

Opportunity for Prevention of HIV and Sexually Transmitted Infections in Kenyan Youth: Results of a Population-Based Survey

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Background: Data from sentinel serosurveillance are useful to estimate HIV infection in populations but may not be representative of the general population. General population-based surveys attempt to avoid selection bias and are the most appropriate for tracking changes in exposure to risk of HIV infection over time and assessing changes in behavior following prevention campaigns.

Objectives: To provide baseline data for targeted sexually transmitted infection (STI) and HIV infection prevention interventions by studying parameters of sexual behavior and knowledge of HIV infection and STIs, measuring health-seeking behavior related to STIs, and measuring gonorrhea, *Chlamydia*, syphilis, and HIV-1 prevalences.

Design: Population-based survey with stratified sampling by age group from randomly selected households in a suburb of Mombasa, Kenya.

Methods: A standard questionnaire was administered to 1497 consenting adults between the ages of 15 and 49 years who lived in randomly selected households. Urine and blood samples were obtained for the estimation of gonorrhea, chlamydial infection, syphilis, and HIV-1 infection prevalences.

Results: Sexual activity in the past 12 months was limited to one partner in all age groups for most sexually active men (68%) and women (88%). More men than women reported two or more partners in the past 12 months (23% vs. 5%, respectively). Almost one half of those persons in the 15- to 19-year-old age group (56% of boys and 48% of girls) were sexually active. Condom use was low with all sexual partners, more so for women than for men. Reported STI symptoms in the past 12 months were high for both men and women. Knowledge of STI symptoms and HIV infection was present but incomplete. Overall HIV seroprevalence was 10.8%, with significantly higher rates among women (13.7%) than among men (8.0%). HIV seroprevalence in the 15- to 19-year-old age group was 3.2%. Female gender, Protestant religion, Catholic religion, and being divorced, separated, and widowed were significantly associated with HIV seroprevalence. Prevalences of gonorrhea, chlamydial infection, and syphilis were 0.9%, 1.5%, and 1.3%, respectively.

Conclusions: This study emphasizes the vulnerability of young adults, in particular young women, to HIV infection and the need for intensive interventions in this group. The low use of condoms, incomplete knowledge of HIV infection and STIs, the high number of reported STIs, and the relatively low HIV-1 seroprevalence among the 15- to 19-year-old group indicate a large need for intensive STI and HIV infection prevention programs, especially for the 15- to 19-year-old age group.

Key Words: STIs—HIV—AIDS—Youth—Sexual behavior—Africa.

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Data from sentinel serosurveillance are useful to estimate HIV infection in populations but may not be representative of the general population as a whole. General population-based surveys attempt to avoid selection bias

associated with sentinel surveillance and are the most appropriate for tracking changes in exposure to risk of HIV infection over time and assessing changes in behavior following prevention campaigns (1).

In Kenya, HIV seroprevalence, as estimated by sentinel surveys of pregnant women, varies from 6% to 35% in urban areas and from 6% to 31% in rural areas (2). It is estimated that there are >2 million people currently infected with HIV-1 in Kenya. The seroprevalence among 2,235 pregnant women at an antenatal clinic in Mombasa, Kenya, was 13% between April 1998 and April 1999 (3) and 14% in 2001 (unpublished data, National Serosurveillance Meeting, Nairobi, January 2002).

Between April and July 2000, we carried out a cross-sectional survey of 1497 adults between the ages of 15 and 49 years who lived in randomly selected households in a suburb of Mombasa, studying parameters of sexual behavior and knowledge of HIV and sexually transmitted infections (STIs), assessing health-seeking behavior related to STIs, and measuring the prevalences of gonorrhea, *Chlamydia*, syphilis, and HIV-1. This analysis was done to provide baseline data for STI and HIV infection prevention interventions.

