Influence of gender on loss to follow-up in a large HIV treatment programme in western Kenya

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Objective To determine the incidence of loss to follow-up in a treatment programme for people living with human immunodeficiency virus (HIV) infection in Kenya and to investigate how loss to follow-up is affected by gender.
Methods Between November 2001 and November 2007, 50 275 HIV-positive individuals aged ≥ 14 years (69% female; median age: 36.2 years) were enrolled in the study. An individual was lost to follow-up when absent from the HIV treatment clinic for > 3 months if on combination antiretroviral therapy (cART) or for > 6 months if not. The incidence of loss to follow-up was calculated using Kaplan–Meier methods and factors associated with loss to follow-up were identified by logistic and Cox multivariate regression analysis.
Findings Overall, 8% of individuals attended no follow-up visits, and 54% of them were lost to follow-up. The overall incidence of loss to follow-up was 25.1 per 100 person–years. Among the 92% who attended at least one follow-up visit, the incidence of loss to follow-up before and after starting cART was 27.2 and 14.0 per 100 person–years, respectively. Baseline factors associated with loss to follow-up included younger age, a long travel time to the clinic, patient disclosure of positive HIV status, high CD4+ lymphocyte count, advanced-stage HIV disease, and rural clinic location. Men were at an increased risk overall and before and after starting cART.
Conclusion The risk of being lost to follow-up was high, particularly before starting cART. Men were more likely to become lost to follow-up, even after adjusting for baseline sociodemographic and clinical characteristics. Interventions designed for men and women separately could improve retention.

Une traduction en français de ce résumé figure à la fin de l'article. *Al final del artículo se facilita una traducción al español.* الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

Introduction

Approximately 33 million people worldwide are living with human immunodeficiency virus (HIV) infection or acquired immunodeficiency syndrome (AIDS), and the majority are in sub-Saharan Africa.[1] The use of combination antiretroviral therapy (cART) in sub-Saharan Africa and other resource-constrained settings has been massively scaled up since 2004: in 2008, more than 4 million adults were being treated.[2] Moreover, cART has significantly reduced mortality and improved life expectancy.[3–5] Nevertheless, the effectiveness of care is threatened by the high number of patients who are lost to follow-up.[6] There is an urgent need to understand why patients are lost to follow-up and to develop interventions to improve retention.

Previous studies indicate that men may be more likely to present for HIV care and initiate cART when they have a low CD4+ lymphocyte count and a more advanced HIV infection, and when they are older.[7,8] Late treatment initiation predisposes men to a poor clinical outcome[7,9,10] and to being lost to follow-up.[11,12] The aims of the present study were to determine: (i) the incidence of losses to follow-up in men and women in a large HIV treatment programme in western Kenya, both before and after cART initiation; (ii) whether baseline clinical or sociodemographic factors influence men's greater likelihood of being lost to follow-up; and (iii) whether gender affects risk factors for becoming lost to follow-up.

Methods

Study design

This retrospective analysis used clinical data routinely collected from patients enrolled between November 2001 and November 2007 at clinics in Kenya associated with the United States Agency for International Development (USAID) Academic Model Providing Access to Healthcare (AMPATH) Partnership. Patients were eligible for inclusion in the analysis if they had an HIV infection and were at least 14 years old at enrolment. Before accessing the data, the study was approved by the institutional review board of Indiana University School of Medicine in the United States of America (USA) and the institutional review and ethics committee of Moi University School of Medicine in Kenya.

The AMPATH programme

In 2001, AMPATH was set up as a joint programme of the Moi University and Indiana University Schools of Medicine and the Moi Teaching and Referral Hospital. In 2004, the USAID–AMPATH Partnership was formed when AMPATH received funding through USAID and the United States President's Emergency Plan for AIDS Relief. Details of the development of this programme are described elsewhere.[13] Since 2001, the programme has enrolled over 100 000 HIV-positive (HIV+) adults and children in 23 facilities run by the Kenyan Ministry of Health. All care and treatment for HIV and tuberculosis infections are provided free.

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The HIV clinical care protocols used by AMPATH are consistent with World Health Organization (WHO) recommendations and are detailed elsewhere.[8] Briefly, patients who are receiving cART are seen by a clinician (i.e. a clinical officer or physician) 2 weeks after treatment initiation and monthly thereafter. Those not on cART return every 1 to 3 months, depending on their clinical status and comorbid conditions.

