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STI Screening Uptake and Knowledge of STI Symptoms among Female Sex Workers Participating in a Community Randomized Trial in Peru

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Abstract

This study aims to evaluate condom use, STI screening, and knowledge of STI symptoms among female sex workers (FSW) in Peru associated with sex work venue and a community randomized trial of STI control. One component of the Peru PREVEN intervention conducted mobile-team outreach to FSW to reduce STIs and increase condom use and access to government clinics for STI screening and evaluation. Prevalence ratios were calculated using multivariate Poisson regression models with robust standard errors, clustering by city. As-treated analyses were conducted to assess outcomes associated with reported exposure to the intervention. Care-seeking was more frequent in intervention communities, but differences were not statistically significant. FSW reporting exposure to the intervention had significantly higher likelihood of condom use, STI screening at public health clinics, and symptom recognition compared to those not exposed. Compared with street or bar-based FSW, brothel-based FSW reported significantly higher rates of condom use with last client, recent screening exams for STIs and HIV testing. Brothel-based FSW also more often reported knowledge of STIs and recognition of STI symptoms in women and in men. Interventions to promote STI-detection and prevention among FSW in Peru should consider structural or regulatory factors related to sex work venue.

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Keywords

female sex workers; Peru; sexually transmitted disease; health behavior

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Introduction

Female sex workers (FSW) are a vulnerable population at high-risk for acquisition of sexually transmitted infections (STI)(1); they have also been considered a bridge group in terms of transmission of STIs from high-risk to general populations (2-5). They represent a key target population for promotion of health care-seeking for STI diagnosis, treatment and prevention interventions. However, FSW are often marginalized, isolated, and difficult to reach for intervention in many settings because sex work is illegal and covert in most countries, and sex workers are not always readily identifiable as such. Many FSW are reluctant to self-identify for fear of violence or persecution by authorities (6-8).

There is an increasing body of evidence that demonstrates that multi-component interventions including peer support, condom promotion, and access to STI screening services are associated with decreased STI prevalence and improved condom use among sex workers (9-14). While clinic-based screening interventions are effective, engaging FSW to access clinic-based services in the context of fear of persecution, lack of knowledge, and stigma is a challenge (15). And while outreach sites may engage FSW outside of clinics, they often lack the scope to address the diversity of reproductive health issues experienced by FSW (14). Few studies address FSW linkage to and engagement in formal health care services. Furthermore, among community-based intervention studies, few are randomized trials.

Interventions that promote health care-seeking behavior as a component of a causal pathway toward improving biological endpoints can be placed within a broad conceptual framework that includes processes and factors operating at individual, socio-cultural, geographical, demographic, economic and other structural levels (16, 17). While individuals factors such as higher education and knowledge of STIs are protective for HIV/STI acquisition (18), structural interventions such as community mobilization, venue-based support, or empowerment efforts have been identified as promising mechanisms for decreasing FSW STI risk and improving linkage to health services(14, 19). It is important therefore, to understand not only individual knowledge and demographic factors related to health-seeking behavior, but to also assess the association between structural factors and STI-related health care-seeking behaviors.

The present analysis was undertaken as a component of the Peru PREVEN Study, in which 20 cities with population >50,000 underwent pair-wise randomization to a multi-component STI intervention that included mobile-team based FSW outreach (20). Pre-intervention baseline analyses for the PREVEN study demonstrated that self-medication, or treating oneself in the absence of medical advice, for symptomatic STIs was less likely among FSW who reported being aware of STI services and those based at brothel venues (21). This present analysis further aims to evaluate uptake of health screening and HIV/STI preventive behaviors among FSW in mid-sized cities in Peru, regardless of symptoms, associated with

the community randomized trial intervention. A second analysis further assesses screening outcomes associated with venue of sex work.

Methods

Study Design

The Peru PREVEN study was a community randomized trial conducted between 2003 and 2006 in medium sized cities in Peru. Trial methods have been previously described elsewhere (20, 22). The primary study endpoints determined in 2006 were combined prevalence of the major curable STIs in the general population and among FSW (20). The PREVEN multi-component HIV/STI intervention consisted of three key components: strengthened STI syndromic management for the general population; mobile team outreach to FSW; and condom promotion among the general population and FSW. Training of clinicians and pharmacy workers, and a health communication campaign on STI recognition and care-seeking, were implemented in the general population in 2005 to support syndromic management.

