrapolated estimates suggest that as many as 15.9 million people might inject drugs worldwide; the largest numbers of injectors were found in China, the USA, and Russia, where mid-estimates of HIV prevalence among injectors were 12%, 16%, and 37%, respectively. About 3 million people injecting drugs were expected to be HIV positive.[24] In the MENA region, there seems to be considerable inter- and intra-country variability, ranging from 0% in Jordan, Palestine, as well as some parts of Libya, to 9.4–15.3% in Iran, which is the only country that provides conclusive evidence for an established concentrated epidemic at a national level.[25]

The Clinical Laboratory Characteristics

The data analyzed in this study showed no statistically significant difference between cases and controls regarding baseline CD4 count, X^2_2=0.73 p=0.694. While the last known CD4 count was significantly higher among controls at a level of ≥ 350, 79% versus 60% among cases, X^2_3=17.156 p=0.001, and in reference to ≤ 200, both ≥ 350 and 200–349, CD4 counts had a protective risk of (0.181 and 0.139, respectively) to LTFU.

In addition, our analyzed data did not reveal any statistically significant association between the baseline viral load and the LTFU p= >0.05. The last viral load of the participants revealed that 71.4% of the control samples and 40 % of the cases had less than 500 copies/mL viral load. In our present study, the last viral load was found to be an insignificant predictor to LTFU except for the last viral load at a level of 500–9,999, which was a protective (at risk of 0.150) factor to LTFU. Contrary to our results, a study in France showed that patients with high CD4 counts, low plasma viral loads or those who were not on HAART at enrolment were more likely to be lost in following-up. Moreover, the analysis of

CD4 count, plasma viral load and use of HAART as time-dependent variables revealed that during follow-up, patients with lower CD4 counts and patients who were on HAART with detectable viral loads were more likely to be lost to follow-up.[23]

In our study, the most common means of detecting HIV/AIDS was prisoners screening (27.6%), followed by pre-marital screening (22.4%). The least common method was T.B Screening (1.0%) and STI Screening (0.5%). A study in Saudi Arabia showed that the most common means of detection included suspected patients, and contacts constitute 51 % of reported HIV Saudi cases.[26] Meanwhile in Cuba, the HIV cases detected by sexual partner tracing or following a visit to a general practitioner accounted for 48.9% of the newly detected HIV cases.[27] This might be attributed to the differences between studies in term of sample size, time period and study setting.

The CDC classification in this analysis showed that the highest percentage (40.0%) was encountered among those patients classified 1A, whereas the ones classified as 1B was 33.8%. In Korea, out of 247 patients participating in a study for predictors of ART poor retention pointed out that 50 % of them were at stage 1A.[28] Meanwhile in Cote d'Ivoire, it was found that 82% of HIV/AIDS were at stage B or C.[29]

The Treatment and Past History Characteristics

Our present study showed that 86.7% of the controls were regular in taking their treatment as compared to 15.2% of the cases. A significant relationship was found between the duration of treatment and LTFU among HIV adult patients where the highest percentages for both cases and controls were encountered in cases where the duration of treatment exceeded six months. In Uganda, a study showed that the LTFU increased after six months of ART treatment, which is in consistent with our results.[30] On the other hand, different studies found that a high risk of LTFU during periods less than six months.[12,31] Diverse meanings of LTFU have been utilized across different reviews in different countries. This poses a risk of misclassification of active patients as LTFU towing to different definitions.

The current study reported that most of the cases complained of previous diseases as compared to controls (40.0% versus 22.9%, respectively). By binary logistic regression, previous disease was a significant predictor to LTFU at a risk of 2.250. In the line to our results, a study by Goulet et al. comparing HIV infected patients with sex and age-matched uninfected patients found that those with HIV disease were more likely to have comorbid conditions, such as liver disease, kidney disease, substance misuse, and multi-morbidity.[32]

In this study, nearly half of the cases (47.6%) compared to only 15.2% of controls reported prior exposure to infected syringes, given the fact that many of them are using intravenous narcotics. These results are consistent with the findings of different studies undertaken in France and MENA countries.[23-25]

The most common possible source of infection was sexual contact; nearly half of the cases and more than three-quarters of the controls reported that sexual contact is their most likely source of infection, (48.6% versus 81%, respectively). This is again consistent with the findings of countries across MENA and Saudi Arabia, which showed that the major route of infection seemed to be sexual transmission, and heterosexual sex became the most common suggested mode of HIV transmission.[25,26] Notably, nearly all HIV/AIDS patients (cases and controls) had never undergone a surgical operation, previous blood transfusion, organ transplantation, dental operation or had any exposure to hemodialysis. In Saudi Arabia, blood transfusion was responsible for 17% of all HIV infections, whereas the contribution of Maternal-To-Child transmission and organ transplant was 5%, and 1%, respectively. Infection through blood transfusion declined with no reported cases since 2001.[26]

CONCLUSION

This study aimed at determining the independent factors predicted LTFU. These included gender, education, sexual intercourse, use of narcotics, last CD4 count, last known viral load, history of past diseases and previous exposure to infected syringes. To the best of our knowledge, this is the first study to determine the predictors of LTFU among HIV/AIDS adult patients in the Kingdom of Saudi Arabia (KSA).

