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Sexual Partner Concurrency among STI Clinic Patients with a Steady Partner: Correlates and Associations with Condom Use

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Abstract

Objectives—Partner concurrency facilitates the transmission of HIV and other sexually transmitted infections (STIs). With this study, we sought to (1) determine the correlates of concurrency among patients with a steady partner, and (2) identify correlates of condom use among patients reporting concurrent steady and non-steady partners.

Methods—Patients recruited from a STI clinic (n = 973; 48% female; 68% African American) completed a survey that assessed demographic characteristics, substance use, sexual partnerships, and sexual behavior, including condom use. Patients reporting a steady sexual partner for 3 months or longer were included in the analyses. Those who also reported a non-steady partner in the past 3 months, in addition to a steady partner, were considered to have engaged in concurrency.

Results—Nearly two-thirds (64%) of patients reported both steady and non-steady partners in the past 3 months. Steady/non-steady concurrency was associated with being male, not cohabitating with a partner, use of alcohol and other drugs, and thinking their steady partner was monogamous. Patients with steady and non-steady partners reported that they seldom used condoms consistently with steady (5%) or non-steady (24%) partners; compared to patients who did not report concurrency, patients who reported steady/non-steady concurrency reported more episodes of unprotected sex in the past 3 months. Among patients reporting concurrency, consistent condom use with non-steady partners was more likely among individuals who (a) used less alcohol and (b) thought that their steady partner was non-monogamous.

Conclusions—To reduce risk for HIV and other STIs, behavioral interventions need to address partner concurrency and its correlates, including alcohol and other drug use.

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COMPETING INTERESTS

The authors have no competing interests.

CONTRIBUTIONS

All authors contributed to the conception and design of the study. Senn and Carey were responsible for data analysis, interpretation of data, and drafting of the article. Vanable, Coury-Doniger, and Urban critically revised the manuscript. All authors approved the final version of the manuscript. Everyone meeting criteria for authorship has been included as an author. Carey accepts full responsibility for the conduct of the study, had access to the data, and controlled the decision to publish.

Keywords

partner concurrency; condom use; HIV; sexually transmitted infections

INTRODUCTION

HIV and STIs are major public health problems: In the U. S., for example, 56,000 people are estimated to be infected with HIV annually,[1] and more than one million chlamydia and 350,000 gonorrhea cases were reported to the CDC in 2006.[2] Globally, HIV ranks third as a cause of disease burden, and is projected to rank first by 2030.[3]

Concurrency, or overlapping sexual relationships, accelerates the spread of STIs through a population.[4] Concurrency has been associated with STI prevalence, faster spread, and establishment of an STI in a population.[4–6] Concurrency has been associated with transmitting an STI;[7, 8] even after controlling for the total number of partners.[9] Surveys indicate that 12% of women (past 5 years) and 11% of men (past year) report concurrent partnerships in the U. S.[10, 11] Rates of concurrency are higher among STI clinic patients ranging from 26% to 56%.[12, 13]

Identifying the correlates of concurrency can enhance understanding of this practice, and facilitate development of risk reduction programs. Previous studies have found that concurrency is associated with male sex, younger age, African-American race, younger age at sexual debut, substance use, and history of incarceration.[9–11, 13–15]

Individuals who have concurrent partners can reduce risk of STIs, for themselves and for their partners, with correct and consistent condom use. Therefore, it is important to understand the patterns of condom use among individuals with concurrent partners. Research has investigated condom use among adolescents and young adults reporting concurrent partners,[16, 17] but research on the patterns and correlates of condom use among adults reporting concurrent partners is needed.

Several different types of concurrency have been identified;[18] individuals who report having sex with a non-steady partner while in a steady relationship, termed “steady/non-steady concurrency” in this study, represent a subgroup that may be at particularly high risk of transmitting STIs, given the low rates of condom use reported in steady partnerships.[19, 20] Therefore, the purposes of this study were to: (1) determine demographic and substance use correlates of steady/non-steady concurrency; and (2) describe patterns and demographic, substance use, and sexual risk behavior correlates of condom use among individuals reporting steady/non-steady concurrency.

