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Perceptions about Sexual Concurrency and Factors Related to Inaccurate Perceptions among Pregnant Adolescents and Their Partners

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Abstract

Background—Inaccurate perceptions about whether a partner has concurrent sexual partners are associated with current STI status. Despite high sexually transmitted infection rates among pregnant adolescents, studies have not investigated the accuracy of perceptions about sexual concurrency among young pregnant couples. The objectives were to assess: 1) the accuracy of perceptions about whether one's partner ever had concurrent sexual partners during the relationship and 2) whether self-reported concurrency and relationship factors are related to inaccurate perceptions.

Methods—Sociodemographic, psychosocial and sexual behavior data were collected from 296 couples recruited from antenatal clinics. Couples included pregnant adolescents, 14-21 years, and the father of the baby, 14 years. Percent agreement and kappa statistics assessed the accuracy of perceptions about whether one's partner ever had concurrent sexual partners during the relationship. Logistic regression models using generalized estimating equations assessed associations between respondents' self-reported concurrency, relationship factors and inaccurate perceptions.

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Results—Among participants whose partner was concurrent (n=171), 60% did not accurately report their partner's concurrency, and greater relationship satisfaction (AOR: 1.54) increased the likelihood of inaccuracy. Among participants with a nonconcurrent partner (n=418), 17% were inaccurate; self-reported concurrency (AOR: 2.69) and greater partnership duration (AOR: 1.25) increased the likelihood of inaccuracy, while greater relationship satisfaction decreased the likelihood of inaccuracy (AOR: 0.68).

Conclusions—Many pregnant adolescents and their partners inaccurately perceived their partner's concurrency status. Self-reported concurrency and relationship factors were associated with inaccuracy, reinforcing the need to improve sexual communication among this population.

Keywords

Concurrency; Adolescents; Pregnancy; Risk Perception

Introduction

Nearly half of annually reported sexually transmitted infections (STIs) are among adolescents aged 15-24 years.¹ Given their low condom use,² pregnant and postpartum adolescents may have even substantially higher STI risk. STI prevalence among pregnant adolescents ranges from 19% to 39% across studies testing biologic specimens, and between 8% and 19% of adolescents become infected or re-infected during pregnancy.² Young postpartum mothers are also at significant STI risk, with 9% to 39% of adolescent mothers diagnosed with an STI 6-12 months following delivery.²⁻⁵ Dissolution of the relationship with the baby's father and gaining a new sexual partner are significant predictors of postpartum STI risk.^{5,6}

Sexual concurrency is an independent risk factor for STI transmission and acquisition and allows for rapid spread of STIs.^{7,8} Sexual concurrency is defined as "overlapping sexual partnerships where sexual intercourse with one partner occurs between two acts of intercourse with another partner".⁹ Concurrency is common among sexually active adolescents, with prevalence estimates ranging from 14% to 67%, depending on the "concurrency" definition and specific study population.^{10,11}

Inaccuracy about whether a partner has concurrent sexual partners is associated with current STI status.⁸ Individuals not aware of their partner's concurrency may be less likely to use condoms, believing they are in a committed relationship.⁸ Increased STI risk among individuals who perceive their nonconcurrent partner as concurrent may be driven by personal risk behavior, as those who are concurrent themselves may be more likely to perceive their partner as concurrent.^{8,12}

A limited number of studies have investigated factors related to inaccurate perceptions of partner sexual risk.¹³⁻¹⁵ However, research shows that couples may be strongly motivated to see their partner in ways that may not be valid.¹⁶ Assumed similarity is particularly common in close relationships.¹⁶ Without open communication, individuals may assume their partner's behavior is like their own. We hypothesize that individuals who self-report concurrency are more likely to accurately perceive their partner's concurrency and less likely to accurately perceive their partner's nonconcurrency.

Relationship factors may also lead to invalid assumptions about a partner's sexual risk. Greater feelings of love, commitment and relationship satisfaction may yield a false sense of security leading to underestimates of risk.¹⁷⁻¹⁹ We expect greater feelings of love, commitment and relationship satisfaction among those who do not accurately perceive their partner's concurrency relative to individuals who accurately report their partner's

concurrency. Just as young people conflate emotional and partner safety,^{19,20} we expect that less positive assessments of the partner and relationship are related to overestimates of the partner's concurrency. Relative to individuals who accurately report their partner's nonconcurrency, we expect lower levels of love, commitment and relationship satisfaction among individuals who do not accurately perceive their partner's nonconcurrency.

