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Partner Notification, Treatment, and Subsequent Condom Use After Pelvic Inflammatory Disease: Implications for Dyadic Intervention With Urban Youth

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Abstract

Research suggests that youth in urban communities often remain in the same sexual relationships after a pelvic inflammatory disease (PID) diagnosis. Utilizing data from the Technology Enhanced Community Health Nursing (TECH-N) study, we explored partner notification, treatment, and condom use after PID diagnosis. Outreach interviews assessed adherence to self-care behaviors, followed by interviews 3 months after diagnosis. Descriptive statistics and multivariable logistic regressions evaluated baseline condom use versus 3 months after diagnosis as it relates to group and relationship status. Ninety-one percent reported partner notification, and of those notified, 90% reported partner treatment. Reports of condom use increased in both groups compared with baseline use. TECH-N participants were more likely to report condom use at last sex at 3 months compared with baseline. Given the open communication with partners about PID and partner-associated effects on condom use, exploring dyadic intervention to promote consistent, condom use after PID for youth in high STI (sexually transmitted infection) prevalence communities is required.

Keywords

pelvic inflammatory disease; partner notification and treatment; condom use; adolescents; STI

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Author Contributions

MMH, HMEB, JP, and MT contributed to the conception and design, data acquisition, analysis and interpretation of data, and statistical expertise. MMH drafted the manuscript. MT and HMEB provided mentorship and project oversight. All authors critically revised the manuscript for intellectual content and gave final approval of the manuscript.

Authors' Note

Technology Enhanced Community Health Nursing (TECH-N) Study may be found at: <https://clinicaltrials.gov/ct2/show/NCT01640379> (Trial Number:).

Declaration of Conflicting Interests

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Introduction

Pelvic inflammatory disease (PID) is a common reproductive health disorder that is caused by infection of a female's upper reproductive tract—the endometrium, fallopian tubes, ovaries, and pelvic peritoneum. It commonly affects sexually active women of reproductive age.¹ Untreated sexually transmitted infections (STIs) such as *Chlamydia trachomatis* and *Neisseria gonorrhoeae* are highly associated with the disorder; therefore, adolescents and young adults (AYA) are at highest risk due to increased rates of STIs. Over time, recurrent episodes of STIs and PID increase the risk for future PID episodes and its common sequelae—chronic pelvic pain, ectopic pregnancies, tubal infertility, and tuboovarian abscesses.²⁻⁴

The Centers for Disease Control and Prevention currently recommends treatment of sex partners to avoid further disease transmission between sexual partners.⁵ While expedited partner therapy (EPT) is an option to fill this gap in some states, it is underutilized due to the reluctance of physicians to prescribe without an evaluation and limited knowledge of the legal status of EPT by both physicians and pharmacists.^{6,7} The use of EPT also precludes individualized clinical evaluation and testing for other STIs and human immunodeficiency virus (HIV) and risk reduction counseling for the sexual partner designed to prevent future transmission of STIs and medical evaluation for other STIs.⁸ Therefore, it may be appropriate to evaluate the feasibility of utilizing dyadic intervention as a public health STI/HIV prevention strategy.

Dyadic intervention focuses on providing prevention counseling and enhancing communication between partners for the patient and their sexual partner(s). To date, there are limited data on the use of dyadic intervention to prevent future episodes of PID. However, dyadic interventions designed to improve HIV medication adherence have shown improved adherence to medication regimens compared with current standard of care (individual treatment, risk reduction counseling, and routine follow-up visits).⁹ While prompt treatment is necessary to avoid long-term sequelae from STIs, it is important to notify sexual partners of infection so that they can seek treatment and prevent further transmission. Prior research from our team suggests that AYA in urban communities with high STI prevalence are often in the same sexual relationship after a STI/PID diagnosis.^{10,11} Several studies from the United Kingdom have also shown effectiveness in the use of technology, such as text messaging and email in young men to increase condom use.^{12,13}

Therefore, understanding partner notification and treatment behaviors following PID are critical for developing effective public health interventions that incorporate the male partner. The objective of this study is to analyze partner notification, partner treatment, and subsequent condom use after a PID diagnosis to identify barriers and challenges that may be associated with developing a dyadic intervention strategy after PID. We hypothesized that participants in the intervention group would be more likely to report partner notification and treatment. We also hypothesized that the intervention group would be more likely to maintain condom use 3 months after a diagnosis of PID.

