AIDS Behav (2006) 10:607–617
DOI 10.1007/s10461-006-9113-7

ORIGINAL PAPER

HIV-Related Sexual Behavior in Urban, Rural and Border Areas of Burkina Faso

Maria Khan · Lisanne Brown · Nicolas Nagot · Souleymane Salouka · Sharon S. Weir

Published online: 20 May 2006

Introduction

As HIV/AIDS prevention resources are scarce, program planners must first reach areas at highest risk of HIV transmission (Weir et al., 2003). "High transmission areas" are often locations where increased social mixing intersects with increased commercial activity (e.g., hotels for truck drivers at the intersection of major commercial routes, bars near trading centers and migrant worker residences; Mwizarubi, Hamelmann, & Nyamuryekung'e, 1997). Nationally-representative surveys provide serological evidence that HIV prevalence is highest in urban areas (UNAIDS/WHO, 2004), where "high transmission areas" are concentrated. However, such areas are also found outside urbanized settings. Even within relatively small rural areas, large differences in prevalence by residence have been observed (Boerma, Urassa, Klokke, Senkoro, & Ng'weshemi, 1999; Serwadda et al., 1992). In a 1997 review of urban-rural differences in sexual behavior and HIV risk, Caraël (1997) emphasized that simultaneous epidemics occur within both urban and non-urban areas, and the interplay between these epidemics as a result of population mobility is important. Especially considering that the majority of the population in sub-Saharan Africa lives in non-urban areas, understanding HIV transmission risk in both urban and non-urban areas is warranted (FAO, 2003).

The present study examined differences in HIV-related sexual behavior among urban, rural and border areas of Burkina Faso. Burkina Faso has the second highest HIV prevalence in West Africa after its southern neighbor, Côte d'Ivoire, with estimates of HIV prevalence varying from about 1% in rural areas to about 4% in some urban towns and regions that border Côte d'Ivoire (INSD, 2003). Population mobility between urban and rural areas and across international borders is assumed to be a particularly important determinant in the West African HIV/AIDS epidemic (Lydie and Robinson, 1998; UNAIDS/IOM, 1998), and Burkina Faso historically has experienced substantial internal and international migration. About 602,000 people migrated internationally between 1988–1992, most often to Côte d'Ivoire and Ghana in search of work (INSD, 2003). Since September 2002, Côte d'Ivoire has experienced a severe political and social crisis that has led to the return of many Burkinabé who were born abroad (INSD, 2003). This in-migration will potentially impact the HIV-epidemics of both urban and rural areas of Burkina Faso.

Behavioral data were needed to interpret urban and non-urban HIV prevalence estimates and to best plan intervention strategies appropriate for each setting in Burkina Faso. Therefore, the Burkina Faso National AIDS Control Program (CNLS) piloted implementation of the Priorities for Local AIDS Control Efforts (PLACE) method, a relatively novel assessment tool designed to identify places where HIV/AIDS prevention programs should be implemented (Weir, Morroni, Coetzee, Spencer, & Boerma, 2002), in two Burkina Faso Health Districts. The method was developed based on epidemiologic models indicating that among the most important determinants of sexual transmission of HIV

M. Khan (✉) · S. S. Weir
MEASURE *Evaluation* Project, Carolina Population Center and Department of Epidemiology, University of North Carolina, Room 306, 123 W. Franklin St., Chapel Hill, NC, 27516-2524
e-mail: maria_khan@unc.edu

L. Brown
MEASURE *Evaluation* Project, Department of International Health and Development, Tulane University, New Orleans, LA

N. Nagot · S. Salouka
Centre Muraz, Bobo-Dioulasso, Burkina Faso

are rates of new and multiple partnership acquisition (Anderson, 1999; Anderson & May, 1988). Individuals with high rates of partner acquisition are at increased risk of acquiring HIV and subsequently infecting partners with lower rates of sexual partner acquisition. Such "core groups" have been identified as central in the epidemiology of sexually transmitted disease (STD) transmission (Wasserheit & Aral, 1996) and core group interventions have been promoted as a cost-effective strategy to reduce transmission of STDs.

Unfortunately, program planners lack tools to identify core group members, thus prevention has been limited (Thomas & Tucker, 1996). Although empiric data to describe key features of a population's sexual network may be difficult to obtain from individuals, there may be characteristics at the community level associated with its capacity to sustain or spread HIV. The importance of improving individual-level health via structural- and/or environmental-level intervention has been well documented (Cohen et al., 2000; Marmot, 1998; Latkin, Mandell, Vlahov, Oziemkowska, & Celantano, 1996; Stokols, 1996; Rose, 1992). Evidence indicates that STDs, HIV and related risk behaviors cluster at social venues such as at bathhouses in San Francisco (Wohlfeiler, 2000), baths and cruising areas in the Netherlands (de Wit, de Vroome, Sandfort, & van Griensven, 1997), bars in Colorado (Potterat et al., 1985) and at multiple venue types in South Africa (Weir et al., 2002) and Negroni-Belen et al. (2003), and that intervention based in social venues is promising (Egger et al., 2000; Wohlfeiler, 2000; Rojanapithayakorn & Hanenberg, 1996; Kelly et al., 1991).

The PLACE Methodology not only gathers data on individual-level sexual behavior but also on structural-level determinants of HIV transmission (Weir et al., 2003). Specifically, the PLACE Method identifies the geographic areas and social venues within these areas where core groups cluster, and it measures the unmet need for condom promotion and HIV/AIDS prevention education at these social venues. A venue-based approach has programmatic advantages. Approaches based on risk group status, such as being a trucker or sex worker, can be stigmatizing and are often inadequate in generalized epidemics, whereas clinic-based approaches miss most people with high rates of new sexual partner acquisition.