Outreach programme

Since 2006, the USAID–AMPATH Partnership has run an outreach programme to improve patient retention. Each patient's address is recorded at enrolment and updated as necessary by HIV-infected outreach workers with perfect clinic attendance or cART adherence. If a scheduled appointment is missed, the patient is contacted by phone or visited. The need to follow up more non-attenders has led to a system for prioritizing patients for outreach. First, adult patients who started cART within the previous 3 months and all children on cART are sought within 24 hours of a missed appointment. Then, adult patients who have been on cART for more than 3 months are sought 7 days after a missed visit and it is expected that they will be found within 28 days. Lastly, individuals who are not receiving cART are sought 28 days after a missed appointment and it is expected that they will be located within 8 weeks.

Data collection

Clinicians recorded demographic, clinical and pharmacological data at each patient's visit using a standardized form. Data were entered by hand into the AMPATH Medical Record System, a secure computerized database designed for clinical management and validated by a random review of the forms.[14,15] All data were stripped of identifiers before analysis. In June 2007, a standardized "field follow-up form" was introduced for outreach workers to document reasons for missed clinic visits.

Variables

The primary study outcome was a loss to follow-up: a patient was lost to follow-up when he or she was absent from the clinic for more than 3 months if on cART, or for more than 6 months if not. Individuals known to have died were not counted as lost to follow-up.

Sociodemographic and clinical characteristics were considered to be independent variables. The following were analysed as binary variables: age, above or below the population mean; gender, male or female; travel time to the clinic, ≥ 1 hour or < 1 hour; CD4+ lymphocyte count closest to enrolment, above or below the population mean; disclosure of HIV+ status at enrolment, yes or no; previous cART, yes or no; WHO clinical stage at enrolment, I/II or III/IV; and clinic location, urban or rural. The period of enrolment was categorized as 2001–2004, 2005–2006 or 2007. This was done because funding from the United States President's Emergency Plan for AIDS Relief became available at the end of 2004, leading to a massive scaling-up of the programme, and the outreach programme was implemented towards the end of 2006, which may have affected the number lost to follow-up.

Data analysis

Categorical and dichotomous variables with normal and non-normal distributions were analysed using the Chi-squared (χ^2) and Kruskal–Wallis tests, respectively. The medians and interquartile ranges of continuous variables were compared using the Wilcoxon rank-sum test.

Logistic regression was used to identify factors associated with having no follow-up visits or being lost to follow-up compared with having at least one follow-up visit or being retained in care. The final model included gender and any variable found significant on univariate analysis (i.e. $P < 0.05$) or hypothesized to have a confounding effect. Due to space constraints, only multivariate analysis findings are presented here.

The Kaplan–Meier method was used to estimate the incidence of loss to follow-up, which is presented as the number of loss-to-follow-up events per 100 person–years. First, the incidence was calculated from the date of enrolment, initially including and then excluding individuals who attended no follow-up visits. It was subsequently calculated for those who attended at least one follow-up visit after enrolment, both before and after cART initiation. For those on cART who were lost to follow-up, time zero was the date of cART initiation. The event date of a loss to follow-up was the date of the last clinic visit recorded in the database. Data on individuals known to have died were censored at the date of their last visit or their date of death, if known. For those still alive and not lost to follow-up by the closure of the database, data were censored at the date of their last clinic visit. In the analysis of individuals lost to follow-up before cART, data were censored on the date of their last clinic visit, their date of death or the date of cART initiation, whichever came first. Survival curves were compared using the Wilcoxon log-rank test.

Cox proportional hazards models were used to analyse associations between gender and key sociodemographic and clinical characteristics. We confirmed our assumptions about the proportionality of the hazard ratios by graphically plotting the log-normal of the time against the log-normal of the survival probability and by using the Grambsch–Therneau test of Schoenfeld residuals for our main effect of gender ($P = 0.352$). We calculated unadjusted and adjusted hazard ratios (HRs) and 95% confidence intervals (CIs) in predictive models. The models were stratified to elucidate gender differences in the risk of being lost to follow-up.

All analyses were performed using STATA version 10/SE software (StataCorp LP, College Station, USA).

Results

Over the 6-year study period, 50 275 patients (69% female; median age: 36.2 years) were eligible for inclusion in the data analysis. Patients were followed up for a median of 9.7 months (interquartile range: 3.2–19.9). The clinical and sociodemographic characteristics of men and women at enrolment are shown in Table 1.

