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## Short Communication

## Psychosocial correlates of inconsistent condom use among HIV-infected patients enrolled in a structured ART interruptions trial in Côte d'Ivoire: results from the TRIVACAN trial (ANRS 1269)

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### Summary

**OBJECTIVE** To investigate the relationship between unsafe sexual behaviours and poor self-perceived health among people living with HIV and AIDS (PLWHA) in western Africa.

**METHODS** In March 2006, a survey was conducted among patients continuing their participation in the TRIVACAN trial (ANRS 1269) in Côte d'Ivoire, in which patients had been randomized to either continuous or interrupted antiretroviral therapy (ART) (2-months-off/4-months-on cycles [2/4-ART]) after 6–18 months of continuous ART (C-ART). Socio-demographic and psychosocial information, including data on sexual behaviours during the previous 6 months, was collected using face-to-face interviews. Sexually active patients with either a steady partner (serodiscordant or of unknown HIV status) or casual partners were considered to have unsafe sexual behaviours if they reported inconsistent condom use (ICU).

**RESULTS** Seventy-seven of the 192 patients reported ICU. In multivariate logistic regression, men were significantly less likely to report ICU than women (OR [95% CI] = 0.45 [0.20–0.98]). After adjustment for educational level and reduced sexual activity since ART initiation, concealment of HIV status (2.08 [1.02–4.25]) and poor self-perceived health (2.32 [0.97–5.52]) were independently associated with ICU.

**CONCLUSION** HIV prevention strategies in resource-limited settings should take into account self-perceived health and difficulties to disclose HIV status. Counselling interventions need to be developed to help PLWHA to adopt or negotiate safe behaviours respecting their individual cultures.

**keywords** unsafe sex, steady partner, casual partner, Africa

### Introduction

Unsafe sexual behaviours remain the predominant mode of HIV transmission in sub-Saharan Africa (UNAIDS 2008). Few studies have analysed the determinants of such behaviours in poor-resource settings (Kiene *et al.* 2006; Bunnell *et al.* 2008), notably among patients initiating antiretroviral therapy (ART) (Moatti *et al.* 2003; Diabate *et al.* 2008). In addition, psychosocial correlates of unsafe sex have only been investigated in high-income countries (Vincent *et al.* 2004; Bouhnik *et al.* 2006). Data collected during the TRIVACAN

trial (ANRS 1269) of structured ART interruptions enabled us to investigate the relationship between unsafe sexual behaviours and poor self-perceived health among people living with HIV and AIDS (PLWHA) in Côte d'Ivoire.

### Patients and methods

#### Study population

TRIVACAN (ANRS 1269) is a randomized trial of structured ART interruptions conducted in Abidjan, Côte

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d'Ivoire between 2002 and 2007 among 840 ART-naive HIV-infected adults (Danel *et al.* 2006). After 6–18 months of continuous treatment with zidovudine plus lamivudine plus either efavirenz (600 mg once a day) or indinavir (800 mg twice a day) as well as ritonavir (100 mg twice a day) (for HIV-2-infected patients, women refusing contraception, and women with a history of nevirapine prophylaxis), patients with CD4 count >350 cells/mm<sup>3</sup> and plasma HIV RNA level <300 copies/ml were randomized into one of the three following strategies: continuous treatment (C-ART) ( $n = 110$ ), 2-months-off/4-months-on treatment (2/4-ART) ( $n = 325$ ) and CD4-guided treatment (CD4GT) ( $n = 216$ ). In November 2005, the CD4GT strategy was prematurely stopped because of a higher severe morbidity rate than in the C-ART strategy, and patients randomized to CD4GT were prescribed continuous treatment.

In May–June 2006, a cross-sectional psychosocial survey was conducted among the 379 patients included in the C-ART and 2/4-ART arms ( $n = 97$  and 282, respectively) who were still being followed up in the trial. During face-to-face interviews, these patients were asked a series of questions capturing socio-demographic and psychosocial data, including data about sexual activity.

#### Definition of unsafe sexual behaviours

Patients who reported not having used a condom at least once during the previous 6 months with either their steady partner (serodiscordant or of unknown HIV status) or casual partners were considered as reporting unsafe sexual behaviours, hereafter described as 'inconsistent condom use' (ICU).

#### Variables

Variables tested for their association with ICU included notably patient-reported symptoms during the previous 6 months (assessed using a list derived from the HIV symptom index (Justice *et al.* 2001)); self-perceived health status (assessed using a 5-point Likert scale: very poor, poor, average, good, very good) and depressive symptoms (as measured by a global score >16 obtained on the CES-D scale (Furher & Rouillon 1989)).