The PLACE method was developed at the University of North Carolina and pilot tested in 1999 in Cape Town, South Africa (Weir et al., 2002). Since then, a group of international collaborators have implemented the protocol in more than twenty settings throughout Africa, South and Central Asia, Central American and the Caribbean. A full description of the methods and results of implementation in Burkina Faso were described in the full study report (PLACE Study Group/Burkina Faso, 2003).

The method was implemented in the Banfora and the Tenkodogo Health Districts by the CNLS and representatives of the Regional Health Offices of each Health District, in collaboration with the Centre Muraz (Bobo-Dioulasso, Burkina Faso) and the MEASURE *Evaluation* Project (University of North Carolina at Chapel Hill and Tulane University). The Banfora Health District, located in the southwestern corner of the country with about 300,000 people, has one of highest HIV prevalence levels in the country (2.4%; INSD, 2003). Banfora borders Côte d'Ivoire and is near Ghana, countries with relative economic prosperity and a destination for migrant workers. The urban area included in this study, the largest commercial center of the Health District with a population of about 17,000, lies at the crossroads of the major international highway leading to Cote d'Ivoire and inter-district highways leading to other major villages in the district. The three rural areas included in the study have populations ranging from 3,500 to 8,000 inhabitants with varying levels of development. The border site is a semi-urban town of 11,000 inhabitants on the border with Côte d'Ivoire, with numerous bars with dancing, brothels and restaurants (DRS Banfora, 1999).

Located in south eastern Burkina Faso, the Tenkodogo Health District has a population of 398,000 and an HIV prevalence of about 1.3% (INSD, 2003). The Health District borders Togo and is close to Ghana, two countries that supply a large proportion of Burkina Faso's imported goods, and a major international highway facilitates trade with Togo. The urban area included in this study is the largest town in the district, with a population of 35,000. It is an important center of transit and commerce owing to its strategic position on a major route leading to Togo. The rural area is comprised of two adjacent villages with a combined large population size of 34,000. The semi-urban border town of about 38,000 inhabitants lies about 11 km from Ghana and 20 km from Togo (DRS Tenkodogo, 2000).

The specific aims of this study were to determine urban, rural and border differences in venues where people meet new sex partners, including differences in the number and type of venues and the potential for on-site HIV/AIDS intervention; compare the prevalence of new and multiple partnerships among a sample of individuals socializing at a sample of venues in each geographic setting; and determine the venue-level and individual-level predictors of new and multiple partnerships in each setting, so that intervention activity is focused on venues and venue patrons most in need.

Method

Participants and procedures

In each of the study areas, named *Zones d' Interventions Prioritaires* ("*ZIP*s") in Burkina Faso, three stages of

interviewing were performed. In the first stage, community informants (about 50 to 80 community informants per town) assumed to be knowledgeable about their area were recruited for a brief interview, during which time they responded to the question, "Where do people in this town go to meet new sex partners?" Each informant provided the name of the venue, the type of venue and the precise venue location, so that each venue could later be revisited. Local health officials identified the types of community informants that would potentially provide the most valid information about their towns. More than half of community informants were taxi or truck drivers, bar/restaurant workers, youth and professionals, but informants also included street vendors, military officials and religious leaders. Based on informant reports, a list of all venues and events in the study areas was compiled.

The second stage involved visits to each of the unique venues named by community informants to verify the location and interview a person knowledgeable about the venue, such as a manager, owner or on-site worker. Venue representatives reported on venue characteristics, including the potential to meet sex partners on site and HIV/AIDS intervention activity. In cases when the venue had no "owner" or "worker," including venues such as streets, public parks or abandoned lots, the interview was conducted with a person knowledgeable about the venue such as a nearby resident or a person who socialized at the venue. Though community informants reported both fixed venues and periodic events (e.g., weddings and festivals), it was only possible to verify venues. If the venue was closed at first visit, the interviewer returned at least three times to attempt the interview.

During the third phase of interviewing a structured face-to-face sexual behavior survey was administered to a representative sample of individuals socializing at the venues most frequently named by community informants (8 venues per study town) during a time of peak operation. The assumption was made that at the venues most frequently named by community informants, individuals were likely to have sexual risk behaviors that warranted HIV/AIDS prevention education.[1] A team of two interviewers visited each of the selected venues and attempted to recruit 16 men and 8 women, as venue verification interviews indicated a 2 to 1, male to female ratio at venues during a busy time. To select a representative sample of individuals socializing at the venues, interviewers followed a protocol that distributed interviewers systematically throughout the venue. For example, when the interviewing team entered a venue with four walls, each interviewer claimed either the right or the left corner at the front of the venue, and each visualized an imaginary line that traversed the venue area diagonally to the opposing corner. Each interviewer recruited the target number of potential respondents at even intervals along the imaginary line. Venues that did not have four walls utilized an adaptation of this method to distribute the probability of interview selection throughout the venue. Interviewers brought the respondents to a private area to assure confidentiality during the interview. If a potential respondent had already been interviewed and reported this to the interviewer, the recruitment was ended.

Before each interview, interviewers explained the purpose and scope of the study and obtained a verbal informed consent for a confidential and anonymous 15 to 20 min interview. For the community informant and venue verification interviews, no compensation was systematically offered, though if appropriate, interviewers purchased a cola or small snack to build camaraderie. During the individual interviews, the interviewer offered to purchase a cola or snack for each respondent and offered him or her condoms at the end of the interview.

Interviewers were selected based on skill, experience and interest in the study. Interviewers for the Banfora Health District were from a neighboring town where they speak the same language, Dioula. Interviewers for the Tenkodogo Health District were comprised of local interviewers as well as members from the Banfora Health District interviewing team, all of whom could speak Mooré, the local language. Each interviewer received a one-week training on the rationale, objective and methods of the PLACE protocol. Study instruments, including the PLACE Method protocol, interview guide and questionnaires, were translated from English to French. In addition, the interviewers reached a consensus about which Dioula and Mooré words would be used during the interviews to best explain certain concepts.

