Infrequent Parental Monitoring Predicts Sexually Transmitted Infections Among Low-Income African American Female Adolescents

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Objective: To prospectively determine (using an 18-month follow-up period) the association between African American female adolescents’ perceptions of parental monitoring and their acquisition of biologically confirmed infection with *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and *Trichomonas vaginalis*.

Design: A prospective cohort study of 217 African American female adolescents enrolled in the control arm of a randomized trial of a human immunodeficiency virus prevention intervention program.

Setting and Participants: A volunteer sample of adolescents (aged 14-18 years) recruited from low-income neighborhoods characterized by high rates of unemployment, substance abuse, violence, and sexually transmitted diseases.

Main Outcome Measures: Adolescents provided 2 self-collected vaginal swab specimens. One was tested for *C. trachomatis* and *N. gonorrhoeae* DNA with ligase chain reaction. The other was used to inoculate culture medium for *T. vaginalis*. Identical assay procedures were repeated at the 6-month, 12-month, and 18-month follow-up intervals.

Results: Adjusted odds ratios indicated that adolescents who perceived infrequent parental monitoring at baseline were 1.8 (95% confidence interval, 1.01-3.21) and 2.4 (95% confidence interval, 1.22-4.87) times more likely to acquire chlamydia or trichomoniasis, respectively, compared with their counterparts who perceived greater levels of monitoring. Similarly, adolescents who perceived infrequent parental monitoring were 2.1 (95% confidence interval, 1.16-3.74) times more likely to test positive for a sexually transmitted infection during the course of the 18-month follow-up period.

Conclusions: Adolescents’ perceptions of their parental-monitoring levels predicted subsequent acquisition of biologically confirmed chlamydia and trichomoniasis infections. These findings suggest that expanded efforts leading toward effective clinic- and community-based sexually transmitted infection intervention programs involving parents may be warranted.


SEXUALLY TRANSMITTED infections (STIs) are a significant and immediate health risk to adolescents.1 In the United States, African American female adolescents are disproportionately likely to acquire STIs including human immunodeficiency virus.2,3 Evidence suggests that family-level interventions are a promising approach to reducing STI incidence among African American female adolescents.4,5 Parental monitoring is one aspect of family-level intervention that may be a particularly important focal point for these efforts.4,6,7

Cross-sectional and prospective studies provide evidence suggesting that female adolescents who perceive infrequent parental monitoring may be more likely to engage in sexual risk behaviors.4,8,9 Unfortunately, the outcome measures for these studies were self-reported, and past evidence suggests that adolescents’ self-reported sexual risk behaviors may lack validity.10 Previously, we reported significant cross-sectional associations between African American female adolescents’ perceptions of parental monitoring and the prevalence of biologically confirmed chlamydial, gonococcal, and trichomonal infections.10 The purpose of our study was to prospectively test (using an 18-month follow-up period) the association between African American female adolescents’ perceptions of parental monitoring and their acquisition of biologically confirmed infection with *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and *Trichomonas vaginalis*. 
where.10,14 All study protocols were approved by the university institutional review board. Detailed descriptions of the study have been published elsewhere.90% (6 months), 89% (12 months), and 85% (18 months). More than 90% of the participants were female adolescents enrolled in a randomized trial of a human immunodeficiency virus prevention program. Only those randomized to receive an attention control intervention were included in the analysis. The attention control curriculum provided the adolescents with information related to health but unrelated to sexual risk behaviors. Baseline data and 6-month, 12-month, and 18-month follow-up data collected from adolescents randomized to the control condition were used for this study.

From December 1996 through April 1999, sexually active African American female adolescents (aged 14-18 years) were recruited from low-income neighborhoods in Birmingham, Ala, that were characterized by high rates of unemployment, substance abuse, violence, teen pregnancy, and sexually transmitted diseases. The study achieved an 85.7% baseline participation rate. Retention rates for the control group were 90% (6 months), 89% (12 months), and 85% (18 months). More detailed descriptions of the study have been published elsewhere.10-14 All study protocols were approved by the university institutional review board.

At the conclusion of the 18-month follow-up period, data for 230 adolescents were available for analysis. Of these, 217 (94%) provided usable specimens at each assessment interval. Our analyses were based on these 217 female adolescents.

**DATA COLLECTION**

Data collection was conducted at the University of Alabama Family Medicine Clinic in Birmingham. A self-administered questionnaire was developed for adolescents with a fifth-grade reading level. The questionnaire was administered in a group setting with monitors providing assistance to those with limited literacy and helping to assure confidentiality of the responses. The adolescents were assured that their names could not be linked to the codes used to identify documents containing their responses. Subsequently, participants were instructed in the correct procedure for self-collecting a vaginal swab specimen. They were asked to provide 2 self-collected vaginal swab specimens for sexually transmitted disease testing.

