

Older Sexual Partners During Adolescence: Links to Reproductive Health Outcomes in Young Adulthood

CONTEXT: Sex at a young age with an older partner has been linked to poor reproductive health outcomes during adolescence, but minimal research has examined the influence of teenagers' having an older sexual partner on reproductive health outcomes during the transition to young adulthood.

METHODS: Logistic regression and contrast analyses of three waves of data from the National Longitudinal Study of Adolescent Health were used to examine whether individuals who had had sex before age 16 with a partner at least three years their senior were at increased risk of becoming teenage or unmarried parents or of contracting an STD by young adulthood.

RESULTS: Ten percent of females and 2% of males had had early sex with an older partner. These females were more likely to acquire an STD as young adults than were those whose riskiest relationship was before age 16 with a similar-aged partner (odds ratio, 2.1) or at age 16 or later with a similar-aged or older partner (2.4 and 2.6, respectively). For males, having sex before 16, regardless of partner age, was associated with an elevated STD risk (odds ratio, 1.9), although controlling for relationship history characteristics attenuated the association.

CONCLUSIONS: Adolescents, particularly young adolescents, should be made aware of the potential risks associated with having older sexual partners. In particular, program providers should be alerted that females who engage in early sexual activity with older partners are at especially high risk of experiencing adverse reproductive health consequences.

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Having sex at a young age with an older partner places adolescents at risk for several negative reproductive health outcomes. Compared with teenagers who first have sex with a partner who is close to their age, those who initiate sex with older partners are less likely to say they wanted sex to occur, use contraceptives less frequently, and are at greater risk of being involved in teenage childbearing and acquiring STDs.^{1–7} These risks are particularly high for the youngest teenagers with the oldest partners.⁷ Communication barriers and power differentials between partners of different ages may be partly responsible for these more negative outcomes, as youth may depend on more experienced partners for information or may not feel able to negotiate contraceptive use with them.^{8,9}

Risk-taking in early sexual relationships also has been associated with risky behaviors in subsequent relationships,^{10,11} so large age differences between teenagers and their sexual partners might have negative implications in later years as well. However, although a growing body of research highlights a link between early sex with an older partner and poorer reproductive health outcomes through high school, minimal research examines outcomes during the transition to young adulthood (after high school and through the early 20s). Most research on this topic has used cross-sectional data, and few studies

have explored the influence of partner age difference on reproductive health outcomes among both males and females. Yet, more than one-quarter of teenagers whose first sexual relationship occurred before age 16 with a partner three or more years their senior were male.¹² Findings for males have been mixed: One study showed poorer contraceptive use among males who had had older partners,⁴ and another showed no association.⁷ Therefore, it is important to investigate the influence of age and partners' age difference on both males' and females' sexual health risks using longitudinal data.

In this article we use a nationally representative longitudinal sample of middle and high school teenagers to examine the association between having sex at a young age with an older partner and selected outcomes during the transition to young adulthood. Using data from the National Longitudinal Study of Adolescent Health (Add Health), which allow us to control for a range of individual and family characteristics, we address the following research questions: First, is having sex at a young age with an older partner associated with the risk of acquiring STDs or being involved in a teenage or nonmarital birth by young adulthood? Second, are any observed associations affected by characteristics of teenagers' relationship history? Finally, do associations differ for males and females?

BACKGROUND

Age, Age Difference Between Partners And Reproductive Health Outcomes

The acquisition of an STD puts individuals at risk for other negative reproductive health outcomes, including susceptibility to other STDs, pelvic inflammatory disease, pregnancy complications, infertility and cervical cancer.¹³ Teenagers who begin having sex at a young age have an elevated STD risk, in part because they are likely to have more partners during adolescence than those who delay sexual initiation.¹⁴ And teenagers who have had older partners are more likely than those who have had only similar-aged partners to acquire an STD.²

Youth who have sex at an early age also face a heightened risk of involvement in teenage pregnancy and childbearing, in part because early sexual activity is associated with relatively poor contraceptive use, large numbers of partners and long periods of exposure to risk.¹⁴ And young female teenagers whose partners are three or more years their senior have a higher risk of becoming pregnant or giving birth than those whose partners are 0–2 years older.^{1,7} A large proportion of births to adolescents involve older fathers,^{15,16} and for both males and females involved in teenage pregnancies, having an older partner is associated with an elevated likelihood that the pregnancy is carried to term.^{1,17}