STIs during pregnancy can cause significant morbidity for the mother, pre-term birth, stillbirth and neonatal infections.²¹ However, relatively few studies address STI risk among pregnant adolescents, and, despite their obvious role in STI transmission and risk, data regarding male partners of adolescent mothers are severely lacking. In spite of high STI rates among pregnant and postpartum adolescents, studies have not investigated the accuracy of perceptions about sexual concurrency among young expecting couples nor explored factors related to inaccurate perceptions. Greater understanding of the factors related to inaccuracy may be important for reducing STI risk among young couples transitioning to parenthood.

The objectives of this study are to: 1) explore the accuracy of perceptions about the partner's sexual concurrency during the relationship (extent of agreement between perceptions and partner-reported concurrency) among young expecting parents and 2) investigate factors related to inaccurate perceptions (discordant reports) about the partner's sexual concurrency during the relationship. Specifically, we aimed to assess whether self-reported concurrency and relationship factors (love, commitment and relationship satisfaction) are related to inaccurate perceptions about sexual concurrency.

Materials and Methods

Study sample and procedures

Data for this study represent baseline data from a longitudinal study of couples comprised of adolescent mothers and the biologic father of her child. Between July, 2007, and February, 2011, 296 pregnant adolescents and their male partners (592 total participants) were recruited from obstetrics and gynecology clinics and an ultrasound clinic in four university-affiliated hospitals in Connecticut. Potential participants were screened and, if eligible, research staff explained the study and answered any questions. If their baby's father was not present at the time of screening, research staff asked for permission to contact the partner to explain the study. If willing, research staff provided informational materials for their partner and asked them to talk to their partner about the study. Research staff called potential participants to answer any questions and, if interested, scheduled an appointment for their baseline interview.

Inclusion criteria included: (a) pregnant or partner is pregnant in the second or third trimester of pregnancy at time of baseline interview; (b) women: age 14-21 years; men: age at least 14 years, at time of the interview; (c) both members of the couple report being in a romantic relationship with each other; (d) both report being the biological parents of the unborn baby; (e) both agree to participate in the study and (f) both speak English or Spanish. Because this was a longitudinal study we used an initial run-in period as part of eligibility criteria where participants were deemed ineligible if they could not be re-contacted after screening and before their estimated due date.

Parental consent was not required; written informed consent was obtained by a research staff member at the baseline appointment. The couples separately completed interviews via audio computer-assisted self-interviews (ACASI). Participation was voluntary and confidential, and did not influence the provision of health care or social services. All procedures were

approved by the Yale University Human Investigation Committee and by Institutional Review Boards at study clinics. Participants were reimbursed \$25 for their effort.

Of 413 eligible couples, 296 (72.2%) couples enrolled in the study. Those who agreed to participate were of greater gestational age ($p=0.03$). Participation did not vary by any other pre-screened demographic characteristic (all $p>0.05$). Data reported are from the baseline assessments of all participants.

Measures

Self-reported concurrency—Participants were categorized as having a concurrent sexual partner during the relationship if they responded they: a) ever had sexual intercourse with someone else during the time they were in a relationship with the father/mother of their baby, b) had sexual intercourse with someone else during the beginning of their relationship, or c) had sexual intercourse with someone else during a breakup with the father/mother of their baby.

Perceptions of sexual concurrency—Participants' perceptions of their partner's concurrency was assessed with the question "Did [initials of father/mother of baby] ever have sexual intercourse with someone else during the time you have been in a relationship with [initials of father/mother of baby]?" Possible responses included: "definitely no", "probably no", "uncertain", "probably yes", "definitely yes". Responses were recoded into "no", "uncertain" and "yes" categories.

