Factors Associated with Inconsistent Condom Use in Adolescents with Negative or Unknown HIV status in Northwest Cameroon

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Abstract

Objective—To evaluate the association between utilization of HIV testing and condom use amongst Cameroonian youth/adolescents who are not known to be HIV-infected.

Background—Worldwide, HIV is spreading most quickly amongst youth/adolescents. Between 44% and 82% of sexually active youth in Cameroon report inconsistent condom use. Data regarding utilization of HIV testing and condom use is lacking.

Methods—A cross-sectional survey was administered to 431 youth ages 12-26 years in Cameroon from September to December 2011. Data on socio-demographics, sexual risk behaviors, self-reported HIV status, and condom use were collected. We compared rates of inconsistent condom use between those known HIV negative who utilized testing (HIV-N) versus those with unknown status due to unutilized testing (HIV-U). Inconsistent condom use was defined as responding "never," "sometimes," or "usually," while consistent condom use was defined as responding "always" to questions regarding frequency of condom use. Generalized Estimating Equations were applied to assess the association between HIV testing and inconsistent condom use adjusting for other confounders.

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Results—Of 414 eligible respondents, 205 were HIV-U and 209 HIV-N. HIV-U subjects were younger (mean age =16.4 vs. 17.9, $p<0.001$) and more likely to report living in an urban area ($p=0.002$) than HIV-N subjects. Seventy-two percent (137/191) of sexually active youth reported inconsistent condom use. After adjusting for potential confounders, HIV-U status [Odds Ratio (OR) =3.97, 95% Confidence Interval (CI) =1.68-6.01] was associated with inconsistent condom use. Similarly, female gender (OR=3.2, 95% CI=1.29-7.89) was associated with inconsistent condom use, while older age at sexual debut was associated with a decreased risk for inconsistent condom use (OR=0.67, 95% CI=0.56-0.81).

Conclusion—Cameroonian adolescents report high rates of inconsistent condom use which we found to be associated with self-reported unknown HIV status due to unutilized HIV testing. Successful HIV prevention programs among African youths/adolescents may benefit from expanded HIV testing programs.

Introduction

Consistent condom use is an effective method to reduce transmission of HIV and other sexually transmitted infections. (Townsend, Mathews, & Zembe, 2013; WHO, 2003) Nevertheless, many youth in Cameroon (44-82%) report inconsistent condom use. (Lydie et al., 2004; Meekers & Klein, 2002a; Meekers, Klein, & Foyet, 2003; Sanou Sobze et al., 2013; UNICEF, 2001; Van Rossem & Meekers, 2011) Young people aged 15-24 account for 41% of all new HIV infections worldwide. (UNAIDS, 2010) Given the high HIV prevalence rates for females (3.9%) and males (1.6%) among youth in Cameroon (Kongnyuy, Soskolne, & Adler, 2008; UNICEF, 2009) and the high rates of reported inconsistent condom use, these youth may represent a vulnerable population and pose potential public health risks to others if they do not utilize HIV testing and are unaware of their HIV status. This paper evaluates the association between the utilization of HIV testing and condom use amongst Cameroonian youth/adolescents who are not known to be HIV-infected.

Methods

Study Population and Setting

We conducted a cross-sectional survey of randomly selected youth ages 12-26 years across 15 schools and 2 churches in the Northwest Region of Cameroon from September-December 2011. Pregnant women, married individuals, and those with known HIV infection were excluded as these may represent a population with different condom use practices than the general population of youth in Cameroon. After informed consent was obtained, study participants completed an anonymous questionnaire regarding sexual risk behaviors and HIV status.

This study was approved by the Institutional Review Boards of the Cameroon Baptist Convention Health Services (CBCHS) and Icahn School of Medicine at Mount Sinai.

Primary Outcome

We evaluated the frequency of condom use among respondents who reported ever having been sexually active. Inconsistent condom use was defined as responding "never," "sometimes," or "usually," to questions regarding frequency of condom use. Consistent use was defined as responding "always."