In addition, young females with older first sexual partners are more likely than other sexually experienced female teenagers to ever have a nonmarital birth.¹⁸ Nonmarital childbearing has negative implications for both women and their children. Unmarried women who give birth attain lower levels of education, are less likely to marry and achieve lower economic status than those who do not give birth.^{19,20} And children born to unmarried parents are more likely to have behavioral and emotional problems, have lower levels of education attainment, begin having sex earlier and are more likely to be involved in a premarital birth than are those born to married couples.^{21–23}

Other Correlates of Reproductive Health

Several individual and family characteristics are associated with reproductive health outcomes. Females, blacks, older teenagers, youth with low grade point averages and those who were relatively young at sexual debut are more likely than others to contract an STD or to report a history of STDs.^{2,24,25} Black teenagers and teenagers with low academic achievement or low educational expectations are at increased risk of involvement in a teenage or nonmarital birth.^{19,26,27} Small, nonrepresentative studies find that substance use is associated with heightened risks of STD acquisition²⁸ and teenage fatherhood.²⁹

Low socioeconomic status, low parental education and residence in a home without two biological parents have been linked to an increased likelihood of contracting STDs and of involvement in a teenage or nonmarital birth.^{24,26,30–32} Adolescents who feel that adults care for

them are less likely than others to acquire an STD by young adulthood.³³ Having a close relationship with one's parents is protective against teenage pregnancy risk,³⁴ especially for sexually experienced females.³⁵ Finally, parent-teenager communication regarding sex and STD prevention is associated with a reduced risk of pregnancy and STDs.^{35–37}

Characteristics of a teenager's relationship history are also important. Young females with older sexual partners are less likely than other sexually experienced teenage women to report that the relationship is "steady," and are more likely to report that their first sexual intercourse was nonvoluntary or unwanted. Also, females who ever had an older partner during adolescence report more lifetime partners, on average, than others.¹⁸ These relationship history characteristics are, in turn, associated with poor reproductive health outcomes. Females who have been forced to have sex or have been sexually abused by a boyfriend are more likely than others to acquire an STD and to have a teenage pregnancy,^{38,39} whereas females whose first sexual experience was voluntary and wanted are less likely than others to have a nonmarital birth.⁴⁰ Males whose first sexual experience was not wanted are at increased risk of teenage fatherhood.⁷ Also, most births to teenagers with older partners occur within the context of an "ongoing, close" relationship, as opposed to a casual encounter;¹⁵ teenagers in more serious relationships may be at greater risk for STDs and pregnancies than teenagers in casual relationships, because condom use is less common in more serious relationships than in casual ones.^{41–44}

Hypotheses

Our review of the literature leads us to three hypotheses. First, we expect that having sex at a young age with an older partner is associated with an elevated risk of being involved in a teenage or nonmarital birth or of acquiring an STD by young adulthood. Second, we anticipate that any observed association is due, in part, to individual and family background characteristics, as well as to characteristics of the relationship history. Third, we expect that having sex at a young age with an older partner has a more negative influence on reproductive health outcomes for females than for males, as females face increased health risks when power differentials (reflected here by age differences) favor the male.⁴⁵

METHODS

Data and Sample

We used data from all three waves of Add Health, a nationally representative school-based study of U.S. students in grades 7–12 in 1995.⁴⁶ More than 20,700 teenagers and their parents completed Wave 1 (1995) in-home interviews. Approximately 14,700 adolescents and 15,200 young adults participated in the Wave 2 (1996) and Wave 3 (2002) follow-up interviews, respectively.

Our sample initially included 11,882 males and females who were never-married at Waves 1 and 2, were sexually

experienced by Wave 3 and had sample weights available, and for whom we could assess age at the start of each sexual relationship and partners' age difference. (Weights were missing for respondents who were not part of the initial Wave 1 probability sample.⁴⁷) We created three subsamples for our study. Analyses of teenage and nonmarital births were limited to the 11,516 respondents who reported no births by Wave 2. The teenage birth sample further excluded 1,103 respondents who were 19 or younger at Wave 3 (because they were still at risk of having a teenage birth), and the nonmarital birth sample excluded 118 who were missing data on this outcome; thus, the final sizes of these subsamples were 10,413 and 11,398, respectively. Our analyses of STDs were restricted to respondents who provided biospecimens to be tested for gonorrhea, chlamydia and trichomoniasis. Thus, 821 respondents were excluded because they refused to collect biospecimens, and another 1,259 were excluded because results were missing for at least one infection and were negative for the others. The STD subsample therefore consisted of 9,802 respondents.

