

## Condom use among antiretroviral therapy patients in Ibadan, Nigeria

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### Abstract

**Background:** While antiretroviral treatment (ART) has improved the health status of people living with HIV, new challenges to their sexual and reproductive health (SRH) needs and their ability to prevent secondary HIV infections have risen. This study aimed to determine the level and factors that affect condom use among ART-experienced patients at the premier teaching hospital in Nigeria.

**Methodology:** This longitudinal study involved patients who initiated treatment at the University College Hospital, Ibadan, Nigeria, between January and December 2006. Sexually active patients who had received treatment for at least six months and had not defaulted on clinic follow-up schedules were studied. Data on socio-demographic characteristics and condom use were extracted from clinic records. Chi square test and logistic regression were employed to determine factors associated with condom use.

**Results:** The study involved 866 patients, specifically, 306 (35.3%) men and 560 (64.7%) women aged 40.7 (SD 7.6) and 33.3 (SD 6.5) years respectively. Condoms usage before treatment and at last clinic visits was 14.0% and 43.3% respectively. Overall reports of condom use at specified periods were as follows: 1 – 6 months (33.0%); 7 – 12 months (37.3%) and above 12 months (53.8%). Patients in a marital union and those with higher education were more likely to use condoms.

**Conclusions:** Condom use is significantly influenced by marital status and educational level. Although condom use increases together with follow-up time, the level can be improved. Primary and secondary prevention efforts targeting high-risk sexual behaviour among ART patients need to receive greater and continual attention.

**Key words:** condom use, HIV/AIDS, antiretroviral therapy, Nigeria

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### Introduction

The success of highly active antiretroviral therapy (HAART) in reducing morbidity and mortality from HIV/AIDS has been widely documented [1]. Consequently, many HIV-infected persons are now living longer, healthier, and more productive lives.

Apart from the beneficial clinical effects, treatment may have unintended effects on sexual behaviour. Some evidence suggests that since HAART became available, the prevalence of unprotected sex [2] and the incidence of sexually transmitted infections (STIs) [3] including HIV have increased. Available evidence suggests that a low viral load may reduce the level of infectiousness of HIV-positive persons receiving HAART [4,5]. As this information moves to the public domain, it may influence people's beliefs about HIV transmission and lessen concern about engagement in unsafe sex. Besides, there has been an ongoing debate about HIV

transmission in the presence of HAART. The debate was sparked by the statement issued by the Swiss Commission on AIDS [6] which suggested that transmission risk is low if (1) the HIV-infected patient is receiving antiretroviral therapy with excellent adherence; (2) viral load has consistently been undetectable (< 40 copies per mL) for more than 6 months; and (3) no sexually transmitted infections (STIs) are present in either partners. The commission made it clear that their analysis was intended for Switzerland – a highly developed country with a low-level concentrated epidemic [7]. The conditions specified above may never be the case in developing countries such as Nigeria. A part of the debate was a model-based analysis of HIV viral load and infectiousness by Wilson *et al.* [8], who concluded that even in HAART, transmission risk is not zero. Sturmer *et al.* have also reported transmission in serodiscordant couples in which one partner has attained viral suppression with HAART [9]. It must

be noted that even low transmission risk has great implications for further spread in a generalized epidemic such as that in Nigeria.

In Nigeria, the spread of HIV has increased significantly since the official report of the first case in 1986. The results of periodic national surveys among ante-natal clinic attendees showed a progressive increase in the adult HIV sero-prevalence rate from 1.8% in 1991 to 5.8% in 2001. However, rates of 5.0% and 4.4% were reported in 2003 and 2005 respectively [10]. About 2.9 million people in Nigeria are estimated to be living with HIV and AIDS [11]; however, out of over one million considered to be eligible for HAART, fewer than 50,000 patients were on treatment by the end of 2005 [12].

In Nigeria, condom use remains alarmingly very low at 25% and 11% for sexually active males and females respectively [10]. This means antiretroviral therapy (ART) patients who are healthy—and as such may engage in high-risk sexual behaviour—are at risk of transmitting HIV to sero-negative partners and re-infecting themselves with new strains of the virus.

There are contrasting reports on condom use among ART patients from studies conducted in developed and developing countries where HIV/AIDS treatment and care services are optimal. For instance, Heard *et al.* in a study based in Paris, France, found that consistent condom use was higher in serodiscordant couples than in sero-concordant couples [13]. Initiation of HAART has also been reported to be associated with increased sexual risk behaviour [14]. Some other studies have reported lower high-risk sexual behaviour among HAART patients [15,16,17]. However, a meta analysis of condom use and HAART by Crepaz *et al.* revealed that condom use varied with belief about the efficacy of HAART in preventing transmission [16]. In the light of the various findings, it becomes imperative to understand the patterns of condom use among HAART patients in southwestern Nigeria in order to proffer appropriate secondary prevention measures.