METHODS

Study Population

The study population included household members between the ages of 15 and 49 years who lived within the proposed intervention area and were resident in the household for the past 3 months. The study area is a low- to middle-socioeconomic class suburb in Mombasa. The area is ≈ 8 km² and has a population of $\approx 50,000$. Housing in this area is mostly permanent with iron roofing. Between April and July 2000, subjects were recruited, and informed oral consent staged by procedure was obtained from the subjects. One thousand four hundred ninety-seven persons were interviewed in private with a structured behavior surveillance survey modified and pretested for the local context. The questionnaire asked about demographic details, sexual behavior, condom use, history of STIs, and knowledge of STI and HIV infection prevention. Sex partners were defined as follows: regular partner, a spouse or live-in partner; steady partner, a regular boyfriend or girlfriend; casual partner, any other nonpaid partner who was not a regular or steady partner; and commercial partner, any partner who was paid for sex. Twenty-milliliter samples of first-catch urine were collected at least 2 hours after the last urine passed for polymerase chain reaction analysis for gonorrhea and *Chlamydia*, and 5-mL samples of blood were obtained from all consenting subjects for testing for syphilis and antibodies to HIV-1. A voluntary counseling and HIV testing service was provided free of charge at a nearby clinic for any subject wanting to know his or her HIV status, and treatment was offered for those found to have an STI.

Sampling Procedure

The study area had been divided into enumeration units as part of the National Census of 1999. The Central Bureau of Statistics randomly

selected 10 enumeration units within the location. Households were randomly selected using random numbers. A statistical assistant from the Central Bureau of Statistics and a nurse visited the selected households, confirmed the head of household, and introduced the study. The study nurse obtained oral informed consent from the head of the household and all eligible household members. The statistical assistant then listed the household members by gender and age. All household members between the ages of 15 and 49 years who had lived in the house for the past 3 months were asked to participate. The number of persons in each age group sampled roughly corresponded to the structure of the population based on national census data. If the selected subject fell within an age range where the required number of subjects had been obtained or was absent after three repeated visits, the subject was not included in the survey. Households continued to be selected randomly until the required number of subjects in each age group was obtained.

Laboratory Methods

Neisseria gonorrhoeae and *Chlamydia trachomatis* were detected in urine by polymerase chain reaction analysis (AMPLICOR; Roche Diagnostics, Branchburg, NJ, USA). Antibodies to *Treponema pallidum* were detected in serum using RPR card testing (Becton Dickinson BD Microbiology Systems, Sparks, MD, USA). Antibodies to HIV-1 were detected in serum using DETECT HIV (Biochem Immunosystems, Montreal, Quebec, Canada) and confirmed with Recombigen HIV-1/HIV-2 (Cambridge Diagnostics, Ireland, Galway, Ireland).

Ethical Permission

Ethical approval was obtained from the Kenyan National AIDS and STD Control Program and the Protection of Human Subjects Committee of Family Health International, United States.

Statistical Analysis

Data were recorded on standard forms and then stored in Epi-Info Version 6.0 (Centers for Disease Control and Prevention, Atlanta, GA, USA). Data were analyzed using the SAS statistical package (Version 6.12; SAS Institute, Cary, NC, USA). Comparison between groups was done using χ^2 tests for proportions and *t* tests and ANOVA procedures for continuous variables. Logistic regression was used in multivariate analyses to model HIV infection. Explanatory variables included in the model were selected largely on a priori basis but also based on statistical significance at univariate analysis. A *p* value of $\leq .05$ was considered statistically significant for all univariate and multivariate tests.

RESULTS

One thousand five hundred seven persons were invited to participate in the study. One thousand five hundred persons agreed to be interviewed, 1163 agreed to give urine samples, and 841 agreed to give blood samples.

Demographic Characteristics of the Study Population

Of the 1,497 interviewed persons with complete demographic data available, 748 (50.1%) were men and

749 (49.9%) were women. The mean age \pm SD of the men was 28.5 ± 8.8 years, and the mean age \pm SD of the women was 27.1 ± 8.3 years. The main characteristics of the study population are shown in Table 1. Twenty-seven percent of men and 11% of women were formally employed. Seventy-one percent (255) of men and 90% (412) of women were currently living with their spouse ($p = .001$). Eleven percent (39) of married men were polygamous, and 14% (63) of married women had cowives.