Measures

•**Dependent variables.** We used Wave 3 data to create the three dependent variables: ever had a teenage birth, ever had a nonmarital birth and positive test results for an STD. The teenage and nonmarital birth measures were derived from respondent reports of all live births (or children fathered) since the summer of 1995. We compared the date of each birth with the respondent's birth date to determine if the birth was a teenage birth, and with the start and end dates of all marriages to determine if it was nonmarital. However, the survey section addressing live births did not capture all births, because respondents were not asked to complete this section if they reported no relationships since 1995, if there was an error or if they did not complete the section correctly.⁴⁸ Therefore, we also examined the household roster to determine if the respondent was living with any biological children. Using the household roster, we compared the child's age to the respondent's age at birth, to assess teenage births. Similarly, we compared the estimated year of birth with marriage dates and coded any birth that occurred at least two years before a marriage began or at least one year after a marriage ended as nonmarital.*

Our STD measure indicates whether respondents tested positive for gonorrhea, chlamydia or trichomoniasis.

•**Age and age difference between partners.** Using data on romantic and sexual relationship histories reported in Waves 1 and 2, we determined respondents' age at the start of each sexual relationship and the age difference between respondents and each partner. We considered respondents who reported sex before age 16 as having had sex at a young age, because 16 is the modal age of consent in state laws governing sex with minors.⁴⁹ We considered those who reported a partner three or more years their senior as having had an older partner, because

TABLE 1. Percentage of respondents in three subsamples of Wave 3 of the National Longitudinal Study of Adolescent Health reporting selected sexual and reproductive health outcomes; and percentage distribution of respondents, by age at beginning of riskiest sexual relationship and partners' age difference—all according to gender

Measure	Teenage birth sample		Nonmarital birth sample		STD sample	
	Female (N=5,436)	Male (N=4,977)	Female (N=6,008)	Male (N=5,390)	Female (N=5,297)	Male (N=4,505)
Percentages						
Ever had teenage birth	13.3	5.5***	na	na	na	na
Ever had nonmarital birth	na	na	21.4	11.7***	na	na
Tested positive for an STD	na	na	na	na	8.2	6.3**
Percentage distribution, by age/ partners' age difference†						
<16, partner ≥3 years older	9.8	2.1***	9.1	2.0**	10.1	1.8***
<16, partner <3 years older	12.0	13.8	11.2	13.6	12.7	13.6
≥16, partner ≥3 years older	8.6	2.3	7.5	2.0	7.9	2.1
≥16, partner <3 years older	15.5	23.6	13.4	20.9	13.7	20.8
Never had sex	54.2	58.2	58.8	61.5	55.6	61.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

p<.01. *p<.001. †Measured at Waves 1 and 2. Notes: Wave 1 was conducted in 1995, Wave 2 in 1996 and Wave 3 in 2002. na=not applicable.

approximately one-third of states include this age difference in their laws.⁴⁹

We grouped respondents into the following hierarchical risk categories: ever had sex before age 16 with a partner at least three years older; ever had sex before age 16 with a partner less than three years older; ever had sex at age 16 or older with a partner at least three years older; ever had sex at age 16 or older with a partner less than three years older; and no adolescent sexual relationships. Respondents who had had more than one sexual relationship were categorized by their riskiest relationship.

•**Individual and family characteristics.** Our analyses included six socioeconomic and demographic controls: race or ethnicity, nativity status (foreign- vs. U.S.-born), respondent's age, educational attainment of the more highly educated parent (classified on a scale of 1, indicating eighth grade or less, to 9, indicating graduate or professional school), family structure (two biological or adoptive parents vs. other) and whether the teenager's family received public assistance. Because our birth measures captured events that occurred before Wave 3, we used Wave 1 age in the models analyzing these outcomes, to avoid measuring age after a birth occurred. STDs,

*Child age was reported in years on the household roster, so we could not distinguish, for example, between children aged five years and one month and those aged five years and 11 months. Therefore, if a marriage started in the same year that or the year before a birth occurred, or if a marriage ended in the year that a birth occurred, we could not determine the sequence of events. To avoid misclassifying births as marital or nonmarital, we classified only births that did not occur in the same year that a marriage started or ended. We included a flag variable in our analyses of nonmarital births that identified the 672 cases with at least one birth that we could classify and at least one birth that we could not. Results for the flag variable indicated that the odds of nonmarital childbearing were twice as high for females with missing information as for those with complete data, and the odds of nonmarital fatherhood were four times as high for those with missing information as for others.