Consequently, this study was aimed at determining the level of and factors associated with condom use among HIV-positive patients receiving treatment at the premier tertiary hospital in southwestern Nigeria.

## Materials and methods

This was a longitudinal study involving patients who initiated treatment at the ART centre in the University College Hospital (UCH), Ibadan,

Southwestern Nigeria, between 1 January and 31 December 2006. Ibadan is the second largest city and one of the most extensive indigenous metropolitan areas in sub-Saharan Africa. It is the capital of Oyo State in Southwest Nigeria.

This 850 bed hospital was the first tertiary health facility in Nigeria. The ARV clinic was one of 25 ARV sites established and funded by the Federal Government in 2002 to provide antiretroviral drugs to an initial 10,000 adults nationwide at a subsidized rate. Since 2004, the President Bush Emergency Plan for AIDS Relief (PEPFAR) has provided immense support for the scale-up of the nation's antiretroviral treatment programme, initially at the government-subsidized rate of 1,000 Naira per month (US \$7.0) but free since January, 2006.

The patients were provided a comprehensive clinical review and care which included counseling at first presentation; they were then followed up once every three months at which time information was collected on relevant clinical indicators as well as contraceptive use. Blood samples were drawn for viral load, CD4 count, blood chemistry and haematological parameters. Results of laboratory investigations were shared with patients at their monthly drug pick-up visits. At enrollment and each follow-up visit, structured case report forms were used by nurses and physicians to collect information on disease symptoms, clinical vital signs, physical examination, drug regimen, allergies, toxicities, referral, etc. During clinical consultation, patients were asked whether they and their partners used contraception (Yes/No or Abstinent). Those who answered yes were further asked about type of contraception (condom, IUD, implant, others).

The data analyzed in this study represents patients who had been on ART for at least six months. Patients aged below 15 years and above 59 years and those who had defaulted on follow-up schedules were excluded from this study. In total, 868 patients were eventually analysed and this sample size has more than 90% power to determine the prevalence of condom use to within 5% precision with 95% confidence. Data on socio-demographic characteristics and condom use were extracted from the clinic records.

Descriptive statistics were used to summarize the variables in the data set. Proportions of persons reporting condom use and associated factors were estimated at initiation of ART and at the last clinical follow-up visit. The chi-square test was used to test the association between condom use and other

**Table 1.** Characteristics of subjects initiated on ART between January and December 2006 at the University College Hospital, Ibadan, Nigeria.

Variables	Included (%) N = 866	Excluded (%) N = 191	P-value
<i>Age group</i>			
20 – 29	21.2	27.7	0.7943
30 – 39	47.7	41.4	
40 – 49	25.9	20.9	
50 - 59	5.2	9.9	
<i>Sex</i>			
Male	35.3	34.0	0.7326
Female	64.7	66.0	
<i>Occupation</i>			
Trading	40.2	37.1	0.7047
Public/Civil Servants	11.2	12.3	
Private employment	7.3	8.4	
Artisans	23.5	20.6	
Others	7.2	9.3	
Unemployed	10.5	12.3	
<i>Level of education</i>			
None	6.9	8.0	0.1025
Primary	24.0	32.0	
Secondary	40.9	36.5	
Tertiary	28.2	23.5	
<i>Union status</i>			
In union	58.7	62.0	0.8898
Not in union*	41.3	38.0	
<i>Partner enrollment</i>	12.7	14.6	0.8079
<i>Report of condom usage before ART</i>			
Abstinent	42.8	43.9	0.7262
Yes	14.0	12.0	
No	43.2	39.8	
<i>Report of condom usage at last clinic visits</i>			
Abstinent	37.0	-	
Yes	43.3	-	
No	19.7	-	

\*single, divorced, separated, widowed

categorical variables. Stepwise logistic regression was used to evaluate the effects of individual factors on the probability of using condom. The cut-off for variable inclusion was a p-value of 0.1 while all p-values less than 0.05 were considered statistically significant. SPSS 15.0 was used for statistical analysis

The antiretroviral treatment program has ethical approval from the University of Ibadan/University College Hospital Joint Institutional Review Board.