Table 2 summarizes the reasons men and women gave for missing a scheduled clinic visit between July and November 2007. Among men, the three principal reasons were work commitments, family commitments and high transport costs. Outreach workers found that 10% of the men had died. Among women, the three principal reasons were family commitments, high transport costs and work commitments. In addition, 5% of the women located had died. The category "other reason" includes: being worried about security, travelling away from home, attending a funeral, visiting relatives, relocated elsewhere, not having started cART, being discouraged by the CD4+ lymphocyte count, not responding to treatment and mental instability.

Table 1. **Clinical and sociodemographic characteristics of patients enrolled at clinics for the treatment of HIV infection, by gender, Kenya, 2001–2007**

Patient's characteristic	Women (*n* = 34 606)	Men (*n* = 15 669)	*P*-value
Attended at least one follow-up visit, no. (%)	31 959 (92)	14 266 (91)	< 0.001
Age in years, median (IQR)	35 (29–42)	40 (34–47)	< 0.001
Patient disclosed HIV+ status,[a] no. (%)	19 259 (61)	9 429 (67)	< 0.001
Attended an urban clinic, no. (%)	17 061 (49)	8 171 (52)	< 0.001
WHO stage-III/IV HIV disease,[b] no. (%)	10 842 (38)	6 730 (53)	< 0.001
CD4+ lymphocyte count[c] in cells/μl, median (IQR)	225 (98–408)	154 (57–302)	< 0.001
Travel time to the clinic ≥ 1 hour,[d] no. (%)	13 166 (41)	5 989 (41)	0.54
Previously received cART, no. (%)	19 550 (56)	8 916 (57)	0.39
Year of enrolment			0.22
2001–2004, no. (%)	4 695 (14)	2 089 (13)	–
2005–2006, no. (%)	18 797 (54)	8 426 (54)	–
2007, no. (%)	11 114 (32)	5 154 (33)	–

cART, combination antiretroviral therapy; HIV, human immunodeficiency virus; IQR, interquartile range; WHO, World Health Organization.

[a] Data on disclosure were missing for 3306 women (9.6%) and 1514 men (9.7%).

[b] Data on disease stage were missing for 6253 women (18.1%) and 3024 men (19.3%).

[c] Data on lymphocyte count were missing for 5464 women (15.8%) and 2604 men (16.6%).

[d] Data on travel times were missing for 2441 women (7.1%) and 1146 men (7.3%).

Loss to follow-up

A total of 12 935 loss-to-follow-up events occurred during 51 574 person–years of follow-up. The incidence of loss to follow-up among all individuals, including those who attended no follow-up visits, was 25.1 per 100 person–years: 28.1 in men and 23.8 in women (Table 3). After we excluded those with no follow-up visits, the incidence decreased to 20.8 per 100 person–years: 23.2 in men and 19.8 in women. The highest incidence was seen before cART initiation, at 27.2 per 100 person–years: 32.7 in men, and 25.2 in women. The lowest incidence was seen after cART initiation, at 14.0 per 100 person–years: 15.0 in men, and 13.5 in women. The incidence was always significantly higher in men than women ($P < 0.05$).

No follow-up visits

In total, 4050 (8%) individuals attended no follow-up visits: 65% were male, with a median age of 33.8 years. Of these individuals, 2191 (54%) were documented as lost to follow-up, while 318 had died and the remainder had not met the definition of being lost to follow-up by the time the database was closed. Multivariate logistic regression analysis showed that the following factors were associated with having no follow-up visits and being lost to follow-up: male gender, a CD4+ lymphocyte count greater than 200 cells/μl, and WHO stage-III/IV disease (Table 4). Factors associated with a low probability of being lost to follow-up in this group were age over 36.2 years, the patient disclosing his or her HIV+ status, having started cART, attending an urban clinic, and being enrolled during a later period.

When individuals who attended no follow-up visits were analysed by gender, the protective effect against being lost to follow-up of age and HIV+ status disclosure was stronger in women (Table 5). Women were far more likely to be lost to follow-up if they had a CD4+ lymphocyte count ≥ 200 cells/μl, but men were much more likely to be lost to follow-up if they had advanced-stage disease. The effects of attending an urban clinic, the period of enrolment and having received cART were equally strong in both genders.