A perceived health index was calculated as follows: patients who reported having less than 12 symptoms (the mean number of symptoms reported by study patients during the previous 6 months) and who perceived their health status as 'very good' were considered as having 'good' self-perceived health, while the others were considered as having 'poor' self-perceived health.

#### Statistical analyses

Logistic regression models were used to identify factors associated with ICU. Factors with a  $P$ -value <0.25 in univariate models were considered eligible for multivariate analysis. A backward procedure was used to select significant factors for the final multivariate model (significance threshold  $\alpha = 0.10$ ). Intercooled Stata 9.2 for Windows (StataCorp LP, College Station, TX, USA) software was used for all the analyses.

#### Results

##### Study population

Among the 379 participants in the psychosocial survey, 249 patients (65.7%) reported having a steady partner, while 60 (15.8%) reported having casual partners. Eighty-two percent of the latter reported having both steady and casual partners. A total of 237 patients (62.5%) reported sexual activity during the previous 6 months, with either their steady partner ( $n = 177$ ), a casual partner ( $n = 7$ ), or both ( $n = 53$ ). We focused our analyses on the 192 of these patients (49 men and 143 women), hereafter described as the 'study population', who reported sexual activity with a serodiscordant steady or casual partner. Twenty-three percent of these patients reported that they concealed their HIV status and 15% could be considered as having a poor perceived health (Table 1).

##### Factors associated with ICU

Seventy-seven patients (40.1%) reported ICU, the majority being women (44.8% *vs.* 26.5% of men,  $\chi^2$ ,  $P = 0.025$ ). In the univariate analyses, women who did not report having used hormonal contraception during the previous 6 months were found to be at higher risk of ICU than men (Table 2). Low educational level and poor self-perceived health were also significantly associated with a higher risk of ICU.

No significant relationship was detected between ICU and age, matrimonial status, perception of moral support by family, frequency of sexual intercourse and reporting apprehension about having sex ( $P > 0.25$ ). In the same way, treatment strategy (CT *vs.* 2/4-ART), treatment status at the time of the survey and HIV viral load at last assessment were not significantly associated with ICU. In the multivariate analysis, female gender, poor self-perceived health and concealment of HIV status were independent predictors of ICU, after adjustment for educational level and reduced sexual activity since ART initiation.

C. Protopopescu *et al.* **Inconsistent condom use in Côte d'Ivoire.****Table 1** Characteristics of the study population ( $n = 192$ ; TRI-VACAN trial, ANRS 1269)

Variables	% of patients
<b>Socio-economic characteristics</b>	
Gender	
Female	74.5
Male	25.5
Age	
Mean (SD) – years	36.6 (7.4)
Matrimonial status	
Married or in a free union	58.8
Single, divorced or widowed	41.2
Educational level (basic literacy)	
Yes	78.6
No	21.4
Area of habitation	
Outside Abidjan	9.9
In Abidjan	90.1
Head of the household status	
No	59.4
Yes	40.6
<b>Experience with HIV and ART</b>	
Disclosure of seropositivity	
Disclosure to at least one person	77.1
Concealment	22.9
Ability to confide in someone about HIV-related problems	
No	37.5
Yes	62.5
Moral support by family	
Strong	40.6
Weak or non-existent	59.4
Moral support by friends or other close persons	
Strong	12.5
Weak or non-existent	87.5
Believing that ART eradicates HIV	
No	83.3
Yes	16.7
No. of symptoms reported*	
Median [IQR]	8 [3; 17]
Self-perception of health status	
Very poor	0
Poor	1.0
Average	12.5
Good	39.1
Very good	47.4
Perceived health index	
Good	84.9
Poor	15.1
<b>Depressive symptoms</b>	
CES-D† global score >16	
No	78.1
Yes	21.9
<b>Sexual activity</b>	
Frequency of sexual intercourse*	
Once a month or less	42.2
At least twice a month	57.8

**Table 1** (Continued).

Variables	% of patients
Reduced sexual activity since ART initiation	
No	22.9
Yes	77.1
Apprehension about having sexual intercourse	
No	39.1
Yes	60.9
Use of hormonal contraception*	
Men	25.5
Women not using hormonal contraception	28.1
Women using hormonal contraception	46.4
<b>Clinical and treatment-related characteristics</b>	
Treatment arm	
2/4-ART	74.5
C-ART	25.5
ART regimen at randomization	
PI-based regimen	11.5
NNRTI-based regimen	88.5
Time since randomization	
Mean (SD) – months	26.4 (4.4)
On ART at the time of the survey	
No	23.4
Yes	76.6
HIV VL at last assessment‡	
Detectable	22.4
Undetectable	77.6

SD, standard deviation; ART, antiretroviral therapy; IQR, interquartile range [25%; 75%]; C-ART, continuous ART; 2/4-ART, 2-months-off/4-months-on ART cycles; PI, protease inhibitor; NNRTI, non-nucleoside reverse transcriptase inhibitor; VL, viral load.