TABLE 2. Odds ratios from logistic regression analyses assessing the likelihood of involvement in a teenage birth, by selected characteristics, according to gender

Characteristic	Females (N=5,436)			Males (N=4,977)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Age/partners' age difference†						
<16, partner ≥3 yrs. older	4.36***	1.80**	1.61*	1.49	0.63	0.59
<16, partner <3 yrs. older	2.42***	1.26	1.22	2.09*	0.93	0.90
≥16, partner ≥3 yrs. older	1.39	1.25	1.13	0.45	0.38	0.37
≥16, partner <3 yrs. older (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Never had sex	0.93	0.51***	0.56**	0.88	0.44	0.50*
Individual and family characteristics						
Race/ethnicity						
White (ref)	na	1.00	1.00	na	1.00	1.00
Black	na	1.52*	1.53**	na	1.09	1.12
Hispanic	na	1.65**	1.66**	na	1.59	1.60
Other	na	1.05	1.05	na	3.20**	3.27**
Foreign-born						
na	0.71	0.73	na	0.32*	0.33*	
Age at Wave 1 (range, 13–21)						
na	0.71***	0.69***	na	0.65***	0.65***	
PVT score (range, 15–137)						
na	0.99**	0.98**	na	0.99	0.99	
Parent education‡ (range, 1–9)						
na	0.92**	0.93**	na	0.94	0.93	
Live with two biological/						
adoptive parents						
na	0.56***	0.57***	na	1.09	1.10	
Receive government aid						
na	1.28	1.28	na	1.91*	1.91*	
Had pregnancy/AIDS education						
na	1.12	1.11	na	0.80	0.79	
Parent-teenager connectedness‡						
(range, 0–4)						
na	0.97	0.96	na	0.84	0.84	
Parent-teenager communication‡						
(range, 0–4)						
na	0.89*	0.89*	na	0.93	0.93	
Substance use index‡ (range, 0–5)						
na	1.11*	1.10	na	1.03	1.03	
Educational aspirations (range, 0–4)						
na	0.91	0.92	na	0.82*	0.82*	
Relationship history characteristics						
No. of sexual partners by Wave 2						
(range, 0–10)						
na	na	1.10	na	na	1.16	
Ever had a nonromantic partner						
na	na	1.32	na	na	0.64	
Ever forced to have sex§						
na	na	0.85	na	na	na	
F	23.80***	15.13***	12.69***	3.66**	7.70***	7.29***
df	5	20	24	5	20	22

*p<.05. **p<.01. ***p<.001. †Measured at Waves 1 and 2; refers to riskiest relationship. ‡Higher scores denote higher levels of the characteristic. §Females only. Notes: na=not applicable. ref=reference group. PVT=Peabody Picture Vocabulary Test. For definitions of scales, see text below.

however, were assessed at Wave 3, and we therefore used a contemporaneous measure of age for those analyses.

Our analyses included four individual characteristics: cognitive ability at Wave 1, as measured by the modified Peabody Picture Vocabulary Test (PVT), on which the national average score is 100;⁵⁰ receipt of both pregnancy and AIDS education in school by Wave 1 (no information about timing or content was available); substance use (five-item summative index capturing whether the teenager ever smoked, chewed tobacco, used marijuana, drank alcohol or used hard drugs); and educational aspirations, a measure of how much the respondent wanted to go to college (scale of 0–4, with higher scores indicating greater aspirations).

*For substance use, aspirations and both parent-teenager relationship measures, we used Wave 2 responses if possible; otherwise, we used Wave 1 data.

†According to Add Health definitions, nonromantic relationships are those that the respondent did not identify as being romantic, as well as those that did not involve kissing, holding hands and telling their partners they liked or loved them.

We also examined two measures of teenagers' relationships with residential parents. Connectedness is a four-item scale based on teenagers' reports of warmth, overall closeness, satisfaction with communication and overall satisfaction with the relationship (Cronbach's alpha=0.75). Communication is a four-item summative index compiled from teenagers' reports of whether they had discussed personal topics (dating or parties; a personal problem) or school-related topics (schoolwork or grades; other school matters) with a residential parent in the past month. For both measures, if a teenager had two residential parents, we took the average of the measures for the two.*

•**Relationship history characteristics.** Using Waves 1 and 2, we calculated the total number of sexual partners and assessed whether the respondent had ever had a nonromantic sexual partner.† For females, we also included a measure that indicates whether the respondent reported at either Wave 1 or 2 ever having been forced to have sex. This measure was not reported for males.