Table 2. **Reasons for missing scheduled visits to clinics for the treatment of HIV infection, by gender, July–November 2007, Kenya**

Reason	Men (*n* = 1 037) %	Women (*n* = 2 117) %
Deceased	10	5
Family commitments	12	21
Work commitments	24	11
High transport costs	12	17
Forgot appointment	5	6
Transferred to another clinic	1	1
Health issue	6	8
Did not miss appointment (database error)	6	6
Refused to attend	1	2
Other	22	22

HIV, human immunodeficiency virus.

At least one follow-up visit

In total, 46 225 individuals (92%) attended at least one follow-up visit. Of these, 69% were female and their median age was 36.6 years. Multivariate Cox regression analysis identified the following factors as associated with a greater risk of being lost to follow-up: male gender, travel time to the clinic ≥ 1 hour, and WHO stage-III/IV disease (Table 4). There was a lower risk in older individuals, those who disclosed their HIV+ status, those who had ever received cART, those with a high enrolment CD4+ lymphocyte count, those attending an urban clinic, and those who enrolled in a later period.

Table 3. **Incidence of loss to follow-up in patients attending clinics for the treatment of HIV infection, Kenya, 2001–2007**

Follow-up and cART status	Loss-to-follow-up events[a]	Total follow-up time (person–years)	Incidence (per 100 person–years)					
			Overall		Men		Women	
			Value	95% CI	Value	95% CI	Value	95% CI
From enrolment in all patients, including those who attended no follow-up visits	12 935	51 574	25.1	24.7–25.5	28.1	27.3–29.0	23.8	23.3–24.3
From enrolment in patients who attended one or more follow-up visits	10 744	51 574	20.8	20.4–21.2	23.2	22.5–24.0	19.8	19.4–20.3
Before cART initiation in patients who attended one or more follow-up visits	5 497	20 214	27.2	26.5–27.9	32.7	31.2–34.2	25.2	24.4–26.0
After cART initiation in patients who attended one or more follow-up visits	4 382	31 383	14.0	13.6–14.4	15.0	14.3–15.8	13.5	13.0–14.0

cART, combination antiretroviral therapy; CI, confidence interval; HIV, human immunodeficiency virus.
[a] A loss-to-follow-up event occurred when a patient was absent from the clinic for more than 3 months while on cART or for more than 6 months if not.

Analysis by gender revealed no major difference between men and women for any risk factor, though men with WHO stage-III/IV disease were more likely to be lost to follow-up than women (Table 5).

Before cART initiation

Multivariate analysis showed that male gender, advanced-stage disease and a high CD4+ lymphocyte count were all predictive of being lost to follow-up before cART initiation, while older age, HIV+ status disclosure, attending an urban clinic and enrolling in a later period were all protective (Table 4).

On analysis by gender, no difference was observed between men and women for most risk factors, except that men with a high CD4+ lymphocyte count were more likely to be lost to follow-up than women (Table 5).

After cART initiation

The median follow-up time after ART initiation was 315 days. Multivariate analysis showed that male gender, travel time to the clinic ≥ 1 hour and WHO stage-III/IV disease were all predictive of being lost to follow-up (Table 4). In contrast, older age, HIV+ status disclosure and enrolling in a later time period were all associated with a lower risk. On analysis by gender, men with WHO stage-III/IV disease were more likely to be lost to follow-up than women (Table 5).

Discussion

A central finding of this study is that men with an HIV infection are more likely to become lost to follow-up than women, both before and after starting cART. This was true even after adjusting for disease stage at baseline, age and other key sociodemographic and clinical factors, and despite the enrolment ratio of men to women being consistent with the epidemiological distribution of HIV infection and AIDS in sub-Saharan Africa.[1,7] Further, of the 8% of individuals who never returned after their enrolment visit, 65% were male.

Different factors may have influenced men and women: men were more likely not to return if they had advanced-stage disease, while women were more likely not to return if their CD4+ lymphocyte count was high. This suggests that the failure of men to return may have been due to severe illness or death. Similarly, men who attended one or more follow-up visits were most likely to be lost to follow-up if they had advanced-stage disease at enrolment or had not received cART, which makes it highly likely that they were lost to follow-up because they died.[12,16–18] These findings are consistent with those of other studies which report that HIV-infected men present later for care than women and are therefore at greater risk of an adverse clinical outcome.[7,9,10] In contrast, women may have delayed returning to care when their own health was relatively stable because of personal commitments, notably family commitments.