METHODS

Participants

Participants were patients attending a public STI clinic in New York State, who took part in a randomized controlled trial (RCT) of several risk reduction interventions.[21] They were eligible for the RCT if they were 18 or older and not impaired mentally, and had engaged in sexual risk behavior in the past 3 months (i.e., inconsistent condom use; and having more than one partner themselves, or having a partner who had more than one sexual partner, who injected drugs, who was HIV positive, or who was diagnosed with an STI in the past 3 months). Fifty-eight percent of the eligible patients agreed to participate in the RCT.

Included in the concurrency group were patients who reported both a "steady" sexual partnership (≥3 months duration) and non-steady partner(s) in the past 3 months. To ensure equivalence between the concurrent and non-concurrent groups, we restricted the non-concurrent group to those patients who reported a steady sexual partnership for ≥3 months. Patients who reported one or more non-steady partners but no steady sexual partner in the past 3 months, or those who reported a steady partnership of less than 3 months duration, were excluded from the analyses. Thus, analyses were limited to the 973 patients who reported having a steady partner for 3 months or longer. Compared to the patients included in the current analyses, those who were excluded (n = 584) were less likely to live with a partner, $\chi^2(1, N = 1557) = 97.73$, more likely to be White, $\chi^2(1, N = 1557) = 12.73$, and more likely to have attended at least some college, $\chi^2(1, N = 1556) = 8.45$. Those who were excluded were also had higher AUDIT scores, $F(1, 1514) = 22.56$, higher DAST scores, $F(1, 1346) = 4.41$, more lifetime partners, $F(1, 1543) = 7.29$, a smaller percentage of episodes of unprotected sex in the past 3 months, $F(1, 1547) = 100.85$, and fewer episodes of unprotected sex in the past 3 months, $F(1, 1547) = 386.41$ (all ps < .05). The two groups did not differ in age, employment status, income, or current STD diagnosis.

Procedures

Patients were screened for eligibility by a Research Assistant (RA), and interested patients provided informed consent. Patients completed an Audio Computer-Assisted Self-Interview (ACASI), and were reimbursed $20 for taking part. Baseline data were collected from March 2004 through June 2006. All procedures were approved by the Institutional Review Boards of the participating institutions (Syracuse University, University of Rochester, and the Monroe County Health Department). Detailed procedures for the RCT are available elsewhere.[21]

Measures

Demographic information. Patients reported their age, sex, race, education, employment, income, and whether or not they lived with their partner.

Sexual partnerships. Patients reported their number of sexual partners in their lifetime and in the past 3 months, whether or not they had a steady partner and, if so, how long they had been in that relationship. Those who reported other sexual partners in the past 3 months, in addition to their steady partner, were considered to have concurrent partners; patients who reported only a steady partner in the past 3 months were considered to not have concurrent partners. Patients were also asked whether they thought their steady partner had other partners, and whether they considered themselves to be heterosexual, homosexual, bisexual, or did not know.

Condom use. Patients reported the number of condom protected and unprotected vaginal and anal sex episodes in the past 3 months with (a) their steady partner and (b) their non-steady partner(s). From this information, we derived patients' number of episodes of unprotected sex (a) total, (b) with a steady and (c) with non-steady partners. These data were also used to determine whether patients used a condom consistently with their steady and non-steady partners.

Substance use. Patients completed the Alcohol Use Disorders Identification Test (AUDIT)[22, 23] to assess alcohol use problems. Scores could range from 0 to 40, with higher scores associated with harmful alcohol use and alcohol problems.[22, 23] The Drug Abuse Screening Test (DAST) [24] assessed drug use. Scores could range from 0 to 10, with higher scores associated with more frequent drug use in the past year.[24] Both the AUDIT and the DAST have been validated in previous studies.[22–25]

Data Analysis

Outliers were trimmed, and variables with a non-normal distribution were re-expressed using a $\log^{10}$ of (x + 1) transformation.[26]

To determine the correlates of steady/non-steady concurrency, analyses of variance (ANOVAs) were conducted on continuous variables, and chi-square analyses were conducted on dichotomous variables. Variables that were significant in univariate analyses ($p < .10$) were included in a multivariate logistic regression model predicting steady/non-steady concurrency. Similar analyses investigated the association between steady/non-steady concurrency and condom use.