Analyses

To determine bivariate associations with gender, we used t tests for continuous measures and chi-squares for categorical measures. For multivariate analyses, we used logistic regression to identify factors associated with all three outcomes, controlling for all other measures. We conducted these analyses in four stages. First, we included only the key independent variable, respondents' age and partners' age difference. Next, we added the individual and family background characteristics, and then the relationship history characteristics, to explore whether these categories of variables account for any observed associations. Lastly, we ran contrast analyses to test whether the combination of having sex at a young age and having an older partner is associated with especially negative outcomes. We obtained contrast estimates by repeating analyses, each time changing the reference category of the age and age difference variable. We used survey estimation procedures in Stata to weight and adjust all models for the data's clustered sampling design,⁵¹ and conducted separate analyses for males and females.

RESULTS

Descriptive Analyses

A significantly greater proportion of females than of males were involved in a teenage birth (13% vs. 6%) or nonmarital birth (21% vs. 12%) between Waves 2 and 3 (Table 1, page 19). A larger proportion of females (8%) than of males (6%) tested positive for an STD at Wave 3. In each of our subsamples, approximately 10% of females had had sex before age 16 with an older partner, compared with 2% of males.

Results of bivariate analyses (not shown) reveal that teenagers who had had early sex with an older partner had had an average of three sexual partners, whereas those who had had sex at age 16 or older with a partner less than three years their senior had had an average of

two partners. Similarly, nearly one-half of the former, but only about one-quarter of the latter, had ever had a nonromantic partner.

Multivariate Analyses

•**Teenage births.** In the model including only the age and age difference variable, females who had engaged in early sex with an older partner and those who had had early sex with a similar-aged partner had higher odds of having a teenage birth than those whose riskiest relationship had begun after age 16 with a similar-aged partner (odds ratios, 4.4 and 2.4, respectively—Table 2).

The addition of family- and individual-level characteristics attenuated these associations. Having sex before age 16 with an older partner and being black or Hispanic (vs. white) were associated with increased odds that a female respondent had a teenage birth; furthermore, the higher females' level of substance use, the greater the likelihood of this outcome. The odds of experiencing a teenage birth were reduced for females who delayed sexual debut until after Wave 2 and those who lived with two parents; they were inversely associated with age at Wave 1, cognitive scores, parents' level of education and parent-teenager communication.

When relationship history characteristics were incorporated into the model, early sex with an older partner remained positively associated with females' likelihood of having a teenage birth (odds ratio, 1.6). The association of substance use was attenuated, but all other results from the previous model were unchanged. None of the relationship history characteristics were associated with having a teenage birth.

For males, the initial model shows that having sex at a young age with a similar-aged partner was associated with increased odds of fathering a child before age 20 (odds ratio, 2.1). In the model controlling for individual and family characteristics, this variable was no longer significant. Belonging to a minority racial or ethnic group other than black or Hispanic and receiving government aid were associated with elevated odds of teenage fatherhood; foreign nativity status, older age at Wave 1 and higher educational aspirations were associated with reduced odds of this outcome.

When relationship history characteristics were added to the model, males who had delayed first sex until after Wave 2 had lower odds of teenage fatherhood than those who had had sex at age 16 or older with a similar-aged partner. Results from the previous model otherwise remained unchanged, and neither relationship history characteristic was significant.

•**Nonmarital births.** In the initial model, female respondents who had had early sex with an older partner and those who had had sex at age 16 or older with an older partner had increased odds of having a nonmarital birth by Wave 3 (odds ratios, 2.2 and 1.4, respectively—Table 3). In contrast, those who had not had sex by Wave 2 had reduced odds of this outcome (0.5).

TABLE 3. Odds ratios from logistic regression analyses assessing the likelihood of involvement in a nonmarital birth, by selected characteristics, according to gender