Predictor Measurements

Our main exposure of interest was self-reported utilization of HIV testing: HIV-negative who utilized testing (HIV-N) vs. HIV -unknown status due to unutilized testing (HIV-U). Subjects were categorized as HIV-U status if they reported having never been tested for HIV and did not know their HIV status. Sexual activity was defined as ever having vaginal or anal intercourse. Among those reported to be sexually active, data including socio-demographics, education level (Zuilkowski & Jukes, 2012), frequency of sexual activity, early sexual debut (Pettifor, O'Brien, Macphail, Miller, & Rees, 2009), involvement in a regular relationship (Meekers, 2003; Meekers, et al., 2003), and reasons for becoming sexually active (Njue, Voeten, & Remes, 2011; Pettifor, et al., 2009) were assessed.

Statistical Analysis

Baseline characteristics of HIV-N and HIV-U youth were compared using Wilcoxon or Chi-square tests as appropriate. We applied Generalized Estimating Equation (GEE) models (Zeger, Liang, & Albert, 1988) to evaluate the unadjusted association between HIV testing status and inconsistent condom use, accounting for the clustering effect of schools. We then repeated the analysis adjusting for known potential risk factors associated with inconsistent condom use. Statistical analyses were performed using SAS® Statistics 9.2 (SAS Institute, Cary, NC).

Results

The questionnaire was completed by 431 participants. After excluding three subjects outside of the study age range, eight with reported HIV infection, and six married, 414 subjects remained for analysis. This primary analytic sample included 209 HIV-N and 205 HIV-U subjects.

Socio-demographic characteristics of both groups are shown in Table 1. HIV-U subjects were younger (mean age =16.4 vs. 17.9, p<0.01), and more likely to report living in an urban area than HIV-N subjects (p<0.01). Overall, 191 subjects reported ever having had sexual intercourse [51.2% (107/209) in the HIV-N group and 48.8% (84/205) in the HIV-U group, p=0.07]. Demographics and risk behaviors of the sexually active youth are shown in Table 2. Subjects with HIV-U status were younger (mean age 17.5 vs. 18.5, p<0.01), less likely to be female (32% vs. 51.4%, p<0.01), and less likely to report a Christian religious affiliation (75% vs. 97%, p<0.01) than those with HIV-N status. Mean reported age at sexual debut was low in both groups (14.3 and 13.4 years in HIV-N and HIV-U subjects respectively) but was not statistically different between groups.

Overall, 56% (107/191) reported having used a condom at least once, while 35% (67/191) reported using a condom at last sexual intercourse. Seventy-two percent (137/191) [68% (74/109) among males and 76% (62/82) among females, *p*=0.24 (data not shown)] reported inconsistent condom use. HIV-U status was associated with inconsistent condom use in our unadjusted analysis [Odds Ratio (OR) = 2.5, 95% Confidence Interval (CI) =1.3-4.9]. (Table 3) Those who reported an older age at sexual debut were at decreased risk of inconsistent condom use in unadjusted analysis (OR=0.8, 95% CI=0.7-0.9). After adjusting for age, female gender, single relational status, religious affiliation, number of lifetime sexual partners, forced sexual debut, age at sexual debut, age of first sexual partner, and frequency of sexual activity, these relationships persisted (OR=4.0, 95% CI=1.7-6.0 for HIV-U status and OR=0.7, 95% CI=0.6-0.8 for age at sexual debut). In addition, female gender was associated with inconsistent condom use in multivariate analysis (OR=3.2, 95% CI=1.3-7.9).

Discussion

In this study of Cameroonian adolescents/young adults in the Northwest Region, we found that unknown HIV status due to unutilized HIV testing, was associated with inconsistent condom use, even after adjusting for other factors associated with condom use.

To our knowledge, only one other study has assessed condom use in those who have not utilized HIV testing. (Mhlongo et al., 2013) This South African study found comparable rates of inconsistent condom use in men who never tested vs. tested at least once for HIV (56.8% vs. 56.3%). However, respondents in that study were males over 18 years old with higher educational levels as compared to our younger population of mixed gender and lower education levels, which may explain the difference in findings.