Accuracy of perceptions about sexual concurrency—Two new outcomes variables were created to indicate whether the participant accurately perceived if his/her partner had concurrent sexual partners during the relationship. Participants who responded "no" or "uncertain" to the perception question and whose partner reported concurrency were categorized as inaccurately perceiving their partner's concurrency. Those who responded "yes" and whose partner reported concurrency were categorized as accurately perceiving their partner's concurrency. Participants who responded "yes" or "uncertain" to the perception question and whose partner reported nonconcurrency were categorized as inaccurately perceiving their partner's nonconcurrency. Those who responded "no" and whose partner reported nonconcurrency were categorized as accurately perceiving their partner's nonconcurrency.

Relationship factors as reported by the index participant included current feelings of love (very strong feelings vs. less than very strong feelings), relationship commitment (very committed vs. somewhat committed, a little committed or totally non-committed) and relationship satisfaction, measured using the 32-item Dyadic Adjustment Scale.²² Sample items include, "How often do you or you partner leave the house after a fight," and "Do you kiss your partner?" A total relationship satisfaction score was computed by summing all items (range 0-151) and then standardized to mean zero and unit variance to facilitate interpretation of the odds ratios.

Control factors were selected given their potential associations with both the factors of interest and the inaccuracy outcome variables and included age (years), gestational age (weeks), relationship duration (years) and whether the partner was the participant's main source of financial support (yes/no). Older adolescents may more realistically appraise risks²³ and may be in more long-term, committed relationships. Greater gestational age is expected to increase males' and decrease females' likelihood of concurrency (since frequency of intercourse often decreases during pregnancy)²⁴ while potentially increasing or decreasing the accuracy of perceptions. Young expecting parents may make more accurate assessments of their partner as they near the childbirth or may make overly positive

assessments following decisions to remain with their partner and carry the baby to term.²⁵ Although longer partnership duration may be associated with increased commitment,²⁶ the cumulative possibility of concurrency increases as relationship duration increases. Evidence generally shows positive associations between partnership duration and the accuracy of perceptions about the partner.^{16,25} We expect that individuals financially dependent on their partner are less likely to report their partner and themselves as concurrent and report greater feelings of love, commitment and relationship satisfaction. Financially-dependent individuals may be less likely to seek concurrent partners or report self-concurrency so as not to jeopardize their financial situation and may gain psychosocial benefit by reporting they are in an “ideal” relationship.^{16,27}

Data analysis

First, we used summary statistics to characterize the study sample. Next, we compared the percent agreement between participants’ perceptions about sexual concurrency during the relationship (no, yes, uncertain) and partner-reported concurrency (no, yes), separately for males and females. Kappa statistics assessed the extent of agreement, taking into account agreement expected by chance. Respondents who were uncertain about their partner’s concurrency (n=64) were excluded from these calculations. Categories of kappa values were pre-defined according to convention: 0.00-0.20 were considered evidence of poor agreement, 0.21-0.40 fair agreement, 0.41-0.60 moderate agreement, 0.61-0.80 substantial agreement and >0.80 was considered almost perfect agreement.²⁸

Logistic regression analyses assessed the unadjusted and adjusted associations between the relationship factors and self-reported concurrency and inaccurate perceptions about sexual concurrency. All multivariable models controlled for age, gender, partnership duration, gestational age and whether the partner was the respondent’s main source of financial support. Generalized estimating equations were used to account for non-independence among subjects as members of a couple. Variables which achieved statistical significance of $p < 0.1$ in unadjusted analyses were included in the multivariable models. Sensitivity analyses were conducted to determine if excluding the “uncertain” perceptions resulted in qualitative differences in our findings. Statistical analyses were conducted using STATA version 11.1 SE (STATA Corp., College Station, TX).

Results

Study sample

The study sample consisted of 295 females and 294 males. Of 592 enrolled participants, one male was missing information about self-reported concurrency and perceptions of sexual concurrency; both the male and female members of this couple were excluded from analyses. Another male was excluded due to missing information about perceptions of sexual concurrency. Mean partnership duration was just over 2 years (Table 1). Mean gestational age was 29.1 weeks, and only 8.8% of couples were married. Females were younger than males (mean 18.7 vs. 21.3 years, $p < 0.001$) and had lower mean household income ($p = 0.013$). The majority of participants were Black (43.8%) or Latino (38.2%), reflecting the populations accessing the recruitment clinics. A lower proportion of males aged 18 years or younger were currently enrolled in school (13.3% vs. 24.8%), and a higher proportion of males older than 18 years had not obtained at least a high school education (22.9% vs. 11.9%). Approximately 14% of males and 18% of females ($p = 0.128$) identified their partner as their main source of financial support. Relative to females, males were younger at first sex (mean 14.3 vs. 15.0 years, $p = 0.003$), had a greater number of lifetime sex partners (12.6 vs. 5.4, $p < 0.001$) and were more likely to report concurrency during the relationship (33.3% vs. 24.4%, $p = 0.013$), but were less likely to report an STI