The mobile team component aimed to increase condom use and increase care-seeking for screening, diagnosis, and treatment of STIs among FSW (23). Each outreach team was led by a health professional and an FSW peer educator, and later visit cycles included a counselor. Intervention sites including brothels, bars, and street venues were identified continuously via key informant interviews. Each intervention cycle was eight weeks long, during which the mobile team visited every identified sex work venue in the city. In addition to presumptive periodic treatment with metronidazole two grams orally every two months for trichomoniasis and/or bacterial vaginosis, counseling was provided at each visit and included promotion of condom use, information on STI symptom recognition, and information about available government-provided health services.

Ethical Considerations

This study was approved by the Institutional Review Boards at the University of Washington (16764), Universidad Peruana Cayetano Heredia (99084), and the United States Naval Medical Research Center Detachment in Peru (NMRCD.2002.0016). The clinical trial registration number is ISRCTN43722548.

Data Collection

Cross-sectional surveys were conducted among FSW in intervention and control cities at baseline in 2002-2003, during 2005, and at the end of the intervention in late 2006. Interviews were conducted among women found offering sex services at increasing numbers of venues identified over the three year intervention. These venues included street, brothel and bar-based settings. FSW who were fourteen years of age or older and were willing and able to provide informed consent were included. Participation in previous surveys, including prior Peru-PREVEN surveys did not preclude participation. Trained fieldworkers administered questionnaires through face-to-face interviews.

Definitions

For this analysis, outcomes of interest included seeking a periodic STI screening exam from a government health facility during the prior six months, HIV testing within the last year, and ability to describe symptoms of STIs in women and in men. Perceived risk of HIV is also included as it has frequently been included in conceptual models of health care-seeking behavior in terms of perceived threat of disease and need for medical support. (16, 24-26) Symptoms were free-listed by participants and recorded where answered correctly. The median number of correctly identified symptoms were summarized, and a binary variable denoting report equal to or more than median number of reported symptoms was computed. Symptoms included lower abdominal pain, vaginal discharge, foul smelling discharge, burning or pain on urination, genital ulcers or sores, swelling in the groin, genital itching, and genital warts among women; and urethral discharge, burning or pain on urination, genital sores or ulcers, swelling in the groin, and genital warts among men. Self-reported condom use outcomes with most recent client and non-client were also assessed. Uptake of services for STI treatment among symptomatic FSW will be presented in a separate manuscript.

Statistical analysis

Statistical analyses used data from the 2006 FSW surveys, adjusting for city-specific baseline values from the 2002 surveys in measurement of intervention effects. Descriptive categorical variables were presented as frequencies and continuous variables as medians and interquartile ranges (IQR). FSW characteristics associated with sex work venue were tested using chi-squared analysis and nonparametric tests of the equality of medians (27). Prevalence ratios for behavioral outcomes associated with the intervention were calculated using non-paired, multivariate generalized linear models (STATA Corp, College Station, TX), utilizing poisson family with robust standard errors and accounting for clustering by city. Intervention analyses were adjusted for city-specific 2002-2003 baseline responses, age, and brothel venue, as there were a higher proportion of brothels in intervention than in control cities, and FSW in control cities were significantly older. (20) A secondary “as treated” analysis was conducted using report of receiving services or participating in activities with the PREVEN mobile team as an exposure variable. Analyses of outcomes associated with brothel venue used similar statistical methods, though did not control for baseline, but rather for hypothesized confounders of age, marital/cohabitation status, geographical region, alcohol use, education, randomization arm and city cluster.

Results

Population and Sample

4,156 FSW were enrolled in 20 cities; 2,063 from control and 2,093 from intervention cities; key demographic characteristics of the sample are described elsewhere (22). Of the 4,156 participants, (44%) were located in coastal cities, 36% in highlands cities and 20% in jungle cities; 21% of FSW were brothel-based, 23% street-based and 56% were bar- or nightclub-based. Median age at first paid sex was 21 years and median duration of sex work was 20 months. Sex work was relatively frequent, with a median of six days worked in the last week, 4 weeks in the last month and 8 months in the last year. Frequency of sex work

increased with age ($p<0.001$). FSW reported a median of nine paying sex partners within the last week and two clients on the last day of work. Approximately 30% reported a source of income other than sex work.

