ORIGINAL ARTICLE

Sexual relationships, intimate partner violence and STI partner notification in Cape Town, South Africa: an observational study

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ABSTRACT

Objectives We aimed to identify individual and sexual partnership characteristics associated with partner notification (PN) among people with STI. We hypothesised that PN would be less likely in more casual sexual partnerships and in partnerships with intimate partner violence (IPV).

Methods We conducted an observational study among the first 330 patients with STI enrolled in a trial of a behavioural intervention to reduce STI incidence, at a clinic in a poor, Cape Town community. We included 195 index patients (those reporting STI symptoms), and conducted longitudinal analyses using participant-completed questionnaires on the day of diagnosis and 2 weeks later. Using partnership data for five recent sexual partners, we assessed factors associated with reported PN with logistic regressions, adjusting for repeated measurements on the same participant for each partner.

Results The sample included 99 males with 303 partners and 96 females with 158 partners. Males reported perpetrating IPV in 46.2% of partnerships. Females reported being IPV victims in 53.2% of partnerships. Males notified 58.1%, females 75.4% of partners during the 2 weeks following diagnosis. Type of partner was an independent correlate of PN for males and females, with the odds of PN lower in more casual partnerships. For males, reporting physical IPV perpetration in the partnership was an independent correlate of PN. For females, there was no association between IPV victimisation in a partnership and PN.

Conclusions Efforts to decrease the pool of infectious partners need to have a strong focus on the promotion of PN in casual relationships and one-night stands. IPV was not identified as a barrier to PN. In future, we need to investigate the association between IPV with an objective measure of PN success such as partner testing or treatment, or index patient reinfection.

Clinical trial registration PACTR201606001682364; Pre-results.

BACKGROUND

Partner notification (PN) is a process by which a person with a STI informs sexual partners of their possible exposure and the need to be tested or to obtain treatment. PN is designed to interrupt STI transmission through the identification and treatment of undiagnosed infections. STI PN and treatment services are essential to prevent re-infection of index patients and to decrease the pool of infectious partners. People with STIs other than HIV in settings of high HIV prevalence, such as South Africa, are among the highest risk populations for HIV infection because STIs are among the most significant factors that facilitate HIV transmission.[1 2] PN and treatment are critical to the success of HIV prevention. Unfortunately, current methods of PN only reach a small proportion of partners.[3 4] For example, among women in low/middle-income countries diagnosed with HIV, rates of non-disclosure of their HIV status to partners vary between 16% and 86% across studies.[5]

Most studies investigating barriers to PN have focused on index patients as the unit of analysis.[6] Sexual risk behaviours vary between individuals and across an individual's sexual relationships. Studies have shown that condom use varies more across an individual's partnerships than between individuals.[7] PN behaviours might vary across an individuals' partnerships. Investigations of the barriers to PN based on partnership-level data could inform interventions to promote PN tailored to the varying circumstances of index patients' sexual partnerships.

There is evidence that the success of PN varies by relationship type[6 8] with PN being less likely to occur in more casual partnerships. People report reluctance to disclose fearing that abandonment and intimate partner violence (IPV) will be consequences of PN.[5 9 10] However, we know little about whether the presence of IPV in a relationship is a barrier to disclosure and PN. For women, IPV *victimisation* has been shown to be associated with incident HIV and HIV risk behaviours in some high prevalence settings,[11 12] and it is conceivable that IPV victimisation will be a barrier to notifying partners of an STI. For males, IPV *perpetration* has been associated with engaging in a cluster of sexual risk behaviours linked to an ideology of successful masculinity,[13 14] and men who perpetrate IPV might be less likely to notify partners of an STI.