history (17.6% vs. 33.8%, $p<0.001$). For 55.6% of females and 61.0% of males, the current pregnancy was their first ($p=0.199$).

Accuracy of perceptions about sexual concurrency

Table 2 presents the accuracy of respondents' perceptions about sexual concurrency during the relationship. The majority of both males (81.5%) and females (85.2%) accurately reported their partner's nonconcurrency, but only 37.5% of males and 41.4% of females accurately reported the partner's concurrency. Eleven percent of both males and females stated they were "uncertain" about their partner's concurrency. While 60.6% of partners of uncertain females were concurrent, only 12.9% of partners of uncertain males were concurrent. Overall, the accuracy of perceptions about sexual concurrency was fair for males ($\kappa=0.37$) and moderate for females ($\kappa=0.49$).

Factors associated with inaccurate perceptions about sexual concurrency

The results of the unadjusted and adjusted associations are presented in Table 3. Stratified analyses by gender were not qualitatively different (data not shown), so data from all participants were combined. Control factors which did not achieve significance at $p<0.1$ were retained given their theoretical significance. Among participants whose partner reported concurrency, only greater relationship satisfaction was statistically significantly related to inaccurate perceptions (AOR: 1.53, 95% CI: 1.12, 2.11, $p=0.008$) in multivariable analyses. Among participants whose partner reported nonconcurrency, the p -value for the unadjusted association between love and inaccuracy was 0.105. Love was retained in the multivariable model although it slightly exceeded our $p=0.1$ cutoff for inclusion. Among participants whose partner reported nonconcurrency, on average, self-reported concurrency resulted in a 2.69-fold increased odds of inaccuracy (95% CI: 1.46, 4.94, $p=0.001$). For each year increase in relationship duration, on average, the odds of inaccuracy increased 25% (95% CI: 4%, 51%, $p=0.019$), while greater relationship satisfaction was negatively associated with inaccuracy (AOR: 0.68, 95% CI: 0.50, 0.94, $p=0.018$). Sensitivity analyses excluding "uncertain" perceptions did not result in qualitative differences in our findings.

Discussion

Among pregnant adolescents and their partners, inaccurate perceptions about sexual concurrency were common. More than half of participants whose partner was concurrent did not accurately report their partner's sexual concurrency. Additionally, approximately one-fifth of both females and males did not accurately report their partner's nonconcurrency, and 11% of females and males were "uncertain" about their partner's concurrency. The accuracy of perceptions about sexual concurrency was moderate for females and fair for males, while other studies have generally found poor to fair agreement in couples' reports of concurrency.^{8,12} Individuals may make more accurate assessments of their partner and relationship during major life transitions.²⁵ Participants in this study may have been especially motivated to accurately assess their partner's behavior given their transition to parenthood.

As hypothesized, both self-reported concurrency and relationship factors were related to inaccurate perceptions about sexual concurrency. Participants who were themselves concurrent were less likely to accurately perceive their partner's nonconcurrency. Individuals may project their own behavior on their partner,¹² or individuals who believe their partner is concurrent may engage in "reactive concurrency" out of revenge, based on concepts of relationship fairness, to repair self-esteem or to lure the partner back.^{8,29}

Relationship satisfaction was higher among individuals who did not accurately perceive their partner's concurrency. More satisfied relationships likely involve greater feelings of trust, which may make it harder for individuals to perceive negative partner behavior.²⁵ Among participants whose partner reported nonconcurrency, increased relationship duration increased the likelihood of inaccuracy. This finding is somewhat unique. Lenoir *et al* reported greater interpartner agreement about sexual concurrency among adolescent couples who had been together longer and considered themselves emotionally close.¹² Person perception studies have found a positive but weak association between relationship duration and accuracy about one's partner.^{16,25} We speculate that young expecting parents may make assessments about their partner's concurrency based on cumulative possibility of concurrency throughout the relationship, which highlights a need for interventions to improve relationship quality. Indeed, our study found that greater relationship satisfaction decreased the likelihood of inaccuracy among participants whose partner reported nonconcurrency.