Behavioral Parameters

Sexual Activity and Sexual Partners

Of those persons interviewed, 88% (659) of men and 83% (618) of women had ever had sexual intercourse. Of those men who had ever had sexual intercourse, 9% reported no sexual intercourse, 68%, one partner, 16%, two partners, and 7%, three or more partners in the past 12 months. Respective figures for women were 7%, 88%, 3%, and 2% (Table 2). Sixty-two percent of men reported one or more regular partners, 33%, one or more steady partners, and 22%, one or more casual partners. Respective figures for women were 82%, 20%, and 3%. The reported number of nonspousal partners is shown in Table 3. Men who had never been married reported a lower rate of steady partners (68%) but more casual part-

TABLE 2. Reported number of sexual partners in the past 12 months

Age group	No partners n (%)	1 partner n (%)	2 partners n (%)	>3 partners n (%)	Total n (%)
Men					
15-19	9 (12.7)	39 (54.9)	12 (16.9)	11 (15.5)	71 (100.0)
20-24	16 (11.1)	89 (61.8)	24 (16.7)	15 (10.4)	144 (100.0)
25-29	20 (14.8)	94 (69.1)	14 (10.3)	7 (5.1)	135 (100.0)
30-34	11 (9.6)	84 (73.0)	16 (13.9)	4 (3.5)	115 (100.0)
35-39	4 (4.7)	61 (70.9)	19 (22.1)	2 (2.3)	86 (100.0)
40+	2 (1.9)	77 (72.0)	19 (17.8)	9 (8.4)	107 (100.0)
Total	62 (9.4)	444 (67.5)	104 (15.8)	48 (7.3)	658 (100.0)
Women					
15-19	6 (7.5)	73 (90.3)	1 (1.3)	0	81 (100.0)
20-24	6 (4.8)	116 (92.8)	1 (0.8)	2 (1.65)	125 (100.0)
25-29	6 (4.2)	132 (92.3)	4 (2.8)	1 (0.7)	143 (100.0)
30-34	8 (7.2)	90 (81.1)	8 (7.2)	5 (4.5)	111 (100.0)
35-39	6 (7.1)	76 (90.5)	2 (2.4)	0	84 (100.0)
40+	12 (16.2)	57 (77.0)	4 (5.4)	1 (1.4)	74 (100.0)
Total	44 (7.1)	544 (88.0)	20 (3.2)	9 (1.5)	618 (100.0)

ners (46%) compared with women who had never been married (93% and 4%, respectively). Married men reported more nonspousal partners (10%, steady partners; 6%, casual partners) than women who rarely reported nonspousal partners (3% and 0.4%, respectively). Twelve men reported one or more commercial partners, and of those, five had two or more. Eight (1%) of 573 women reported forced sex in the past 12 months.

In the 15- to 19-year-old age group, 56% (71) of men and 48% (81) of women reported having ever had sexual intercourse. Of those men who had ever had sexual intercourse, 13% reported no sexual intercourse, 55%, one partner, 17%, two partners, and 16%, three or more partners in the past 12 months. Respective figures for women were 8%, 90%, 1%, and 0. Men who had never been married in the 15- to 19-year-old age group reported less steady partners than women who had never been married (57% vs. 97%, respectively) but more casual partners (62% vs. 3%, respectively). There were only three married men in this age group. Of the 41 married women in this age group, only one reported a nonspousal partner.

Condom Use

Of those persons who had had sexual intercourse, 45% (295) of men and 22% (134) women had ever used a condom. The highest rates of use were observed in the 20- to 24-year-old age group (59%) for men and the 25- to 29-year-old age group (29%) for women. In the 15- to 19-year-old age group, 47% of men and 24% of women had ever used a condom. Rates of reported consistent condom use among men were 0.2%, 10%, and 36% with

TABLE 1. Characteristics of study population

Characteristic	Men (%) n = 748 (49.97)	Women (%) n = 749 (50.03)	Total (%) n = 1497 (100)
Age group			
15-19	127 (17.0)	169 (22.6)	299 (19.9)
20-24	164 (21.9)	156 (20.8)	320 (21.3)
25-29	145 (19.4)	155 (20.7)	300 (20.0)
30-34	119 (15.9)	111 (14.8)	230 (15.3)
35-39	86 (11.5)	84 (11.2)	170 (11.3)
40+	107 (14.3)	74 (9.9)	181 (12.0)
Religion			
Christian	397 (53.1)	390 (52.1)	787 (52.6)
Muslim	320 (42.8)	342 (45.7)	662 (44.2)
Other	31 (4.1)	17 (2.3)	48 (3.2)
Education			
No formal education	40 (5.4)	124 (16.6)	164 (11.0)
Primary	355 (47.5)	396 (52.9)	731 (50.2)
Secondary	267 (35.7)	187 (25.0)	434 (30.3)
Post secondary	86 (11.5)	42 (5.6)	128 (8.6)
Marital status			
Never married	366 (49.0)	216 (28.8)	582 (38.9)
Married/cohabiting	362 (48.5)	458 (61.2)	820 (54.8)
Separated/divorced	16 (2.1)	61 (8.1)	77 (5.1)
Widowed	3 (0.4)	14 (1.9)	17 (1.1)
Living with spouse			
Yes	255 (70.8)	412 (90.0)	667 (82.1)
No	105 (29.2)	40 (8.7)	145 (17.9)

