Alcohol Use, Partner Characteristics, and Condom Use Among HIV-Infected Russian Women: An Event-Level Study

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ABSTRACT. Objective: Alcohol use is a prominent factor correlated with HIV risk behavior engagement. Hazardous drinking is prevalent among Russian women and may contribute to decreased condom use. Event-based studies suggest that HIV risk behaviors may vary based on situational factors including partner characteristics and alcohol use. This study investigated the effect of situational factors on condom use during the most recent sexual encounter among a sample of HIV-infected Russian women. **Method:** HIV-infected women ($n = 239$; mean age = 30.0 years) receiving medical care in St. Petersburg, Russia, completed an audio computer-assisted self-interview that assessed characteristics of their last sexual encounter. Multivariable logistic regression examined the associations between the following situational factors: (a) alcohol use, (b) partner type, (c) partner's serostatus, and (d) partner's alcohol use on whether a condom was used for vaginal and/or anal sex during the

last sexual encounter. **Results:** A total of 54.0% engaged in unprotected vaginal and/or anal sex during their last sexual encounter. In an adjusted logistic regression model, unprotected sex did not differ by participants' alcohol use (adjusted odds ratio [AOR] = 0.72, 95% CI [0.29, 1.8]) but was more likely with partners who had consumed alcohol (AOR = 2.3, 95% CI [1.1, 5.2]) and HIV-infected partners (AOR = 2.8, 95% CI [1.6, 4.9]) and less likely to occur in the context of nonsteady partnerships (AOR = 0.36, 95% CI [0.13, 0.99]). **Conclusions:** More stable, steady relationships with HIV-infected partners who consumed alcohol were associated with greater likelihood of noncondom use. Results highlight the need to address the intersection of alcohol and sexual risk engagement within the context of HIV-infected women's relationships. (*J. Stud. Alcohol Drugs*, 77, 968–973, 2016)

AS OF 2010, the World Health Organization (WHO) estimated there were 980,000 people (480,000 women) living with HIV in Russia, with an HIV prevalence rate exceeding 1% (UNAIDS, 2010). Incident HIV infections are increasing among young women (Burruano & Kruglov, 2009), with heterosexual contact the primary transmission mode (UNAIDS, 2010). Furthermore, women (Shin et al.,

2010; WHO, 2011) and HIV-infected individuals (Krupitsky et al., 2005) in Russia have elevated rates of hazardous drinking. WHO estimates that 5.8% of Russian women are heavy episodic drinkers and 2.6% have an alcohol use disorder (WHO, 2011). Alcohol use is a prominent factor associated with HIV transmission behavior (Baliunas et al., 2010; Donovan & McEwan, 1995; Griffin et al., 2010; Shuper et al., 2009, 2010) broadly, and within Russia, specifically (Abdala et al., 2010, 2011, 2013; Krupitsky et al., 2005).

Moreover, alcohol use before sexual encounters is common; one study found that 85% of Russian sexually transmitted infection (STI) clinic patients reported one or more occasions of drinking during a sexual encounter in the past 3 months (Benotsch et al., 2006). Thus, understanding the role of alcohol use on HIV-infected Russian women's engagement in unprotected sex is an important public health priority.

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Global association studies examining overall patterns of alcohol use and HIV/STI transmission risk suggest a positive association between drinking and sexual risk taking (Dingle & Oei, 1997; Shuper et al., 2009) and incident HIV infections (Baliunas et al., 2010). However, event-based studies provide a more reliable index of sexual risk than retrospective assessments of multiple events and allow for analysis that links alcohol use to a specific sexual occasion (Brown & Vanable, 2007; Schroder et al., 2003). Such event-based studies suggest a nuanced relation between alcohol and sexual risk behavior that is influenced by situational factors such as partner characteristics, including partner type (e.g., steady vs. nonsteady partners; Brown & Vanable, 2007; Vanable et al., 2004) and relationship duration (Corbin & Fromme, 2002). Indeed, studies not accounting for situational factors often fail to show differences in condom use for drinking versus nondrinking sexual encounters (Desiderato & Crawford, 1995; Senf & Price, 1994).

Alcohol myopia theory specifies that alcohol exerts its largest effect on behaviors in situations where there are both strong instigatory (e.g., sexual arousal) and inhibitory (e.g., HIV transmission risk) cues to engage in a desired behavior (e.g., sex without a condom; Steele & Josephs, 1990). Accordingly, when strong instigatory and inhibitory cues are present, alcohol use limits one's capacity to attend to distal inhibitory cues in the face of more proximal instigatory situational cues (Steele & Josephs, 1990). The notion that there are situational differences in alcohol-related HIV transmission risk based on partner characteristics is consistent with alcohol myopia theory (Steele & Josephs, 1990). Without alcohol, encounters involving nonprimary partners often activate restraint and inhibition of desired sexual risk behaviors (e.g., sex without a condom) because of reduced partner familiarity and concerns about a partner's sexual history (Macaluso et al., 2000).

