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New sexual partners and readiness to seek screening for chlamydia and gonorrhoea: predictors among minority young women

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Objectives: To determine (1) level of readiness and (2) demographic and behavioural predictors of readiness to seek chlamydia (CT) and gonorrhoea (NGC) screening in the absence of symptoms after sex with a ''new'' partner.

Methods: Baseline data, obtained as part of a larger randomised controlled clinical trial in young women, were analysed. Readiness to seek screening for CT and NGC after sex with a ''new'' partner was assessed using the stages of change framework from the transtheoretical model of change—precontemplation, contemplation, preparation, and action. Ordinal logistic regression, using the proportional odds model, was used to determine predictors of being in action for or having already been screened for CT and NGC after sex with a ''new'' partner.

Results: The sample consisted of 376 predominantly African American (67%) young women (mean age 18.5 (SD 1.4) years). The distribution of readiness to seek CT and NGC screening was 4% precontemplation, 11% contemplation, 28% preparation, and 57% action. The best fitting logistic model that predicted being in action for seeking screening after sex with a ''new'' partner included high perceived seriousness of acquiring a sexually transmitted infection (OR = 2.02, 95% CI 1.05 to 3.89), and having ''other'' (not steady) partners in the last 6 months (OR = 0.50, 95% C.I. 0.32 to 0.78)

Conclusions: Many young women report that they were not getting screened for CT and NGC after sex with a ''new'' partner and therefore may be at increased risk of an untreated STI. Enhancing level of perceived seriousness of acquiring an STI from a ''new'' partner may increase a young woman's readiness to seek screening after initiating a new sexual relationship.

D elay in the diagnosis and treatment of chlamydia (CT) and gonorrhoea (non-gonococcal cervicitis, NGC), cervical infections in adolescent and young adult women is a significant cause of pelvic inflammatory disease (PID) and can result in impaired fertility, ectopic pregnancy, and chronic pain.[1–3] Early detection through screening and treatment of both asymptomatic and symptomatic CT and NGC infections is important to decrease the duration of untreated infection and thereby decrease the incidence of PID and minimise tubal damage.[1–5] In addition, early detection through screening, along with treatment, could decrease the duration of infection that, in turn, may reduce the risk of transmission to other sex partners.

Young women's STI health seeking behaviours are central to understanding client initiated STI screening practices. The transtheoretical model of change (TTM) by Prochaska and DiClemente[6] offers a framework for measuring and understanding behaviour change such as STI health seeking. One construct of the TTM, the stages of change, has five levels of motivation, each with specific constellations of attitudes, intentions, and/or behaviours. These levels of motivations have been described as precontemplation, contemplation, preparation, action, and maintenance.[6] Rather than viewing behaviour change as an all or nothing event, the stages of change continuum recognises that individuals progress through a series of stages that can result in the long term maintenance of a newly acquired behaviour.

Using the TTM as a theoretical framework to guide exploratory research in STI health seeking,[6 7] one study found that young women were further along the stages of change for CT and NGC screening after having unprotected sex with a ''change'' in partner compared to a ''main'' partner.[8] Entering a new sexual relationship is a risk factor for acquiring CT and NGC infection.[9–13] Based on the 1993 Centers for Disease Control and prevention (CDC) CT prevention recommendations, young women under 25 years with a history of having a new or more than one partner in the previous 3 months should seek annual screening.[4 5] To our knowledge, no previous study has examined a young woman's readiness to seek CT and NGC screening after sex with a ''new'' partner or assessed predictors of having already sought CT and NGC screening.

Thus, the purpose of this study was twofold: (1) to determine readiness to seek CT and NGC screening in the absence of symptoms after sex with a ''new'' partner in a sample of predominantly minority young women seeking reproductive care; and (2) to assess demographic and behavioural predictors of readiness to seek CT and NGC screening in the absence of symptoms after sex with a ''new'' partner.

METHODS

Sample selection

Participants in this study were part of a larger randomised controlled clinical trial to evaluate the efficacy of an intervention to promote STI screening in young women

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attending an urban community reproductive health clinic. Healthcare services provided at this clinic included free contraceptive methods, pregnancy testing, and free STI testing and treatment for young women and their sexual partner(s).