Measures

Community informant interviews

Interviews with community informants yielded a list of venues and events known for sexual meeting. Interviewers first asked community informants to report the places, in general, where people go to meet sex partners. They also probed community informants to provide venues that all youth and sex workers go to meet new partners. The most common venue types are presented; however, in the analysis venues were also categorized into three major venue types. "Formal Commercial Venues" (*Venue category 1*) included formal

[1] Venue verification interviews supported community informants' reports that sexual risk behavior clustered at the most frequently cited venues that were selected for the individual interviews. Representatives of these venues were more likely to report that at their venues, men find women sex partners, women find men sex partners and sex workers solicit clients (92.0, 88.0 and 26.7%, respectively) than representatives of all other venues (72.6, 65.7 and 8.7%, respectively).[0] Individual interviews also confirmed that meeting sex partners on site was common, though it differed greatly by setting; only 15% of men and women in rural villages had ever met a partner on site, compared with 60% of men and women in the border area of Banfora and over 70% in urban Tenkodogo.

bars, *maquis* (small open-aired modern bar serving beer and liquor), hotels/brothels and dance clubs, venues where people came primarily to socialize. "Informal venues" (*Venue category 2*) included small open-air venues such as *cabarets* (small outdoor "shack" bars serving home brewed beer), street food vendors, small shops, tea clubs, video clubs and private homes. "Public venues" (*Venue category 3*) included markets, streets, schools, hospitals, etc.

Venue verification interviews

Venue representatives reported the time of the week and the season of the year that the venue was at peak operation, on-site activities, the prevalence of meeting sex partners on site, whether sex workers solicit clients on site and whether on-site AIDS/STD prevention and condom provision had ever been hosted and/or could be hosted in the future.

Interviews with individuals socializing at venues known for sexual meeting

Individuals reported demographic variables (age, residence, recent migration to the current residence within the 12 months prior to the survey), socio-economic variables (education, employment status), daily venue attendance, AIDS education in the three months prior to the survey, sexual partnership indicators (new and multiple partnership in the one month and 12 months prior to the survey and sex trade), condom use and STD symptoms. As new and multiple partnerships are both important underlying determinants of sexually-transmitted HIV infection (Boerma & Weir, 2005; Anderson, 1999; Anderson & May 1988), the variable modeled in the multivariable settings was coded "1" if the respondent reported either one new or at least two partners in the month prior to the survey and "0" otherwise.

Data analysis

Bivariate tabular analysis was performed to assess urban, rural and border differences in sexual meeting venues and characteristics of individuals who socialize at these venues. The prevalence of venue representatives who reported meeting sex partners and HIV/AIDS prevention activity at their venue was calculated. Prevalence of individual-level demographic, socio-economic, venue attendance characteristics, sexual behavior, AIDS education and condom use was also calculated. Pearson Chi-Square test statistics were computed to compare urban, rural and border differences in venue-level and individual-level characteristics.

The goal of conducting the PLACE Method in Burkina Faso was to obtain venue-level and individual-level sexual behavior indicators in order to develop venue-based interventions specific to each geographic area. Thus, Prevalence Proportion Ratios (PPR) and 95% Confidence Intervals for the associations between reports of new/multiple partnerships in the month prior to the survey with venue-level and individual-level variables were estimated using generalized estimating equations to account for clustering by the venue where the individual was interviewed, stratified by geographic area (Zeger & Liang, 1986). The associations between the new/multiple partnership with venue size (categorized as <30 people, 30–100 people and >100 people socializing at the venue) and venue type (dichotomized as formal or informal/public) were examined among men and women combined, adjusting only for the Health District where interview took place (Banfora or Tenkodogo) and the other venue-level variable in the model; individual-level variables were not entered into the model because the associations between the outcome and venue characteristics, independent of the characteristics of the population that socializes at the venue, were of interest. Associations between new/multiple partnership and individual-level variables (demographic, socio-economic, AIDS education and venue attendance characteristics) were estimated for men and women separately, adjusting for all other individual-level characteristics in the model, venue-level characteristics and Health District of the interview.

Results

Number and type of sexual meeting venues in urban, rural and border areas

A total of 163 urban, 189 rural and 117 border area community informants were interviewed. They identified a total of 196 venues in the two urban areas, 150 venues in the five rural areas and 76 venues in the two border areas; therefore, a mean of 98 venues per urban town, 30 venues per rural village and 38 venues per border town were identified. Over 30 different types of venues were identified. Figure 1 presents the most common types of venues in each setting. In urban and border areas of both Health Districts, the most common venues were small drinking establishments including *maquis* and *cabarets*. In the rural areas in the Banfora Health District, the most common venues were *cabarets* and "tea clubs" (an informal daily gathering of men), while *maquis*, brothels and bar/dancing establishments were less common. In the rural areas of the Tenkodogo Health District, markets comprised the greatest proportion of venues, while *cabarets*, video clubs, restaurants, and food and alcohol vendors each comprised about 10% of venues. Rural venues also included meeting places such as the hospital or the phone booth, places not typically considered sexual meeting venues.

Larger percentages of *Venue category 1,* "Formal commercial venues," were identified in urban (45%) and border