**MEASURES**

**Assessment of Parental Monitoring**

Although a uniform definition of parental monitoring has not been applied in the research literature, most studies measure 2 important aspects of parental monitoring: (1) adolescents' perceptions of their parents' knowledge of where they go, and (2) adolescents' perceptions about parents' knowledge of whom they are with when the adolescent is not at home or at school. Given that perceptions are powerful determinants of behavior, adolescents' perceptions of parental monitoring rather than assessments from parents have been used to assess this construct.6-12

At baseline, participants completed a 2-item measure assessing parental monitoring. These items were strongly correlated (Pearson r = 0.70; P = .01), yet the correlations were not strong enough to suggest that the items were redundant. One item asked the adolescents how often parents (or parental figures) knew where they were when they were not at home or at school. The other assessed how often their parents knew whom they were with when not at home or at school. Responses were provided on a 5-point scale: 1, “never or almost never;” 2, “rarely;” 3, “sometimes;” 4, “usually;” and 5, “almost always.” Adolescents who responded “almost always” or “usually” to both items were classified as perceiving frequent parental monitoring; the remainder were classified as perceiving infrequent parental monitoring.

**Laboratory Measures**

Participants provided 2 vaginal swab specimens. The first was placed in a transport tube (Abbott LCx Probe System; Abbott Laboratories, Abbott Park, Ill) and tested for C trachomatis and N gonorrhoeae DNA with ligase chain reaction.15,16 The second was used to inoculate culture medium for T vaginalis (InPouch TV test; BioMed Diagnostics Inc, Santa Clara, Calif).17 Identical assay procedures were repeated at each 6-month follow-up interval. Adolescents who tested positive for an STI were notified by telephone or in person (with written documentation) and requested to return for an oral single-dose treatment.

**Assessment of Covariates**

**Related to the Outcome**

Identification of covariates is an important method of controlling for their potentially confounding effects. Therefore, several variables were tested as potential covariates between adolescents' perceived level of parental monitoring and acquisition of STIs during the 18-month follow-up period. Potential key covariates were age, whether participants tested positive for any of the STIs assessed at baseline, and frequency of adolescents' communication with parents about sex-related issues. The latter measure was assessed using a scale that asked participants how frequently they discussed each of 5 topics with their parents: sex, how to use condoms, how to prevent infection with an STI, how to prevent infection with the virus that causes acquired immunodeficiency syndrome, and how to prevent pregnancy. The scale achieved adequate inter-item reliability (α = .88). Only 1 of the covariates that we tested (Table 1) met the statistical criteria for a

<table>
<thead>
<tr>
<th>Potential Covariate</th>
<th>Parental Monitoring</th>
<th>Gonorrhea</th>
<th>Chlamydia</th>
<th>Trichomoniasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.22</td>
<td>.43</td>
<td>.15</td>
<td>.29</td>
</tr>
<tr>
<td>Any STI at baseline†</td>
<td>.10</td>
<td>.90</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Parental communication</td>
<td>.08</td>
<td>.71</td>
<td>.93</td>
<td>.13</td>
</tr>
</tbody>
</table>

Abbreviation: STI, sexually transmitted infection.

*Associations are presented as P values.
†Any of 3 biologically assessed STIs (gonorrhea, chlamydia, or trichomoniasis).
covariate (ie, a significant association using a screening level of \( P \leq .10 \) with parental monitoring and at least 1 of the outcome measures).

**DATA ANALYSIS**

Bivariate associations between baseline levels of parental monitoring and STI acquisition were assessed using contingency table analysis. Relative risk ratios compared STI incidence rates between adolescents who reported relatively infrequent parental monitoring and those who reported more frequent monitoring. To control for the identified covariate, hierarchical logistic regression was used to calculate an adjusted odds ratio that controlled for the prevalence of biologically confirmed STIs at baseline. Significance was defined by 95% confidence intervals and an obtained \( P \) value of less than .05.

**RESULTS**

At enrollment, the age of the adolescents was mean±SD, 16.0±1.2 years. At baseline, 36.5% of participants were classified as perceiving infrequent parental monitoring. More than half (53.5%) of the adolescents tested positive at least once for 1 of the 3 assessed STIs. Thirty-three adolescents (15.2%) tested positive for gonorrhea during at least 1 of the 3 assessment periods. In addition, 84 participants (38.7%) tested positive for chlamydia and 48 (22.1%) tested positive for trichomoniasis during at least 1 of the 3 assessment periods.