FSW Characteristics and Venue of Sex Work

Brothel-based and street-based sex workers were similar in terms of socio-demographic characteristics (Table 1); while bar-based sex workers were significantly younger, more likely to be from jungle and highlands regions than from the coast, less likely to have ever been married or to be currently living with a sex partner, had received more education, and received higher payment per sexual transaction. Bar-based sex workers reported more frequent use of alcohol before sex with a paying client, with more than half reporting alcohol use “most of the time” or “always”. Patterns of sex work varied by work venue, with brothel-based workers reporting more significantly more clients than bar- or street-based workers.

Intervention Arm and Reported Exposure to Intervention

Although proportions of FSW accessing STI screening services and reporting knowledge of STI symptoms all were higher in intervention cities, these differences were not statistically significant (Table 2). Condom use outcomes are analyzed in detail elsewhere and were similar between intervention and control groups (20). Among FSW surveyed in 2006, 4% in the control arm and 75% in the intervention arm reported receiving services from or ever participating in activities with the mobile PREVEN outreach team. Associations between outcomes of interest and reported exposure to the intervention are detailed in Table 3. Reported exposure to the mobile team intervention was associated with an increased likelihood of reported condom use with last non-client (PR 1.46; 95%CI 1.01-2.10), ever seeking a STI screening exam (PR=1.28; 95%CI 1.03-1.59), ever receiving HIV testing (PR=1.24; 95%CI 1.04-1.48), receiving recent HIV testing (PR=1.26; 95%CI 1.02-1.57), knowledge of STIs (PR=1.11; 95%CI 1.06-1.15), and awareness of female and male STI symptoms (PR=1.32; 95%CI 1.07-1.64 and PR=1.50; 95%CI 1.21-1.86 respectively). There was a trend towards increased frequency of recent screening exams at a public STI clinic.

Sex Work Venue, Condom Use, and Uptake of STI Screening Services

Prevalence ratios evaluating relationships of sex work venue and uptake of STI screening services are described in Table 4. Outcomes for street-based and bar-based FSW were initially analyzed separately but were nearly identical, and were therefore combined. Brothel-based FSW reported significantly higher rates of condom use with clients (PR=1.04; 95%CI 1.02-1.06), recent STI screening exams (PR=1.97; 95%CI 1.58-2.45), and HIV testing in the last year (PR=1.74; 95%CI 1.45-2.09) compared with FSW who were street- or bar-based. They more often reported perceived risk of HIV acquisition (PR=1.38 95%CI 1.15-1.65) than street- or bar-based FSW. Brothel-based FSW also more frequently reported knowledge of STIs (PR=1.07; 95%CI 1.04-1.09) and identified more symptoms of STIs in women (PR=1.39; 95%CI 1.22-1.59) and in men (PR=1.32; 95%CI 1.12-1.57).

Discussion

Despite significantly greater reductions in prevalence of curable STIs among FSW from intervention cities than in control cities during the Peru PREVEN community randomized trial, we did not find statistically significant increases in uptake of STI screening services when comparing intervention and control cities after adjusting for baseline. One possible explanation is the mobility of FSW, diffusion of the intervention across units of analysis (cities). Outcome surveys were performed at the city-level and enrolled FSW separately from the intervention, thus one quarter of the women completing outcome surveys in the intervention cities had not participated in the intervention. Furthermore, the mobile teams reported high turn-over among participants; after the fifth cycle of the intervention, more than half of FSW were identified as first time participants (23). This is supported by consistent associations between increased health screening behaviors and reported exposure to the intervention. Another explanation could be the presence of social desirability bias in reporting sexual behaviors. In this study for example, more than 90% of participants in both cities reported condom use with their last client, numbers remarkably higher than most studies in other settings. Follow-up qualitative work revealed that participants were reluctant to admit non-condom use not only to research teams, but also among their peers, especially in brothel settings where condom use was strictly enforced (C. Mejia, personal communication, 2012). However sex workers still acknowledged less condom use with non-clients than with clients, and somewhat less condom use among FSW not exposed to the intervention.