The majority (72%) of our adolescents reported inconsistent condom use despite many reporting having used a condom once (56%) or at last sexual intercourse (35%). This is consistent with other Cameroonian studies amongst youth which reported rates of inconsistent condom use between 44%-82% (Lydie, et al., 2004; Meekers & Klein, 2002a; Meekers, et al., 2003; Sanou Sobze, et al., 2013; UNICEF, 2001; Van Rossem & Meekers, 2011), and other studies in sub-Saharan Africa reporting rates between 44%-90%. (Lagarde et al., 2001; Owoaje & Uchendu, 2009; Zembe, Townsend, Thorson, & Ekstrom, 2012) Similarly, the largest study of sexual risk behaviors in Cameroonian youth from 2000, reported overall rates of inconsistent condom use to be 82% amongst regular partners and 59% amongst casual partners. (Meekers, et al., 2003) It is important to note that these studies were performed in major urban centers while our respondents were from a mix of semi-urban and rural areas and surveyed more recently. Studies of condom use amongst youth in other parts of Africa have reported a wider range of rates of inconsistent condom use, which may be attributable to differences in gender and study populations.

In addition to unutilized HIV testing, female gender was also significantly associated with inconsistent condom use, while older age at sexual debut was protective against this in our study. Female gender has long been reported to play a role in condom use, specifically given the differences in the ability to negotiate condom use as well as the perceived efficacy and knowledge of condom types. (Meekers & Klein, 2002a, 2002b) Several studies in Nigeria

have reported that females were less likely to use condoms consistently. (Amoran & Fawole, 2008; Owoaje & Uchendu, 2009; Sunmola, Dipeolu, Babalola, & Adebayo, 2003)Young age at sexual debut has been a common finding in studies evaluating patterns of sexual behavior in Cameroon. One Cameroonian study described 15% of females and 28% of males reported sexual debut at <15 years of age. (Meekers, et al., 2003) Studies in South Africa and Nigeria have reported even higher rates of sexual debut < 15 years (40% and 37% respectively). (Owoaje & Uchendu, 2009; Zembe, et al., 2012) However, these studies did not demonstrate the association between early sexual debut and inconsistent condom use, and the study populations were significantly different from our study. (Owoaje & Uchendu, 2009; Zembe, et al., 2012)

Our study is limited by its cross-sectional design, restricting our ability to make direct causal inferences. Data on timing of the HIV testing was incomplete as many respondents could not specify the answer to this question. It is possible that non-utilization of HIV testing and therefore unknown HIV status is simply a marker for an otherwise already at risk population. In addition, we did not distinguish between condom use in casual partners and regular partners. However, since few participants responded as having regular partners, this may not have altered our overall results.

In conclusion, Cameroonian adolescents report high rates of inconsistent condom use, which we found to be associated with an unknown HIV status due to unutilized testing. HIV prevention programs among African youths/adolescents should consider incorporating expanded HIV testing programs to better reach those at highest risk for inconsistent condom use.

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Table 1

Baseline Characteristics of Study Population

	HIV negative (HIV-N) status (n=209)	HIV unknown (HIV-U) status (n=205)	*p*-value
Age, years (Mean) (SD)	17.9 (2.6)	16.4 (2.4)	< 0.01
Female, No. (%)	120 (57.4)	102 (49.8)	0.12
Location of Habitation, No. (%)			<0.01
City	14 (6.7)	30 (14.6)	
Town	124 (59.3)	131 (63.9)	
Rural	71 (34.0)	44 (21.5)	
Relationship Status, No. (%)			0.79
Single	166 (79.4)	165 (80.5)	
In a relationship	43 (23.6)	40 (19.5)	
Religion, No. (%)			0.09
Christian	183 (87.6)	167 (81.5)	
Other	26 (12.4)	38 (18.5)	
Highest Level of Education, No. (%)			0.38
Primary School or lower	5 (2.4)	8 (3.9)	
Secondary School or higher	204 (97.6)	197 (96.1)	
Parental Status, No. (%)			0.53
Both alive	156 (74.6)	157 (76.6)	
Single parent alive	46 (22.0)	38 (18.5)	
Neither alive	7 (3.4)	10 (4.9)	
Ever sexually active, No. (%)	107 (51.2)[*]	84 (48.8)[^]	0.07

P-values from Wilcoxon test for continuous variables and Chi-square or Fisher's exact for categorical variables.