**BIVARIATE ASSOCIATIONS**

Table 2 presents relative risk ratios, 95% confidence intervals, and their respective \( P \) values. In contrast to those who perceived frequent monitoring, adolescents perceiving infrequent monitoring were significantly more likely to test positive for at least 1 STI during the 18-month follow-up period. As indicated, the strongest association observed was for trichomoniasis. More than one third (35.7%) of the adolescents who perceived infrequent parental monitoring tested positive for trichomoniasis at least once during the 18-month follow-up period, as compared with 17.7% among those perceiving more frequent monitoring. The association between parental monitoring and incidence of chlamydia was also significant. Nearly half (47.4%) of the adolescents who perceived infrequent parental monitoring tested positive for chlamydia at least once during the 18-month follow-up period, as compared with 33.6% among those perceiving more frequent monitoring. Significant bivariate associations between parental monitoring and incidence of gonorrhea or acquisition of multiple STIs were not observed.

**ADJUSTED ASSOCIATIONS**

Table 2 also presents odds ratios adjusted for the effects of STI prevalence at baseline. Adjusted odds ratios indicate that adolescents who perceived infrequent parental monitoring at baseline were 1.8 and 2.4 times more likely to acquire chlamydia or trichomoniasis, respectively, compared with their counterparts who perceived greater levels of monitoring. Similarly, adolescents who perceived infrequent parental monitoring were more than twice as likely to test positive for an STI during the course of the 18-month follow-up period.

**COMMENT**

To the best of our knowledge, this is the first prospective report showing that female adolescents’ perceptions of infrequent parental monitoring predict subsequent biologically confirmed acquisition of STIs. This evidence adds to the emerging empirical literature supporting family-level programs designed to reduce adolescents’ STI risk.\(^{7,12}\) Our findings are strengthened by the fact that all participants began the prospective period free of infection (ie, those testing positive at baseline were effectively treated).

Physicians are in a unique position to facilitate parental involvement in the lives of their adolescent patients. Our findings suggest that one potentially beneficial talking point between physicians and parents may be the importance of frequent parental monitoring. Beyond the reduced risk of acquiring STIs, more frequent parental monitoring may lead to adolescents’ less fre-

### Table 2. Bivariate and Multivariate Associations Between Infrequent Parental Monitoring and STI Incidence Among African American Female Adolescents

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Infrequent Monitoring, % Positive</th>
<th>Frequent Monitoring, % Positive</th>
<th>RR</th>
<th>95% CI</th>
<th>( P ) Value</th>
<th>AOR*</th>
<th>95% CI</th>
<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gonorrhea</td>
<td>17.6</td>
<td>14.9</td>
<td>1.18</td>
<td>0.62-2.23</td>
<td>.62</td>
<td>1.11</td>
<td>0.51-2.41</td>
<td>.79</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>47.4</td>
<td>33.6</td>
<td>1.41</td>
<td>1.01-1.96</td>
<td>.05</td>
<td>1.80</td>
<td>1.01-3.21</td>
<td>.05</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>35.7</td>
<td>17.7</td>
<td>2.02</td>
<td>1.24-3.28</td>
<td>.004</td>
<td>2.45</td>
<td>1.22-4.87</td>
<td>.01</td>
</tr>
<tr>
<td>Any STI†</td>
<td>64.9</td>
<td>47.1</td>
<td>1.38</td>
<td>1.08-1.75</td>
<td>.01</td>
<td>2.09</td>
<td>1.16-3.74</td>
<td>.01</td>
</tr>
<tr>
<td>Multiple STIs‡</td>
<td>16.7</td>
<td>15.3</td>
<td>1.09</td>
<td>0.54-2.20</td>
<td>.81</td>
<td>1.06</td>
<td>0.46-2.45</td>
<td>.89</td>
</tr>
</tbody>
</table>

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; RR, relative risk; STI, sexually transmitted infection.

*Adjusted for baseline prevalence of any biologically confirmed STI.
†Based on 3 biologically confirmed STIs (gonorrhea, chlamydia, and trichomoniasis).
‡Two or more STIs were diagnosed during the course of the 18-month follow-up period.
Previous evidence collected in cross-sectional studies suggests that parental monitoring may be an important protective factor against STI acquisition among female adolescents. Although a couple of studies have examined this question prospectively, the outcome measures were self-reported sexual risk behavior rather than biologically confirmed end points. This study combined a prospective design with biologically confirmed outcome measures to provide a more rigorous test of the hypothesis that parental monitoring can be protective against STI infection among female adolescents. Our findings add further support to the hypothesis that parental monitoring serves a protective function. Expanded efforts leading toward effective clinic- and community-based STI intervention programs involving parents may be warranted.

Adolescents’ perceptions of their parental-monitoring levels predicted subsequent acquisition of biologically confirmed chlamydia and trichomoniasis infections. Our findings suggest that expanded efforts leading toward effective clinic- and community-based STI intervention programs involving parents may be warranted.

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REFERENCES