TABLE 3. Reported number of nonspousal sexual partners in the past 12 months

	Steady		Casual	
	Men, n (%)	Women, n (%)	Men, n (%)	Women, n (%)
All sexually active				
0	402/596 (67.4)	460/573 (80.3)	466/596 (78.2)	558/573 (97.4)
1	179/596 (30.0)	112/573 (19.5)	88/596 (14.8)	9/573 (1.6)
>1	15/596 (2.5)	1/573 (0.2)	42/596 (7.0)	6/573 (1.0)
Never married				
0	71/225 (31.6)	5/69 (7.2)	121/225 (53.8)	66/69 (95.7)
1	144/225 (64.0)	64/69 (92.8)	71/225 (31.6)	2/69 (2.9)
>1	10/225 (4.4)	0	33/225 (14.7)	1/69 (1.4)
Married/cohabiting				
0	325/359 (90.5)	436/451 (96.7)	338/359 (94.2)	449/451 (99.6)
1	30/359 (8.4)	14/451 (3.1)	14/359 (3.9)	0
>1	4/359 (1.1)	1/451 (0.2)	7/359 (1.9)	2/451 (0.4)
Married in past				
0	6/12 (50.0)	19/53 (35.8)	7/12 (58.3)	43/53 (81.1)
1	5/12 (41.7)	34/53 (64.2)	3/12 (25.0)	7/53 (13.2)
>1	1/12 (8.3)	0	2/12 (16.7)	3/53 (5.7)

regular, steady, and casual partners, respectively. The figures for women were 0.3%, 5%, and 33%, respectively. The most important reason for respondents never to use a condom was because they trusted their partner (67% of men and 68% of women). Regardless of partner type, this was the most common reason not to use a condom last time (74%–82% of men and 68%–75% of women). This reason came before wanting to have a child (8% of men and 9% of women) and a perceived dislike of condoms in those who never use them (18% of men and 12% of women).

Health-seeking Behavior

Urethral discharge and genital ulcer were reported in the past 12 months by 6% and 3% of men, respectively. Vaginal discharge and genital ulcer within the past 12 months were reported by 4% and 5% of women, respectively (Table 4). Twenty-five percent of those subjects with an STI symptom admitted to sex while they had symptoms (16% of men and 25% of women), and of these, only 11% used a condom to protect their partner.

Knowledge of STIs and HIV

Unprompted knowledge of male and female STI symptoms is shown in Table 5. Twenty-eight percent of men and 60% of women were unable to mention one male STI symptom. Fifty-four percent of men and 48% of women were unable to mention one female STI symptom. Unprompted knowledge of ways to prevent STIs is shown in Table 5. Five percent of men and 13% of women were unable to mention one way of preventing

STIs, and 45% of men and 51% of women were only able to mention one correct way. One percent of men and 4% of women were unable to mention at least one correct way to prevent contracting HIV infection, and 18% of men and 20% of women were only able to mention one way of preventing HIV infection. Ninety-three percent of women and 78% of men believed that an HIV-infected mother could transmit HIV to her unborn child; most (76% of men and 78% of women) believed that this was due to sharing of blood. However, only 7% of men and women believed a mother could do something to reduce the risk of transmission of HIV to her unborn child. Twenty-six percent of men thought drugs exist to reduce transmission, and 37% of women thought that not having sex during pregnancy would reduce mother-to-child transmission. Thirty-eight percent of men and 39% of women thought an HIV-infected mother could do something to prevent transmission of HIV to the newborn child. Eighty-two percent of men and 83% of women cited not to breastfeed. Fifty-nine percent of men and 61% of women saw an advantage in having an HIV test, but only 12% of men and 10% of women knew their HIV status. Of those persons reporting previous HIV testing, most men (32%) knew their HIV status because they had donated blood, and most women (37%) knew because of an antenatal visit.