Limitations and strengths

This study is subject to several of limitations. First, we relied on self-reported behavior and perceptions which were not possible to validate. Although the gold standard, self-reports could have been subject to socially desirable responding. However, ACASI has been shown to elicit higher reports of sensitive behaviors compared to other interview modalities and procedures were in place to assure confidentiality.³⁰ Second, since the study purposefully recruited couples who remained in a romantic relationship at least through the second trimester of pregnancy, the findings may not be generalizable to all pregnant adolescents and their partners. However, although sexual risk operates in partnerships, most studies to date have not been able to explore perceptions of risk among couples. Additionally, due to small numbers, we were unable to investigate "uncertain" perceptions separately. It is possible that "uncertain" adolescents may be distinct from those who more definitively report perceptions about their partner's concurrency. Finally, this study is cross-sectional and unable to establish the causality of associations found. Despite its importance to many behavioral theories, there is little evidence about the development of perceived risk. This study makes a unique contribution to the literature by identifying factors associated with misperceived risk estimates.

Relatively few studies have examined STI risk among pregnant adolescents; fewer still have explored young expecting fathers' sexual risk. Despite its limitations, this study extends the literature on sexual risk among pregnant adolescents and their male partners and, to our knowledge, is the first to assess perceptions of sexual concurrency among young expecting couples. This study's ability to utilize information from both members of the couple makes it particularly unique. Additionally, we are aware of no studies which have assessed factors related to inaccurate perceptions in both the presence and absence of sexual concurrency.

Implications

This study provides empiric evidence about factors related to inaccurate perceptions about sexual concurrency. Both self-reported concurrency and relationship factors were associated with inaccurate perceptions about the partner's concurrency status, reinforcing the need to improve sexual communication among young expecting parents. Targeting factors associated with inaccurate perceptions about partner sexual risk may be an effective method of intervention.¹³ STI prevention programs may therefore benefit by implementing interventions to improve relationship quality and sexual communication skills among young expecting parents. Prevention programs may also benefit by helping young expecting parents to identify and assess sources of information about their partner's STI risk behavior and objectively evaluate their own and their partner's STI risk. Greater understanding of the

factors that influence the accuracy of perceptions about sexual concurrency may improve and aid the theoretical development of STI prevention interventions for young men, women and couples.

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Table 1

Selected sociodemographic and sexual risk characteristics among study participants

Couple Characteristics			
Variable	(n=295)		
Partnership duration (years) [*] , mean (SD)	2.2 (SD = 1.6)		
Gestation (weeks), mean (SD)	29.1 (SD 5.3)		
Married, n (%)	26 (8.8%)		
Individual Sociodemographic Characteristics			
Variable	Females (n=295)	Males (n=294)	p-value
	mean (SD)	mean (SD)	
Age (years)	18.7 (SD 1.7)	21.3 (SD 4.1)	<0.001
Household income (\$)	13,399 (SD 15,466) [‡]	17,271 (SD 21,518) [‡]	0.013
Race/ ethnicity	n (%)	n (%)	
Black	116 (39.5)	142 (48.3)	0.054
Latino	117 (40.0)	108 (36.7)	
White	50 (17.0)	31 (10.5)	
Other	12 (4.1)	13 (4.4)	
18 years, currently in school	73 (24.8)	39 (13.3) [‡]	<0.001
18 years, not in currently in school	49 (16.6)	35 (12.0)	
>18 years, obtained at least a high school education	138 (46.8)	152 (51.9)	
>18 years, did not obtain at least a high school	35 (11.9)	67 (22.9)	
Partner is main source of financial support	54 (18.3)	40 (13.7) [‡]	0.128
Individual Sexual Risk Characteristics			
Variable	Females (n=295)	Males (n=294)	p-value
	mean (SD)	mean (SD)	
Age at first sex (years)	15.0 (SD 1.9)	14.3 (SD 3.2)	0.003
Lifetime number of sex partners	5.4 (SD 5.7)	12.6 (SD 17.3) [‡]	<0.001
	n (%)	n (%)	
Current pregnancy is first pregnancy	164 (55.6)	177 (61.0) [§]	0.199
STI history	100 (33.9)	52 (17.6)	<0.001
Self-reported concurrency during the relationship	72 (24.4)	98 (33.3)	0.017