Thus, alcohol may lead to unsafe sex with nonprimary partners by narrowing attentional focus to the most salient aspects of the sexual situation (e.g., sex without a condom) while, at the same time, reducing a person's capacity to focus on distal consequences of engaging in a desired behavior (e.g., potential for HIV transmission to a seronegative partner; MacDonald et al., 2000). In contrast, for couples in committed relationships, particularly with HIV seroconcordant steady partners, condom use norms are typically well established, with most partners opting for sex without a condom (Liu et al., 2011). Thus, alcohol-related impairment may not affect decisions about condom use in these relationships (Corbin & Fromme, 2002).

Despite the presumed link between alcohol use and sexual risk behaviors, studies confirming this association among HIV-infected women in Russia are lacking. Further, previous studies examining the association between alcohol use and unprotected sex (a behavior that confers

HIV transmission risk to uninfected partners) among HIV-infected women have used a global association methodology (e.g., Krupitsky et al., 2005), precluding an examination of event-level situational factors that may produce differential levels of instigatory and inhibitory cues to engage in a desired behavior.

Thus, the aim of the current study was to examine the extent to which alcohol use (participant and/or partner use) and partner characteristics (i.e., partner type, partner serostatus) were associated with unprotected vaginal and/or anal sex during the most recent sexual encounter among HIV-infected Russian women. We hypothesized that unprotected sex would be more likely for encounters where one or both partners consumed alcohol, within steady partnerships, and with HIV-infected partners. We also explored the extent to which partner characteristics moderated the association between alcohol use and unprotected sex.

Method

Participants

Participants were HIV-infected women ($N = 250$) receiving HIV medical care in St. Petersburg, Russia. Analyses are limited to participants reporting vaginal and/or anal sex ($n = 239$; 95.6% of total sample) during their most recent sexual encounter. Participants were between 19 and 35 years of age ($M = 30.0$ years, $SD = 2.9$); 44.4% were married, and 61.9% were currently employed.

Procedures

Participants were recruited during their regularly scheduled medical appointments at a comprehensive HIV care center in St. Petersburg, Russia. Study staff approached women in the clinic, described the study, and assessed eligibility. Eligibility criteria included (a) being age 18–35 years old, (b) having reported vaginal sex in the previous 3 months, (c) not being pregnant, and (d) currently being prescribed antiretroviral medication. Eligibility criteria were designed to recruit young women, a population experiencing increased HIV prevalence in Russia, who engaged in recent HIV transmission risk behavior. Current antiretroviral medication use was an eligibility criterion for additional study aims examining antiretroviral adherence.

Baseline data collection consisted of a 45-minute survey administered via an audio computer-assisted self-interview. All measures were translated from English to Russian and back-translated from Russian to English. A pilot study was conducted to refine the measures before baseline data collection. Written informed consent was obtained from all participants. The institutional review boards of the participating institutions approved all study procedures.

Measures

Demographic characteristics. Participants reported their age, marital status, and current employment status (not employed, employed).

HIV medical information. Participants reported the length of time since their HIV diagnosis and their most recent viral load (detectable, undetectable, unknown).

Most recent sexual encounter characteristics. Participants indicated whether they engaged in vaginal and/or anal sex and whether a condom was used for each of the sexual behavior(s). Participants indicated the number of alcoholic drinks that were consumed either immediately preceding or during the sexual encounter. Participants reported on their partner type at their most recent sexual encounter (primary or "steady" partner, someone you knew well but not a steady partner, a casual or anonymous partner, or "other" partner). The latter three categories were collapsed to provide a dichotomously coded index of whether the sexual encounter involved (a) a steady partner or (b) a nonsteady partner. Participants reported whether their partner consumed alcohol. Last, participants indicated their partner's HIV serostatus (HIV negative, HIV positive, or unsure of their partner's serostatus).

Data analytic approach

Descriptive statistics described participants' demographics, HIV medical status, and most recent sexual encounter characteristics. Separate chi-square and *t*-test analyses examined associations between demographic characteristics and unprotected vaginal and/or anal sex during the most recent sexual encounter, and between HIV medical status and unprotected vaginal and/or anal sex during the most recent sexual encounter. Demographic and HIV medical status variables significant at $p \leq .10$ were entered as covariates in a multivariable logistic regression model predicting unprotected vaginal and/or anal sex.

