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Risk Factors for Sexually Transmitted Infections among Young Adolescents

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A B S T R A C T

Significant numbers of adolescents are initiating sexual activity at age 17 and younger. Little is known about this younger population of adolescents. This includes risk or protective factors for sexual activity and sexually transmitted infection (STI) acquisition. To safeguard all adolescents from the consequences of risky sexual behaviors, and to insure age appropriate and effective interventions, further study is critical to address risky behaviors specific to early adolescents. This study was a retrospective chart review of 155 sexually active adolescent girls. Students were divided into those who never had a documented STI and those who had 1 or more STIs. Data were collected from a sexual history questionnaire. These data were grouped into risk or protective domains. Domains were made up of 5 items of protective factors, 3 items of peer risks, 2 items of family risks, and 7 items of individual risks. STI outcomes were compared to these characteristics. One hundred fifty-five sexually active adolescents were studied. A univariate and multivariate analysis of risk and protective factors for testing positive for an STI demonstrated that high levels of protective factors reduced the risk of STIs. This suggests that STI prevention programs should focus on increasing protective factors among young adolescents in addition to reducing risk factors.

***Key words**: STI (Sexually transmited infections), adolescents, risk factors, Trichomonas vaginalis, Chlamydia trachomatis*

Introduction

Younger adolescents are at risk for acquiring sexually transmitted infections (STIs), such as *Neisseriae gonorrhoaeae* (NG), *Chlamydia trachomatis* (CT), and *Trichomonas vaginalis*. Although STI rates are highest among 15 to 17 years olds[1–3], infection rates in this early adolescent population are substantial[4]. Although considerable information exists about sexual behaviors among high school students, relatively little is known about younger sexually active adolescents, including factors that either increase risk for or offer protection from acquisition of STIs. To reduce risky sexual behaviors in this population of younger teens, it is critical to explore these factors in this population of adolescents. This study was undertaken to determine risk and protective factors for STI acquistion in sexually active middle school students.

Materials and Methods

We conducted a retrospective chart review 2007 through January 2010 in 3 middle schools. All students registering for comprehensive services (those with parental consent) complete a health questionnaire. This questionnaire surveys adolescents on a broad array of health-related topics, including home life, educational aspirations, peer behaviors, and the student's personal behaviors pertaining to drug use and sexual activity. Those students who are sexually active are scheduled a second appointment (within 1–2 weeks) to complete an additional reproductive health history form and receive testing for STIs. The reproductive health form includes information on condom use, age of sexual debut, the age of the student's oldest sex partner, and number of lifetime partners. Sexually active girls are encouraged to undergo a vaginal exam but some refuse. The number of girls who refused a pelvic exam was not tracked. Vaginal wet preparations from students undergoing pelvic examinations are then examined for the presence of motile trichomonads. Students included in this study were adolescents who (1) were fully registered, (2) were screened for STIs, and (3) completed the questionnaire and initial reproductive health history form.

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TABLE 1
DISTRIBUTION OF PROTECTIVE OR RISK FACTORS FOR TESTING POSITIVE FOR AN STI POSITIVITY AND STI NO POSITIVITY (N=155)

	Yes (%) Positivity	No (%) Positivity
Individual risk		
Trouble with police	43 (28%); 42%	110 (72%); 26%
Ever tried cigarettes/tobacco	37 (24%); 24%	116 (76%); 33%
Ever tried beer/wine/other/liquor	72 (47%); 29%	81 (53%); 32%
Ever used marijuana other drugs	38 (25%); 37%	115 (75%); 29%
adjustright Thought about running away	72 (47%); 35%	81 (53%); 27%
Protective domain		
Important to do well in school	143 (93%); 29%	10 (7%); 60%
Parents/guardians listen to you	114 (81%); 27%	27 (19%); 56%
At least one person to talk to	135 (93%); 31%	10 (7%); 40%
Parents talked about alcohol/drugs/sex	128 (90%); 30%	15 (10%); 40%
Live with both parents	118 (82%); 31%	26 (18%); 32%
Peer and family risk		
Any of close friends ever tried cigarettes/tobacco	76 (50%); 26%	77 (50%); 35%
Any of close friends ever tried beer/wine/other liquor	99 (65%); 28%	54 (35%); 35%
Any of close friends ever used marijuana/other drugs	77 (50%); 30%	76 (50%); 32%
Worried anyone in family drinks to much	39 (25%); 33%	114 (75%); 30%
Worried anyone in family used drugs too much	39 (25%); 31%	115 (75%); 31%