Eligible participants for the larger investigation included English speaking, single females aged 16–22.5 years seeking reproductive healthcare services between May 2002 and February 2004. Subjects were excluded if they were currently pregnant or trying to conceive, with an obvious mental illness, and under the influence of alcohol or illicit drugs at the time of recruitment, HIV positive by self report, or unable to understand the consent form and what was expected of participation. All eligible subjects voluntarily consented to participate in a 12 month intervention study, agreed to complete standardised questionnaires every 6 months, and provide urine for screening for NGC and CT infection at the baseline, 6 month, and 12 month visits. Only data collected at baseline were used in the analyses presented here. Human subject review boards at Baylor College of Medicine and the University of Texas Health Sciences Center Houston approved all study protocols.

The study sample consisted of 376 young women. During the study period, 1112 young women were seen in the clinic. Of these, 182 (16%) were deemed ineligible and 129 (12%) were missed as a result of clinic flow patterns and therefore not screened for eligibility. Of the 801 eligible young women approached, 424 (53%) refused to participate. There were no significant demographic (age and race/ethnicity) differences between subjects who enrolled (n = 376) and the total number of eligible subjects (n = 801). The most common reasons for declining to participate were having insufficient time in the clinic because of conflicts with work or school (63%) and disinterest in the study (26%).

Procedure

After obtaining informed consent, a trained research assistant administered a baseline questionnaire, in private, that took up to 40 minutes to complete. Each subject was given $25 following the completion of this assessment. The questionnaire elicited demographic information such as age, race/ethnicity, and age appropriate education (10th grade by 16 years, 11th grade by 17 years, 12th grade or general educational development (GED) by any age. Behavioural information elicited included age at first sex and number of lifetime sexual partners, past STI history, and type of partner in the past 6 months. A calendar method was used to enhance recall in determining participant's number of sexual partners in the last 6 months and for each type of partner listed (old versus new partner, main versus other partner). An "old partner" was defined as a sexual partner with whom the participant had been having sex for more than the past 6 months. A "new partner" was defined as a sexual partner with whom the participant had been having sex for less than 6 months. A "main partner" was defined as "a boyfriend or a steady partner" and an "other partner" was "someone you have sex with occasionally or someone who is not your boyfriend or steady partner."

Participants were queried as to how serious they thought it would be if they had a STI, not including HIV (perceived seriousness). Possible responses included "not serious," "somewhat serious," and "very serious." Subjects were asked to indicate whether they had used condoms, oral contraceptive pill, or Depo-Provera when they last had sex, and their reason for coming to the clinic that day (for an annual well woman examination/Papanicolau smear, oral contraceptive pills, Depo-Provera, STI check up, pregnancy test, and medication for STI). A final question based on the underlying theoretical framework, the TTM,[6][7] and adapted from stages of change for condom use and STI screening,[8][14] asked participants to indicate "How ready are you to get screened for gonorrhoea and chlamydia even when you do not have vaginal symptoms if you have sex with a new partner?" Response options included: "I am not ready to get screened…" (Precontemplation), "I am thinking about getting screened…" (Contemplation), "I am planning to get screened…" (Preparation), and "I am already getting screened…" (Action).

Selection and definitions of variables
Primary outcome variable
The primary outcome variable was based on the study participants' response to: "How ready are you to get screened for gonorrhoea and chlamydia even when you do not have vaginal symptoms if you have sex with a new partner." Owing to its distribution, this ordinal variable was recategorised to "Precontemplation and Contemplation," "Preparation," and "Action". Non-response was set to missing.

Potential independent variables
Selection of demographic and behavioural variables for the analyses was based on previous research on STI risk factors and condom use, as well as clinical experience (see table 1). Because of skewed distributions or inordinate number of categories, most variables were recoded to dichotomous or ordinal variables as seen in table 1. Categories denoted 1 were the referent category in the ordinal logistic regression analyses. The variables, age at enrolment and age at first sex, were maintained at the continuous level of measurement.