## Results

### *Characteristics of study subjects*

A total of 1057 reproductive age HIV/AIDS patients commenced on ART were studied. Clinic defaulters (n = 199) were excluded because their data

were not complete. Thus 866 ART patients were included in the final analyses. Baseline characteristics of included and excluded patients as shown in Table 1 indicate that both are comparable. The included patients comprised 306 men aged 15 – 59 years (35.3%) and 560 women aged 15 – 49 years (64.7%). The mean ages of the men and women were 40.7 (SD 7.6) and 33.3 (SD 6.5) years respectively. The characteristics of the subjects are shown in Table 1. About half (47.7%) were in the age group 30 – 39 years while close to a quarter (25.9%) were aged 40 – 49 years. Greater proportions were traders (40.2%) and artisans (23.5%). The commonest level of educational attainment was secondary education (40.9%). More than half (58.7%) of the subjects were

**Table 2.** Report of condom use according to selected characteristics

Variables (n)	Report of condom use before ART			Report of condom use at last clinic visit			
	N (%)	OR (95% CI)	p-value	N (%)	OR (95% CI)	p-value	
<i>Age group</i>							
20 – 29 (184)	24 (13.0)	1.20 (0.43 – 3.34)	0.9213	72 (39.1)	1.06 (0.54 – 2.07)	0.166	
30 – 39 (412)	59 (14.3)	1.34 (0.51 – 3.53)		195 (47.2)	1.47 (0.78 – 2.77)		
40 – 49 (224)	32 (14.3)	1.33 (0.49 – 3.63)		91 (40.6)	1.13 (0.58 – 2.18)		
50 – 59 (45)	45 (11.1)	1.00		17 (37.8)	1.00		
<i>Sex</i>							
Male (306)	45 (14.7)	1.11 (0.75 – 1.66)	0.600	152 (49.7)	1.49 (1.13 – 1.98)	0.005*	
Female (560)	75 (13.4)	1.00		223 (39.8)	1.00		
<i>Level of education</i>							
None (62)	4 (6.5)	1.0	0.012*	13 (21.0)	1.0	0.001*	
Primary (208)	20 (9.6)	1.49 (0.49 – 4.53)		75 (36.1)	2.04 (1.04 – 4.02)		
Secondary (353)	49 (14.0)	2.29 (0.78 – 6.45)		160 (45.3)	2.98 (1.56 – 5.71)		
Tertiary (243)	46 (18.9)	3.26 (1.12 – 9.46)		123 (50.6)	3.69 (1.89 – 7.18)		
<i>Occupation</i>							
Trading (348)	42 (12.1)	1.00	0.14	145 (41.8)	1.44 (0.84 – 2.46)	0.408	
Public/civil servants (98)	22 (22.7)	2.13 (1.20 – 3.78)		49 (50.0)			1.42 (0.91 – 2.23)
Private employment (63)	11 (17.7)	1.57 (0.76 – 3.24)		32 (50.8)			1.09 (0.77 – 1.54)
Artisans (204)	26 (12.8)	1.07 (0.63 – 1.80)		89 (43.8)			0.82 (0.47 – 1.44)
Others (63)	7 (11.3)	1.10 (0.56 – 2.19)	23 (37.1)	0.96 (0.60 – 1.53)			
Unemployed (92)	12 (13.2)	0.92 (0.40 – 2.16)	37 (40.7)				
<i>Union status</i>							
Not in union (358)*	20 (5.6)	1.0	0.001*	110 (30.8)	1.00	0.000*	
In union (508)	100 (19.7)	4.14 (2.51 – 6.84)		265 (52.2)	2.45 (1.84 – 3.25)		
<i>Partner enrollment</i>							
Yes (133)	21 (15.8)	1.76 (1.04 – 2.98)	0.035*	43 (42.2)	0.94 (0.62 – 1.44)	0.788	
No (731)	90 (12.3)	1.00		305 (43.6)	1.00		

\* Statistically significant ( $p < 0.05$ )  
Categories with OR 1.0 are the reference groups

in a marital union. The status of marital union differed significantly between men and women. In all, 31.5% men versus 46.6% women were not in union (*i.e.*, single, separated, divorced or widowed) ( $p = 0.034$ ). Condom use was reported by 14.0% of respondents at commencement of antiretroviral therapy while 42.8% reported abstinence. At the last clinic visit, after some period of treatment follow-up, 43.3% and 37.0% reported condoms use and abstinence respectively. The median CD4 count at ART initiation was 162 cells/mm<sup>3</sup> and 104 cells/mm<sup>3</sup> for condom users and non-users respectively ( $p < 0.001$ ). At the last clinic visit, these numbers increased to 288 cells/mm<sup>3</sup> and 270 cells/mm<sup>3</sup> ( $p = 0.194$ ).

