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Association between sex partner meeting venues and sexual risk-taking among urban adolescents

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Abstract

Purpose—To increase understanding of the association between sexual partner meeting venue types (school, through friends or family, organized groups, public places, or on the street) and sexual risk-taking among urban youth.

Methods—Data were from 17-18 year olds who reported having had sex (n=1,656) by the time they participated in the 2008-2009 follow-up of a multi-component alcohol preventive intervention, Project Northland Chicago. We used logistic regression to assess the association between partner meeting venue and sexual risk-taking.

Results—Approximately 20% of Chicago adolescents met their most recent sex partner on the street or in public places. Adolescents who met their partner in a public place rather than school were more likely to report having 3 years age discordant partner [women Odds Ratio (OR) = 7.7, 95% Confidence Interval (CI) = 3.3-17.7, men OR=2.7, 95% CI=1.1, 6.6], alcohol use prior to sex (women OR=3.4, 95% CI 1.8-6.5, men OR=2.4, 95% CI=1.3-4.4), casual partner (women OR = not significant, men OR=2.4, 95% CI=1.3-4.5), anal sex (women OR = not significant, men OR=2.4, 95% CI=1.2-4.9), and unprotected sex (women OR=1.7, 95% CI 1.0-2.7, men OR=1.9, 95% CI=1.1-3.4). Meeting partners on the street was associated with increased probability of alcohol use prior to sex (women OR=2.2, 95% CI 1.1, 4.3, men OR=2.1, 95% CI=1.0-4.6), age discordant partnerships among women (OR=14.2, 95% CI 6.4-31.4), and casual sex partners among men (OR=2.5, 95% CI 1.4-4.8).

Conclusions—Targeting sexual risk-taking with partners selected from public places or the street may improve adolescent HIV preventive interventions.

Keywords

age discordance; venue; sexual partners; alcohol use; urban adolescents

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Implications and Contribution. Nearly 20% of 17-18 year old general population, urban Chicago adolescents met their most recent sexual partner in venues associated with substantial increased sexual risk-taking. Targeting risk-taking at public places (parties or Internet) or on the street may improve the efficacy of HIV preventive interventions.

INTRODUCTION

In the United States, preventing adolescent and young adult human immunodeficiency virus (HIV) and other sexually transmitted infections (STI) from sexual encounters is a public health priority [1]. In 2009, 15% of newly diagnosed HIV infections in the United States were among 20-24 year olds, and 80-90% of these infections were due to sexual activities[2, 3]. Furthermore, each year 9 million new STIs are diagnosed among 15-24 year olds [4]. Increased understanding of adolescent sexual risk-taking will help researchers and public health professionals develop interventions to prevent STIs and HIV infections.

An important factor in HIV or STI acquisition is sexual partner meeting venues (e.g., Internet, bar, street) [5-7]. Consequently, some HIV interventions target patrons of specific venues [8-10]. Even among adolescents, meeting venues are associated with sexual risk-taking, and venue-based HIV or STI preventive interventions have been conducted [11, 12]. Yet, the sexual risk-taking behaviors linking partner meeting venues to increased HIV or STI acquisition are unclear.

Evidence and theory suggest that meeting venues influence HIV or STI acquisition in two ways. First, meeting venues may influence the probability that a partner is from another sexual network because some venues may provide more opportunities to meet dissimilar partners (e.g., by age or race) [13]. Social network theory and evidence suggest that the selected partners' network and bridging between high and low prevalence sexual networks may increase the probability of HIV or STI transmission [14-18]. Second, the theory of interpersonal behavior suggests the situational conditions found at different meeting venues may influence the social acceptability of excess alcohol use, having sex with a new or casual partner, condom use, and anal sex [19-23].

Increased understanding of the association between partner meeting venue and sexual risk-taking can improve HIV and STI prevention. Interventions could be developed that target venue-specific high-risk behaviors. For example, if anal sex is more common when meeting partners on the street, street-based interventions could focus prevention messages around protection during and risks from anal sex.

We considered two objectives to better understand the role of partner meeting venue in sexual risk-taking among urban adolescents. First, we identified the common venue types where men and women met their most recent sexual partner. Second, we assessed the association between partner meeting venue and sexual risk-taking [age discordance, alcohol use in the two hours prior to sex, casual partner, anal sex, and unprotected sex]) by gender.