Statistical analysis
Univariate analysis was performed for each variable using ordinal logistic regression with a screening criterion alpha level of $p < 0.25$.[15] When the assumptions of ordinal logistic regression were not met, multinominal logistic regression was used. Ordinal logistic regression analyses, using the proportional odds model, were performed to construct a full model. The score test was used to evaluate the appropriateness of the proportional odds assumptions. The Wald test was used to test parameter estimates. Multi-collinearity among predictors in the multivariate analyses was also evaluated. Three interaction terms were evaluated: perceived seriousness of getting a STI with (1) total number of partners in the last 6 months, (2) number of "new" sex partners in the last 6 months, and (3) reason for clinic visit. The likelihood ratio test for the significance of the interaction terms was used to test the null hypothesis that the coefficients of the interaction terms equalled 0. The likelihood ratio test indicated that the reduced model was as good as the full model, thus there was no advantage in including the interaction terms in the final explanatory model. Statistical analyses were performed using SAS Version 8.2.[16]

RESULTS
Table 2 provides demographic and behavioural characteristics of the study sample. Of note, 53% reported ever having a STI and 28% reported having a STI the past 12 months.

Readiness to seek CT and NGC screening with a "new" partner
Evaluation of readiness to seek screening for CT and NGC in the absence of symptoms when having sex with a "new partner," revealed 16 (4%) subjects were in precontemplation, 42 (11%) were in contemplation, 104 (28%) were in preparation, and 214 (57%) were in action.

Table 1 Univariable logistic regression analysis for seeking chlamydia and gonorrhoea screening with a ''new'' partner among 376 young women

Variables	Coefficient	Standard error	Odds ratio	95% CI	p Value
Age	0.08	0.07	1.08	0.94, 1.25	0.25
Living arrangements (reference = adult relative)					
Lives by self	0.16	0.20	1.39	0.63, 3.08	0.42
Other arrangement	0.12	0.14	1.29	0.74, 2.27	0.37
Race (reference = African American)					
Hispanic	0.02	0.13	1.04	0.62, 1.75	0.87
White	<−0.00	0.16	0.90	0.48, 1.69	0.75
Age appropriate education	−0.17	0.11	0.70	0.46, 1.08	0.11
Mean age at first sexual encounter	0.08	0.06	1.08	0.96, 1.22	0.17
Number of lifetime partners (reference = 1 partner)					
2–4 partners	−0.02	0.16	0.96	0.52, 1.78	0.90
⩾5 partners	−0.08	0.16	0.84	0.45, 1.57	0.59
⩾2 partners last 6 months	−0.33	0.11	0.51	0.34, 0.78	0.001
Number of ''new'' partners in last 6 months (reference = 0 partners)					
1 partner	−0.05	0.12	0.90	0.57, 1.43	0.67
⩾2 partners	−0.39	0.13	0.46	0.23, 0.76	0.002
Number of ''main'' partners in last 6 months (reference = 0 partners)					
1 partner	0.26	0.21	1.68	0.75, 3.74	0.21
⩾2 partners	0.08	0.25	1.17	0.44, 3.11	0.76
⩾1 ''other'' partners in last 6 months	−0.36	0.11	0.49	0.31, 0.76	0.001
Ever had a STI	−0.005	0.10	0.01	0.68, 1.49	0.96
STI in the past 12 months	−0.08	0.12	0.85	0.55, 1.32	0.47
Perceived very serious if get STI (reference = not serious and somewhat serious)	0.37	0.16	2.11	1.10, 4.04	0.02
Used condoms at last sex	−0.06	0.10	0.88	0.58, 1.32	0.54
Reason for clinic visit (reference = all other reasons)					
Annual well woman examination/Pap smear	−0.12	0.13	0.78	0.45, 1.35	0.37
Oral contraceptive pills	−0.19	0.15	0.67	0.37, 1.22	0.19
Depo-Provera shot	−0.17	0.17	0.70	0.36, 1.37	0.29
STD checkup	−0.44	0.18	0.42	0.21, 0.84	0.01
Pregnancy test	−0.44	0.23	0.39	0.15, 0.98	0.05
Medication for STI	−0.63	0.28	0.28	0.09, 0.88	0.03

Predictors of readiness to seek CT and NGC screening with a ''new'' partner

A subset of potential independent variables demonstrated associations with the primary outcome (table 1). Age appropriate education, mean age of first sexual encounter, number of partners in the last 6 months, number of ''new,'' ''main,'' and ''other'' partners in the last 6 months, perceived seriousness of getting a STI (not HIV), and reasons for clinic visit met the criterion of a p value of <0.25 and were included in the next stage of modelling.