Why men delay access to care and have poorer clinical outcomes remains unclear. Perhaps women are more likely to be tested earlier for HIV at an antenatal clinic or by a health-care provider they have visited to seek treatment for a dependent. Moreover, women may seek care promptly because they are the primary caregivers and feel a greater responsibility for remaining healthy.

Another important study finding is that loss to follow-up is much more common before cART initiation than after. The data point to two different mechanisms. First, individuals who feel well may not return to the clinic until their health begins to deteriorate and, second, very sick individuals may not return because they are too sick or have died. Clearly, efforts should be made to improve retention in these two groups in the period before cART initiation. Overall, loss-to-follow-up rates in this study were lower than the average reported in a systematic review of HIV treatment programmes in sub-Saharan Africa.[6] This was probably because patients who had died were excluded from our definition of being lost to follow-up.

The study identified several important risk factors for and protective factors against being lost to follow-up, some of which are modifiable. In particular, individuals who disclosed their HIV+ status before enrolment were less likely to be lost to follow-up, as were those who spent less than 1 hour travelling to the clinic, those who attended urban clinics and those who had ever received cART. Our findings are consistent with those of a previous study which indicated that non-disclosure of an HIV+ status was closely associated with poor medication adherence and a failure to achieve virological control.[19] Modification of these risk factors could reduce losses to follow-up. For example, interventions aimed at improving the disclosure rate, such as dedicated disclosure coun-

Table 4. **Variables associated with being lost to follow-up in patients attending clinics for the treatment of HIV infection, on multivariate analysis, Kenya, 2001–2007**

Variable	OR for attending no follow-up visits and being lost to follow-up (*n* = 29 376)		HR for being lost to follow-up for patients who attended one or more follow-up visits					
			From enrolment (*n* = 36 914)		Before cART initiation (*n* = 42 903)		After cART initiation (*n* = 20 329)	
	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI
Gender (men versus women)	1.42	1.19–1.70	1.19	1.14–1.25	1.27	1.19–1.36	1.24	1.15–1.33
Age (≥ 36.2 years versus < 36.2 years)	0.46	0.39–0.55	0.63	0.60–0.66	0.64	0.60–0.68	0.59	0.55–0.64
Disclosure of HIV+ status at enrolment (yes versus no)	0.61	0.52–0.72	0.86	0.83–0.90	0.81	0.77–0.87	0.91	0.85–0.98
Travel time to the clinic ≥ 1 hour (yes versus no)	1.04	0.88–1.23	1.07	1.02–1.11	1.06	0.99–1.13	1.11	1.04–1.19
Ever having received cART (yes versus no)	0.07	0.06–0.09	0.24	0.23–0.26	NA	NA	NA	NA
CD4+ lymphocyte count at enrolment (≥ 200 cells/µl versus < 200 cells/µl)	3.49	2.61–4.68	0.59	0.56–0.63	1.31	1.21–1.41	0.98	0.91–1.06
WHO HIV disease stage (III/IV versus I/II)	2.67	2.25–3.17	1.64	1.57–1.72	1.54	1.44–1.65	1.30	1.21–1.40
Attending an urban clinic (yes versus no)	0.63	0.53–0.74	0.87	0.84–0.91	0.82	0.77–0.88	0.97	0.90–1.04
Period of enrolment (2007 or 2005–2006 versus 2001–2004)	0.14	0.12–0.16	0.59)	0.57–0.61	0.66	0.63–0.69	0.85	0.79–0.90

cART, combination antiretroviral therapy; CI, confidence interval; HIV, human immunodeficiency virus; HR, hazards ratio; NA, not applicable; OR, odds ratio; WHO, World Health Organization.

selling, other types of peer counselling and helping patients to establish support systems, may be helpful. The accessibility of health-care services could be greatly improved by introducing satellite clinics or offering regular weekend and evening clinics. Work and family commitments were identified as primary reasons that men and women, respectively, missed scheduled clinic visits, which reinforces the suggestion that adjusting clinic hours would make it easier for those who work to attend. Moreover, the introduction of "family clinics" that enable caregivers to have their own and their dependent's health attended to at the same time may improve retention and attendance at scheduled clinic visits. In addition, starting cART earlier could improve retention, although this requires further exploration. The provision of transport disbursements, where resources permit, to those unable to afford regular travel to the clinic may also increase retention rates.