METHODS

Study population

Data were derived from the 17-18 year old youth who participated in the 2008-2009 follow-up of a group-randomized alcohol preventive intervention trial conducted among a representative sample of Chicago public elementary schools, Project Northland Chicago [24-26]. Students in the treatment and control schools (n=61 schools) completed surveys at four time points: one pretest (2002, age 11) and three surveys immediately following each intervention year (2003, age 12; 2004, age 13; and 2005, age 14). In 2008-2009 (ages 17-18 years), we attempted follow-up with the 5711 youth that participated in the Project Northland Chicago survey during any time point.

Our study population began with the 3032 youth (53% Response Rate) who participated in the follow-up survey regardless of whether they participated in the intervention or control

groups because the Project Northland Chicago intervention produced little difference in adolescent alcohol use or hypothesized mediators (e.g., alcohol norms, expectations) [25, 26]. Students lost to follow up were more likely to be male ($t(3734)=-6.85, p<0.001$) and non-White ($t(3383)=3.15, p<0.01$). We omitted 36 adolescents who did not respond to any item ($n=2$) or 10% of their responses on alcohol, sex, or drug use items were inconsistent ($n=34$). The Institutional Review Board at the University of Florida approved this project.

Our objective was to evaluate differences in sexual partner meeting venues, thus, we restricted our analysis to the 1920 (64%) adolescents who consistently reported having had sex on the nine sexual activity questions (i.e., they did not choose “I have never had sex” on any item). Youth reported the types of sex (oral, vaginal, or anal) they had the last time they had sex. We excluded youth ($n=175, < 10\%$) reporting only oral sex because oral sex has a low probability of transmitting HIV [27]. Few youth reported same sex partners (23 women and 24 men), and we found differences between common meeting venues among adolescents with same sex compared to opposite sex partners. Thus, we excluded youth reporting same sex partners ($n=47$) or not reporting their partner’s gender ($n=42$). Thus, our analysis included 1,656 adolescents who had vaginal or anal sex with an opposite sex partner the last time they had sex.

Partner meeting venue

To assess meeting venue, adolescents were asked for the last time they had sex “Where did you first meet this sexual partner?” Ten response options were provided: (a) I have never had sex, (b) school, (c) work, (d) through friends or family, (e) at an organized event (such as church activities, recreational sports teams or clubs), (f) at a party at someone’s house, (g) at a bar or nightclub, (h) on the street (including parks and public transportation), (i) Internet, or (j) other, please write in. We created two categories of responses from adolescents who selected other and provided a description: grew up together and around my neighborhood. Due to sparseness of some responses, we created five categories for analysis by grouping responses with similar distance from one’s primary social network and importance in prior studies [12, 13]: (a) school ($n=708$); (b) through friends and family included through friends or family ($n=498$) or grew up together ($n=10$); (c) organized group included work ($n=54$) and organized events ($n=53$); (d) public place included party at someone’s house ($n=81$), bar or night club ($n=9$), Internet ($n=34$), around my neighborhood ($n=31$), and miscellaneous other responses ($n=13$); and (e) on the street ($n=145$). Because of small sample sizes for some risk-taking and meeting venue categories, we also assessed two broad groups of meeting venues: (1) public places – organized group, public places, or on the street; (2) non-public places – school or through family and friends.

Event-level sexual risk-taking

Based on the literature regarding risk for HIV and other STIs, we focused on five known sexual risk factors: age discordant partners, event-level alcohol use, casual sex partner, engaging in anal sex, and having unprotected sex [14, 22, 28-30]. Participants reported each characteristic for their most recent sex. Our primary objective was to measure potential HIV or STI risk. Thus, we classified participants who did not use a condom during their last anal or vaginal sex as having unprotected sex. Because condom use would impede pregnancy attempts, participants desiring pregnancy ($n=49$) were classified as having protected sex. Participants categorized as exposed to alcohol use prior to sex reported either they or their partner was drinking alcohol in the two hours prior to sex. Participants categorized as having a casual partner reported a partner who was “a person you know, but not a steady partner” or “a casual acquaintance or someone you just met.”