Our results are consistent with different studies have been carried out outside Saudi Arabia. It is vital to determine the main factors that contribute to the inability of patients to take their medications and to put the emphasis on regular monitoring by professional healthcare workers, clinics, as well as regimes to avoid treatment failures.

REFERENCES

1. 2012 Revision - Protocol 1. Patient evaluation and antiretroviral treatment for adults and adolescents [Internet]. World Health Organization. Available from: http://www.euro.who.int/en/health-topics/communicable-diseases/hivaids/publications/2012/hivaids-treatment-and-care.-clinical-protocols-for-the-who-european-region.-2012-revisions/2012-revision-protocol-1.-patient-evaluation-and-antiretroviral-treatment-for-adults-and-adolescents

2. Dalal RP, MacPhail C, Mqhayi M, Wing J, Feldman C, Chersich MF, Venter WD. Characteristics and outcomes of adult patients lost to follow-up at an antiretroviral treatment clinic in Johannesburg, South Africa. Journal of Acquired Immune Deficiency Syndromes. 2008 Jan 1;47(1):101-7.

3. Forster M, Bailey C, Brinkhof MW, Graber C, Boulle A, Spohr M, Balestre E, May M, Keiser O, Jahn A, Egger M. Electronic medical record systems, data quality and loss to follow-up: survey of antiretroviral therapy programmes in resource-limited settings. Bulletin of the World Health Organization. 2008;86:939-47.

4. Brinkhof MW, Dabis F, Myer L, Bangsberg DR, Boulle A, Nash D, et al. Early loss of HIV-infected patients on potent antiretroviral therapy programmes in lower-income countries. Bulletin of the World Health Organization. 2008;86(7):559-67.

5. Saumu WM. The magnitude and factors associated with loss to follow up among children attending the HIV clinic at Kangundo level four hospital: University of Nairobi. 2016.

6. Weigel R, Hochgesang M, Brinkhof MW, Hosseinipour MC, Boxshall M, Mhango E, Nkwazi B, Tweya H, Kamlaka M, Chagwera F, Phiri S. Outcomes and associated risk factors of patients traced after being lost to follow-up from antiretroviral treatment in Lilongwe, Malawi. BMC infectious diseases. 2011 Dec;11(1):31.

7. Wools-Kaloustian K, Kimaiyo S, Diero L, Siika A, Sidle J, Yiannoutsos CT, Musick B, Einterz R, Fife KH, Tierney WM. Viability and effectiveness of large-scale HIV treatment initiatives in sub-Saharan Africa: experience from western Kenya. Aids. 2006 Jan 2;20(1):41-8.