* Calculated by averaging couple members' responses

[‡] One response missing[‡] Two responses missing[§] Three responses missing

Table 2

The accuracy of respondents' perceptions about sexual concurrency during the relationship

Female's perception	Male partner-reported concurrency n (%)			Male's perception	Female partner-reported concurrency n (%)		
	No	Yes	Total		No	Yes	Total
No	167 (57)	38 (13)	205 (69)	No	181 (62)	41 (14)	222 (75)
Yes	16 (5)	41 (14)	57 (19)	Yes	14 (5)	27 (9)	41 (14)
Uncertain	13 (4)	20 (7)	33 (11)	Uncertain	27 (9)	4 (2)	31 (11)
Total	196 (66)	99 (34)	295	Total	222 (76)	72 (24)	294
*Kappa .47, p<.001; percent agreement 79.4% vs. expected agreement 61.2%				*Kappa .37, p<.001; percent agreement 79.1% vs. expected agreement 66.6%			

*Kappa calculations exclude "uncertain" responses

Table 3

Unadjusted and adjusted associations between selected factors and inaccurate perceptions about sexual concurrency during the relationship

Variable	Odds Ratio (OR)	95% CI	p-value	Adjusted OR (AOR)	95% CI	p-value
Partner Reported Concurrency (n=171)						
Age (years)	1.01	0.92, 1.12	0.810	0.99	0.88, 1.13	0.932
Gender, Female	0.83	0.49, 1.41	0.484	0.78	0.40, 1.49	0.446
Gestational age (weeks)	1.01	0.95, 1.08	0.649	1.02	0.96, 1.09	0.527
Relationship duration (years)	0.93	0.79, 1.10	0.415	.96	0.79, 1.16	0.647
Partner is main source of financial support, Yes	1.04	0.46, 2.33	0.929	1.19	0.49, 2.87	0.701
Self-reported concurrency, Yes	0.54	0.28, 1.07	0.078	0.63	0.29, 1.36	0.238
Feelings of love, Very strong feelings	1.21	0.63, 2.31	0.566	--	--	--
Commitment, Very committed	1.50	0.78, 2.86	0.223	--	--	--
Relationship satisfaction *	1.58	1.17, 2.15	0.003	1.54	1.12, 2.11	0.008
Partner Reported Nonconcurrency (n=416[‡])						
Age (years)	1.03	0.96, 1.10	0.434	0.99	0.62, 2.83	0.886
Gender, Female	0.77	0.47, 1.27	0.312	0.90	0.51, 1.61	0.732
Gestational age (weeks)	1.03	0.98, 1.08	0.264	1.02	0.97, 1.07	0.440
Relationship duration (years)	1.31	1.10, 1.55	0.002	1.25	1.04, 1.51	0.019
Partner is main source of financial support, Yes	0.68	0.31, 1.50	0.339	0.68	0.29, 1.62	0.388
Self-reported concurrency, Yes	3.60	2.06, 6.29	<0.001	2.69	1.46, 4.94	0.001
Feelings of love, Very strong feelings	0.63	0.36, 1.10	0.105	1.32	0.62, 2.83	0.469
Commitment, Very committed	0.52	0.28, 0.98	0.043	0.87	0.38, 1.99	0.733
Relationship satisfaction *	0.64	0.50, 0.83	0.001	0.68	0.50, 0.94	0.018

* Standardized to zero mean and unit standard deviation prior to estimation. The reported coefficients give the expected change in the expected odds of inaccuracy for a 1 sd increase in the predictor variable

[‡]Of 418 individuals whose partner reported nonconcurrency, two males were missing information about main source of financial support