\*During the previous 6 months.

†Center for Epidemiological Studies Depression scale (Furber & Rouillon 1989).

‡Detectability threshold: 300 copies/ml.

## Discussion

The present study in Côte d'Ivoire clearly shows that ICU is relatively frequent even among ART-treated patients, and that it concerns especially women, individuals concealing their HIV status, and individuals reporting poor self-perceived health.

Interestingly, no significant relationship was found between patients' report of ICU and the treatment strategy to which they were allocated or to their treatment status at the time of the survey. These results bring additional evidence about the absence of more frequent unsafe sexual behaviours while on ART (Crepaz *et al.* 2004). They may also be paralleled with the results of a recent Kenyan study underlining that psychosocial support plays a stronger role than treatment itself in creating favourable conditions for safe sexual behaviour (Sarna *et al.* 2008).

C. Protopopescu *et al.* **Inconsistent condom use in Côte d'Ivoire.****Table 2** Analysis of factors associated with unsafe sexual behaviours (*n* = 192; TRIVACAN trial, ANRS 1269)

Variables	Crude OR [95% CI]	<i>P</i> -value	Adjusted OR [95% CI]	<i>P</i> -value
<b>Socio-economic characteristics</b>				
Gender*				
Female (ref.)	1		1	
Male	0.44 [0.22; 0.91]	0.027	0.45 [0.20; 0.98]	0.045
Age – years	0.99 [0.95; 1.03]	0.699		
Matrimonial status				
Married or in a free union (ref.)	1			
Single, divorced or widowed	0.86 [0.48; 1.55]	0.616		
Educational level (basic literacy)*				
Yes (ref.)	1		1	
No	2.97 [1.46; 6.07]	0.0027	2.48 [1.16; 5.31]	0.020
Area of habitation				
Outside Abidjan (ref.)	1			
In Abidjan	2.74 [0.87; 8.61]	0.085		
Head of the household status*				
No (ref.)	1			
Yes	0.62 [0.34; 1.12]	0.115		
<b>Experience with HIV and ART</b>				
Disclosure of seropositivity*				
Disclosure to at least one person (ref.)	1		1	
Concealment	1.69 [0.86; 3.34]	0.130	2.08 [1.02; 4.25]	0.045
Ability to confide in someone about HIV-related problems				
No (ref.)	1			
Yes	0.62 [0.34; 1.13]	0.121		
Moral support by family				
Strong (ref.)	1			
Weak or non-existent	1.35 [0.74; 2.44]	0.327		
Moral support by friends or other close persons*				
Strong (ref.)	1			
Weak or non-existent	2.20 [0.83; 5.83]	0.114		
Believing that ART eradicates HIV*				
No	1			
Yes	1.89 [0.88; 4.06]	0.104		
No. of symptoms reported†	1.01 [0.99; 1.03]	0.173		
Perceived health index*				
Good (ref.)	1		1	
Poor	2.43 [1.09; 5.45]	0.031	2.32 [0.97; 5.52]	0.058
<b>Depressive symptoms</b>				
CES-D‡ global score >16*				
No (ref.)	1			
Yes	1.68 [0.84; 3.35]	0.142		
<b>Sexual activity</b>				
Frequency of sexual intercourse†				
Once a month or less	1			
At least twice a month	1.37 [0.76; 2.47]	0.301		
Reduced sexual activity since ART initiation*				
No (ref.)	1		1	
Yes	0.52 [0.26; 1.04]	0.063	0.55 [0.28; 1.11]	0.097
Apprehension about having sex				
No (ref.)	1			
Yes	0.75 [0.41; 1.37]	0.355		
Use of hormonal contraception*, †				
Men (ref.)	1			
Women not using hormonal contraception	2.77 [1.21; 6.36]	0.016		

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Variables	Crude OR [95% CI]	P-value	Adjusted OR [95% CI]	P-value
Women using hormonal contraception	1.97 [0.92; 4.23]	0.082		
<b>Clinical and treatment-related characteristics</b>				
Treatment arm				
2/4 ART (ref.)	1			
CT	0.83 [0.42; 1.62]	0.578		
ART regimen at randomization*				
NNRTI-based regimen (ref.)	1			
PI-based regimen	2.39 [0.97; 5.93]	0.059		
On ART at the time of the survey				
No (ref.)	1			
Yes	1.46 [0.72; 2.95]	0.292		
HIV VL at last assessment§				
Undetectable (ref.)	1			
Detectable	0.85 [0.42; 1.72]	0.661		

OR, odds ratio; CI, confidence interval; ART, antiretroviral therapy; CT, continuous treatment; 2/4 ART, 2-months-off/4-months-on ART cycles; PI, protease inhibitor; NNRTI, non-nucleoside reverse transcriptase inhibitor; VL, viral load.