8. Chesney MA. Factors Affecting Adherence to Antiretroviral Therapy. Clinical infectious Diseases- Chicago. 2000;30:S171-S6.
9. Nziva MM. Factors influencing Adherence to Antiretroviral Therapy Among Sero-Positive Clients at MBagathi District Hospital-Nairobi: The University of Nairobi. 2013.
10. Ickovics JR, Meade CS. Adherence to HAART among patients with HIV: breakthroughs and barriers. AIDS care. 2002 Jun 1; 14(3):309-18.
11. Deribe K, Hailekiros F, Biadgilign S, Amberbir A, Beyene BK. Defaulters from antiretroviral treatment in Jimma University Specialized Hospital, Southwest Ethiopia. Tropical Medicine & International Health. 2008;13(3):328-33.
12. Ferradini L, Jeannin A, Pinoges L et al. Scaling up of highly active antiretroviral therapy in a rural district of Malawi: an effectiveness assessment. Lancet 2006; 367:1335-42.
13. Mageda K, Leyna GH, and Mmbaga EJ. High initial HIV/AIDS related mortality and- Its predictors among patients on Antiretroviral Therapy in the Kagera Region of Tanzania: A five-year Retrospective Cohort study. AIDS Res Treat. 2012 Sep 2; 2012: 843598.
14. Megerso A, Garoma S, Tolosa Eticha TW, Daba S, Tarekegn M, Habtamu Z. Predictors of loss to follow-up in antiretroviral treatment for adult patients in the Oromia region, Ethiopia. HIV/AIDS (Auckland, NZ). 2016;8:83.
15. Obermeyer CM. HIV in the Middle East. Bmj. 2006 Oct 19;333(7573):851-4.
16. Sieleunou I, Souleymanou M, Scho¨nenberger AM et al. Determinants of survival in AIDS patients on antiretroviral therapy in a rural centre in the Far-North Province, Cameroon. Tropical Medicine and International Health. 2009 Jan; 14(1): 36-43.
17. Hawkins C, Chalamilla G, James O et al. Sex differences in antiretroviral treatment outcomes among HIV-infected adults in an urban Tanzanian setting. AIDS. 2011 June 1; 25(9): 1189-97.
18. Johannessen A, Naman E, Ngowi BJ et al. Predictors of mortality in HIV-infected patients starting antiretroviral therapy in a rural hospital in Tanzania. BMC Infectious Diseases. 2008 April 22; 8:52.
19. Alvarez-Uria G, Naik PK, Pakam R, Midde M. Factors associated with attrition, mortality, and loss to follow up after antiretroviral therapy initiation: Data from an HIV cohort study in India. Glob Health Action. 2013;6:21682.
20. Semvua SK, Orrell C, Mmbaga BT, Semvua HH, Bartlett JA, Boulle AA. Predictors of non-adherence to antiretroviral therapy among HIV infected patients in northern Tanzania. PloS one. 2017 Dec 18;12(12):e0189460.
21. Mberi MN, Kuonza LR, Dube NM, Nattey C, Manda S, Summers R. Determinants of loss to follow-up in patients on antiretroviral treatment, South Africa, 2004–2012: a cohort study. BMC health services research. 2015 Dec;15(1):259.
22. Bozicevic I, Riedner G, Haghdoost A. HIV case reporting in the countries of North Africa and the Middle East. Journal of the International AIDS Society. 2014 Jan 1;17(1).
23. Ndiaye B, Ould-Kaci K, Salleron J, Bataille P, Bonnevie F, Choisy P, Cochonat K, Fontier C, Guerroumi H, Ajana F, Chaud P. Incidence rate and risk factors for loss to follow-up in HIV-infected patients from five French clinical centres in Northern France-January 1997 to December 2006. Antivir Ther. 2009 Jan 1;14(4):567-75.
24. Arasteh K, Des Jarlais DC, Mathers BM, Degnhardt L, Phillips B, Wiessing L, Hickman M, Strathhdee SA, Wodak A, Panda S, Tyndall M. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. Commentary. Lancet. 2008;372(9651).
25. Gökengin D, Doroudi F, Tohme J, Collins B, Madani N. HIV/AIDS: trends in the Middle East and North Africa region. International Journal of Infectious Diseases. 2016 Mar 1;44:66-73.
26. Al-Mazrou YY, Al-Jeffri MH, Fidail AI, Al-Huzaim N, El-Gizouli SE. HIV/AIDS epidemic features and trends in Saudi Arabia. Ann Saudi Med. 2005 Mar 1;25(2):100-4.
27. De Arazoza H, Joanes J, Lounes R, Legeai C, Clémençon S, Pérez J, Auvert B. The HIV/AIDS epidemic in Cuba: description and tentative explanation of its low HIV prevalence. BMC Infectious Diseases. 2007 Dec;7(1):130.
28. Lee S, Lee SH, Lee SJ, Kim KH, Lee JE, Cho H, Lee SG, Chen DH, Chung JS, Kwak IS. Predictors of poor retention in care of HIV-infected patients receiving antiretroviral therapy in Korea: five-year hospital-based retrospective cohort study. Journal of Korean medical science. 2016 Mar 1;31(3):376-81.
29. Kouassi Kan V, Coly A, N'Guessan J, Dobé S, Agbo S, Zimin T, Dosso Y, Ackah A, Traoré V. Factors Associated with Loss to Follow-up Status among ART Patients in Cote d'Ivoire. Research Report Summary. Published by the USAID Health Care Improvement Project. Bethesda, MD: University Research Co., LLC (URC). 2014.
30. Weidle PJ, Malamba S, Mwebaze R, Sozi C, Rukundo G, Downing R, Hanson D, Ochola D, Mugyenyi P, Mermin J, Samb B. Assessment of a pilot antiretroviral drug therapy programme in Uganda: patients' response, survival, and drug resistance. The Lancet. 2002 Jul 6;360(9326):34-40.
31. Zachariah R, Teck R, Buhendwa L, Fitzerland M, Labana S, Chinji C, Humblet P, Harries AD. Community support is associated with better antiretroviral treatment outcomes in a resource-limited rural district in Malawi. Transactions of the Royal Society of Tropical Medicine and Hygiene. 2007;101(1):79-84.
32. Goulet JL, Fultz SL, Rimland D, Butt A, Gibert C, Rodriguez-Barradas M, Bryant K, Justice AC. Do patterns of comorbidity vary by HIV status, age, and HIV severity? Clinical Infectious Diseases. 2007 Dec 15;45(12):1593-601.

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