Characteristic	Females (N=6,008)			Males (N=5,390)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Age/partners' age difference†						
<16, partner ≥3 yrs. older	2.15***	1.64*	1.43	0.84	0.67	0.61
<16, partner <3 yrs. older	1.26	1.11	1.04	0.76	0.68	0.66
≥16, partner ≥3 yrs. older	1.39*	1.21	1.10	0.73	0.62	0.60
≥16, partner <3 yrs. older (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Never had sex	0.52***	0.57***	0.69**	0.45***	0.56***	0.65
Individual and family characteristics						
Race/ethnicity						
White (ref)	na	1.00	1.00	na	1.00	1.00
Black	na	2.46***	2.45***	na	2.09***	2.11***
Hispanic	na	1.72**	1.72**	na	1.83**	1.84**
Other	na	1.27	1.25	na	1.85	1.87
Foreign-born	na	0.52*	0.53*	na	0.67	0.67
Age at Wave 1 (range, 13–21)	na	1.03	1.02	na	1.01	1.00
PVT score (range, 15–137)	na	0.97***	0.97***	na	0.99*	0.99*
Parent education‡ (range, 1–9)	na	0.92**	0.92**	na	0.91**	0.91**
Live with two biological/						
adoptive parents	na	0.55***	0.56***	na	0.85	0.85
Receive government aid	na	1.32	1.34	na	1.42	1.43
Had pregnancy/AIDS education	na	1.28*	1.26*	na	0.91	0.90
Parent-teenager connectedness‡						
(range, 0–4)	na	0.92	0.92	na	0.99	0.99
Parent-teenager communication‡						
(range, 0–4)	na	0.89*	0.88**	na	0.94	0.94
Substance use index‡ (range, 0–5)	na	1.21***	1.19***	na	1.19**	1.19**
Educational aspirations (range, 0–4)	na	0.92	0.92	na	0.94	0.94
Relationship history characteristics						
No. of sexual partners by Wave 2						
(range, 0–10)	na	na	1.19**	na	na	1.16*
Ever had a nonromantic partner	na	na	1.07	na	na	0.73
Ever forced to have sex§	na	na	0.74	na	na	na
<i>F</i>	29.46***	25.16***	21.80***	16.71***	10.23***	9.41***
<i>df</i>	6	21	24	6	21	23

*p<.05. **p<.01. ***p<.001. †Measured at Waves 1 and 2; refers to riskiest relationship. ‡Higher scores denote higher levels of the characteristic. §Females only. Notes: na=not applicable. ref=reference group. PVT=Peabody Picture Vocabulary Test. For definitions of scales, see page 20.

After controls for individual and family characteristics were added to the model, the associations of having sex at a young age with an older partner and reporting no sexual relationships by Wave 2 remained (odds ratios, 1.6 and 0.6). Being black or Hispanic and having received pregnancy and AIDS education in school were associated with increased odds of having a nonmarital birth; in addition, the higher a female respondent's level of substance use, the higher her odds of experiencing this outcome. Foreign nativity status, living with two parents, greater cognitive ability, parent education and parent-teenage communication were protective against experiencing a nonmarital birth.

The addition of relationship history characteristics attenuated the association between early sex with an older partner and nonmarital childbearing. All other predictors identified in the previous model remained unchanged. In addition, the more sexual partners a respondent had had, the greater her odds of experiencing a nonmarital birth.

For males, the initial model shows no association between age and age difference and fathering a child outside

TABLE 4. Odds ratios from logistic regression analyses assessing the likelihood of acquiring an STD during young adulthood, by selected characteristics, according to gender

Characteristic	Females (N=5,297)			Males (N=4,505)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Age/partners' age difference†						
<16, partner ≥3 yrs. older	3.02***	2.64**	2.43**	1.16	1.10	0.97
<16, partner <3 yrs. older	1.35	1.16	1.16	2.10**	1.98*	1.86
≥16, partner ≥3 yrs. older	1.04	1.00	0.95	0.73	0.75	0.68
≥16, partner <3 yrs. older (ref)	1.00	1.00	1.00	1.00	1.00	1.00
Never had sex	1.20	1.04	1.12	0.87	1.15	1.44
Individual and family characteristics						
Race/ethnicity						
White (ref)	na	1.00	1.00	na	1.00	1.00
Black	na	5.54***	5.44***	na	4.52***	4.48***
Hispanic	na	1.64*	1.65*	na	3.07***	3.08***
Other	na	1.75	1.74	na	2.08*	2.09*
Foreign-born	na	0.95	0.95	na	0.90	0.91
Age at Wave 3 (range, 18–27)	na	1.01	1.01	na	1.05	1.04
PVT score (range, 15–137)	na	0.99	0.99	na	0.98**	0.98**
Parent education' (range, 1–9)	na	1.00	1.00	na	0.95	0.94
Live with two biological/ adoptive parents						
Receive government aid	na	1.43*	1.46*	na	1.09	1.11
Had pregnancy/AIDS education	na	0.86	0.86	na	0.82	0.82
Parent-teenager connectedness‡ (range, 0–4)						
Parent-teenager communication‡ (range, 0–4)	na	0.96	0.96	na	0.97	0.97
Substance use index‡ (range, 0–5)	na	0.91	0.89	na	1.11	1.10
Educational aspirations (range, 0–4)	na	0.91	0.91	na	1.14	1.14
Relationship history characteristics						
No. of sexual partners by Wave 2 (range, 0–10)						
Ever had a nonromantic partner	na	na	1.72*	na	na	0.85
Ever forced to have sex§	na	na	0.80	na	na	na
<i>F</i>	6.16***	13.53***	11.13***	4.50***	8.03***	8.23***
<i>df</i>	5	21	25	5	21	23