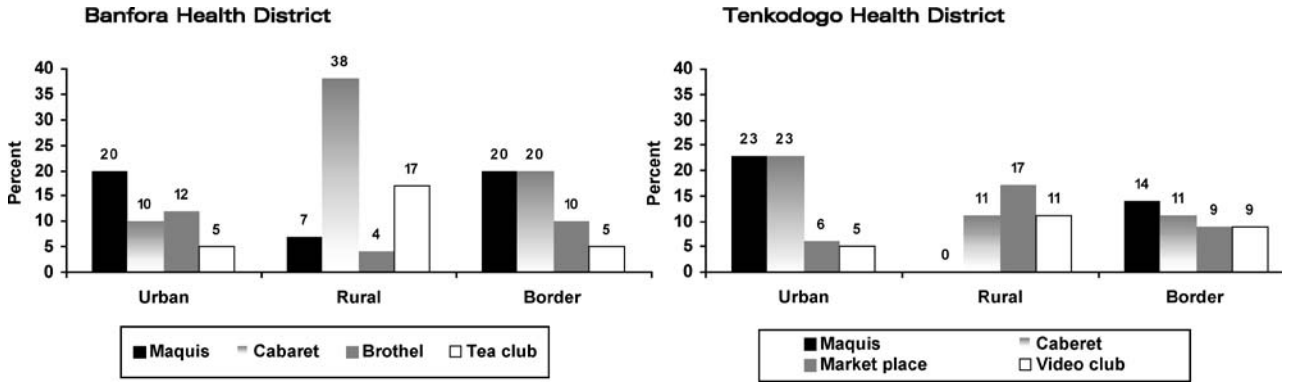

Fig. 1 Distribution of types of sexual meeting venues in urban, rural and border areas, Banfora and Tenkodogo Health District, Burkina Faso, 2001

areas (48%) than rural areas (15%). The majority of rural venues are described as *Venue category 2*, "Informal venues" such as *cabarets*, street food vendors, small shops, tea clubs, video clubs and private homes (60%). In contrast, less than 30% of venues in urban and border areas are considered informal venues. *Venue category 3*, "Public venues" such as markets, streets, schools, hospitals, etc., account for about one-quarter of venues in each area.

Numerous community informants reported that people also meet new sex partners at community events such as weddings, funerals, baptisms, harvest celebrations and traditional rituals, in addition to geographically fixed venues, as important for sexual meeting. While events were reported in areas throughout the health districts, they comprised a substantial proportion of all community informant reports in rural areas of Banfora (14%) and Tenkodogo (35%).

Characteristics of sexual meeting venues

The venue was identified and the interview was accepted at 181/196 (92%) of urban venues, 133/150 (89%) of rural venues and 65/76 (86%) of border venues.

Times of peak operation differed, often reflecting differences by type of area. In urban towns, over 70% of bars, brothels and dance clubs reported that Friday and Saturday nights were the busiest times. In contrast, large proportions of venues in rural areas and border towns reported they are busiest during the weekdays, both in the Banfora Health District (about 33 and 50%, respectively) and the Tenkodogo Health District (50% in rural and border areas).

Venue representatives throughout both Health Districts reported that the dry season was the busiest time for venue operation, as during the rainy season, people must work and have little money for social events. Venue representatives in rural and border areas were most likely to report this season as important (81 and 78%, respectively) compared with those in urban areas (58%).

Table 1 presents venue representative reports on sexual partnership and HIV/AIDS prevention efforts at venues. The majority of all 379 venues where the interview was conducted confirmed community informant reports that people

Table 1 Sexual partnership potential and HIV/AIDS prevention at sexual meeting venues in urban, rural and border areas, according to venue representatives, Banfora and Tenkodogo Health Districts, Burkina Faso, 2001 (%)

	Percent[a]	Test Statistic[b]
Sexual partnership potential		
People meet new sex partners		
Urban	84.0	2.00
Rural	84.2	
Border	89.2	
Female sex workers solicit clients		
Urban	14.4	17.37**
Rural	5.3	
Border	26.2	
HIV/AIDS prevention		
Ever had an HIV prevention program		
Urban	28.7	6.48*
Rural	22.6	
Border	38.5	
Willing to have HIV prevention		
Urban	82.9	1.04
Rural	85.7	
Border	90.8	
Condoms were ever given or sold		
Urban	12.2	1.38
Rural	8.3	
Border	12.3	
Willing to sell/give condoms		
Urban	70.2	3.51
Rural	57.1	
Border	66.2	

[a]Percentages were computed based on total of 181 urban, 133 rural and 65 border sites where site representatives were interviewed.

[b]Pearson $X^2(2)$.

*$p < .05$.

**$p < .01$.

meet new sex partners at the venue, regardless of setting. While a minority of venues reported that sex workers come to solicit clients, respondents in urban and border areas were much more likely to report sex work at their venues compared with their rural counterparts.

A minority of venues, regardless of the area, had ever provided condoms or hosted an AIDS education session on venue. In contrast, the majority of venues in all areas were willing to participate in HIV/AIDS prevention, and large proportions were willing to sell condoms on venue. Border venues were most likely to report past HIV/AIDS intervention programs and willingness to participate in future programs.

Sexual partnership and condom use among venue patrons

A representative sample of individuals was interviewed while socializing at 65 venues most frequently cited by community informants (eight venues per town). The number of venues included in urban, rural and border areas for the individual interviews (17, 31 and 17 venues, respectively) represented a fraction of all venues identified by community informants (9, 21 and 22%, respectively). More than half of venues selected for individual interviews were formal commercial establishments (57%), followed by public venues (32%) and informal venues (11%). The individual interview acceptance rates were high overall, though slightly higher among men (95, 96 and 98%, respectively) than among women (90, 90 and 93%, respectively).

Table 2 presents socio-demographic characteristics, venue-attendance characteristics and sexual behavior of the individuals interviewed at venues. Regardless of geographic setting, women were five to six years younger than men. A minority of respondents had completed primary school, though the percentage who received at least one year of schooling was higher than the national average (INSD, 2003). The majority of men and women had never received HIV/AIDS education, particularly in rural areas. Though most respondents were residents of their respective area, recent migration to urban areas was common.

Greater than half of the women in urban and border areas visited the venue where they were interviewed every day. Visiting multiple sexual meeting venues was more common among men than women.

New and multiple partnerships and sex work were most common among women in urban and border areas though reported by important proportions of rural women. The Banfora border town and the Tenkodogo urban town were reputed for sex work; women in these areas reported a mean number of eight new partners in the month preceding the survey, while all other men and women in the Health Districts reported a mean of less than one new partner. While there is geographic heterogeneity among women's sexual behavior, men tended to report similar and relatively high levels of partnership across all settings.