TABLE 4. Prevalence of reported sexually transmitted infection symptoms

Symptom	Men (%)	Women (%)
Vaginal discharge	—	33 (4.4)
Urethral discharge	44 (5.9)	—
Genital ulcer	25 (3.3)	34 (4.5)

TABLE 5. Knowledge of sexually transmitted infections and HIV

	Men (%)	Women (%)	Total (%)
Unable to name one correct male symptom	206 (27.5)	446 (59.6)	652 (43.6)
Unable to name one correct female symptom of STI	404 (54.0)	356 (47.5)	760 (50.8)
Unable to name at least one correct way of preventing STI	34 (4.6)	99 (13.2)	133 (8.9)
Able to name only one correct way of preventing STI	334 (44.7)	379 (50.6)	714 (47.6)
Unable to name at least one correct way of preventing HIV	10 (1.3)	29 (3.9)	39 (2.6)
Able to name only one correct way of preventing HIV	135 (18.1)	150 (20.0)	285 (19.0)
Ever discussed HIV/STI with spouse	312 (53.3)	358 (56.9)	670 (55.2)
Ever discussed HIV/STI with casual partner	84 (19.1)	9 (2.8)	93 (12.3)
Ever discussed HIV/STI with commercial partner	3 (0.8)	0	3 (0.8)
Has not known anyone who has died of AIDS	217 (29.1)	272 (36.3)	489 (32.7)
Cared for someone with AIDS	88 (16.2)	67 (13.9)	155 (15.1)
Has not heard or talked about STI and AIDS in the last 12 months	12 (1.6)	12 (2.4)	30 (2.0)
Believed HIV-infected mother could transmit HIV to her unborn child	577 (77.6)	597 (92.7)	1174 (84.6)
Believed HIV mother could do something to prevent HIV transmission to her unborn	48 (6.6)	51 (6.9)	99 (6.8)
Believed HIV mother could do something to prevent HIV transmission to her newborn	282 (38.0)	291 (39.0)	573 (38.5)
Saw an advantage to having a HIV test	441 (59.0)	457 (61.0)	898 (60.0)
Knew HIV status	92 (12.3)	78 (10.4)	170 (11.4)
Knew site where they could get advice about AIDS and get an HIV test	240 (32.1)	234 (31.2)	474 (31.7)

HIV and STI Seroprevalences

Those persons who did not consent to blood being taken for an HIV test ($n = 659$) tended to be younger and were more likely to be never married, divorced, or separated, than those who did agree to blood being taken for an HIV test ($n = 841$), but there were fewer widows in the former group. There was no difference in the level of education or religion (data not shown). HIV seroprevalence by gender and age is shown in Table 6. The overall HIV seroprevalence was 10.8% with a significantly higher rate among women (13.7%) than among men (8.0%) ($p = .008$). HIV seroprevalence among the 15- to 19-year-old age group was 3.2%. Although HIV seroprevalence was consistently higher among women than among men across all age groups, the gender disparity was most pronounced in the 20- to 24- and 25- to 29-year-old age groups. Prevalences of gonorrhea, chlamydial infection, and syphilis were 0.9%, 1.5%, and 1.3%, respectively (Table 7). Correlates of HIV seropositivity in a multivariate model were female gender ($p = .05$), Protestant religion ($p = .008$) and Catholic religion ($p = .005$) compared with Muslim religion, and being

divorced/separated ($p = .002$) or widowed ($p = .02$) compared with being married. Number of partners, reporting sex with a casual or commercial partner in the past 12 months, and condom use with a regular, steady, or casual partner were not significantly associated with HIV seroprevalence. There were no significant associations with STI prevalence, but the number of persons with an STI was small. Of those persons who denied sexual activity, one of 48 women tested and one of 36 men tested were HIV-1 positive, and two of 85 women tested had an STI.