Another possible explanation is related to decreased statistical power when accounting for clustering by city (28, 29). In our study, the design was powered for STI endpoints, which were less frequent than reported uptake of health services. Similar studies reporting statistically significant outcomes have been critiqued for failing to account for clustering in study design or analysis (9). Finally, it is possible that reductions in curable STI rates were a result of periodic presumptive treatment for vaginal trichomoniasis, and testing and specific treatment for STIs, in addition to the moderate behavior change brought about by the counseling aspects of the intervention.

A recent systematic review of HIV risk among FSWs suggests an iterative and dynamic interaction between individual sex worker, client, work environment, community organization and macrostructural factors (30). An interesting finding in our analysis was that although street-based and brothel-based sex workers were more similar to each other than bar-based workers in demographic profiles, it was bar-based and street-based workers who had similar health-seeking behaviors, suggesting that structural factors operating in brothels could “override” individual demographic risk characteristics. Similar findings were noted among injection drug-using FSW in another semi-regulated setting in Tijuana, where policy environment and micro-social factors, such as having syringes confiscated by police, predominately drove increased HIV risk more so than individual level factors (7). In the Philippines, structural factors including trafficking or managerial practices of having condoms available in sex work venues were independently associated with FSW ability to negotiate condom use with clients (31).

In the context of Peru, as in many countries, prostitution has essentially had a quasi-legal status, in which sex work is generally not penalized, though efforts to promote it, especially with children, are considered criminal. Government health clinics in Peru offer free STI screening and treatment for FSW, and regularly provided FSW with documentation “carnets” in order to verify health status. Although operation of brothels is not legal, they often operate and pay taxes under the auspices of a legally licensed establishment such as a bar or hotel. Outdated regulations required brothel-based FSWs to provide “carnet” documentation of health status. Although these regulations were no longer enforced during the period of the study, many brothel owners continued to require condom use and health card documentation as a matter of practice.

Reported STI rates among FSW have varied throughout the world by geographic location and type of sex work venue. However which venues are of highest risk in any given setting also has varied tremendously. Bar-based or nightlife workers in Tijuana, Mexico were characterized as at higher risk due to alcohol use and absence of regulatory enforcement (32), while street-based sex workers in Bangkok, Thailand had higher HIV and syphilis prevalences than other sex workers (33). In Queensland, Australia, sex workers employed at licensed brothels were less likely to report gonorrhea than illegal street-based workers (34), but brothel-based workers in Karnataka State in India were found to have higher rates of HIV infection and lower risk-reduction behaviors than street and home-based FSW (10). The regulatory practices associated with the type of sex venue such as 100% condom use “house-rules” or requirement of regular STI screening, more so than the venue type per se, may be a predominant driver of health-seeking and STI preventive behaviors among FSW and should be examined further.

Modeling analyses suggest that decriminalization of sex work could avert 33-46% of HIV infections over the next decade (30). While regulation of sex work may promote positive health seeking behaviors among FSW, there is also concern that regulations have the potential to push the most vulnerable sex workers, such as those who are already HIV-infected, into less protected settings (35-37). In our study only 21% of the 4,156 women identified were brothel-based. In general it has been more difficult to identify and access sex workers in bars, nightclub, or streets than in brothels (8, 32). Our findings suggest that mobile teams that include FSW peers may be an effective method in reaching out to provide STI prevention, diagnosis, and treatment services to socially marginalized FSW in all settings and to foster subsequent engagement in formal public health services.

These findings contribute to a body of evidence suggesting a role for health promotion interventions for sex workers utilizing mobile outreach and peer services. Sex work venue is significantly associated with the health care-seeking and STI preventive behaviors of sex workers, thus health promotion interventions to increase STI prevention and detection among FSW should consider structural factors related to all types of sex work venue.