Urban and border women were more likely to report condom use with a recent new partner than with their rural counterparts. Reported condom use with a recent new sex partner was high among men in all areas.

Figure 2 indicates that, regardless of the study area, there was great discrepancy between the proportions reporting new/multiple partnerships in the past month versus the proportion of individuals with such sex partnerships who possessed a condom while socializing at the venue. Though their partnership levels were slightly lower, no rural woman carried a condom.

Multivariable regression

The crude analysis indicated that individuals interviewed at the venues most frequently named by community informants in all areas had high levels of partnership and low levels of condom coverage, suggesting that prevention was needed in each area. The question underlying the multivariable regressions was whether prevention programs should be designed differently for each geographic setting, specifically, if certain venues or certain types of venue patrons should be targeted.

Relatively weak and imprecise estimates between venue-level variables and new/multiple partnership were generally observed. In urban areas, men and women who socialized at the largest venues (>100 persons) were more likely than those at the smallest venues (<30 persons) to report the new/multiple partnership (PPR: 2.17, 95% CI: 0.79, 5.98). In rural areas, men and women at formal venues (bars, clubs) were slightly more likely than those at other venues to report the outcome (OR: 1.26, 95% CI: 0.89, 1.80). In border areas, neither venue type nor size was associated.

The relationship between individual-level variables and women's new/multiple partnership was variable, by setting. In rural areas, age was an important predictor, with teenage women much more likely to report new/multiple partnership in the past month than women aged 20 to 24 (PPR: 0.43, 95% CI: 0.18, 1.02) or 25 years and older (PPR: .45, 95% CI: 0.20, 1.00). In urban areas, women who received a primary school education or higher (seven years of education and greater) were less likely to report new/multiple partnership (PPR: 0.44, 95% CI: 0.17, 1.13). Those with a higher prevalence of new/multiple partnerships in urban areas came to the venue daily (PPR: 1.49, 95% CI: 0.82, 2.70). It was decided that these results were not interesting given the lack of strength imprecision. In border areas, women who were more likely to report new/multiple partnership were working full or part-time (PPR: 2.06, 95% CI: 0.91, 4.61), and

Table 2 Characteristics of individuals socializing at sexual meeting venues most frequently named by community informants (Eight Venues Per Town), Banfora and Tenkodogo health districts, Burkina Faso, 2001 (%)

	Male			Test statistic[b]	Female			Test Statistic[b]
	Urban ($N=261$)	Rural ($N=451$)	Border ($N=244$)		Urban ($N=120$)	Rural ($N=204$)	Border ($N=114$)	
Age[a]								
15 to 19	3.5	11.1	4.5	30.93[c**]	25.8	46.6	27.2	33.97[c**]
20 to 24	25.7	28.4	20.9		38.3	25.0	23.7	
25 to 29	26.8	26.2	35.3		20.8	13.2	32.5	
30 to 34	22.6	15.3	20.1		8.3	7.8	10.5	
35 to 39	10.7	9.8	11.1		1.7	4.4	3.5	
≥ 40	9.6	9.3	8.2		1.7	2.0	2.6	
Residency								
Residents of the study area	85.4	80.5	79.1	3.54	84.2	91.3	79.0	10.31**
Have lived in the area <1 year	13.4	9.7	13.9	4.43	35.8	10.8	31.6	33.40**
Years of education[a]								
0	10.7	27.3	11.1	50.40[d**]	13.3	27.0	16.7	14.93[d**]
1 to 5 (Primary)	51.3	38.8	57.0	60.8	42.2	60.5		
6 to 9 (Secondary)	15.7	18.9	16.0	16.7	18.6	19.3		
10+ (Beyond secondary)	0.4	0.0	0.8	0.0	0.0	0.0		
Unemployed	10.7	24.8	13.9	26.97**	29.2	59.8	31.6	41.40**
Frequency of venue attendance								
Visit the venue every day	22.6	35.9	43.9	26.24**	55.8	40.7	52.6	8.30**
Visited/will visit multiple venues that day	55.6	38.1	40.6	21.56**	30.8	28.9	23.6	1.61
Sexual partnership indicators								
Have been sexually active in the past year	97.3	92.9	97.1	6.87*	98.3	90.7	96.5	8.82**
Have ever met a new sex partner on site	35.2	34.6	32.4	0.56	58.3	27.0	46.5	32.61**
Had a new sex partner in past month	41.4	28.6	31.2	12.15**	60.0	23.5	43.9	43.50**
Had a new sex partner in past year	73.6	58.1	62.7	17.42**	76.7	45.1	70.2	36.87**
Have ever given money, goods, services for sex (men)	48.8	27.1	39.8	32.18**	–	–	–	–
Have ever received money, goods, services for sex (women)	–	–	–	–	55.8	14.7	41.2	62.54**
Have had only 1 sex partner in the past year (partner was not new)	19.2	27.9	22.1	8.07*	19.2	43.6	21.1	29.23**
Number of new partners in past month[a]								
0	58.6	70.5	68.8	34.72[c**]	39.2	75.0	56.1	66.35[c**]
1	26.1	21.3	20.1		35.8	17.6	14.0	
2	9.2	6.9	7.4		7.5	3.9	12.3	
3–10	6.1	0.4	3.3		10.0	2.0	5.3	
11–50	0.0	0.0	0.4		3.3	0.0	7.0	
51–100	0.0	0.0	0.0		3.3	0.0	5.3	
AIDS education and condom use								
Have attended an AIDS educational session	41.0	35.5	55.3	24.17**	35.8	25.0	46.5	14.43**
Have ever used a condom	88.5	68.7	82.4	40.52**	90.8	49.5	73.7	60.52**
Used a condom with the most recent new sex partner[e]	78.3	74.4	81.6	1.30	82.9	54.2	84.0	15.58**
Possessed a condom on site	11.5	7.1	7.4	4.63	13.3	0.0	10.5	26.26**

[a]Percentages may not total to 100 due to missing values.