Covariates

We selected five characteristics associated with increased risk of HIV or other STIs as covariates: gender, condom use, unexpected sex, casual partner, and new partner [14, 30, 31]. Adolescents categorized as having unexpected sex reported they did not expect to have sex with that partner. Adolescents classified as having a new partner reported that this was the first time they had sex with that partner.

Statistical Analysis

To estimate the association between partner meeting venue and the sexual risk-taking measures, we used logistic regression in SAS software, version 9.2 (SAS Institute, Inc., Cary, NC). We did not adjust for school level clustering, because we found no evidence of clustering of the sexual-risking taking behaviors by the sampled elementary schools (Interclass correlation < 0.001).

We stratified all analyses by gender, based on suggested gender differences in the relationship between meeting venue and sexual risk-taking [12, 13]. Among the entire sample, we tested for interactions between gender and meeting venue for each sexual risk-taking measure. For each event-level sexual risk-taking measure, we estimated unadjusted and multivariate (covariates included unexpected sex, casual partner, new partner, and intervention group) logistic regression to estimate the association between partner meeting venue and event-level sexual risk-taking. Models with casual partner as the outcome did not include casual partner as a covariate. Due to the dramatic difference in sexual risk between unprotected and protected anal sex [22], we adjusted for condom use when considering anal sex as the outcome. Statistical significance was determined by 95% confidence intervals for Odds Ratios that did not include the null value.

We conducted four sensitivity analyses to assess the influence of our assumptions. First, because oral sex carries a low, but real sexual risk [27], we ran all analyses including the adolescents who reported only having oral sex. Thus, we included adolescents who participated in any combination of oral, vaginal, or anal sex. Second, we restricted analyses to the subset of adolescents (n=1309, 79%) who reported they were currently in school (9th through 12th grade, ungraded, or other grade) because school may not be a reasonable proxy of the primary social network of adolescents who are not attending school. Third, we omitted participants who reported meeting partners on the Internet because grouping Internet with public places was less than ideal, and there were insufficient numbers to assess Internet separately (n=34). Fourth, because of the racial/ethnic disparities in HIV and STIs [2], we conducted an analysis adjusting for race/ethnicity among the 1,535 adolescents who reported Non-Hispanic White, Non-Hispanic Black, and Hispanic race/ethnicity. We excluded the adolescents from other racial/ethnic groups because the groups had insufficient size (n=49) to be assessed independently and were too diverse to be combined.

RESULTS

Study population

The mean age at the time of completing the survey for the 1,656 adolescents reporting having sex was 18.1 (standard deviation $\pm$ 0.7) for women and 18.2 (standard deviation $\pm$ 0.7) for men. Over half (55.4%) of the participants were women, and 79.1% were from low-income families (eligible for free or reduced price lunch in 8th grade). The cohort consisted of primarily minority youth: 55% of women and 50% of men were non-Hispanic Black; 27% of women and 29% of men were Hispanic; and 11% of women and 14% of men were non-Hispanic White. Approximately a third of adolescents (31% of women and 39% of men) reported that their most recent sex experience was with a new partner. Women were

less likely to report that they had not expected to have sex with that partner (15% of women and 20% of men).

Meeting venue

Among men, the most common (51%) venue for meeting their most recent sex partner was at school (Table 1). Women, however, were most likely to report meeting their partners at school (37%) or through family and friends (36%) (Table 1). Approximately 20% of men and women reported meeting their last sex partner on the street or at a public venue (Table 1). Among the women who met their partner at a public venue, the most frequent meeting venue was a party at someone's house (38%), followed by around their neighborhood (24%), and the Internet (20%). Among men, the majority (61%) met their partners at a party at someone's house, a fifth (21%) met on the Internet, and 12% met around their neighborhood.

Sexual risk-taking and meeting venue

Unadjusted and multivariate results were similar, thus for simplicity, only multivariate results are presented. We found a significant interaction between gender and meeting place in predicting age discordant partnerships, but not for the other sexual risk-taking measures. For clarity of results and established gender differences in sexual risk-taking, we presented all results stratified by gender. We found similar results for all sexual risk-taking measures in all four sensitivity analyses (restricting to youth in schools, including youth reporting only oral sex, excluding youth who reported meeting partners on the Internet, and adjusting for race/ethnicity).