We found that individuals who had a high CD4+ lymphocyte count and who may not have been feeling any symptoms of HIV infection were highly likely not to return to the clinic after enrolment. These individuals may benefit from targeted counselling and from specific strategies for retaining them in care, such as scheduling visits less frequently or carrying out rapid assessment either in the community or the clinic. In addition, in what we believe is a separate dynamic, individuals who presented with advanced-stage disease were at high risk of becoming lost to follow-up and may therefore have been at very high risk of death. Again, targeted interventions, including more frequent scheduled clinic visits and rapid assessment in the clinic, may improve both retention in care and clinical outcomes.[20]

Another important study finding is that, despite concerns about the effect of rapidly scaling-up ART in African settings,[21–23] retention among our patient population appears to have improved over time. We postulate that this is because AMPATH has expanded by providing more parent and satellite clinics, by offering more comprehensives services and care, such as giving food supplements,[24] and by enhancing community outreach through several mechanisms, including increased use of community health workers, recording detailed locator information on each patient and expanding the peer outreach programme.

The study has several strengths. First, data were obtained from Kenya's largest

Table 5. **Variables associated with being lost to follow-up in patients attending clinics for the treatment of HIV infection, by gender, on multivariate analysis, Kenya, 2001–2007**

Variable	OR for attending no follow-up visits and being lost to follow-up				HR for being lost to follow-up for patients who attended one or more follow-up visits									
					From enrolment				Before cART initiation				After cART initiation	
	Men (n = 8 930)		Women (n = 20 446)		Men (n = 11 382)		Women (n = 25 532)		Men (n = 11 076)		Women (n = 24 734)		Men (n = 6 466)		Women (n = 13 863)	
	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI
Age (≥ 36.2 years versus < 36.2 years)	0.63	0.46–0.85	0.40	0.32–0.49	0.68	0.62–0.73	0.61	0.58–0.65	0.64	0.57–0.71	0.64	0.59–0.69	0.61	0.54–0.70	0.58	0.54–0.64
Disclosure of HIV+ status at enrolment (yes versus no)	0.81	0.59–1.11	0.54	0.44–0.66	0.84	0.78–0.91	0.87	0.83–0.92	0.78	0.70–0.88	0.83	0.77–0.89	0.87	0.77–0.99	0.95	0.87–1.04
Travel time to the clinic ≥ 1 hour (yes versus no)	1.43	1.06–1.94	0.91	0.74–1.11	1.12	1.04–1.21	1.04	0.99–1.10	1.03	0.92–1.15	1.07	1.00–1.16	1.15	1.02–1.29	1.09	1.00–1.19
Ever having received cART (yes versus no)	0.02	0.01–0.04	0.10	0.08–0.13	0.21	0.19–0.23	0.26	0.24–0.28	NA	NA	NA	NA	NA	NA	NA	NA
CD4+ lymphocyte count at enrolment (≥ 200 cells/µl versus < 200 cells/µl)	2.11	1.36–3.28	4.75	3.15–7.14	0.58	0.52–0.64	0.60	0.56–0.64	1.52	1.33–1.74	1.20	1.09–1.33	0.97	0.85–1.11	0.98	0.90–1.07
WHO HIV disease (stage III/IV versus I/II)	5.06	3.64–7.04	2.04	1.65–2.51	1.86	1.72–2.03	1.55	1.46–1.64	1.54	1.37–1.72	1.54	1.42–1.67	1.55	1.37–1.76	1.20	1.10–1.30
Attending an urban clinic (yes versus no)	0.61	0.45–0.83	0.64	0.52–0.78	0.86	0.80–0.93	0.88	0.83–0.92	0.78	0.70–0.87	0.85	0.78–0.91	1.02	0.91–1.15	0.93	0.85–1.01
Period of enrolment (2007 or 2005–2006 versus 2001–2004)	0.11	0.08–0.14	0.16	0.14–0.19	0.58	0.54–0.62	0.59	0.56–0.62	0.64	0.58–0.70	0.67	0.63–0.71	0.82	0.73–0.91	0.86	0.80–0.94

cART, combination antiretroviral therapy; CI, confidence interval; HIV, human immunodeficiency virus; HR, hazards ratio; NA, not applicable; OR, odds ratio; WHO, World Health Organization.