[b]Pearson $X^2(2)$ unless otherwise noted.

[c]Pearson $X^2(10)$.

[d]Pearson $X^2(6)$.

[e]Among those reporting a new partner in the past month.

*$p < .05$.

**$p < .01$.

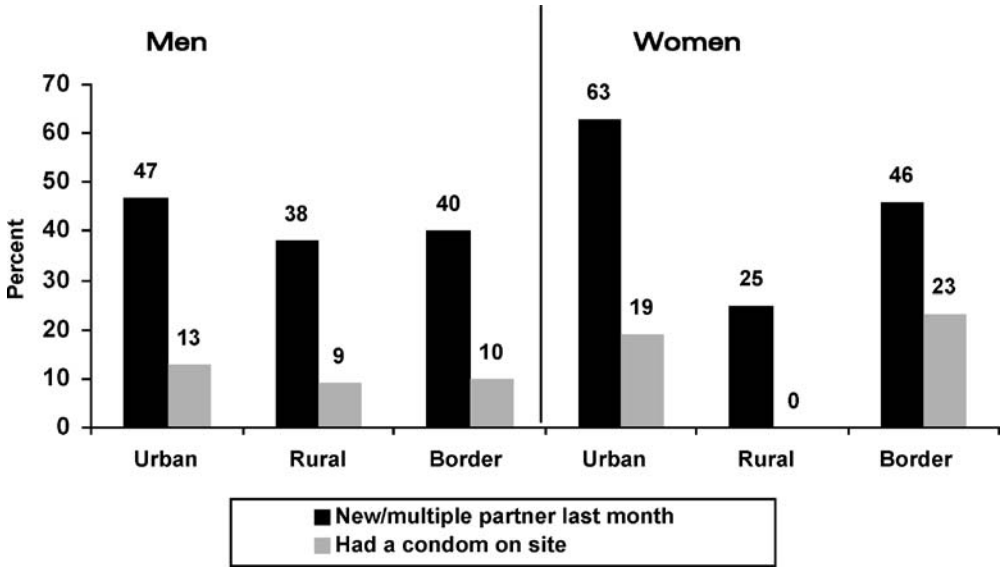

Fig. 2 Pecent of men and women with "risky" sex partnership (reported at least one new partner or multiple partners in the month prior to the survey) and percent of individuals with "risky" sexual partner that possessed a condom with them when socializing at the venue, Banfora and Tenkodogo Health Districts, Burkina Faso, 2001

possessed a condom on venue while socializing (PPR: 1.68, 95% CI: 0.72, 3.91).

Men's new/multiple partnership patterns were not associated with any individual-level variables.

Discussion

Differences in sexual risk behavior observed in urban, rural and border populations studied in this sample provide insight into the pattern of HIV prevalence measured by seroprevalence surveys. Women and men in urban and border areas experienced higher levels of new and multiple partnerships than their rural counterparts. In particular, women in the border town of Banfora Health District and the urban town of the Tenkodogo Health District were most vulnerable; they reported an average of eight new partners in the month preceding the survey, while all other men and women in the Health Districts reported a mean of less than one new partner. Epidemiologic models indicate that HIV prevalence rapidly increases in the presence of a "core" group with high levels of new or multiple partnership and a high degree of sexual mixing (Anderson, 1999; Anderson & May, 1988). The population of women at urban and border venues constitute a core group, and in rural areas, where prevalence is low, these high levels of partnership among women were not observed. Large proportions of respondents in urban and border areas had not used a condom the last time they had sex with a new partner, and as social desirability bias is known to result in over-reporting of condom use, reported condom use is probably even lower than estimated here (Catania, Chitwood, Gibson, & Coates, 1990). Therefore, the study results highlight the unmet need for condom promotion in urban and border areas.

Though levels of sexual partnership are higher in urban and border areas, these results indicate that there is a high potential for sexual meeting and partnership in rural areas as well. We expected to find numerous sexual meeting venues in urban and border areas, but it was surprising that even in the smallest rural town, which had a population about 3,500 persons and very minimal development, more than 30 unique venues were identified, representing about 1 venue per 120 inhabitants. As a point of comparison, in the most developed urban study area which had a population of 17,000, a total of 107 unique venues were identified, representing about 1 venue per every 160 inhabitants. Further, substantial proportions of men and women in rural areas reported new and multiple partnerships, while condom use was generally lower in rural areas than in urban and border areas. Reported condom use was particularly low among rural women, and no woman in any rural area who reported having either a new partner or multiple partners in the past month possessed a condom on venue while socializing.

Condom promotion at social venues identified by community informants would likely reach a population in great need of improved condom availability; new and multiple partnership acquisition is higher at venues than has been observed in the general population (INSD, 2003). According to population-based estimates, about 39% of men and 10% of women reported having had one casual partner in the year prior to the survey. In contrast, reports of at least one new partner in the past year were much more common in urban, rural and border areas of PLACE study respondents at the most frequently reported sexual meeting venues, both among

male venue patrons and female venue patrons. Further, on-site condom promotion would improve the availability of condoms and condom promotion messages proximate to the sex act. According to the interview with venue representatives, condoms were available at less than 12% of venues. However, large proportions of venue representatives were willing to sell condoms at their venues, and over 83% of venue representatives in all settings were willing to participate in prevention activity. The study population comes to the same venues frequently; greater than 50% of women in urban and border areas, those who have the highest partnership levels, visited the venue where the interview was held every day. Hence, patrons with high levels of partnership are likely to be exposed to on-site condom promotion messages frequently.

Promotion of condoms where people meet partners has obvious potential. For example, Thailand's success story of decreasing rates of HIV can be attributed, in part, to intervention based in brothels which enforced condom distribution, mandated STD testing and treatment and included sanctions of sex workers who tested positive for a STD test (Rojanapithayakorn & Hanenberg, 1996). Increased condom distribution, together with educational materials, has also increased condom use in hotels in Nicaragua (Egger et al., 2000), and popular opinion leader interventions based in gay bars in two southern US settings reduced reported sexual risk behaviors among clients (Kelly et al., 1991).