Two of these variables contributed to the final model, whether the participant had an ''other'' partner during the past 6 months and perceived seriousness of getting a STI, not HIV (table 3).

Other partners during the past 6 months

For this sample of young women, participants who had ''other'' partners during the last 6 months were 0.5 times as likely to be in a later stage of change compared to participants who did not have ''other'' partners during the past 6 months. Thus, participants who had ''other'' partners during this time frame were less likely to seek screening for CT and NGC after sex with a ''new'' partner, compared to participants who did not have ''other'' partners during this time frame.

Perceived seriousness of acquiring an STI (not HIV)

Participants who thought it would be ''very serious'' if they got a STI were 2.0 times as likely to be in a later stage of change compared to participants who thought it would be ''somewhat serious'' or ''not serious'' if they acquired an STI. Thus, the more serious participants thought it would be if they acquired an STI, the more likely they were to seek screening for CT and NGC after sex with a ''new'' partner.

DISCUSSION

In this study, 57% of young women reported they had already been screened (action) for CT and NGC in the absence of symptoms after sex with a ''new'' partner. Banikarim et al found that 47% of young women reported they had already been seeking screening for CT and NGC when having unprotected sex after a ''change'' in partners while 26% were doing so with their ''main'' partner.[8] The higher frequency of seeking screening for a ''new'' partner (57%) found in our study compared to a ''change'' in partner (47%) reported by Banikarim et al may be because of the time frames used. In the study by Banikarim et al, subjects were asked to recall behaviour that occurred since sexual debut.[8] In contrast, subjects in our study were asked about behaviour occurring over the previous 6 months. Higher frequency of seeking screening for a ''new'' partner as compared to a ''change'' in partner may also be because of perceived STI risk related to the type of partner involved. A ''change'' in partner in the study by Banikarim et al may have included sexual activity with a familiar person perceived or at low risk for STIs,[8] whereas a ''new'' partner may be less familiar and therefore perceived as more risky.

Believing it very serious to contract an STI contributed to a young woman's likelihood of seeking CT and NGC screening

Table 2 Demographic and behavioural characteristics of 376 young women

Variable	N = 376
Age (years)	
Range	16–21
Mean (SD)	18.5 (1.4)
Race/ethnic distribution	
African American	67% (253)
Hispanic	18% (68)
Non-Hispanic white	11% (42)
Other.	4% (13)
Age appropriate education level*	68% (258)
Age at first sexual intercourse (years)	
Range	9–20
Mean (SD)	15.3 (1.6)
Lifetime sexual partners	
Range	1–300
Mean (SD)	6.4 (18.0)
Median	4.0
Partner(s) past 6 months	
Main	93% (350)
Other	26% (96)
New	51% (192)
Old	23% (86)
Ever had a STI	50% (190)
STI past 12 months	28% (105)
Reasons for the clinic visit†	
Annual well woman exam/Pap smear	41% (156)
Oral contraceptive pills	32% (120)
Depo-Provera shot	25% (73)
STI check/vaginal discharge	17% (65)
Pregnancy test	7% (25)
STI medication	4% (16)
Contraception past 30 days	
Condoms	53% (201)
Oral contraceptive pills	23% (87)
Depo-Provera	24% (92)
Withdrawal	13% (47)
Used condoms at last sex	59% (224)
Perceived seriousness of getting a STI, not HIV	
Very serious	91% (341)

*10th grade by 16 years, 11th grade by 17 years, 12th grade or general educational development (GED) by any age.
†A number of subjects came in for more than one reason.

when having a sex with a ''new'' partner. There are few data in the literature specifically on perceived seriousness in relationship to seeking screening after having sex with a ''new'' partner. A report by Simon and Das in 1984 found no relationship between perceived seriousness of acquiring STIs and seeking asymptomatic checkups among predominantly African American young women in college.[17] Although this earlier study did not evaluate screening behaviour as it related to a ''new'' partner and in the context of the stages of change, the difference in findings between our study and the study by Simon and Das may be explained by the increase in public health information and knowledge among young women regarding STIs in the past 20 years. Further research is necessary to explore STI related characteristics young women consider serious. Such information could provide

potential points of leverage to modify STI screening behaviour.