We aimed to identify the individual and sexual partnership characteristics associated with PN among people diagnosed with an STI, using longitudinal partnership-level data. We hypothesised that PN would be less likely in sex partnerships that were more casual, and in which the index

Table 1 Characteristics of participants and partnerships associated with STI partner notification 2 weeks after the baseline survey: prospective analysis (crude ORs)

	Males				Females			
	Partner notified 2 weeks after diagnosis		OR*	95% CI	Partner notified 2 weeks after diagnosis		OR*	95% CI
	n	%			n	%		
Characteristics of participants								
Age								
24 years or younger	58	48.33	1.00		48	64.86	1.00	
Older than 24 years	118	64.48	**1.94**	1.00 to 3.78	71	84.52	**2.96**	1.26 to 6.97
Education								
Not completed grade 12	105	62.13	1.00		82	75.23	1.00	
Completed grade 12	30	53.57	0.70	0.36 to 1.39	30	85.71	1.98	0.71 to 5.50
Post-grade 12 education	41	52.56	0.68	0.30 to 1.52	7	50.00	**0.33**	0.11 to 0.99
STI symptoms: ulcer								
No	137	57.81	1.00		102	73.91	1.00	
Yes	39	59.09	1.05	0.49 to 2.25	17	85.00	2.00	0.58 to 6.91
STI symptoms: discharge								
No	76	63.33	1.00		35	71.43	1.00	
Yes	100	54.64	0.70	0.35 to 1.38	84	77.06	1.34	0.54 to 3.36
STI symptoms: burning urine								
No	47	59.49	1.00		43	78.18	1.00	
Yes	129	57.59	0.92	0.45 to 1.91	76	73.79	0.79	0.34 to 1.80
HIV status, participant report								
Negative or unknown	154	57.89	1.00		84	79.25	1.00	
Positive	22	59.46	1.07	0.36 to 3.19	35	67.31	0.54	0.23 to 1.27
Alcohol use, past 3 months								
Non-drinkers	23	74.19	1.00		29	80.56	1.00	
Drinkers	45	47.37	0.31	0.09 to 1.07	42	75.00	0.72	0.22 to 2.44
Heavy drinkers	108	61.02	0.54	0.17 to 1.74	48	72.73	0.64	0.20 to 2.12
Drug use past 3 months								
No	84	51.22	1.00		111	76.55	1.00	
Yes	92	66.19	1.86	0.97 to 3.59	8	61.54	0.49	0.18 to 1.30
Characteristics of partnerships								
Age differential								
Participant younger	104	65.00	**1.89**	1.09 to 3.26	13	81.25	1.06	0.28 to 3.98
Similar age	56	49.56	1.00		45	80.36	1.00	
Participant older	16	53.33	1.16	0.48 to 2.80	61	70.93	0.60	0.30 to 1.17
Type of sex partner								
Once-off	29	43.28	1.00		6	42.86	1.00	
Casual	63	48.46	1.23	0.65 to 2.34	26	57.78	1.82	0.39 to 8.48
Main	84	79.25	**5.00**	2.60 to 9.63	87	87.88	**9.67**	2.02 to 46.35
Transactional sex								
No	133	58.33	1.00		103	75.18	1.00	
Yes	43	57.33	0.96	0.44 to 2.10	16	76.19	1.06	0.36 to 3.13
Victim of physical IPV, past 3 months								
No					78	72.22	1.00	
Yes					41	82.00	1.75	0.82 to 3.76
Victim of sexual IPV, past 3 months								
No					81	75.00	1.00	
Yes					38	76.00	1.06	0.49 to 2.26
Victim of emotional IPV, past 3 months								
No					72	71.29	1.00	
Yes					47	82.46	1.89	0.87 to 4.14
Perpetrator of physical IPV, past 3 months								
No	103	50.99	1.00					
Yes	73	72.28	**2.51**	1.43 to 4.38				
Perpetrator of sexual IPV, past 3 months								
No	143	56.75	1.00					
Yes	33	64.71	1.40	0.70 to 2.78				
Perpetrator of emotional IPV, past 3 months								
No	110	52.63	1.00					
Yes	66	70.21	**2.12**	1.15 to 3.91				

*ORs are adjusted for clustering.
IPV, intimate partner violence.

patient was an IPV victim. We also examined the association between PN and other participant and partnership characteristics, including participant age, education, alcohol and drug use, age disparity in the partnership and transactional sex. These characteristics have been associated with STI incidence and risk behaviour.[15–19] Finally, we investigated the prevalence of adverse partner responses to PN such as IPV.