Multivariable logistic regression analysis then examined the association between unprotected vaginal and/or anal sex during the most recent sexual encounter and (a) participant's alcohol use (no alcohol use vs. alcohol use) and (b) partner's alcohol use (no alcohol use vs. alcohol use) before the most recent sexual encounter; and partner characteristics including (c) partner type (steady vs. nonsteady) and (d) partner's serostatus (HIV-uninfected or unknown serostatus vs. HIV-infected).

Last, exploratory analyses examined whether partner characteristics moderated the association between alcohol use and unprotected sex. Five separate hierarchical multivariable regression analyses were conducted with age entered in Step 1; the main effects of participant alcohol use, partner alcohol use, partner type, and partner serostatus entered in Step 2; and interactions between (a) Participant Alcohol

Use $\times$ Partner Type, (b) Participant Alcohol Use $\times$ Partner Serostatus, (c) Partner Alcohol Use $\times$ Partner Type, (d) Partner Alcohol Use $\times$ Partner Serostatus, and (e) Participant Alcohol Use $\times$ Partner Alcohol Use entered in Step 3.

Results

Descriptive statistics

Participants' time since diagnosis ranged from less than 1 year to 18 years, with a mean (*SD*) of 7.2 (4.1) years since diagnosis. The majority (58.6%) self-reported their current viral load as undetectable, 28.9% reported their current viral load as detectable, and 12.6% indicated they "did not know" their current viral load status.

A minority engaged in anal sex (12.1%, $n = 29$); 98.3% reported engaging in vaginal sex ($n = 235$) at their most recent sexual encounter. Fifty-four percent endorsed engaging in unprotected vaginal and/or anal sex during the most recent sexual encounter. A minority (16.3%) reported drinking alcohol, with 23.4% indicating their partner drank before the most recent sexual encounter; participants' alcohol use was correlated with partners' alcohol use ($r = .53$, $p < .001$).

The majority of sexual encounters were with an HIV-negative partner or partner of unknown serostatus (58.6%) and within a steady partnership (90.8%). Of these encounters with HIV-negative or unknown serostatus partners ($n = 140$), 87.8% ($n = 123$) indicated that their encounter was with a steady partner, whereas 12.1% ($n = 17$) endorsed sex with a nonsteady partner. Among the encounters with HIV-infected partners ($n = 99$), 94.9% ($n = 94$) indicated that the sexual encounter was with a steady partner, whereas 5.1% ($n = 5$) endorsed sex with a nonsteady partner. There was no difference when examining partner serostatus by partner type, $\chi^2(1, n = 239) = 3.49$, $p = .07$.

We also examined the degree to which married participants reported that their most recent sexual encounter was with a steady versus nonsteady partner. Of the married participants ($n = 106$), 98.1% ($n = 104$) indicated their encounter was with a steady partner, whereas 1.9% ($n = 2$) endorsed sex with a nonsteady partner. Among the nonmarried participants ($n = 133$), 85.0% ($n = 113$) indicated the sexual encounter was with a steady partner, whereas 15.0% ($n = 20$) endorsed sex with a nonsteady partner.

Bivariate associations between demographics, HIV medical status variables, and unprotected sex

The likelihood of engaging in unprotected vaginal and/or anal sex did not differ by marital status, employment status, length of time since HIV diagnosis, or self-reported viral load (all $ps > .10$). Participants reporting unprotected sex were older ($M = 30.3$ years, $SD = 2.9$) than individuals not engaging in unprotected sex ($M = 29.7$ years, $SD = 3.0$),

$t(237) = -1.7, p = .10$; thus, age was controlled for in the multivariable logistic regression model.

Multivariable logistic regression model

Multivariable logistic regression model results are shown in Table 1. There was no difference in unprotected vaginal and/or anal sex between participants who were drinking and who were not drinking (adjusted odds ratio [AOR] = 0.72, 95% CI [0.29, 1.8]). However, unprotected sex was more likely with partners who consumed alcohol (AOR = 2.3, 95% CI [1.1, 5.2]) and more likely with HIV-infected partners (AOR = 2.8, 95% CI [1.6, 4.9]). Unprotected sex was less likely in the context of nonsteady partnerships (AOR = 0.36, 95% CI [0.13, 0.99]).

Exploratory analyses

Separate hierarchical multivariable regression analyses were conducted with age entered in Step 1; the main effects of participant alcohol use, partner alcohol use, partner type, and partner serostatus entered in Step 2; and interactions between (a) Participant Alcohol Use $\times$ Partner Type, (b) Participant Alcohol Use $\times$ Partner Serostatus, (c) Partner Alcohol Use $\times$ Partner Type, (d) Partner Alcohol Use $\times$ Partner Serostatus, and (e) Participant Alcohol Use $\times$ Partner Alcohol Use entered in Step 3. No significant interactions were observed between alcohol use (participant, partner), partner type, and partner's serostatus in predicting unprotected sex (results are not shown, but available from the first author on request).