An STI was defined as a positive urine-based test for gonorrhea or chlamydia or a wet prep that demonstrated motile trichomonads. Questions from the instrument were grouped into protective and risk factor domains as shown in (Table 1). A »yes« answer to a question in the protective factor domain indicated the presence of this protective factor; a protective factor was considered absent if the student did not answer the question or answered »no«. Risk factors were considered present if a student did not answer the risk question or answered »yes« or »don't know«; a risk factor was considered absent if the student answered »no« to a risk factor question. The percentage of students indicating the presence or absence of each risk or protective factor is also shown in (Table 1). Using data from the initial reproductive health history form, we also examined the influence of other factors known to be related to acquisition of STIs[4–10], including age of sexual debut, age difference between each student and her oldest sex partner, number of lifetime partners, and condom use at last intercourse. Condom use at last sex was scored as 0 (no use) or 1 (used condom). We calculated age difference as the age of oldest reported sex partner minus the adolescent's current age. The reproductive health history form did not ask the age of the student at the time she was having sex with the oldest partner. We dichotomized the age difference between the student's current age and age of her oldest sex partner as follows: difference of 0 to 2 years was scored 0 and difference of 3 or more years was scored as 1. Risk and protective factors were measured at one point in time, whereas the outcome of testing positive for 1 or more STIs could have occurred at any time point within the chart review time frame. Univariate and multivariate logistic regressions with presence of an STI as the dependent variable were used to model the probability of any positive STI as a function of any given risk or protective factor and age of sex debut, age difference between the girl's current age and age of her oldest partner, condom use at last sex, and number of life time partners. Odds ratios and corresponding 95% confidence intervals were also calculated. Variables significant in univariate analysis were entered into the multivariate logistic regression model simultaneously.

Results

Our analysis adolescent girls (N=155): Ages ranging from 11 to 17 years, with a mean age of 13 years (SD 1.00). Forty-four adolescents (28.4%) had 1 or more positive chlamydia results, 17 adolescents (11.0%) had 1 or more positive gonorrhea results, and 2 adolescents (1.3%) tested positive for trichomonas. The prevalence of trichomonas is likely an underestimate as most young adolescents refused the recommended vaginal exam. Overall, 48 girls (31%) tested positive for 1 or more STIs. Sixty-one adolescents (42.7%) had 3 years or more as the difference between their current age and the age of their oldest sex partner. Forty-eight percent had 1 lifetime sexual partner, 22.9% had 2, 12.5% had 3, and 16.7% had 4 or more. One hundred eighteen (80.3%) used condoms

TABLE 2
UNIVARIATE AND MULTIVARIATE ANALYSIS OF RISK AND PROTECTIVE FACTORS FOR TESTING POSTITIVE FOR AN STI

	STI Positivity (%)*	Unadjusted OR's (95% CI)	Adjusted OR's (95% CI)
Individual risk			
Trouble with police	42% (26%)	2.01 (0.96, 4.21)	
Ever tried cigarettes/tobacco	24% (33%)	0.66 (0.28, 1.54)	
Ever tried beer/wine/other/liquor	29% (32%)	0.87 (0.44, 1.74)	
Ever used marijuana other drugs	37% (29%)	1.45 (0.67, 3.14)	
Thought about running away	35% (27%)	1.43 (0.72, 2.84)	
Protective domain			
Important to do well in school	29% (60%)	0.27 (0.07, 0.99)†	0.10 (0.01, 0.99)†
Parents/guardians listen to you	27% (56%)	0.30 (0.13, 0.71)†	0.29 (0.10, 0.88)†
At least one person to talk to	31% (40%)	0.68 (0.18, 2.53)	
Parents talked about alcohol/drugs/sex	30% (40%)	0.63 (0.21, 1.90)	
Live with both parents	31% (32%)	0.94 (0.37, 2.34)	
Peer and family risk			
Any of close friends ever tried cigarettes/tobacco	26% (35%)	0.66 (0.33, 1.32)	
Any of close friends ever tried beer/wine/other liquor	28% (35%)	0.73 (0.36, 1.48)	
Any of close friends ever used marijuana/other drugs	30% (32%)	0.92 (0.46, 1.84)	
Worried anyone in family drinks to much	33% (30%)	1.18 (0.54, 2.56)	
Worried anyone in family used drugs too much	31% (31%)	0.98 (0.44, 2.14)	
≤ 13 yrs old sexual debut	27% (39%)	0.59 (0.29, 1.18)	
≤ 3 yrs age difference	43% (23%)	2.42 (1.18, 4.99)†	1.67 (0.68, 4.09)
Condom use	28% (48%)	0.42 (0.18, 0.97)†	0.89 (0.31, 2.59)
≤ lifetime partners	45% (18%)	3.87 (1.79, 8.37)†	3.69 (1.47, 9.29)†

* Positivity of STI for the reference group; † $p<0.05$

the last time they had sex. Univariate and multivariate analysis of risk and protective factors for testing positive for an STI are shown in (Table 2). In the univariate analysis, 2 protective factors were associated with a reduced risk for testing positive for an STI: importance of doing well in school and the belief that parents or guardians »listen to you«. In contrast, an age difference of 3 or more years between the student's current age and the age of her oldest partner, not wearing a condom at last sex, and reporting 2 or more lifetime partners all conferred increased risk for testing postive for STI. In the multivariate analysis, both protective factors remained significantly associated with a reduced risk for testing positive for an STI. Girls having 2 or more lifetime partners were almost 3.7 times more likely to test positive for an STI compared to those having only 1 partner.