According to the Health Belief Model, perceived threat, a key component of the model, is a sequential function of perceived seriousness and susceptibility. A heightened state of seriousness is required before perceived susceptibility becomes a powerful predictor of behaviour.[18] Thus, individualised counselling interventions that increase a young woman's perception of the severity of CT and NGC, including their adverse sequelae, and the likelihood of becoming infected with an STI, may motivate adoption of STI screening practices. However, interventions would also need to help young women assess their cumulative risk of acquiring STIs from both sequential and concurrent sexual relationships. Although we asked participants to indicate their perceived susceptibility for a STI with each partner type during the previous 3 months, not all participants reported all partner types. Thus, while we suspect that perceived susceptibility to an STI may be related to type of sexual partner, we were unable to examine the impact of perceived susceptibility on seeking STI screening for specific partner types.

An unexpected finding of the proportional odds model was that young women who had ''other'' partners during the past 6 months were less likely to be seeking screening for CT and NGC after sex with a ''new'' partner, compared to young women who did not have ''other'' partners during the past 6 months. This finding is complex. One possible explanation for low readiness to seek screening is that these young women discounted their risk for infection with ''other'' partners who could have been ''new'' or ''old,'' specifically because they had been using condoms with their ''other'' partner and therefore perceived themselves at low risk for STIs. Unfortunately partner specific data on condom use in the last 6 months are not available and future studies to assess this potential relation are required. This finding, however, raises the importance of reinforcing young women's awareness of their risk for infection with their ''other'' partners.

The study is not without limitations. Foremost, the analyses were based on a cross-sectional design; thus, temporal order or causality cannot be inferred from these data. Another limitation is the use of self report to assess readiness to seek screening with no validation of actual behaviour. Finally, the study was conducted in a clinic where young women were already seeking clinical services (including STI testing). Therefore, the results may not generalise to young women who do not seek clinic services. Further investigation with non-clinic based populations will be needed to establish the generalisability of the findings.

In conclusion, the present study suggests that enhancing young women's level of perceived seriousness of acquiring a STI from ''new'' partners may help motivate the adoption of STI screening behaviour. STI screening results in the early detection and prompt treatment of STIs. Such a strategy confers health advantages for the young woman by reducing

Table 3 Predictors (unadjusted and adjusted) of young women's readiness to seek chlamydia and gonorrhoea screening with a ''new'' partner

Factors	Unadjusted			Adjusted*		
	Odds ratio	95% CI	p Value	Odds ratio	95% CI	p Value
≥1 ''other'' partners in last 6 months	0.49	0.31 to 0.76	0.001	0.50	0.32 to 0.78	0.002
Perceived very serious if get STI (reference = not serious and somewhat serious)	2.11	1.10 to 4.04	0.02	2.02	1.05 to 3.89	0.03

*Adjusted for age appropriate education, mean age at first sexual encounter, total number of partners, new and main partners in last 6 months and reason for clinic visit.

Key messages

- Using the transtheoretical model stages of change framework, more than 40% of minority young women report not seeking screening for chlamydia (CT) and gonorrhoea (NGC) screening after sex with a new partner.
- Participants who had ''other'' (non-steady) partners during the last 6 months were less likely to seek screening for CT and NGC.
- The more serious participants thought it would be if they got a STI, the more likely they were to seek CT and NGC screening after sex with a new partner.
- Enhancing level of perceived seriousness of acquiring a STI from a ''new'' partner may increase a young woman's readiness to seek CT and NGC screening after initiating a new sexual relationship.

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the duration of infection and, as a direct consequence, the likelihood of developing adverse sequelae associated with untreated STIs. In addition, prompt screening for STIs may also positively impact a key factor associated with the STI reproductive rate in communities—the duration of infection. As recommended by the CDC, enhancing STI screening offers clear health advantages to the individual who may be infected as well as the community in which they reside.[5]

CONTRIBUTORS

MRC initiated the study, selected and recoded variables for analysis, led the interpretation of the data analysis, and wrote the first draft of the manuscript's abstract, introduction, and discussion sections; CW and CK participated in selection and recoding of variables, provided interpretation of the data analysis, wrote the first draft of the Methods section, and critically reviewed additional drafts; CK conducted the statistical analyses; RD, PS, MV, and KVS selected variables, helped with interpretation of the data analysis, and provided critical feedback on the written manuscript.

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