DISCUSSION

Sexual activity within the past year in this middle- to low-socioeconomic status population was mostly limited to one partner for most sexually active men and women. A minority of persons had two or more partners in the past 12 months, and men were much more likely to report more than one partner than were women. The large difference (23% vs. 5%, respectively), however, suggests that it is not solely due to underreporting by women. Nonspousal partners were common for those persons who were sexually active, especially men. Most single women reported one steady partner in the past 12 months and few casual partners, while single men were much

TABLE 6. HIV-1 prevalence by age group

Age group	Men (%)	Women (%)	Total (%)
15-19	1/50 (2.0)	3/75 (4.0)	4/125 (3.2)
20-24	1/87 (1.2)	12/77 (15.6)	13/164 (7.9)
25-29	7/83 (8.4)	18/87 (20.7)	25/170 (14.7)
30-34	10/72 (13.9)	11/75 (14.7)	21/147 (14.3)
35-39	8/58 (13.8)	8/51 (15.7)	16/109 (14.7)
40-44	3/40 (7.5)	2/29 (6.9)	5/69 (7.3)
45-49	4/35 (11.4)	3/22 (13.6)	7/57 (12.3)
Overall	34/425 (8.0)	57/416 (13.7)	91/841 (10.8)

TABLE 7. Sexually transmitted infection prevalence

Sexually transmitted infection	Men (%)	Women (%)
Gonorrhoea	7 (1.2)	4 (0.7)
Chlamydia	6 (1.1)	11 (1.9)
Syphilis	5 (1.2)	6 (1.5)
Sexually transmitted infection ^a	17 (4.2)	20 (5.0)

^a Either gonorrhoea and/or chlamydia and/or syphilis test positive.

less likely to have a steady partner but were more likely to have casual partners. Overall, this suggests that HIV transmission is driven by a minority of persons with multiple partners.

About one half of the youth in the 15- to 19-year-old age group were sexually active. A few had multiple partners in the past year, but again men were much more likely to have had more than one partner than were women. There was no evidence of behavior change in terms of reduction in the number of partners in this age group.

The validity of any sexual behavior data must always be questioned. Misreporting of sexual behavior is a recognized problem of sexual behavioral surveys (4). In this survey, the presence of HIV infection or an STI in respondents who denied that they had ever had sexual intercourse suggests that there was some misreporting. Typically, women report less sex partners than men do, and this is probably a result of underreporting (5). This pattern was seen in this survey. However, although we believe that both misreporting and underreporting are likely to have taken place, it is unlikely that these invalidate the overall conclusions of the study.

Overall, condom use in the population as a whole was low, especially in women and older men. This was most marked, as expected, with a spouse but increased with casual and commercial partners. Use was highest in the 20- to 29-year-old age group, which suggests some degree of behavior change in this age group. Despite the low use, condom use was commonly cited as a way to prevent HIV infection.

Although gender specific, a significant proportion of men and women were unable to mention one male or female STI symptom, and a lower but significant proportion were unable to mention one way of preventing an STI. Knowledge of HIV infection prevention was better. Likewise, knowledge of transmission of HIV from mother to child was good, but details of prevention were still poor. This probably reflects the scarcity of such services in Kenya at the time.

Overall HIV seroprevalence was consistent with that found among antenatal women in Mombasa (3) but was lower among men than women. Age and gender distributions were typical of those found in several population studies in Africa (6–13), with a disproportionately high rate of HIV infection among women in the 20- to 29-year-old age group compared with men. HIV seroprevalence was five times higher among women than among men in this age group. The reasons for this finding are unknown, but the increased transmission from men to women (14,15), high levels of asymptomatic STIs (16), and cross-generational relationships (17) probably con-

tribute to it. In contrast to the high HIV seroprevalence in the 25- to 29-year-old age group, seroprevalence was still relatively low in the 15- to 19-year-old age group, and the gender disparity was less marked. This HIV-1 seroprevalence is similar to that found in Cotonou and Yaoundé but is much lower than that in Kisumu in Kenya (10). The relatively high proportion of respondents in this age group who were not sexually active and the low number of multiple and casual partners may account for this result. These figures suggest that prevention interventions in this age group may have a significant impact.

In summary, this survey emphasizes the disproportionately high vulnerability of young adults, in particular young women, to HIV infection and the need for intensive intervention in this group. Relatively low HIV seroprevalence in the 15- to 19-year-old age group suggests prevention interventions in this age group may have a significant impact. The high number of annual partners for young men suggests partner reduction may be a useful strategy in this particular group. The low use of condoms, incomplete knowledge of HIV infection and STIs, and the high number of reported STIs in the past year in general present a large window of opportunity for appropriate, targeted STI and HIV prevention interventions.

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