HIV care provider and are therefore more broadly generalizable. Second, since 2006, data were collected in the context of a peer-led outreach programme that actively attempted to contact patients who did not return to the clinic and to reconnect them with treatment. Third, although the effect of gender on clinical outcomes is not a new issue, few studies have systematically endeavoured to determine the effect of gender on losses to follow-up or have highlighted the increased risks facing men. Fourthly, the study evaluated loss-to-follow-up rates and predictors of loss to follow-up over a period of nearly 6 years, which strengthens the findings and enabled temporal trends to be monitored.

The study also has several limitations. Because data on the self-reported reasons for missed clinic visits only began to be collected in June 2007, they are available on only a small subsample of the population and therefore must be interpreted with caution. In addition, a large proportion of respondents indicated "other" as the reason for missing a visit, so for these individuals the actual reasons remained unknown to the investigators. Disclosure of HIV status and the time spent travelling to the clinic were only documented at enrolment and updated data are not available for carrying out a more detailed analysis of these potentially important issues. It is possible that some individuals lost to follow-up had died, moved or transferred to another healthcare provider without informing us, and that this resulted in some outcomes being misclassified. Since 2006, however, individuals were considered lost to follow-up only after the outreach programme had attempted to locate them.

The reasons that lead men to present for care with advanced-stage disease and to become lost to follow-up require more investigation. Individuals who have not started cART should also be investigated further, and increased efforts should be made to ensure that they are not lost to follow-up. Several factors associated with being lost to follow-up are potentially modifiable and provide opportunities for improving HIV care programmes in sub-Saharan Africa. In particular, the needs of men and women could be addressed separately. Better access to and retention in care programmes are crucial for improving the survival of HIV-infected patients. ■

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ملخص

تأثير نوع الجنس على فقدان متابعة الحالات في برنامج علاجي موسع لفيروس الإيدز في غربي كينيا

الغرض تحديد معدل وقوع فقدان متابعة الحالات في برنامج علاجي للمعايشين لفيروس الإيدز في كينيا وتقصي كيف يتأثر فقدان متابعة الحالات بنوع الجنس.

الطريقة في الفترة بين تشرين الثاني/نوفمبر 2001 حتى تشرين الثاني/نوفمبر 2007، أدرج في الدراسة 50275 شخصاً إيجابياً لفيروس الإيدز عمرهم أكبر من أو يساوي 14 سنة (شكلت الإناث 69% منهم؛ والمتوسط العمري لديهم كان: 36.2 سنة). واعتبر أن الشخص قد فقد المتابعة إذا تغيب عن عيادة العلاج لأكثر من 3 شهور إذا كان يعالج بمزيج من مضادات الفيروسات القهقرية أو إذا غاب أكثر من 6 شهور ولم يكن يعالج. وحُسِبَ معدل وقوع فقدان المتابعة باستخدام طرق كابلان-مايير Kaplan–Meier، وحددت العوامل المرتبطة بفقدان متابعة الحالات عن طريق التحليل اللوجستي وتحليل كوكس للتحوف المتعدد المتغيرات.

الموجودات إجمالياً، حضر 8% من الأفراد زيارات بدون متابعة، وفقد منهم 54% في المتابعة. وكان إجمالي معدل وقوع فقدان المتابعة للحالات هو 25.1 لكل 100 شخص سنوياً. ومن بين 92% من الذين حضروا زيارة متابعة واحدة على الأقل، كان معدل وقوع فقدان المتابعة قبل وبعد بدء المعالجة بمزيج من مضادات الفيروسات القهقرية 27.2 و 14.0 لكل 100 شخص سنوياً بالترتيب. وتضمنت العوامل القاعدية المرتبطة بفقدان المتابعة: صغر العمر، وطول مسافة الانتقال أو السفر إلى العيادة، وإفصاح المريض عن إصابته بفيروس الإيدز، والعدد المرتفع للخلايا اللمفاوية +CD4، والمرحلة المتقدمة من المرض بفيروس الإيدز، وموقع العيادة الريفية. وكان الرجال في الإجمال أكثر عرضة للخطر قبل وبعد بدء العلاج بمزيج من مضادات الفيروسات القهقرية.

الاستنتاج إن خطر فقدان متابعة الحالات مرتفع، ولاسيما قبل بدء العلاج بمزيج من مضادات الفيروسات القهقرية. والأكثر ترجيحاً هو فقدان متابعة الرجال، وحتى بعد تصحيح الصفات القاعدية الاجتماعية والديموغرافية والسريرية . ويمكن للتدخلات المصممة للرجال والنساء على انفراد أن تحسّن من بقاء المرضى قيد المتابعة.