Methods

We conducted an analysis of data from the Technology Enhanced Community Health Nursing (TECH-N) study, which was a randomized controlled clinical trial () of an intervention to improve short-term self-care through text messaging services and a community health nurse to prevent recurrent STIs after a PID diagnosis. Methods for participant recruitment, data collection, and follow-up for the TECH-N study have been described in detail in the literature.¹⁴ Briefly, female patients aged 13 to 25 years with mild-moderate PID were recruited to participate in the TECH-N study if they were eligible for outpatient treatment. Recruitment sites included outpatient clinics and emergency departments at an urban academic medical institution located in a STI prevalent urban community. At baseline, all participants completed an audio-computerized-assisted self-interview (ACASI) to collect baseline demographics, reproductive and sexual history, and health-related questions related to quality of life, and all provided vaginal specimens for STI testing. Participants were randomized into either the intervention group or the control group using a computer-generated block randomization sequence. The control group received standard of care based on the Centers for Disease Control and Prevention recommendations: a complete course of broad-spectrum antibiotics to treat PID, standardized discharge instructions, and asked to schedule a follow-up visit within 72 hours.^{15,16} In addition to standard of care, the intervention group also received daily medication reminders and positive health reminders through a text messaging service. They were also visited by a community health nurse within 5 days to provide risk reduction counseling using the Sister-to-Sister Teen intervention and perform clinical follow-up assessments.^{14–18} All participants were followed-up at 14 days, 30 days, and 90 days post enrollment. After completing 14 days of treatment, a survey was administered to assess adherence to self-care behaviors including partner notification and treatment. ACASIs were also performed at 1 month and 3 months to collect data on condom and contraceptive use, current health status, interim sexual behavior, and interim diagnosis of STIs and pregnancy. This study was approved by the Johns Hopkins Medicine Institutional Review Board.

Four main questions were used in our analysis from the post-PID survey given at baseline and 3 months, listed in Table 1. The survey questions were evaluated in relation to the participant's main sexual partner. Also, change in relationship status was defined as follows: no longer having the same sexual partner when diagnosed with PID. For each question, participants responded either yes or no. Descriptive statistics were used to identify and evaluate demographics (age, ethnicity, medical insurance, history of STI, history of pregnancy, and number of lifetime partners), number of partners notified, number of partners treated, and relationship status after a PID diagnosis.

Chi-Square analyses were used to examine the relationship between condom use at baseline and at 3 months in the study population overall and between group assignments. The primary outcome measure of this analysis was reported condom use. Stratified and multivariable logistic regression models that controlled for group assignment and relationship status were used to further evaluate the relationship of condom use at baseline as it compares to use at 3 months after a PID diagnosis and relationship status. When a participant reported that they were no longer sexually active, their data were not included in

the analysis. All analyses were performed in SPSS 24, and a 2-sided P value of $<.05$ was considered statistically significant.

Results

There was a total of 286 participants in this analysis: 137 were in the control group and 149 were in the intervention group. Thirty-one participants were either lost to follow-up or did not answer all of the questions in the survey (Figure 1). Therefore, 122 remained in the control group and 133 remained in the intervention group. The majority were low income (86%), African American (94%) females with an average age of 18.8 years ($SD = 2.5$). There were no differences in baseline demographics (age, ethnicity, medical insurance, history of STI, history of pregnancy, and number of lifetime partners) between groups (Table 2). At baseline, 57% had reported a history of an STI, 53% had a history of pregnancy, and there was an average of 6 ($SD = 6.6$) lifetime sexual partners. Although there was an average of 6 lifetime sexual partners, most participants reported they had one current partner (in the prior 3 months) at the time of diagnosis.