METHODS

We conducted an observational study among the first 330 patients with STI enrolled in a trial of a behavioural intervention to reduce STI incidence, at a clinic in a poor, Cape Town community. In longitudinal analyses, we examined factors associated with PN during the 2 weeks following diagnosis.

We invited all people 18 years of age and older who were diagnosed with an STI at the clinic to participate in the trial. They were recruited on the day of their STI diagnosis, and could participate that day, or at most 2 days afterwards. After recruiting the first 330 trial participants, we had an armed robbery, which led us to change from electronic to paper questionnaires. In the process, we reduced the length of the questionnaire, removing the IPV questions. This determined the sample size for this study. To limit the sample to 'index patients' and to exclude participants who had attended the clinic because they were a partner of someone with an STI, we excluded those who reported they did not have STI symptoms on the day of their clinic visit (discharge or unexplained fluid from genitals, open sore on genitals, or burning/pain on urination), and those who reported that their partners were already enrolled in the study (seven participants). Our analytic sample comprised 201 participants.

After consenting, participants completed the baseline questionnaire. A data collector asked participants to identify, by first name or nickname, up to five sex partners during the prior 3 months. Names were entered into an electronic questionnaire on a tablet computer, and participants self-completed the audio-assisted survey, in English or isiXhosa. We programmed questions about a partnership to include the partner name in the question wording. After the baseline survey, we randomly allocated participants to one of three single-session counselling interventions focusing on sexual risk behaviour and PN (the trial is not the subject of the current manuscript). After the counselling session, we invited participants to return to the clinic for a survey 2 weeks later.

Measures

The dependent variable, PN, was dichotomous: participant reports at the 2-week follow-up survey of whether the partner was notified by any method (in person, by phone or text message, or with a health worker's help) or if the participant had advised the partner to go for STI testing or treatment. If the partner had been notified, we asked how he/she had reacted.

At baseline, we asked participants their age, sex, education, STI symptoms, HIV status, alcohol and drug use. Participants were classified into non-drinkers, drinkers (drank between one and six drinks per occasion) and heavy drinkers (drank seven to nine drinks per occasion monthly or more frequently). If they used any of the following drugs in the three prior months, they were classified as drug users: marijuana, Mandrax, cocaine, methamphetamine or any drug injected with a needle.

At baseline, participants reported up to five sexual partners in the past 3 months, and they classified each as 'main', 'casual' or 'one-night stand' (casual partner referred to 'someone you have sex with on a regular basis who is not a main partner'; a one-night stand referred to 'someone who you may have only had sex with once or twice, not someone you have sex with on a regular basis'). Female participants were classified as an IPV victim in a partnership if they reported at baseline physical IPV (partner threw something at you which could hurt; hit you; threatened to use, or used a gun, knife or other weapon), emotional IPV (partner insulted you, made you feel bad about yourself or humiliated you; did something to scare or intimidate you on purpose) or sexual IPV (partner forced you to have sex when you did not want to; you had sex because you were scared of what partner might do if you said no) in the prior 3 months. Male partners were classified as IPV perpetrators if they reported at baseline perpetrating the above-mentioned forms of violence (except that male sexual IPV perpetration only included one item, 'forced partner to have sex when she did not want to'). We calculated the age differential between the participant and partner. A participant was classified as having engaged in transactional sex if, in the past 3 months, they had had sex with the partner in expectation of money or goods.

Analysis

Partnerships were the unit of analysis. We used a cluster analysis to adjust the SE to account for correlations arising from repeated measurements for the same participant (for each partner). We stratified the analyses by gender, and described the association of participant and partnership characteristics with PN. The analyses were longitudinal, using variables collected at baseline as independent variables and the dependent variable (PN) measured 2 weeks after baseline. We performed logistic regressions, reporting ORs and 95% CIs. Because the participants were enrolled in an randomised controlled trial (RCT) and were exposed to one of three single-session behavioural counselling sessions after baseline, we included allocation assignment as a variable in the multivariate regression model. Statistical significance was defined as P<0.05.