Women were at more than one and half times as likely as men to report having an age discordant partner overall, and for partners met at each venue, except school (Table 2 and Figure 1). Only 33 youth reported partners that were younger than themselves. Thus, we were unable to assess differences between older and younger partners.

Among women, age discordant partnerships were more common for partnerships formed at venues other than school (Figure 1). The percent of women with age discordant partnerships increased as the conceptual social distance between the meeting venue and an adolescent's primary social network (i.e., school) increased (Figure 1). Compared to partners met at school, age discordant partnerships were much more likely among women who met partners through friends or family [Odds Ratio (OR)=4.9], at organized groups (OR=6.2), public venues (OR=7.7), or on the street (OR=14.2) (Table 3). Men who met partners at public venues or through friends and family were two to three times as likely to report an age discordant partner compared to men who met partners at school (Table 3). When grouping meeting venues into public and non-public, women were three times as likely to report meeting an age discordant partner at a public rather than a non-public venue (Table 4).

Overall, 15% of women and 17% of men reported that they or their partner was using alcohol in the two hours prior to sex. Compared to partners met at school, both women and men reported alcohol use prior to sex two to three times as often when meeting partners on the street or in public places (Table 3). Among women, alcohol use prior to sex was also reported twice as often when partners were met through friends and family compared to partners met at school (Table 3). Similarly, men and women were twice as likely to report alcohol use prior to sex when meeting a partner in a public compared to non-public venue (Table 4).

Women (11%) were less than half as likely as men (29%) to report having a casual partner the last time they had sex. Compared to men who met their partner at school, casual partners were twice as common among men who met their partners through friends or family, in

public places, or on the street (Figure 1 and Table 3). Among men, reporting casual partners was twice as common with partners met in public compared to non-public places (Table 4).

Women (6%) were half as likely as men (11%) to report having anal sex the last time they had sex. Compared to men who met their partners at school, anal sex was approximately twice as common among men who met their partner through friends or family or in public places (Table 3). Among men who reported meeting their last partner in a public place, 20% reported having anal sex.

The last time adolescents had sex, 38% of women and 25% of men reported having unprotected sex. Almost half of women who reported meeting their partner in a public place (48%) or on the street (44%) reported having unprotected sex (Figure 1). Men and women were nearly twice as likely to have unprotected sex with partners met in public places than with partners met at school (Table 3). Women were more likely to have unprotected sex with partners met in public compared to non-public places (Table 4).

DISCUSSION

While the majority of Chicago adolescents meet their most recent sexual partners at school or through friends and family, the 20% of adolescents who met their partners on the street or in public places reported more sexual risk-taking. Meeting partners in public places was associated with an increased probability of age discordant partners, alcohol use prior to sex, casual partners (men only), unprotected sex, and anal sex (men only). Meeting partners on the street was also associated with increased probability of alcohol use prior to sex, age discordant partnerships (women only), and casual partners (men only). Our findings support presenting adolescent HIV and STI preventive intervention at street and public venues.

Meeting their most recent partner at a public places rather than at school was associated with a greater likelihood of all five sexual-risk taking measures assessed among men and three of the five measures among women (age discordant partner, using alcohol prior to sex, and unprotected sex). The majority of sex partners met in public places were met at private parties (38% for women and 61% for men). Our findings of increased sexual-risk taking at private parties complement prior findings that over half of high school students who engaged in casual sexual activities engaged in these activities at someone else's house [32]. Private parties may provide adolescents opportunities for alcohol use, meeting partners, and having sex. Due to limited sample sizes, we were unable to disentangle risks from partners met at private parties from partners met at other public places.

Adolescents who met partners on the street rather than school also reported a greater frequency of risky partners, but not sexual risk behaviors. Compared to meeting partners at school, both men and women who met partners on the street were more likely to report themselves and/or their partner was using alcohol prior to sex, women were more likely to report age discordant partners, and men were more likely to report casual partners. The increased likelihood of selecting risky sexual partners on the street is consistent with and adds to prior studies suggesting street venues are popular and sexually risky places for adolescents to meet sexual partners [5, 33]. Among San Francisco adolescents, meeting partners on the street was frequent among gang members, but avoided by youth attending school or not affiliated with gangs [33]. Furthermore, the ten times increased probability of an age discordant partnership when meeting on the street compared to at school is similar to previous finding among 17 year old women recruited from clinical settings [13].