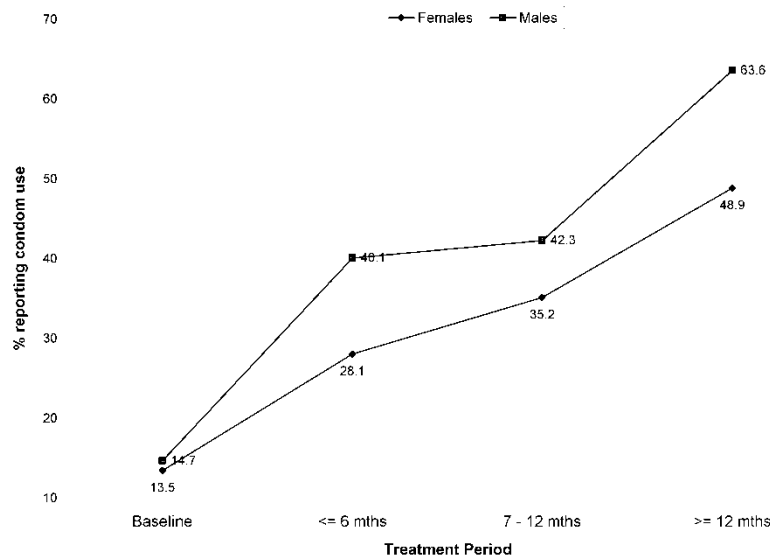
#### *Patients' characteristics associated with condom use*

Table 2 presents the factors associated with condom use before ART and after some time of treatment follow-up. The proportion of patients who

reported condom use before treatment initiation is similar across the four age groups ( $p = 0.921$ ).

Although the prevalence of condoms use before ART was higher among males (14.7%) than females (13.4%), the difference was not statistically significant ( $p = 0.600$ ) (Table 2). The level of condom use increased from 6.5% among those with no formal education to 14.0% and 18.9% among those with secondary and tertiary education respectively ( $p = 0.012$ ). In terms of occupation, the highest rate of condom use was found among public/civil servants (22.7%). Patients who were in a union (19.7%) were about four times more likely to use condoms compared to those who were not in any union (5.6%) (OR 4.14; CI: 2.51 – 6.84). Patients whose partners were enrolled for HIV/AIDS care were also more likely to use condoms (OR 1.76 CI: 1.04 – 2.98). The stepwise logistic regression revealed that marital status (OR 4.10; CI: 2.44 – 6.89) and education (OR 3.85; CI: 1.31 – 11.33 for

**Figure 1.** Trends in the reported use of condoms by males (15 – 59 years) and females (15 – 49 years) initiated on ART between January and December 2006 at the University College Hospital, Ibadan, Nigeria.



tertiary versus none) are factors independently associated with condom use before ART.

At the time of last clinic visit, a similar pattern of condom use still persisted, though in higher proportions (Table 2). A significantly higher proportion of males reported condom use (OR 1.49; CI: 1.13 – 1.98). Educational attainment and marital union status were also significantly associated with condom use. The multivariate logistic model showed that being in a union (OR 2.46; CI: 1.83 – 3.30), secondary education (OR 3.33; CI: 1.72 – 6.46), and tertiary education (OR 4.30; CI: 2.18 – 8.49) are significant independent predictors of condom use by ART patients.

Figure 1 shows the trend in condom use over time in treatment. There was a significant increase in condom use before ART compared to after ART ( $p = 0.000$ ). This pattern was the same for both males and females ( $p = 0.000$ ). Overall reports of condom use according to treatment follow-up periods are 1 – 6 months (33.0%); 7 – 12 months (37.3%) and above 12 months (53.8%).

## Discussion

This study provides information on condom use by patients on antiretroviral therapy (ART) in Ibadan, Southwestern Nigeria. Condom use increased from 14.0% at treatment entry to 43.3% after an average of eight months of treatment. Educational attainment, marital union, gender, and partner enrollment were factors that influenced condom use. Female patients and those who were not in any marital union

constituted a group that is more prone to high-risk behaviour. This may be a result of poor bargaining power of women and those who are not in a stable union. For instance, it may be difficult for someone who does not have any marital relationship with a partner to negotiate condom use. It was also found that the median CD4 count of those reporting condom use was higher. This might have made such patients perceive themselves healthy and fit for active sex. They might in turn have decided to use condoms as a means of prevention.