* $p < .05$. ** $p < .01$. *** $p < .001$. †Measured at Waves 1 and 2; refers to riskiest relationship. ‡Higher scores denote higher levels of the characteristic. §Females only. Notes: na=not applicable. ref=reference group. PVT=Peabody Picture Vocabulary Test. For definitions of scales, see page 20.

of marriage. Reporting no sexual partners through Wave 2 was associated with reduced odds of this outcome (odds ratio, 0.5). When individual- and family-level controls were included, this association was unchanged. Being black or Hispanic and reporting higher levels of substance use were associated with elevated odds of fathering a child outside of marriage, while levels of cognitive ability and parent education were inversely related to the odds of fathering a child outside of marriage.

Controlling for relationship characteristics eliminated the association of not having had a sexual partner by Wave 2, but the associations of individual and family controls remained unchanged. One relationship history characteristic, number of sexual partners, was positively associated with a respondent's likelihood of fathering a child outside of marriage.

•**Positive STD test.** Females who had had sex at a young age with a partner at least three years their senior had elevated odds of testing positive for an STD (odds ratio, 3.0—Table 4). This association remained after individual, family and relationship characteristics were controlled for

(2.4). Additionally, being black or Hispanic and receipt of government aid were related to increased odds of a positive STD test result. Also, the odds of testing positive for an STD were raised if females had ever had a nonromantic partner (1.7).

Among males, those who had had sex before age 16 with a similar-aged partner had elevated odds of testing positive for an STD (odds ratio, 2.1). This association was not significantly reduced by the addition of individual- and family-level controls. Black, Hispanic and other minority racial or ethnic groups had increased odds of a positive STD test, and the likelihood of testing positive was inversely related to cognitive ability. With the addition of relationship history characteristics, having sex at a young age lost significance, but neither relationship history measure was associated with a positive STD test for males.

Contrast Analyses

•**Teenage births.** In contrast analyses that included just the age and age difference measure (the first model in Table 5), females who had had early sex with an older partner had almost twice as high odds of having a teenage birth as females whose riskiest relationship had begun before age 16 with a similar-aged partner (odds ratio, 1.8); they had more than three times as high odds of having a teenage birth as those who had had sex at age 16 or older with a partner three or more years their senior (3.1). These differences were no longer significant in models controlling for individual- and family-level characteristics and for these as well as relationship history characteristics.

None of the contrasts of the combined age and age difference variable were associated with teenage fatherhood. However, in the initial model, males who had had sex before age 16 had higher odds of this outcome than males who had had sex at a later age, regardless of partner age difference (odds ratio, 2.1). This difference did not remain significant in the subsequent models.

•**Nonmarital births.** Females who had had early sex with an older partner were more likely to experience a nonmarital birth than both females who had had early sex with a similar-aged partner (odds ratio, 1.7) and those who had had sex later with an older partner (1.5). After controls for individual and family characteristics were added, neither of these comparisons remained significant. Among males, those who had had early sex with an older partner did not differ significantly from either comparison group in any of the models assessing nonmarital birth.

•**Positive STD test.** In each model, females who had had sex before age 16 with an older partner had at least twice as high odds of testing positive for an STD as those who had had early sex with a similar-aged partner and those who had sex at age 16 or older with an older partner.

For males, none of the comparisons among combined age and age difference categories were significant. However, males who had had sex before age 16 had twice

TABLE 5. Odds ratios from analyses of relative likelihood of selected sexual and reproductive health outcomes, by age at beginning of riskiest sexual relationship and age difference between partners, according to gender

Relationship characteristic	Teenage birth			Nonmarital birth			STD		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Females									
Age <16, partner ≥3 yrs. older									
Vs. <16, partner <3 yrs. older	1.80**	1.43	1.33	1.70**	1.48	1.37	2.25**	2.28**	2.10**
Vs. ≥16, partner ≥3 yrs. older	3.13***	1.45	1.43	1.54*	1.36	1.30	2.90**	2.64*	2.56*
First sex <16 vs. ≥16	2.83***	1.36	1.31	1.43**	1.22	1.14	2.02***	1.72*	1.67*
Partner ≥3 yrs. older vs. <3 years older	1.77**	1.37	1.25	1.59***	1.35*	1.24	1.80**	1.72**	1.58*
Males									
Age <16, partner ≥3 yrs. older									
Vs. <16, partner <3 yrs. older	0.72	0.68	0.65	1.10	0.98	0.93	0.56	0.56	0.52
Vs. ≥16, partner ≥3 yrs. older	3.34	1.66	1.61	1.15	1.08	1.02	1.60	1.47	1.42
First sex <16 vs. ≥16	2.11*	0.95	0.93	0.79	0.71	0.69	2.04**	1.91*	1.81
Partner ≥3 yrs. older vs. <3 years older	0.67	0.56	0.54	0.87	0.75	0.73	0.65	0.66	0.59