This study has three important limitations. First, we only had information on the adolescent's most recent sexual event. Thus, we are unable to assess whether individual adolescents alter their sexual risk-taking when meeting partners at different venues. We

cannot eliminate the interpretation that adolescents more prone to risk-taking seek partners outside of school. In both of these scenarios, adolescents seeking partners at public venues are riskier or looking for riskier experiences. Thus, regardless of whether we use a casual or an association interpretation, we can conclude that meeting sexual partners at school or through friends and family is likely to result in less risky partners and less risk-taking compared to meeting partners in a variety of public places. Second, due to small sample sizes, we were unable to assess each public venue separately (e.g., Internet and private party were grouped together) or assess adolescents who reported same sex partnerships (n=40). While the sample size limitations are reflected in our confidence intervals, we also assessed sexual-risk with two categories of venue (public and non-public). Third, we were unable to assess the length of time between the adolescent meeting their partner and their most recent sexual experience because the survey did not include a related question. Data suggest that 50% of similarly aged adolescents have sex with a new partner within a month of meeting [34] and sexual relationships last a median of 10 months [35] thus, the meeting place is likely relevant for the majority of the sexual experiences studied.

This study has two important strengths. First, our study expands previous findings from within special populations (e.g., recruited from clinical settings or on the street) [13, 33], to the general population of Chicago low-income, urban adolescents recruited at their home or in school. Furthermore, over 80% of the sample belonged to minority racial/ethnic groups (non-Hispanic Black and Hispanic) at increased risk of HIV [2, 36]. Second, we had several measures from the same sexual event. Event-level measures are superior to individual-level measure because can link the risk-taking with a given partner. Thus, the adolescent participated in the reported sexual risk-taking with the partner met at the reported venue.

Among the general population of 17-18 year old Chicago adolescents who had opposite gender sexual partners, public places and the street were common venues that were associated with increased partner risk and sexual risk-taking. To slow or stop the increases of HIV or STI infections among adolescents, prevention scientists need to increase understanding of the relationships adolescents form in public settings. For example, if there is a true correlation between meeting venue and social network, interventions could suggest adolescents choose partners who know a minimum number of their friends. Additionally, understanding the nature of relationships youth form “on the street” (i.e., are these relationships transactional or formed when with friends at a local park) will help identify appropriate interventions for this group of youth. Finally, a greater understanding of how the time between meeting a partner influences the association between partner meeting place and sexual risk-taking will help determine whether to target interventions at venues or timing of sex with a new partner. In the meantime, similar to the large number of interventions on the Internet [37] intervention messages could be displayed at public venues where adolescents’ frequent.

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Figure 1.
Sexual risk taking by meeting venue

Table 1

Frequency of meeting venue for most recent sex partners of adolescents

	Women compared to men Odds Ratio			
	Women (n=917) % (n)	Men (n=739) % (n)	Odds ratio	95% CI
At school	36.9 (335)	51.2 (373)	0.6	(0.5, 0.7)
Friends or family	35.9 (326)	25.0 (182)	1.7	(1.4, 2.1)
Organized group	7.0 (63)	6.0 (44)	1.2	(0.8, 1.7)
Public places	10.1 (92)	10.4 (76)	1.0	(0.7, 1.3)
On the street	10.0 (91)	7.4 (54)	1.4	(1.0, 2.0)

Note: 10 women and 10 men did not report where they met their most recent sex partner.