RESULTS

The first 330 participants enrolled in the trial comprised 62.5% of all patients with STI eligible to participate in the trial. Those who declined participation did so mostly due to time constraints. We excluded 45 participants because they were enrolled in the study more than 1 day their STI diagnosis. We excluded a further 84 participants because they did not report STI symptoms or they were a partner of someone already enrolled. The sample included 201 symptomatic participants (100 males and 101 females) who sought STI treatment between June 2014 and May 2015, and who had consented to participate in the parent study (trial). By the 2-week survey, we had retained 195 participants (97.0%) (99 males and 96 females), and these comprise the analytic sample. Most 155 (79.5%) were enrolled on the day of their STI diagnosis. The average age of males was 28.6 years (SD 7.23) and females 29.2 years (SD 7.73). Males reported an average of 3.1 partners for a total of 303 partners (106 main, 130 casual and 67 one-night stands) in the 3 months prior to baseline; females reported on average 1.6 partners for a total of 158 partners (99 main, 45 casual and 14 one-night stands).

Males reported IPV perpetration in 140 (46.2%) partnerships. Males reported perpetrating physical IPV in 101 (33.3%) partnerships, sexual IPV in 51 (16.8%) and emotional IPV in 94 (31.0%) partnerships. Males reported perpetrating IPV in 64 (60.4%) main partnerships, 57 (43.9%) casual partnerships and 19 (28.4%) one-night stands.

Table 2 Multivariate model of participant and partnership characteristics associated with notifying partner 2 weeks after baseline survey (prospective model)

	Males		Females	
	Adjusted OR*	95% CI	Adjusted OR*	95% CI
Characteristics of participants				
Age				
24 years or younger	1.00		1.00	
Older than 24 years	1.34	0.59 to 3.03	1.49	0.61 to 3.62
Education				
Not completed grade 12	1.00		1.00	
Completed grade 12	1.10	0.47 to 2.60	0.97	0.21 to 4.42
Post-grade 12 education	0.78	0.32 to 1.95	**0.23**	0.06 to 0.85
STI symptoms: ulcer				
No	1.00		1.00	
Yes	0.36	0.11 to 1.12	1.34	0.24 to 7.40
STI symptoms: discharge				
No	1.00		1.00	
Yes	0.62	0.29 to 1.33	1.28	0.35 to 4.72
STI symptoms: burning urine				
No	1.00		1.00	
Yes	0.62	0.21 to 1.84	1.25	0.44 to 3.59
HIV status, participant report				
Negative or unknown	1.00		1.00	
Positive	1.13	0.32 to 3.99	**0.35**	0.15 to 0.82
Alcohol use, past 3 months				
Non-drinkers	1.00		1.00	
Drinkers	**0.14**	0.04 to 0.50	1.27	0.34 to 4.78
Heavy drinkers	0.30	0.09 to 1.02	1.66	0.46 to 6.01
Drug use past 3 months				
No	1.00		1.00	
Yes	**3.04**	1.48 to 6.26	0.49	0.08 to 2.91
Characteristics of partnerships				
Age differential				
Participant younger	**2.02**	1.06 to 3.85	1.19	0.09 to 15.26
Similar age	1.00		1.00	
Participant older	1.67	0.69 to 4.04	0.70	0.31 to 1.55
Type of sex partner				
Once-off	1.00		1.00	
Casual	1.17	0.54 to 2.55	1.94	0.51 to 7.43
Main	**5.18**	2.37 to 11.33	**20.41**	4.64 to 89.72
Transactional sex				
No	1.00		1.00	
Yes	0.73	0.28 to 1.95	2.98	0.84 to 10.59
Victim of physical IPV, past 3 months				
No			1.00	
Yes			0.48	0.11 to 2.19
Victim of sexual IPV, past 3 months				
No			1.00	
Yes			0.49	0.15 to 1.58
Victim of emotional IPV, past 3 months				
No			1.00	
Yes			1.75	0.38 to 7.99
Perpetrator of physical IPV, past 3 months				
No	1.00			
Yes	**2.22**	1.00 to 4.93		
Perpetrator of sexual IPV, past 3 months				
No	1.00			
Yes	1.26	0.49 to 3.22		
Perpetrator of emotional IPV, past 3 months				
No	1.00			
Yes	0.85	0.39 to 1.86		

*ORs are adjusted for all other factors in the model, for clustering, and for trial condition.
IPV, intimate partner violence.