Rates of partner notification and treatment between the 2 groups did not differ. Overall, 90% of partners were notified, and of those notified, almost all (91%) reported partner treatment. The control group and intervention group reported a change in relationship status of 43% and 55%, respectively ($P = .07$). Thirty-five percent of the overall study population had reported condom use at 3 months, which was a 19% increase from baseline. In a bivariate analysis comparing condom use, we found that reported rates of condom use were slightly higher in the intervention group than in the control group. The control group had increased from 17% of reported condom use at baseline to 30% at 3 months ($P = .046$). However, the intervention group had an increase of condom use from 16% at baseline to 39% at 3 months ($P = .005$).

In a stratified logistic regression, we compared reported condom use at baseline with those who did not report condom use at last sex by group assignment separately (Table 3). Participants reporting condom use at baseline in the intervention group had slightly higher odds of condom use at 3 months compared with the control group but not significantly different (intervention odds ratio [OR] = 3.90, 95% confidence interval [CI] = 1.45–10.46; control OR = 2.62, 95% CI = 1.00–6.89) for group comparison ($P = .575$). The intervention group also had higher odds of reporting condom use at 3 months compared with nonusers at baseline, if they were no longer in the same relationship (intervention OR = 9.41, 95% CI = 1.91–44.92; control OR = 2.26, 95% CI = 0.70–7.26). However, participants in the intervention group had lower odds of reporting condom use at 3 months compared with nonusers at baseline, if they were still in the same relationship (intervention OR = 1.60, 95% CI = 0.38–6.74; control OR = 3.36, 95% CI = 0.74–15.18; Table 3). When controlling for group assignment and change in relationship status in a multivariable logistic regression, participants who reported condom use at baseline were 3.1 times (OR = 3.10, 95% CI = 1.56–6.15) more likely to report condom use at 3 months compared with baseline nonusers at last sex (Table 3).

Discussion

Young urban adolescent and young adults who participated in the TECH-N study were more likely to report condom use at last sexual encounter at 3 months, especially if they were no longer in the same relationship. The TECH-N intervention included more follow-up visits and risk reduction counseling through various types of mediums; thus, participants in the intervention group were more likely to report partner behavior change and condom use compared with control participants. Although the intervention was moderately effective on an individual level at increasing condom use, a dyadic approach may further enhance this rate of usage post-PID. Research demonstrates that AYA prioritize intimacy in their relationships and condoms represent infidelity.^{19,20} For more robust STI prevention, incorporating concordance from both partners is needed so that neither partner is viewed as the “guilty” party.^{20,21}

Despite high reported rates of partner notification and treatment, those residing in high STI prevalence communities remain at high risk for recurrent STIs as condom use is linked to relationship status and community rates of sexual concurrency. Moreover, nearly half of the participants in the TECH-N study had reported that they remained in the same sexual relationship at the 3-month follow-up visit. That, in addition to high reported rates of partner notification and treatment, AYA affected by PID showed willingness to discuss their diagnosis with their sexual partners. These findings are foundational for the implementation of dyadic intervention to promote consistent long-term condom use among AYA with a history of PID as a core public health prevention strategy, since condom use is still suboptimal in this population. Therefore, longer longitudinal follow-up of PID-affected AYA may reveal changes in sexual behavior within a relationship after diagnoses of PID. Moreover, inclusion and engagement of partners in a treatment plan of PID would also help identify barriers or factors that affect condom use behaviors long term.