Résumé

Influence du sexe de la personne sur la perte du suivi dans un vaste programme de traitement du VIH dans l'ouest du Kenya

Objectif Déterminer l'incidence de perte de suivi dans un programme de traitement pour les personnes vivant avec l'infection par le virus de l'immunodéficience humaine (VIH) au Kenya, et investiguer comment la perte de suivi est influencée par le sexe.

Méthodes Entre novembre 2001 et novembre 2007, 50 275 individus séropositifs d'âge ≥14 ans (69% de sexe féminin; âge médian: 36,2 ans) ont participé à l'étude. Le suivi a été perdu lorsque les individus ont été absents de la clinique de traitement du VIH pendant >3 mois lorsqu'ils étaient sous combinaison thérapeutique antirétrovirale (TARV), et pendant >6 mois dans le cas contraire. L'incidence de perte du suivi a été calculée au moyen des méthodes Kaplan-Meier, et les facteurs associés à la perte du suivi ont été identifiés par la régression logistique et l'analyse multivariable par régression du modèle de Cox.

Résultats Globalement, 8% des individus ne se sont jamais présentés à une visite de suivi, et 54% d'entre eux ont perdu le suivi. L'incidence totale de perte du suivi était de 25,1 par 100 personnes-années. Parmi les 92% qui ont assisté à une visite de suivi au moins, l'incidence de perte du suivi avant et après le début du TARV a été de 27,2 et 14,0 par 100 personnes-années, respectivement. Parmi les facteurs de la ligne de base associés à la perte du suivi, ont été constatés le jeune âge, la longueur du temps de trajet pour se rendre à la clinique, la révélation de l'état VIH positif du patient, un nombre élevé de lymphocytes CD4+, un stade avancé de la maladie à VIH et la ruralité de la clinique. Les hommes ont présenté un risque plus élevé en général et ce, avant et après le début du TARV.

Conclusion Le risque de perte du suivi a été élevé, particulièrement avant le début du TARV. Les hommes ont été plus enclins à perdre le suivi, même après ajustement pour base sociodémographique et caractéristiques cliniques. Des interventions conçues séparément pour les hommes et les femmes pourraient améliorer la rétention.

Resumen

Influencia del género en las bajas en el seguimiento de un amplio programa terapéutico contra el VIH en el oeste de Kenya

Objetivo Determinar la incidencia de bajas en el seguimiento de un programa terapéutico de personas portadoras del virus de la inmunodeficiencia humana (VIH) en Kenya, e investigar si el sexo de dichas personas influye en las bajas en el seguimiento.

Métodos Entre noviembre de 2001 y noviembre de 2007 se inscribieron en el estudio 50 275 personas VIH-positivas de más de 14 años de edad (69% mujeres; edad media: 36,2 años). Se consideró una baja en el seguimiento cuando la persona se ausentó de la clínica de tratamiento del VIH durante más de tres meses si estaba en tratamiento antirretroviral combinado (TARC) o, en el caso contrario, durante más de seis meses. La incidencia de bajas en el seguimiento se ha calculado utilizando los métodos de Kaplan-Meier, y los factores asociados con las bajas en el seguimiento se han identificado mediante un análisis de regresión logística y de regresión multifactorial de Cox.

Resultados En términos generales, el 8% de las personas no acudieron a las visitas de seguimiento, de las que el 54% se consideraron como bajas en el seguimiento. La incidencia total de bajas en el seguimiento fue de 25,1 por 100 años-persona. Del 92% que acudió al menos a una visita de seguimiento, la incidencia de baja en el seguimiento, antes y después de comenzar el TARC fue de 27,2 y 14,0 por 100 años persona, respectivamente. Los factores iniciales asociados a la baja en el seguimiento incluyeron: la juventud, la lejanía de la clínica, la revelación del paciente de su estado de VIH-positivo, el recuento linfocítico CD4+ elevado, enfermedades debidas al VIH en fase avanzada y la ubicación de la clínica rural. El riesgo general en hombres fue elevado, antes y después de iniciar el TARC.

Conclusión El riesgo de baja en el seguimiento del paciente fue elevado, sobre todo antes de iniciar el TARC. Hubo una tendencia de más bajas en el seguimiento entre los hombres, aún después del ajuste de las características sociodemográficas y clínicas iniciales. Las intervenciones específicas e individuales para hombres y mujeres podrían mejorar la permanencia en el programa.

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