Females reported IPV victimisation in 84 (53.2%) partnerships. Females reported physical IPV in 50 (31.7%) partnerships, sexual IPV in 50 (31.7%) and emotional IPV in 57 (36.1%) relationships. Females reported being a victim of IPV in 67 (67.7%) main partnerships, 17 (37.8%) casual partnerships and 0 (0%) one-night stands.

Males notified 176 (58.1%) partners and females notified 119 (75.4%) partners during the 2 weeks following diagnosis.

Table 1 presents participant and partnership characteristics by PN during the 2 weeks following diagnosis. Among males, the odds of PN were higher when the participant was over 24 years; when they were more than 3 years younger than their partner (compared with same age); when it was a main partnership; and when they reported perpetrating physical and emotional IPV in the partnership. Among females, the odds of PN where higher when the participant was over 24 years; when they had not completed grade 12 (compared with having post-grade 12 education); and when it was a main partnership.

Table 2 shows results of the multivariate models of factors associated with partner notification during the 2 weeks after diagnosis. Among males, adjusting for all other factors in the model, the odds of PN were higher in non-drinkers (compared with drinkers), in drug users, in main partnerships (compared with one-night stands), and in partnerships where the participant was younger than the partner and the participant reported perpetrating physical IPV. Among females, the odds of were PN higher among participants who had not completed grade 12 (compared with post-grade 12 education), among participants who reported being HIV negative/unknown HIV status and in main partnerships (vs one-night stands).

Male participants reported the following partner reactions to PN: violence, 16 (4.4%) partners; abandonment (partner told me to leave and did not want to see me again), 23 (6.3%); anger, 51 (14.0%); caring, 68 (18.7%); appreciation, 121 (33.2%); no reaction, 45 (12.4%). Females reported violent reactions, 2 (0.9%) partners; abandonment, 7 (3.3%); anger, 11 (5.1%); caring, 54 (25.2%); appreciation, 68 (31.8%); and 36 (16.8%) did not react. Participants could report one or more reactions per partner.

DISCUSSION

The strongest, independent correlate of PN was partner type. Male and female participants were more likely to notify their main partners compared with their one-night stands. Participants were somewhat more likely to notify casual partners compared with one-night stands although the association was not statistically significant. These findings are consistent with most other studies.[6] In other research, however, there is not a consistent association between more serious partnerships and behaviour that protects partners against STIs. For example, the prevalence of condomless sex is more common in more serious (vs casual) relationships.[7 20 21]

The participants reported high levels of IPV: over 50% of women reported IPV victimisation and almost 50% of men reported IPV perpetration. Our hypothesis that PN would be less likely in partnerships with IPV was not supported. Among men, physical IPV perpetration was an independently positively associated with PN. This could suggest that men who perpetrate physical IPV in a partnership are less likely that those who do not perpetrate such IPV to fear the consequences of PN. These findings show that IPV was not a barrier to self-reported PN. However, it is possible that IPV undermines successful PN outcomes in other ways. For example, IPV might undermine a partner's ability to access STI diagnosis and treatment services.

Our findings are consistent with a survey conducted in US family planning clinics among young women who had ever had an STI: those exposed to IPV were no more or less likely to have notified their partner.[10] If we regard PN as a behaviour that has the potential to mitigate STI risk, our findings are in contradiction to those of other studies which IPV leads to behaviours that put partners at greater risk of STIs.[13 20] However, the study by Decker *et al* suggests that there might be other ways in which IPV undermines successful PN. Partners of women who had experienced IPV were less likely to subsequently seek care for their STIs,[10] reinforcing the importance of investigating the association between IPV and successful PN outcomes such as partner treatment and index patient reinfection.