RESULTS

Participants were 48% female, 68% African American, and 21% Caucasian; 65% had a high school education or less, 52% were unemployed, and 57% reported an income < 15,000$US per year. Most participants (90%) self-identified as heterosexual. The average age of participants was 29.5 years (SD = 9.7; range = 18 to 61 years).

Steady/Non-steady Concurrency Point Prevalence

Of the 973 patients who reported having a steady sexual partner for 3 months or longer, 624 (64%) reported also having a non-steady partner in the past 3 months. Among those reporting both a steady and non-steady partner, the average number of sexual partners in the past 3 months was 3.4 (*SD* = 2.1).

Correlates of Steady/Non-steady Concurrency

Table 1 summarizes the univariate analyses regarding the correlates of steady/non-steady concurrency. Three *demographic* variables were associated with concurrency at $p < .10$ and were included in the multivariate model: (a) male sex, χ^2 (1, $N = 973$) = 58.25, $p < .0001$; (b) not living with a partner, χ^2 (1, $N = 973$) = 9.35, $p < .01$; and (c) income ≥ $15,000 per year, χ^2 (1, $N = 972$) = 2.76, $p < .10$.

In addition, *substance use* was related to steady/non-steady concurrency. Having both a steady and non-steady partner was associated with higher AUDIT scores, $F(1, 943) = 27.23$, $p < .0001$ and higher DAST scores, $F(1, 838) = 16.56$, $p < .0001$.

Steady/non-steady concurrency was associated with *thinking that your steady partner was monogamous*, χ^2 (1, $N = 972$) = 36.09, $p < .0001$; 60% of patients who (themselves) had both a steady and non-steady partner thought that their steady partner was non-monogamous, whereas 79% of the patients who had only a steady partner believed that their partner was non-monogamous.

In the multivariate model (Table 2), male sex (Wald χ^2 (1, $N = 818$) = 26.15, $p < .0001$), not living with a partner (Wald χ^2 (1, $N = 818$) = 19.04, $p < .0001$), higher AUDIT scores (Wald χ^2 (1, $N = 818$) = 6.45, $p < .05$), higher DAST scores (Wald χ^2 (1, $N = 818$) = 4.32, $p < .05$), and thinking your steady partner was monogamous (Wald χ^2 (1, $N = 818$) = 18.37, $p < .0001$) were associated with steady/non-steady concurrency.

Steady/Non-steady Concurrency and Sexual Behavior

Patients who had both a steady and non-steady partner reported more episodes of unprotected sex in the past 3 months ($M = 23.6$) than individuals who had only a steady partner ($M = 21.4$), $F(1, 966) = 5.89$, $p < .05$. Concurrency status was not associated with the number of episodes of unprotected sex with a steady partner, or with consistent condom use with a steady partner;

few patients in either group reported consistent condom use with a steady partner (5% of those with both steady and non-steady partners; 3% of those with only a steady partner).

Steady/Non-steady Concurrency and Consistent Condom Use

Among patients who reported steady/non-steady concurrency, 148 (24%) reported using condoms consistently with non-steady partners. Table 3 displays correlates of consistent condom use with non-steady partners among individuals reporting steady/non-steady concurrency. Living with a partner was the only demographic variable associated with less consistent condom use with non-steady partners, χ^2 (1, N = 622) = 4.96, p < .05. AUDIT score, F(1, 604) = 8.49, p < .01, was associated with condom use; inconsistent condom users reported more drinking. Patients who reported consistent condom use with non-steady partners had fewer lifetime partners than those who reported inconsistent condom use, F(1, 614) = 4.01, p < .05. Thinking your steady partner was non-monogamous was associated with a greater likelihood of consistent condom use with non-steady partners, χ^2 (1, N = 621) = 8.64, p < .01.

Table 4 provides the results of the logistic regression conducted to predict consistent condom use with non-steady partners among patients reporting steady/non-steady concurrency. In this analysis, AUDIT score, Wald χ^2 (1, N = 602) = 7.00, p < .01, and whether or not the participant thought his/her steady partner was non-monogamous, Wald χ^2 (1, N = 602) = 6.47, p < .05, were associated with consistent condom use with non-steady partners.