Our findings must be considered in light of several general limitations. While these data support the potential of male engagement during the treatment period due to high partner notification and treatment rates, we lack actual data from the male partner perspective. We are, therefore, unable to determine how receptive male sexual partners may be to actively participating in dyadic intervention with their partners diagnosed with PID. Treatment rates may be underestimated since these data were only reported by participants, instead of their partners. While PID largely affects heterosexual women identifying a single partner at the time of their diagnosis, there is insufficient data on participants who were also engaged in same-sex relationships or had multiple sexual partners. These are important considerations that need further study and evaluation to develop an effective dyadic intervention that is generally beneficial and impactful longitudinally. Finally, change in condom technique was also not evaluated prior to or post intervention, but this may have affected the differential rates of condom use observed between the intervention and control participants.

Implications

Considering the high reported rates of partner notification and treatment from this study and the stability of over half of the relationships over the 3-month follow-up period, the utility of

dyadic intervention should be further explored as a secondary prevention strategy in urban AYA. Increase of trust and intimacy within a relationship negatively correlate to the use of condoms in adolescents; therefore, relationship status should be evaluated prior to counseling of the dyad together.²² Condom use also tends to be abandoned as a relationship is perceived as monogamous by one or both parties, which increases the risk of infection.²³ Over half of young adults have also reported being in a casual sexual relationship of some type, thus integrating strategies for conversation about nonexclusive relationships and associated risks should be included as a part of the intervention.²² Data from this study also showed a slight increase in condom use through the TECH-N approach in female participants with a complicated STI such as PID. Technology integration for outreach with both young women and men may also show effectiveness in increasing condom consistency in STI prevalent communities in the United States.

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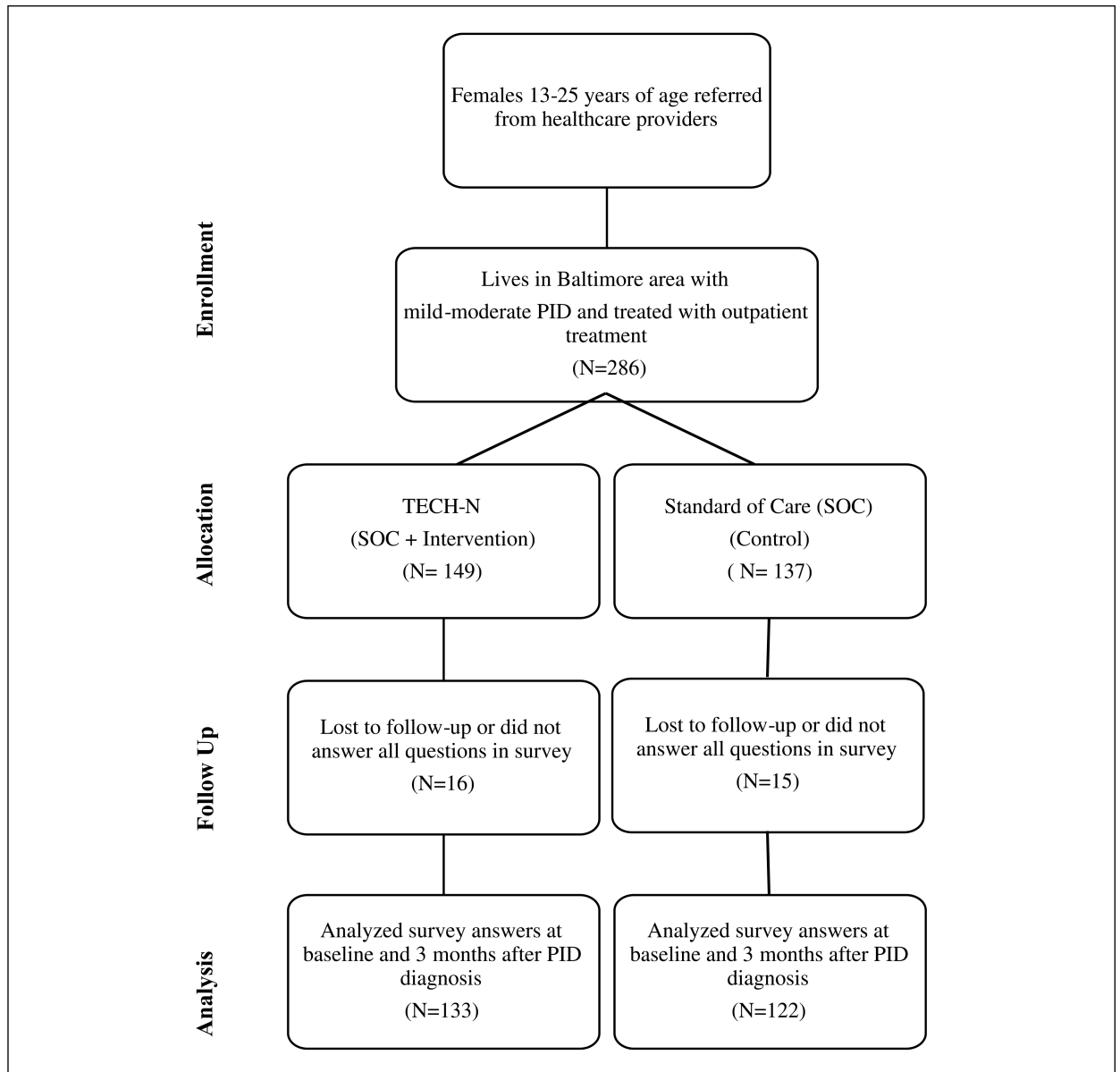