Table 2

Sexual risk-taking among adolescents reporting heterosexual sex the last time they had sex

	Women % (n)	Men % (n)	Women compared to men Odds Ratio	
			OR	95% CI
Age discordant partner	15.2 (109)	9.7 (53)	1.7	(1.1, 2.5)
Alcohol use in 2 hours prior to sex	14.5 (127)	17.0 (121)	0.8	(0.6, 1.1)
Casual sex partner	10.8 (99)	28.7 (210)	0.3	(0.2, 0.4)
Anal sex	6.2 (57)	11.4 (84)	0.5	(0.4, 0.7)
Unprotected sex	37.5 (328)	24.9 (177)	1.8	(1.4, 2.3)

Table 3

Adjusted^a odds ratios between sexual risk-taking and partner meeting venue by gender

	School	Friends or Family	Organized group	Public place	On the street
Age discordant partnership [†]					
Women	---	4.9 (2.4, 10.2) [*]	6.2 (2.3, 16.5) [*]	7.7 (3.3, 17.7) [*]	14.2 (6.4, 31.4) [*]
Men	---	2.3 (1.1, 4.7) [*]	1.3 (0.3, 4.8)	2.7 (1.1, 6.6) [*]	1.7 (0.5, 5.6)
Alcohol use prior to sex					
Women	---	2.4 (1.4, 3.9) [*]	1.8 (0.7, 4.3)	3.4 (1.8, 6.5) [*]	2.2 (1.1, 4.3) [*]
Men	---	1.2 (0.7, 2.0)	0.9 (0.3, 2.4)	2.4 (1.3, 4.4) [*]	2.1 (1.0, 4.6) [*]
Casual sex partner ^b					
Women	---	0.9 (0.5, 1.5)	0.8 (0.3, 2.1)	1.9 (0.9, 3.9)	1.3 (0.6, 2.7)
Men	---	1.9 (1.2, 2.8) [*]	0.7 (0.3, 1.7)	2.4 (1.3, 4.5) [*]	2.5 (1.4, 4.8) [*]
Anal sex ^c					
Women	---	1.1 (0.5, 2.1)	1.2 (0.4, 3.8)	1.7 (0.7, 4.1)	1.1 (0.4, 3.1)
Men	---	1.9 (1.1, 3.4) [*]	0.7 (0.2, 2.5)	2.4 (1.2, 4.9) [*]	1.3 (0.5, 3.3)
Unprotected sex					
Women	---	1.0 (0.7, 1.5)	1.4 (0.8, 2.5)	1.7 (1.0, 2.7) [*]	1.5 (0.9, 2.5)
Men	---	1.2 (0.8, 1.8)	1.8 (0.9, 3.6)	1.9 (1.1, 3.4) [*]	1.0 (0.5, 2.0)

^a Adjusted for expected sex, casual partner, new partner, and intervention group.^b Not adjusted for casual partner.^c Also adjusted for condom use^{*} Statistically significant because 95% confidence intervals do not include 1[†] Statistically significant interaction between gender and meeting place.[‡] Statistically significant interaction test for gender by meeting place

Table 4Adjusted^a odds of sexual risk-taking comparing public to non-public meeting places among adolescents

	Sexual risk-taking		
	Among those who met in public places % (n)	Among those who met in non-public places % (n)	Public compared to Private Meeting Place Odds Ratio
Age discordant partnership ⁺			
Women	31.5% (47)	11.1% (62)	3.5 (2.2, 5.5) [*]
Men	13.4% (13)	8.8% (39)	1.7 (0.8, 3.3)
Alcohol use prior to sex			
Women	20.7% (37)	12.9% (89)	1.7 (1.1, 2.6) [*]
Men	28.0% (35)	14.7% (85)	2.1 (1.3, 3.6) [*]
Casual sex partner			
Women	13.7% (25)	10.2% (74)	1.5 (0.9, 2.4)
Men	40.0% (52)	25.9% (154)	2.0 (1.3, 3.0) [*]
Anal sex ^b			
Women	7.7% (14)	5.7% (41)	1.3 (0.7, 2.6)
Men	16.3% (21)	10.4% (62)	1.5 (0.9, 2.7)
Unprotected sex			
Women	45.9% (82)	35.7% (245)	1.5 (1.1, 2.2) [*]
Men	28.8% (36)	24.1% (139)	1.3 (0.8, 2.1)

Note: public = at an organized event, public place, or on the street; non-public = school or through family and friends

^a Adjusted for expected sex, casual partner, new partner, and intervention group.^b Not adjusted for casual partner.^c Also adjusted for condom use^{*} Statistically significant because 95% confidence intervals do not include 1⁺ Statistically significant interaction between gender and meeting place.