Condom promotion should not be implemented in any one type of venue or target any one population of venue patrons; the multivariable regressions indicated that new and multiple partnerships occur among multiple populations that socialize at a diversity of venue types and sizes. Because new/multiple partnership was slightly more likely at formal venues (i.e., bars, clubs) than other venue types in rural areas, pilot programs could first be implemented in formal venues. However, efforts should be extended to multiple venue types, especially considering that small informal venues are numerous and formal venues are a relatively small proportion of venues. In urban areas venue size was correlated with increased partnership; the largest venues (>100 persons at the peak time of operation) tended to have about two times the prevalence of "high risk" partnership, so funds could first be used to implement programs at these venues. For the border areas, the size and type of venue was not predictive of partnership, suggesting that intervention resources should reach a diversity of venues.

The multivariable regression indicated that the outcome was associated with certain individual-level variables among women, while null associations were observed among men. Anecdotal reports during fieldwork suggested that female sex workers attend venues to solicit clients. Hence, women with the highest risk of new/multiple partnership are likely to share certain characteristics. For example, new/multiple partnership in the past month was reported among the youngest women in rural areas and among women who come to the venue daily in urban areas; prevention messages in each of these areas should consider these characteristics. In contrast, a diversity of men come to socialize at venues, and a high percentage of all men are likely to have experienced recent sex partnership.

This study has a number of limitations. First, the venues where individual interviews were held were not randomly sampled, thus individual results are only representative of individuals who socialize at the venues most frequently cited by community informants.

A number of biases could have impacted each stage of the interviewing. The list of venues obtained from community informants may have been incomplete while the venue representatives and individuals interviewed on venue may not have provided fully valid information. Social desirability bias is likely to affect reporting about sensitive issues including sexual behavior and the potential for HIV/AID transmission (Catania et al., 1990), thus community informants could have been embarrassed to reveal knowledge of sexual meeting venues, venue representatives may have felt that the interview about the HIV-related sexual behavior at their establishments was stigmatizing while individuals may have felt embarrassed to reveal the truth about their sexual behavior and condom use practices.

Community informants may not have been the most knowledgeable persons in the community about sexual meeting venues, but interviewers were trained to probe community informants extensively for venues until informants had exhausted their lists and numerous community informants were interviewed, so measurement error from any one individual informant was reduced. Thus, we believe that the list of venues identified by community informants represents nearly 100% of venues in the study areas. Venue representatives may not have been the most knowledgeable about their specific venues; however interviewers made efforts to interview an owner, manager or patron who knew the venue intimately. All respondents may have had difficulty remembering back to activities or behaviors, but interviewers were trained to probe and prompt respondents in a systematic manner, such as to help community informants remember the most venues possible and individuals to remember the number of partners they had in the past month.

The results of this study indicate that in urban, rural and border areas, on-site sexual meeting was common and venue managers in each area were willing to host interventions; on-venue condom promotion should be expanded. The Banfora and Tenkodogo Health District Authority representatives showed much interest in the PLACE methodology, and they actively participated to its implementation. However, during meetings to disseminate study results in the two Health Districts, the limited capacity of the Health

District Authorities to use study results was highlighted. It has been non-governmental organizations (NGOs), rather than the governmental Health District Authorities, that have been on the front lines of implementing HIV prevention programs. Thus, a key "lesson learned" in implementing the PLACE Method in these Burkina Faso Health Districts was that NGOs should also be implicated in operational research to plan HIV intervention so that study findings directly and immediately inform HIV prevention programs. NGOs showed much interest in the concept of the PLACE methodology. As the methodology needed to be adapted to their needs and their capacities, further qualitative research was conducted by Centre Muraz to explore the acceptability of the PLACE method for use by local NGOs in charge of intervention implementation. The results of all these research activities will be discussed in an upcoming workshop involving all stakeholders and policy makers with the goal of outlining an effective strategy to define HIV prevention programs both at the coordination and implementation levels.

Acknowledgments This study was made possible by support from the World Bank and USAID under terms of Cooperative Agreement HRN-A-00-97-00018-00. We wish to thank Dr. P Patnaik for technical assistance in the field and the Banfora and Tenkodoko Health District research teams for their diligence in data collection and data entry.

References

Anderson, R. (1999). Transmission dynamics of sexually transmitted infections. In K. K. Holmes, P. F. Sparling, P. A. Mardh, S. M. Lemon, W. E. Stamm, P. Piot, & J. Wasserheit (Eds.), *Sexually Transmitted Diseases, Third Edition* (pp. 25–37). New York: McGraw-Hill, Health Professions Division.

Anderson, R., & May, R. (1988). Epidemiologic parameters of HIV transmission. *Nature*, *333*, 514–519.

Boerma, J. T., & Weir, S. S. (2005). Integrating demographic and epidemiological approaches to research on HIV/AIDS: the proximate-determinants framework. *Journal of Infectious Diseases*, *191*(Suppl. 1), S61–S67.

Boerma, J. T., Urassa, M., Senkoro, K. P., Klokke, A. H., & Ng'weshemi, J. Z. L. (1999). Spread of HIV in a rural area in Tanzania. *AIDS*, *13*, 1233–1240.

Caraël, M. (1997). Urban-rural differentials in HIV/STDs and sexual behavior. In G. Herdt (Ed.), *Sexual Cultures and Migration in the Era of AIDS: Anthropological and Demographic Perspectives*. New York: Oxford University Press.

Catania, J., Gibson, D., Chitwood, D., & Coates, T. (1990). Methodological problems in AIDS behavioral research: influence on measurement error and participation bias in studies of sexual behavior. *Psychological Bulletin*, *108*(3), 339–362.

Cohen, D., Scribner, R., & Farley, T. (2000). A structural model of health behavior: A pragmatic approach to explain and influence health behaviors at the population level. *Preventive Medicine*, *30*, 146–154.