The low prevalence of condom use among males (14.7%) and females (13.5%) before ART is similar to the proportion found among participants in the Nigeria National HIV/AIDS and Reproductive Health Survey (NARHS) of 2005 [10]. It was also noted that the proportion of participants who were either abstaining from sexual intercourse or using condoms increased from 56.8% at ART initiation to 80.3% at last clinical visits. However, this rate still falls short of the expected 100%. This result has great public health significance for HIV/AIDS prevention. Agbesu [18], in an analysis of condom use in 20 countries in sub-Saharan Africa, reported that levels of condom use are still very low and vary widely. The proportion of persons who reported using condoms during their last sexual encounter ranged from 6% to 28% among men and 1% to 9% among women [18]. In our study, condom use reported at ART initiation among men was even lower than the 28% found among men in the Nigerian national survey in 2005. However the findings in NARHS 2005 may be over-reported because people tend to

claim what they do not practice when they are being interviewed in surveys to pretend conformity to right practices. Low prevalence of condom use raises great concern about the implications of this high-risk sexual behaviour among HIV-positive persons, especially those who have refused to present themselves for care and treatment.

Even though condom use has increased to 43.3% among the study cohort after a period of care and treatment, this number is quite low compared to findings from studies conducted among ART patients in other settings. Sarna *et al.* reported 89% condom use among ART patients in India [19] although the subjects in that study were financing treatment themselves, so they might have been economically stable. Socioeconomic status has been found to influence condom use. Similar relatively higher levels of condom use have been reported among HAART patients in developed countries [5,14,20]. The low level of condom use found in this study would not have been of much concern if it were compensated for by a high level of sexual abstinence. It has been estimated that the chance of eradication of an HIV epidemic through widespread ART coupled with a reduction in high-risk sexual behaviour is 85%. In the absence of sexual risk reduction, the chance reduces to 50% and decreases further in the presence of increased high-risk sexual behaviours [21].

Before ART initiation, more persons in union were found to report condom use than those who were single, separated, divorced or widowed. This trend was surprising because most studies have reported that condom use is more prevalent among people who are not in any union. A limitation of the study is that there is no information on partner notification and knowledge of partner's serostatus. It is, however, worrisome if more persons out of union use condoms less frequently. This portends a major threat to secondary prevention of HIV transmission. The influence of education on condom use before ART in this study is consistent with previous knowledge [18]. It is generally known that the more educated people are, the more they are likely to use condoms. The patients' knowledge of their improved immunological status (CD4 count) might also contribute to increased sexual activity and thereby higher condom use. However, this possibility cannot be clearly ascertained in the present study because reasons for improved condom usage cannot be elicited from the available data.

With a median duration of about eight months of treatment follow-up, there was a slight increase in condom use among males (49.6%) and females (40.0%). Although this increase is low compared to that reported similar studies as noted earlier, it is worth commenting that some level of behaviour change was reported among this group of people. It was found that greater increases were reported among those who had at least a secondary education. People in younger age groups were also found to have improved with condom use. In the setting of this study, secondary prevention messages are provided through regular health education and counseling. It appears those who have higher education responded more positively to such behaviour change communications.

It was also found that uptake of condom use increased with time; the longer the follow-up period, the higher the prevalence of condom use. This may be a reflection of the fact that continual exposures to secondary prevention messages have impact as time progresses.

This study is subject to several limitations. The condom use report is based on self-report information which is subject to errors and biases. The analysis utilized readily available data and as such many variables relating to sexual behavior and condom use could not be investigated. Because the analysis was restricted to persons who initiated HAART, we did not have an external reference group; thus similar or different changes in condom use may have taken place that we did not appropriately capture. Despite these limitations, this study has important public health relevance. It is important both to know that condom use among ART patients is at a sub-optimum level and to be able to identify some of the influencing factors. The study further showed that behaviour change advocacy and other prevention efforts should be intensified alongside ART treatment.

## Conclusion

Condom use is low among people living with HIV in Ibadan, Nigeria. Primary and secondary prevention efforts targeting high-risk sexual behaviour among HIV-positive persons need to receive greater attention. Good adherence to ART when combined with effective and sustained counselling is associated with increased condom use. The longer the patients have been on treatment, the higher the level of condom use. This fact offers some

hope that increased provision of secondary prevention messages in HIV/AIDS care and treatment settings could yield more positive results. Secondary prevention programs need to be modified to cater for the needs and benefit of people with little or no education. There is need for improvement in women empowerment and self-esteem among those who are not in a marital union. Appropriate prevention messages can be designed for such groups. It may be beneficial to conduct a more in-depth study on sexual behaviour and condom use among ART patients to help to understand these issues better and thereby develop specific interventions to strengthen prevention efforts.

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