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Table 1
Characteristics of FSW by Venue of Sex Work (2006 Survey)

Characteristic	Brothel n=846 (21.0%) <i>n</i> (%) or median (<i>IQR</i>)	Bar n=2,263 (56.3%) <i>n</i> (%) or median (<i>IQR</i>)	Street n=913 (22.7%) <i>n</i> (%) or median (<i>IQR</i>)	p-value
Age	25 (22-30)	23 (20-27)	27 (22-36)	<0.001
Education				
Incomplete primary	94 (11.1)	172 (7.6)	125 (13.7)	<0.001
Complete primary	353 (41.7)	885 (39.1)	420 (46.0)	
Complete secondary	300 (35.5)	897 (39.6)	299 (32.8)	
Any superior	52 (6.2)	176 (7.8)	35 (3.8)	
Region				
Coast	500 (59.1)	737 (32.6)	597 (65.4)	<0.001
Highlands	201 (23.8)	1,009 (44.6)	164 (18.0)	
Jungle	145 (17.1)	517 (22.9)	152 (16.7)	
Ever married or cohabitating	668 (79.0)	1,425 (63.0)	725 (79.4)	<0.001
Currently living with sex partner	356 (42.6)	588 (26.8)	410 (45.4)	<0.001
Partner does not know about sex work	55 (6.5)	397 (17.5)	106 (11.6)	<0.001
Number of clients (last 7 days)	53 (25-80)	5 (3-10)	12 (6-20)	<0.001
Number of clients last day of sex work	9 (4-15)	1 (1-2)	3 (2-4)	<0.001
How much last regular client paid (soles)	15 (10-20)	60 (30-130)	20 (15-35)	<0.001
Number of months in sex work	24.5 (12-60)	13 (5-30)	36 (12-84)	<0.001
Number of days working in last week	7 (6-7)	5 (3-7)	6 (4-7)	<0.001
Other employment than sex work	108 (12.8)	709 (31.3)	297 (32.5)	<0.001
Frequency of alcohol use before sex with paying client				
Never	414 (48.9)	160 (7.1)	369 (40.4)	<0.001
Some of the time	368 (43.5)	850 (37.6)	474 (51.9)	
Most of the time	32 (3.8)	598 (26.4)	40 (4.4)	
Always	28 (3.3)	588 (26.0)	13 (1.4)	
Reside in intervention city	553 (65.4)	1,197 (52.9)	330 (36.1)	<0.001

Table 2

STI Screening and Knowledge of STI Symptoms Associated with Peru PREVEN Intervention (2006 Survey)

	Control n=2,063 (49.6%)	Intervention n=2,093 (50.4%)	aPR* (95% CI)	p
STI Screening				
Aware that gov't health centers provide screening exams to FSW	1,498 (72.8)	1,656 (79.3)	1.02 (0.90-1.16)	0.769
Ever sought a screening exam at gov't health center [†]	1,132 (56.7)	1,301 (63.1)	1.02 (0.81-1.27)	0.876
At least one attempt to receive screening exam in last six months [†]	1,062 (52.3)	1,191 (57.3)	0.97 (0.76-1.23)	0.799
Ever HIV test	1,272 (63.0)	1,463 (70.4)	1.02 (0.86-1.21)	0.828
HIV test in last year [†]	1,118 (55.7)	1,275 (61.5)	0.96 (0.77-1.20)	0.730
Believe self at high risk of acquiring HIV [‡]	854 (42.5)	1,082 (52.9)	1.17 (0.76-1.78)	0.477
Knowledge of Symptoms				
Ever heard of STDs	1,824 (90.6)	1,931 (95.0)	1.04 (0.98-1.09)	0.201
Describe symptoms in women				
Median (IQR) sum of symptoms mentioned	3 (1-4)	3 (1-4)		
overall median	1,032 (50.1)	1,234 (59.1)	1.11 (0.82-1.51)	0.506
Describe symptoms in men				
Median (IQR) sum of symptoms mentioned	1 (0-2)	2 (1-3)		
overall median	1,355 (65.8)	1,595 (76.3)	1.23 (0.90-1.68)	0.191

* Adjusted for 2002 baseline city proportions, age, brothel venue and clustering by city

[†] Recoded as zero if skipped out of parent question[‡] Not adjusted for baseline, not asked in 2002 surveys

Table3

Condom Use, STI Screening, and Knowledge of STI Symptoms Associated with Reported Exposure to Peru PREVEN Intervention (2006 Survey)