DRS Banfora: Direction Regionale de la Sante de Banfora. (1999). *Plan de developpement sanitaire 2000–2004 du district sanitaire de Banfora. La ville de Banfora (Burkina Faso)*, Direction Regionale de la Sante de Banfora.

DRS Tenkodogo: Direction Régionale de la Santé de Tenkodogo. (2000). *Plan de developpement sanitaire 2000--2004 du district sanitaire de Tenkodogo*. La ville de Tenkodogo (Burkina Faso), Direction Regionale de la Sante de Tenkodogo.

Egger, M., Pauw, J., Lopatatzidis, A., Medrano, D., Paccaud, F., & Smith, G. D. (2000). Promotion of condom use in a high-risk setting in Nicaragua: a randomised controlled trial. *Lancet*, *355*(9221), 2101–2105.

FAO. (2003). *HIV/AIDS: a rural issue*. Accessed on April 6, 2005 at: HIV/AIDS: http://www.fao.org/Focus/E/aids/aids1-e.htm.

INSD: Institut National de la Statistique et de la Demographique (INSD) et ORC Macro. (2003). *Enquete Demographique et de Sante, Burkina Faso 2003*. Calverton, Maryland (USA): INSD et ORC Macro.

Kelly, J. A., St. Lawrence, J. S., Diaz, Y. E., Stevenson, L. Y., Hauth, A. C., & Brasfield, T. L. (1991). HIV risk behavior reduction following intervention with key opinion leaders of population: an experimental analysis. *American Journal of Public Health*, *81*(2), 168–171.

Latkin, C., Mandell, W., Vlahov, D., Oziemkowska, M., & Celantano, D. (1996). People and places: behavioral settings and personnel network characteristics as correlates of needle sharing. *Journal of Acquired Immune Deficinecy Syndromes and Human Retrovirology*, *13*(3), 273–280.

Lydie, N., & Robinson, N. (1998). West and Central Africa. *International Migration*, *36*(4), 469–511.

Marmot, M. (1998). Improvement of social environment to improve health. *Lancet*, *351*, 57–60.

Mwizarubi, B., Hamelmann, C., & Nyamuryekung'e, K. (1997). Working in high transmission areas: truck routes. In J. Z. L. Ng'weshemi (Ed.), *HIV Prevention and AIDS care in Africa: A District Level Approach* (pp. 137–149). Amsterdam: Royal Tropical Institute Press.

Negroni-Belen, M., Vargas-Guadarrama, G., Rueda-Neria, C. M., Bassett-Hileman, S., Weir, S. S., & Bronfman, M. (2003). Identification of meeting places of sexual partners in 2 cities of the Southern Mexican borders, using the PLACE method. *Salud Publica de Mexico*, *45*(Suppl. 5), S647–S656.

PLACE Study Group/Burkina Faso, prepared by Khan, M. (2003). *Combating the Epidemic at the Level of the Health District: A Rapid Assessment of AIDS Prevention in Banfora and Tenkodogo Health Districts of Burkina Faso Using the PLACE Method*, *MEASURE/Evaluation Technical Report*. Chapel Hill, North Carolina: MEASURE Evaluation Project, Carolina Population Center, University of North Carolina.

Potterat, J. J., Rothenberg, R. B., Woodhouse, D. E., Muth, J. B., Pratts, C. I., & Fogle, J. S., 2nd (1985). Gonorrhea as a social disease. *Sexually Transmitted Diseases*, *12*(1), 25–32.

Rojanapithayakorn, W., & Hanenberg, R. (1996). The 100% condom program in Thailand. *AIDS*, *10*, 1–7.

Rose, G. (1992). *The Strategy of Preventive Medicine*. New York: Oxford University Press.

Serwadda, D., Wawer, M. J., Musgrave, S. D., Sewankambo, N. K., Kaplan, J. E., & Gray, R. H. (1992). HIV risk factors in three geographic strata of rural Rakai District, Uganda. *AIDS*, *6*(9), 983–989.

Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, *10*(4), 282–298.

Thomas, J. C., & Tucker, M. J. (1996). The development and use of the concept of a sexually transmitted disease core. *Journal of Infectious Diseases*, *174*(Suppl. 2), S134–S143.

UNAIDS/IOM: Joint United Nations Programme on HIV/AIDS and the Internatinal Organization for Migration (1998). Migration and AIDS. *International Migration*, *36*(4), 445–468.

UNAIDS/WHO: Joint United Nations Programme on HIV/AIDS and theWorld Health Organization (2004). *UNAIDS Technical Update*. Geneva, Switzerland: UNAIDS.

Wasserheit, J., & Aral, S. (1996). The dynamic topology of sexually transmitted disease epidemics: implications for prevention strategies. *Journal of Infectious Diseases*, *174*(Suppl. 2), S201–S213.

Weir, S. S., Pailman, C., Mahlalela, X., Coetzee, N., Meidany, F., & Boerma, J. T. (2003). People to places: focusing AIDS prevention efforts where it matters most. *AIDS*, *17*(6), 895–903.

Weir, S. S., Morroni, C., Coetzee, N., Spencer, J., & Boerma, J. T. (2002). A pilot study of a rapid assessment method to identify places for AIDS prevention in Cape Town, South Africa. *Sexually Transmitted Infections*, *78*(Suppl. 1), i106–i113.

de Wit, J. B., de Vroome, E. M., Sandfort, T. G., & van Griensven, G. J. (1997). Homosexual encounters in different venues. *International Journal of STD & AIDS*, *8*(2), 130–134.

Wohlfeiler, D. (2000). Structural and environmental HIV prevention for gay and bisexual men. *AIDS*, *14*(Suppl. 1), S52–S56.

Zeger, S. L., & Liang, K. Y. (1986). Longitudinal data analysis for discrete and continuous outcomes. *Biometrics*, *42*(1), 121–130.