[*] n=207,

[^] n=197

SD= Standard Deviation

Risk Behaviors Among Sexually Active Subgroup

	HIV negative (HIV-N) status (n=107)	HIV unknown (HIV-U) status (n=84)	*p*-value
Age, years (Mean) (SD)	18.5 (2.5)	17.5 (2.5)	0.02
Female, No. (%)	55 (51.4)	27 (32)	<0.01
Location of Habitation, No. (%)			0.28
City	11 (10.3)	15 (17.86)	
Town	63 (58.9)	48 (57.14)	
Rural	33 (30.8)	21 (25)	
Relationship Status, No. (%)			0.32
Single	76 (71.0)	65 (77.38)	
In a relationship	31 (29.0)	19 (22.62)	
Religion			<0.01
Christian	97 (90.7)	63 (75)	
Other	10 (9.3)	21 (25)	
Highest Level of Education, No. (%)			0.47
Primary School or lower	2 (1.9)	3 (3.6)	
Secondary School or higher	105 (98.1)	81 (96.4)	
Parental Status, No. (%)			0.49
Both alive	73 (68.2)	63 (75)	
Single parent alive	31 (29.0)	18 (21.4)	
Neither alive	3 (2.8)	3 (3.6)	
Age at sexual debut, years (Mean) (SD)	14.3 (4.3)	13.4 (4.5)	0.18
Number of lifetime sexual partners, No. (%)			0.94
1	42 (39.2)	35 (41.7)	
2-3	34 (31.8)	25 (29.7)	
4	31 (29.0)	24 (28.6)	
Ever used condom, No. (%)	63 (60.6)	44 (54.3)	0.39
Used condom at last sexual intercourse, No. (%)	42 (71.2)	25 (59.5)	0.22
Reason for becoming sexually active, No. (%)			0.12
Needed help/ Forced/ Pushed into it/ Received money or gift	25 (23.4)	12 (14.3)	
Fell in love/ Found oneself doing it/ Cannot remember/ Other	82 (76.6)	72 (85.7)	
First sexual partner 6 years older, No. (%)	43 (40.2)	41 (41.8)	0.23
Frequency of sexual activity, No. (%)			0.79
Less than once a month	34 (31.8)	30 (35.7)	
Once a month	34 (31.8)	27 (32.2)	
Weekly or more often	39 (36.4)	27 (32.1)	
Frequency of condom use, No. (%)			<0.01
Never/ Sometimes/ Usually	69 (63.9)	68 (81.0)	
Always	39 (36.1)	16 (19.0)	
Ever smoked cigarettes, No. (%)	18 (16.8)	22 (27.2)	0.09

	HIV negative (HIV-N) status (n=107)	HIV unknown (HIV-U) status (n=84)	*p*-value
Alcoholic use once weekly, No. (%)	22 (27.2)	22 (36.7)	0.23

P-values from Wilcoxon test for continuous variables and Chi-square or Fisher's exact for categorical variables.

SD = standard deviation

Table 3

Factors Associated with Inconsistent Condom Use in Youth with HIV Negative or Unknown Status in Cameroon by GEE[†]

	Odds Ratio (95% CI)	
Risk Factor	**Unadjusted**	**Adjusted**
Age (1 year increment)	0.87 (0.77-0.99)	1.24 (0.99-1.54)
Female gender	1.47 (0.76-2.84)	3.2 (1.29-7.89)
Single relational status	0.77 (0.36-1.66)	0.6 (0.25-1.45)
Religious affiliation	0.87 (0.36-2.09)	0.69 (0.24-2.0)
Number of lifetime sexual partners		
1	1.00 (Referent)	1.00 (Referent)
2-3	1.15 (0.58-2.31)	0.94 (0.36-2.4)
4	0.74 (0.38-1.47)	0.72 (0.28-1.9)
Forced sexual debut	1.40 (0.60-3.25)	1.58 (0.59-4.22)
Age at sexual debut (1 year increment)	0.76 (0.67-0.86)	0.67 (0.56-0.81)
First sexual partner 6 years older	2.04 (1.05-3.98)	1.69 (0.77-3.7)
Frequency of Sexual Activity		
Less than once a month	1.00 (Referent)	1.00 (Referent)
Once a month	0.46 (0.24-0.89)	0.61 (0.26-1.4)
Weekly or more	2.49 (1.17-5.29)	1.72 (0.65-4.54)
HIV unknown status, never tested	2.48 (1.26-4.89)	3.97 (1.68-6.01)

[†]GEE= Generalized Estimating Equation