DISCUSSION

More than one-half of patients recruited from an STI clinic who were in a current steady relationship of at least 3 months duration also reported having a non-steady partner(s) in the past 3 months. The patients investigated in the present study likely represent a subgroup of those with concurrent partners; individuals who have multiple concurrent non-steady relationships, or individuals in a short (i.e., less than 3 months) steady relationship with additional concurrent partner(s) were not included in the present study. However, given the low rates of condom use in long-term, steady partnerships, both in the present study and in other studies,[19, 20] those reporting a steady sexual partnership and additional non-steady partner(s) are likely to be at high risk of transmitting STIs, and thus merit additional study.

Similar to other studies, male sex was associated with concurrency.[9, 14] This may reflect a sexual double-standard, where it is considered more acceptable for men to have multiple partners.[27] Individuals who lived with a partner were less likely to engage in steady/non-steady concurrency, also corroborating previous research.[15] This finding suggests that partners who live together may be more committed to their primary relationship, and are less likely to have other partners; it may also reflect that it is more difficult to have concurrent sexual relationship without a primary partner learning of this when partners cohabitate.

Similar to other studies, alcohol and drug use was associated with steady/non-steady concurrency.[11, 13] According to Alcohol Myopia Theory,[28] drinking impairs information processing, leading individuals to focus on immediate cues (e.g., an attractive partner) at the expense of more distal cues (e.g., concerns about a steady partner). In the present study, however, we report on drinking and drug use in general, not drinking and drug use in conjunction with sex. Thus, additional research is necessary to determine whether Alcohol Myopia Theory can explain the results found in the present study. The association between steady/non-steady concurrency and substance use could also be explained by a “third variable” that is related to both substance use and sexual risk behavior, such as sexual sensation-seeking.[29] Because other studies have found that substance use is associated with unprotected sex,[30] as well as with concurrency, sexual risk reduction interventions that include a component addressing substance use may be effective at reducing sexual risk behavior.

We also found that patients reporting steady/non-steady concurrency were more likely to think their steady partner was monogamous. It is possible that these individuals are more likely to come to a clinic for STI testing, either to protect their partners from STIs or to avoid conflict if an STI were brought into the relationship. Indeed, one of the unspoken rules governing concurrent partnerships is that one should not infect one's steady partner with an STI.[31] In contrast to findings from other studies regarding the association between African American race and partner concurrency,[10, 11, 13] race was not associated with steady/non-steady concurrency in this study.

Patients reporting steady/non-steady concurrency used condoms more consistently with their non-steady partners than with their steady partners, consistent with prior research.[19, 20] However, the percentage of patients reporting consistent condom use either with steady or with non-steady partners was low. Thus, both the steady and non-steady partners of patients reporting concurrency are at increased risk of contracting an STI.

Substance use, particularly drinking, emerged as a predictor of whether patients used condoms consistently with non-steady partners. Again, this finding may be related to the inability to attend to distal cues,[28] such as wanting to protect a steady partner by using a condom with non-steady partners.

Interestingly, patients reporting steady/non-steady concurrency who thought their steady partners were non-monogamous were more likely to use condoms consistently with non-steady partners than were individuals who thought their partners were monogamous. Research needs to determine the factors underlying this association.

This study has several strengths, including the large and diverse sample of patients at elevated risk for STIs, and the use of clear and easy-to-understand questions to determine steady/non-steady concurrency. However, sampling at a single site precludes generalization to the general population. In addition, we focused on individuals who had a steady partner for at least 3 months; results may not generalize to individuals who are not involved in a steady relationship. Although steps were taken to help patients recall their behavior over the past 3 months (e.g., having patients complete a calendar of important events), patients may not have been able to accurately recall their behavior.

The majority of patients reported having both a steady and non-steady partner in the past 3 months. Because of the association between partner concurrency and STIs, risk reduction interventions need to address partner concurrency as a critical component of infection prevention. Partner concurrency could be addressed through individual-level interventions that include a substance use component, and through social- or structural-level interventions that address peer and social norms about partner concurrency.