Figure 1.
Study design.

Table 1.

Post-PID Sexual Behavior Items.

-
1. Were you able to notify your partner for treatment after you were diagnosed with PID 3 months ago?
 2. Did your partner go for treatment?
 3. Is he still your sexual partner?
 4. Did you use condoms at last intercourse?
-

Abbreviation: PID, pelvic inflammatory disease.

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Table 2.

Summary of Participant Demographics at Baseline.

	Control (n = 137)	TECH-N (n = 149)	Overall (N = 286)	<i>p</i> ^a
Age in years, mean (SD)	18.9 (2.5)	18.7 (2.5)	18.8 (2.5)	.639
Ethnicity, n (%)				
Black/African American	128 (93.4)	140 (93.9)	268 (93.7)	
Other	9 (6.6)	9 (6.1)	18 (6.3)	.640
Medical insurance, n (%)				
Medicaid	116 (84.7)	131 (87.9)	247 (86.4)	
Private/self-pay	21 (15.3)	11 (12.1)	39 (13.6)	.382
History of STI, n (%)	82 (59.8)	80 (53.7)	162 (56.6)	.227
History of pregnancy, n (%)	73 (53.2)	79 (53.0)	152 (53.1)	.951
Number of lifetime partners, mean (SD)	6.3 (7.6)	5.8 (5.9)	6.1 (6.8)	.535

Abbreviation: SD, standard deviation; STI, sexually transmitted infection; TECH-N, Technology Enhanced Community Health Nursing.

^aCalculated using Pearson χ^2 or Student's *t* test for continuous values.

Table 3.Stratified Logistic Regressions Among 255 Women Completing 3-Month Follow-up^a.

	Odds Ratio	95% CI	<i>p</i> ^b
Condom use at 3 months according to baseline use			
TECH-N	3.90	1.45–10.46	.007
Control	2.62	1.00–6.89	.050
Group comparison			.575
Condom use at 3 months observing those who were no longer in the same relationship			
TECH-N	9.41	1.91–44.92	.005
Control	2.26	0.70–7.26	.172
Condom use at 3 months observing those who were still in the same relationship			
TECH-N	1.60	0.38–6.74	.415
Control	3.36	0.74–15.18	.101

Abbreviations: CI, confidence interval; TECH-N, Technology Enhanced Community Health Nursing.

^aLogistic regressions were calculated in reference to each group's baseline response.^bCalculated using Pearson χ^2 .