\*Variables entered in the multivariate model.

†During the previous 6 months.

‡Center for Epidemiological Studies Depression scale (Furher & Rouillon 1989).

§Detectability threshold: 300 copies/ml.

Patients' perception of their health status was the only health-related factor found to be significantly associated with ICU. This echoes evidence from studies conducted in France among specific subpopulations of PLWHA with other indicators of perceived health, such as poor mental health-related quality of life among gay men (Bouhnik *et al.* 2006) and self-reported side effects among injecting drug users (Vincent *et al.* 2004).

Female gender was also found to be associated with ICU (Glass *et al.* 2004). It has long been observed that, in heterosexual relationships, women often prefer not to use condoms because of their emotional attachment to their partners (Fullilove *et al.* 1990; Maticka-Tyndale 1992). In addition, in many African countries, women's social status is closely related to their ability to have children (Caldwell *et al.* 1992; WHO 1994), with those without children facing disgrace and rejection (Desgrées du Loû & Ferry 2005; Criton & Fener 2007). The desire to have children to overcome social stigma may thus take precedence over the risk of infecting someone else with HIV (Moore & Oppong 2007). It is also possible that some women do not even consider using condoms in the context of steady partnerships (Moore & Oppong 2007). Finally, social phenomena such as cross-generational relationships with financial motivation must be taken into account. In such relationships, material gain, sexual gratification, emotional factors and recognition from peers often override concerns about the risk of sexually transmitted infections (Longfield *et al.* 2004).

The present study also shows that educational level has a significant impact on protective behaviours, as already observed in previous studies conducted in several sub-Saharan Africa countries (Lagarde *et al.* 2001; Zellner 2003; De Walque 2006). This could be explained by a higher efficacy of HIV prevention campaigns among educated populations (De Walque 2007). Individuals with a lower education level may also have more difficulties to negotiate condom use. However, it must be pointed out that the relationship between educational attainment level and HIV prevalence in developing countries is complex and changes from place to place and by stage of epidemic. Indeed, large studies in four areas in Africa showed an increased risk of HIV infection among the more educated (Hargreaves & Glynn 2002). In addition, a recent study in Tanzania (Hargreaves & Howe 2010) shows that HIV prevalence significantly decreased between 2003 and 2007 among people with primary or secondary education, while it remained stable among people with no education, which suggests that prevalent HIV infections in Tanzania are now concentrating among less educated groups.

Concealment of seropositivity was also associated with ICU, as already shown in South Africa among PLWHA in clinical care (Kiene *et al.* 2006), and in France among serodiscordant homosexual couples (Bouhnik *et al.* 2007). These findings underline the dilemma that PLWHA face between disclosing their HIV status to potential sexual

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partners and protecting these partners as well as themselves against infection or super infection (Schiltz & Sandfort 2000).

The present study is limited by its cross-sectional design, which prevents the possibility of exploring longitudinal changes in PLWHA's sexual behaviours. However, to our knowledge, it is the first study to document sexual behaviour in the context of planned ART interruptions in sub-Saharan Africa.

In conclusion, this study highlights the importance of social barriers to the use of condoms in sub-Saharan Africa, as well as the central role of individuals' experience with HIV disease, in terms of both perceived health and disclosure of HIV status to non-medical persons. Counselling interventions need to be developed with the help of patients' associations and healthcare or social workers to help PLWHA to adopt or negotiate safe behaviours respecting their individual cultures. Support should especially target women with actions helping them to find the balance between their needs for protection against HIV infection and their desire to have children, be it for personal or societal reasons.

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#### Investigators

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#### Trial coordination team

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Dominique Costagliola (independent statistician), Daniel Sereni, Nicolas Meda, Thérèse N'Dri-Yoman, Philippe van de Perre. Representatives of the French Agence Nationale de Recherches sur le SIDA (ANRS, Paris, France) Brigitte Bazin, SÖverine Blesson, Chantal Canon, Jean-François Delfraissy

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