Discussion

Our results indicate that HIV-infected women's drinking was not associated with differences in condom use during their last sexual episode. However, there was an increased likelihood of unprotected sex among women whose male partners consumed alcohol. Past event-level studies examining the intersections among alcohol use, partner characteristics, and condom use have typically focused only on the respondent's drinking (Brown & Venable, 2007; Venable et al., 2004) rather than examining both partners' alcohol use. Results from this study highlight the importance of the role of alcohol use by both partners in relationship to condom use. Men's alcohol use may be a more important determinant of condom use than that of their female partners because men have greater control over condom use and may also have greater power within the relationship (Wingood & DiClemente, 2002). Future research would benefit from examining whether similar results emerge if the man within the partnership was the primary respondent.

Sexual encounters with steady partners or HIV-infected partners also were associated with increased likelihood

TABLE 1. Multivariable logistic regression analysis modeling the direct effects of alcohol use and partner characteristics on unprotected vaginal and/or anal sex during the most recent sexual encounter ($n = 239$)^a

Predictor	Odds ratio	[95% CI]	<i>p</i>
Alcohol use			
Participant's alcohol use			
No alcohol use	Ref. ^b		
Alcohol use	0.72	[0.29, 1.8]	.48
Partner's alcohol use			
No alcohol use	Ref. ^b		
Alcohol use	2.3	[1.1, 5.2]	.04
Partner characteristics			
Partner type			
Steady	Ref. ^b		
Nonsteady	0.36	[0.13, 0.99]	.05
HIV serostatus			
HIV uninfected or unknown serostatus	Ref. ^b		
HIV infected	2.8	[1.6, 4.9]	<.001
Model χ^2	$\chi^2 = 24.9, p < .001$		

Notes: Ref. = reference group; CI = confidence interval. ^aAnalysis controls for age, which was included in the model as a continuous measure; ^bthe reference group is the group against which the other category is compared.

of unprotected sex. These findings are consistent with research suggesting that condom use norms are typically well established within committed relationships, with couples opting not to use condoms, regardless of whether alcohol is consumed (Corbin & Fromme, 2002). Further, condom use was less likely in relationships where both individuals were HIV-infected. Although serosorting has been studied as an HIV risk-reduction strategy among men who have sex with men (e.g., Eaton et al., 2009), HIV-infected women have also reported decreased condom use with HIV-infected partners (Liu et al., 2011). Future research would benefit from investigations of condom use within HIV-infected women's partnerships over time and across sexual episodes, permitting a better understanding of how relationship dynamics, partner characteristics, and alcohol use affect HIV-associated sexual practices. The use of ecological momentary assessment methods to collect "real-time" data may permit a more nuanced examination of within-person variation in alcohol use, situational characteristics, and condom use across multiple, real-world events.

Building on the current findings, these research efforts may ultimately result in tailored interventions that can better address the alcohol-risky sex linkage among HIV-infected individuals and identify the extent to which relationship dynamics, situational characteristics, and alcohol use influence HIV transmission risk behaviors.

Strengths and limitations

To our knowledge, this is the first study to examine the role of alcohol use and partner characteristics in relationship to unprotected sex among a sample of HIV-infected Russian

women using an event-level methodology. Focusing on a single recent event reduces self-report errors (Brown & Venable, 2007; Schroder et al., 2003) and allows for an examination of alcohol use within a single, naturalistic sexual encounter.

There are limitations that should be acknowledged. First, analyses were restricted to female respondents' descriptions of partner characteristics and behaviors. Furthermore, participants only provided a dichotomous indicator of partner drinking rather than indicating number of drinks consumed. Although focusing on a single recent event reduces self-report errors, this sexual episode may not be representative of participants' typical sexual behaviors. In addition, the sample consisted of HIV-infected women, 18–35 years, in HIV care and receiving antiretroviral medications in St. Petersburg, Russia, so findings may not generalize to other HIV-infected samples.

Conclusions

Results from the current study highlight the need to address the intersection of alcohol use and HIV transmission risk behaviors within the context of HIV-infected women's relationships, examining situational factors that may result in differential instigatory and inhibitory cues affecting the alcohol–risky sex relation. Few secondary HIV-prevention interventions addressing the intersection of alcohol use and HIV transmission risk behaviors have been developed or tested (Brown & DiClemente, 2011; Brown et al., 2013).

Further, in the only intervention trial for HIV-infected Russian drinkers, there was limited evidence of the intervention's efficacy to reduce incident STI or HIV transmission risk behaviors relative to an attention-control group (Samet et al., 2015). Given our findings pertaining to male partner alcohol use and engagement in unprotected sex, future interventions for HIV-infected Russian women may benefit from couples-based approaches and inclusion of content addressing the intersection of alcohol use and unprotected sex.

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