	No exposure to PREVEN mobile teams n=2,475 (60.3%)	Reported exposure to PREVEN mobile teams n=1,628 (39.7%)	aPR* (95% CI)	P
Condom Use				
One or more condoms on-hand right now or in your room	2,011 (86.6)	1,460 (90.7)	1.02 (0.94-1.11)	0.575
Condom use at last vaginal sex with a client	2,209 (95.7)	1,530 (97.3)	1.01 (0.99-1.03)	0.188
Condom use at last vaginal sex with a non-client	278 (23.7)	347 (33.1)	1.46 (1.01-2.10)	0.045
STI Screening				
Aware that gov't health centers provide screening exams to FSW	1,677 (67.8)	1,440 (88.5)	1.22 (1.06-1.39)	0.004
Ever sought a screening exam at gov't health center [†]	1,223 (50.7)	1,183 (73.8)	1.28 (1.03-1.59)	0.028
At least one attempt to receive screening exam in last six months [†]	1,149 (47.0)	1,077 (66.7)	1.22 (0.97-1.52)	0.083
Ever HIV test	1,405 (57.8)	1,296 (80.2)	1.24 (1.04-1.48)	0.014
HIV test in last year [†]	1,201 (49.7)	1,161 (71.8)	1.26 (1.02-1.57)	0.036
Believe self at high risk of acquiring HIV	1,057 (43.8)	853 (53.5)	1.09 (0.79-1.52)	0.598
Knowledge of Symptoms				
Ever heard of STDs	2,145 (88.7)	1,567 (99.0)	1.11 (1.06-1.15)	<0.001
Describe symptoms in women				
Median (IQR) sum of symptoms mentioned	2 (1-4)	3 (2-4)		
overall median	1,145 (46.3)	1,094 (67.3)	1.32 (1.07-1.64)	0.011
Describe symptoms in men				
Median (IQR) sum of symptoms mentioned	1 (0-2)	2 (1-3)		
overall median	1,044 (42.2)	1,134 (69.7)	1.50 (1.21-1.86)	<0.001

FSW survey asked: Have you received services from (or participated in activities of) the PREVEN Mobile Team?

* Adjusted for baseline city proportions, age, brothel venue, education, cohabitation, randomization arm, and region. Cluster by city.

[†] Recoded as zero if skipped out of parent question

Table 4

Condom Use, STI Screening, and Knowledge of STI Symptoms Associated with Venue of Sex Work (2006 Peru PREVEN Survey)

	Brothel n=846 (21.0%)	Street/Bar n=3,310 (79.0%)	aPR* (95% CI)	P
Condom Use				
One or more condoms on-hand right now in your room or on your person	831 (98.3)	2,677 (85.6)	1.15 (1.08-1.23)	<0.001
Condom use at last vaginal sex with a client	837 (98.9)	2,944 (95.7)	1.04 (1.02-1.06)	<0.001
Condom use at last vaginal sex with a non-client	169 (32.7)	462 (26.7)	1.28 (0.97-1.69)	0.081
STI Screening				
Aware that gov't health centers provide screening exams to FSW	799 (94.7)	2,355 (71.3)	1.29 (1.16-1.43)	<0.001
Ever sought a screening exam at gov't health center [†]	744 (91.1)	1,689 (52.1)	1.75 (1.43-2.14)	<0.001
At least one attempt to receive screening exam in last six months [†]	750 (89.5)	1,503 (46.0)	1.97 (1.58-2.45)	<0.001
Ever HIV test	762 (91.5)	1,973 (60.5)	1.47 (1.28-1.70)	<0.001
HIV test in last year [†]	740 (88.1)	1,653 (51.0)	1.74 (1.45-2.09)	<0.001
Believe self at high risk of acquiring HIV	563 (66.8)	1,373 (42.8)	1.38 (1.15-1.65)	0.001
Knowledge of Symptoms				
Ever heard of STDs	810 (98.5)	2,945 (91.3)	1.07 (1.04-1.09)	<0.001
Describe symptoms in women				<0.001
Median (IQR) sum of symptoms mentioned	3 (2-4)	3 (1-4)		
overall median	601 (71.2)	1,665 (50.4)	1.39 (1.22-1.59)	
Describe symptoms in men				<0.001
Median (IQR) sum of symptoms mentioned	2 (1-3)	1 (0-3)		
overall median	596 (70.5)	1,612 (48.8)	1.33 (1.12-1.57)	

* Adjusted for age, education, cohabitation, region, randomization arm, and alcohol use. Cluster by city.

[†] Recoded as zero if skipped out of parent question