Given the prevalence of IPV reported by the participants in this study, it is surprising that so few of them reported violence as a consequence of PN. Yet, it is of concern that there were some reports of violence and abandonment. Interventions to facilitate safer disclosure of STIs might prevent these harmful consequences of PN; however, there is little evidence about what such interventions might look like.[22] The rates of IPV as a consequence of disclosure are similar to those described in other studies.[5 10]

Males were more likely to notify their partner when they were more than 3 years younger than their partner, compared with similar age. Age disparity, when the woman is younger than her male partner, has been hypothesised as an indicator of relationship power inequity and a risk factor for STI,[23] but our findings do not bear this out. We found no evidence that transactional sex impedes PN. This contrasts to other studies with dyad-level analyses, showing that economic dependence on a partner is associated with sexual risk behaviours.[20 21]

Individual-level factors associated PN included education and reported HIV status among women, and drug and alcohol use among men. Compared with female participants who had not completed grade 12, those with post-grade 12 education were less likely to notify partners. This is unexpected, given that more educated individuals tend to be early adopters of safer sexual behaviours.[15] Women who reported they were HIV positive were less likely to notify partners compared with those who reported they were HIV negative or of unknown status. These participants might be at higher risk of transmitting infections, and it is critical to focus PN efforts on them. Male alcohol drinkers were less likely to notify partners, compared with non-drinkers, which is consistent with literature demonstrating that alcohol is a risk factor for HIV acquisition and further transmission.[24] Men who reported that they used drugs were *more* likely than those who did not to notify partners. This is an unexpected finding given that drug use is associated with sexual risk behaviours.[25] Whether drug use interferes with successful PN outcomes such as partner treatment and index patient reinfection needs further investigation.

Limitations

We are unable to determine the accuracy of our assumption that symptomatic participants were 'index cases' and were not attending the clinic because they were referred by a partner. In the baseline survey, we did not ask whether they had been referred by a partner, and the patient electronic records do not discriminate between index patients and partners. A minority of participants were enrolled 1 day after their diagnosis which might have led to an underestimate of PN. In a sensitivity

Key messages

► STI partner notification (PN) is less likely in casual compared with main partnerships, and efforts to promote PN need to focus on casual relationships.
► Male patients with STI had been a perpetrator of intimate partner violence (IPV), and females an IPV victim in approximately half of their recent sexual partnerships.
► This study does not provide any evidence that IPV is a barrier to PN based on participants' reports.
► Harmful consequences of PN, abandonment and IPV, were reported in under 10% of notifications, suggesting the appropriateness of interventions to facilitate safer disclosure of STIs.

analysis (not reported here), we excluded those not enrolled on the day of their diagnosis, and there were no substantial differences in the estimates or the interpretation of the findings. PN was self-reported, and not validated with an objective measure such as partner visits to STI clinics or index patient reinfection. We did not explore the relationship between male IPV victimisation and PN (nor female perpetration and PN). We speculated the harmful effects of victimisation would be more relevant to female patients with STI, given the prevalence of intimate partner homicide, the most severe form of IPV, is far more common in females compared with males (39% of female homicides were perpetrated by intimate partners vs only 6% of male homicides).[26]

CONCLUSIONS

This study shows the individual and partnership-level dynamics influencing PN, and the findings can inform interventions to promote PN. PN is much more likely to occur in the context of main partnerships. This means efforts to decrease the pool of infectious partners need to focus on the promotion of PN in casual relationships and one-night stands. On average, successful PN needs to be achieved with more than one partner per index case to prevent onward transmission[4] and PN successes with casual or ex-regular partners are more efficient at preventing onward transmission relative to successes with regular partners.[4] Despite the high levels of IPV in partnerships of patients with STI in this setting, our study does not provide evidence that IPV is a barrier to PN measured by participants' reports. In future, we need to investigate the association between IPV and an objective measure of PN success such as partner testing, treatment or index patient reinfection.

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