KEY MESSAGES

- Many patients attending a STI clinic who were in a steady relationship for also reported having overlapping non-steady sexual partner(s).
- Patients reporting steady/non-steady concurrency were more likely to be male, not cohabitating, use more alcohol/drugs, and think their steady partner was monogamous.
- Patients reporting steady/non-steady concurrency did not use condoms consistently with either steady or non-steady partners.

- Among those reporting steady/non-steady concurrency, consistent condom use with non-steady partners was associated with less alcohol use and thinking their steady partner was non-monogamous.

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Table 1

Sociodemographic and Substance Use Correlates of Self-Reported Steady/Non-steady Concurrency

	Steady and Non-Steady Partners (*n* = 624)		**Steady Partner Only (*n* = 349)**	
	M	*SD*	*M*	*SD*
Age (years)	29.5	9.7	29.5	9.7
AUDIT***	7.0	7.9	4.5	6.0
DAST***	2.1	2.6	1.3	2.1
	n	%	*n*	%
Sex (% male)***	379	61%	123	35%
Race (% African American)	432	69%	231	66%
% currently live with a partner**	175	28%	131	38%
Education (% high school or less)	406	65%	225	65%
Unemployed	333	53%	172	49%
Income (< $15,000/year)	344	55%	211	61%
Think partner is non-monogamous***	375	60%	276	79%

AUDIT = Alcohol Use Disorders Identification Test; DAST = Drug Abuse Screening Test.

** $p < .01$;

*** $p < .0001$ in univariate analyses

Table 2

Multivariate Predictors of Self-Reported Steady/Non-steady Concurrency

	Wald Chi-Square	Odds Ratio	Confidence Interval
Sex (male)***	26.15	2.31	1.68—3.18
Currently live with a partner***	19.04	0.48	0.34—0.67
Income (<$15,000/year)	0.15	0.94	0.69—1.29
AUDIT*	6.45	1.04	1.01—1.06
DAST*	4.32	1.08	1.01—1.17
Think partner is non-monogamous***	18.37	0.46	0.32—0.66

AUDIT = Alcohol Use Disorders Identification Test; DAST = Drug Abuse Screening Test.

* $p < .05$,

*** $p < .0001$

Table 3

Correlates of Consistent Condom Use Among Patients Reporting Steady/Non-steady Concurrency

	Consistent condom use with non-steady partners (*n* = 148)		**Inconsistent condom use with non-steady partners (*n* = 474)**	
	M	*SD*	*M*	*SD*
Age (years)	28.9	9.3	29.6	9.8
AUDIT**	5.4	7.0	7.6	8.1
DAST	1.8	2.4	2.1	2.7
Sex partners, lifetime*	33.5	36.9	37.6	37.2
Unprotected sex, steady partner (number of events, past 3 months)	20.5	23.5	19.7	21.5
Unprotected sex, steady partner (% of events, past 3 months)	72	36	77	32
	n	%	*n*	%
Sex (% male)	85	57%	293	62%
Race (% African American)	106	72%	324	68%
% currently live with a partner*	31	21%	144	30%
Education (% high school or less)	98	66%	307	65%
Unemployed	77	52%	256	54%
Income (<$15,000/year)	78	53%	265	56%
Think partner is non-monogamous**	104	71%	271	57%

AUDIT = Alcohol Use Disorders Identification Test; DAST = Drug Abuse Screening Test.

* $p<.05$;

** $p < .01$ in univariate analyses

Table 4

Multivariate Predictors of Consistent Condom Use with Non-steady Partners Among Individuals Reporting Steady/Non-steady Concurrency

	Wald Chi-Square	Odds Ratio	Confidence Interval
Currently live with a partner	3.25	0.64	0.40—1.04
AUDIT**	7.00	0.96	0.94—0.99
Lifetime partners, number	2.18	0.69	0.42—1.13
Think partner is non-monogamous*	6.47	1.72	1.13—2.61

AUDIT = Alcohol Use Disorders Identification Test.

* $p < .05$,

** $p < .01$