Discussion

Adolescents who indicated that doing well in school was important to them were 73% less likely to test positive for an STI compared to those not endorsing the view and those who felt their parents/guardians listen to them were 70% less likely to test positive. These findings are consistent with theoretical models of adolescent health behavior[11,12]**.** In a discussion on protective factors, resiliency, and healthy youth development, Resnick summarized how a resiliency paradigm identifies protective or nurturing factors that modify expected adverse outcomes[8]. Our data provide some empirical evidence to document the health benefits of protective factors. However, it is unclear how wanting to do well in school and the perception of having parents who listen to them confer protection.

Some research has shown that adolescent girls are more receptive to health advice from mothers (including advice about sexual behaviors) when they describe their relationship with their mothers as being close[13]. Alternatively, these protective factors could be proxy measures for other protective behaviors (e.g., greater parental monitoring) not measured here or for less sexual risk taking along other dimensions. Our results are consistent with the studies by Ford et al.[6] on sexual behavior and Wu et al.[14] on adolescent risk reduction. Ford et al. found that parental discussion of sex and a higher grade point average (both can be viewed as protective factors similar to what we report here) were associated with decreased risk of STIs 6 years later. We did not measure parental moni-

toring but it may be that adolescents who felt their parents listened to them lived in more close knit families where parental monitoring could occur or were more willing to share with parents their planned activities. This would give parents an opportunity to minimize high-risk behaviors. Crosby et al.[11] found that adolescents who reported perceived low levels of parental monitoring were 1.8 times more likely to acquire CT and 2.4 times more likely to acquire trichomonas compared to teens who perceived higher levels of parental monitoring. We did not find a relationship between condom use at last sex and a decrease in STI risk. However, we used only a single question to measure condom use; 1 item is likely insufficient to capture the complexities of condom use behavior including such issues as consistency of use or correct use, both of which can be associated with increased risk for STIs[15]. Previous research has shown that the adolescent's perception is most important to measure and impacts their behavior[16]. Our findings cannot be generalized to all younger adolescents. Adolescents in this study were girls from middle schools. We measured risk and protective factors at only 1 point in time; the diagnosis of an STI could have occurred before and after the surveys were completed.

Conclusion

In conclusion, we found that middle school students with certain self-reported protective factors had a decreased STI risk, whereas certain traditional risk factors increased the risk for testing positive for an STI. If others confirm these findings, future research should focus on determining how these protective factors reduce risk. Our findings also suggest that STI prevention programs should focus on increasing protective factors among adolescents in addition to reducing risk factors.

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ČIMBENICI RIZIKA ZA SPOLNO PRENOSIVE INFEKCIJE MEĐU MLADIM ADOLESCENTIMA

SAŽETAK

Značajan broj adolescenata započinje seksualnu aktivnost u dobi od 17 godina i ranije. Malo je istražena populacija mlađih adolescenata, u svezi rizika ili zaštitnih čimbenika protiv spolno prenosivih infekcija (SPI). Kako bi se zaštitili od posljedica rizičnog seksualnog ponašanja i kako bi se osigurale djelotvorne intervencije u toj dobi, važno je istraživanje i proučavanje rizičnih ponašanja, specifično za ranu adolescenciju. U studiji je retrospektivno obrađeno 155 spolno aktivnih adolescentica. One su bile podijeljene u jednu grupu onih koje nikada nisu imale dokumentirani STI i one koje su imale jednu ili više dokumentiranih spolno prenosivih infekcija. Podaci su prikupljeni iz formiranog upitnika o seksualnoj aktivnosti. Dobiveni podaci su grupirani u pet stavki tzv. zaštitnih faktora, tri faktora vršnjačkog utjecaja, dva faktora obiteljskih rizika i sedam faktora individualnih rizika. Rezultati spolno prenosivih infekcija su uspoređivani s tim faktorima/karakteristikama. Univarijatna i multivarijatna analiza rizika i zaštitnih faktora za testiranje na STI, pokazala su da visoke razine zaštitnih faktora smanjuju rizik od spolno prenosivih bolesti. To sugerira da se preventivni programi na STI trebaju usredotočiti na povećanje zaštitnih čimbenika među mladim adolescentima.