*p<.05. **p<.01. ***p<.001. Notes: Model 1 includes only the age and age difference variable, model 2 adds all individual and family characteristics included in Tables 2–4 and model 3 adds all partner and relationship characteristics included in Tables 2–4.

as high odds of testing positive for an STD as those who had delayed first sex, regardless of partner age difference. This association remained in the model controlling for individual- and family-level controls (odds ratio, 1.9), but not in the model that included relationship history characteristics.

DISCUSSION

Our study broadens previous research by examining whether the negative influences of having early sex with an older partner extend into young adulthood and whether these associations differ for males and females. Our findings for females partially support our hypotheses. Relative to females whose riskiest relationship begins at age 16 or later with a partner less than three years their senior, those who have early sex with an older partner have greater odds of having a teenage birth, having a nonmarital birth and acquiring an STD by young adulthood. Are these differences due to their having sex at a younger age, having an older partner or both?

The contrast analyses show that when all other measured factors are controlled for, the combination of age and age difference matters only for STDs among females. The odds of acquiring an STD by young adulthood are higher among those who have sex at an early age with an older partner than they are both among those who have early sex with a similar-aged partner and among those who have delayed sex with an older partner. These results are consistent with evidence suggesting that young teenagers with older partners are more likely than those with similar-aged partners to have a current or past infection with an STD,² perhaps because having an older partner is linked to reduced condom use.¹⁴ Condom use decisions typically are made by the person in a relationship who has the greater perceived power^{6,8}—usually the older (typically the male) partner. In relationships marked by power imbalances, females are therefore at increased risk for negative health outcomes.⁴⁵ Power differentials do not have the same influence on births as on STDs

because prevention of births is not dependent upon condom use.

Our analyses reveal a different story for males. The combination of having sex at a young age and having an older partner is not significant for males. Instead, only age at sex matters, and it matters only in relation to STDs. Males who have sex before age 16 have greater odds of acquiring an STD by young adulthood than their peers who delay sex until at least age 16. This association disappears, however, once relationship history characteristics are taken into account. Our findings are consistent with those from another study showing that sex at an early age is related to reduced odds of males' contraceptive use (which is related to an elevated risk of acquiring an STD), but age difference between male teenagers and their partners is not significant.⁷ Contrary to our findings, however, the earlier study also found that early sex is associated with elevated odds of teenage fatherhood.

We hypothesized that the association between having sex at a young age with an older partner and reproductive health outcomes operates partly through relationship history factors. At the bivariate level, we find positive associations between early sex with an older partner and number of sexual partners, and our multivariate analyses reveal positive associations between number of sexual partners in adolescence and odds of a nonmarital birth by young adulthood. This factor explains the association among females between having sex at a young age with an older partner and the odds of having a nonmarital birth. Thus, young female teenagers who have sex with an older partner have an elevated risk of childbearing outside marriage partly because of their number of sexual partners in adolescence. This finding supports other research linking sex with older partners with an increased number of sexual relationships,^{12,18} and supports an association between a greater number of sexual partners and adverse outcomes such as reduced contraceptive use and increased teenage pregnancy risk.¹⁴

In addition, for females, having ever had a nonromantic partner is associated with increased odds of acquiring an STD. However, the association between having sex at a young age with an older partner and STDs does not diminish in analyses controlling for having had a nonromantic partner. No relationship history characteristics are associated with having a teenage birth, and having been forced to have sex does not predict poor reproductive health outcomes. Although previous research has linked early sex with an older partner to an elevated likelihood of nonvoluntary sexual experiences for females, it has also shown that most young females with older sexual partners consider their relationships to be voluntary and romantic.⁷

Several individual and family factors are also associated with reproductive health outcomes. For example, our research highlights that parent education and teenage educational aspirations are inversely associated with the risk of teenage and nonmarital births. These findings reinforce an opportunity-cost approach, which stresses the importance of educational engagement and aspirations in motivating adolescents to avoid early sex and childbearing.^{26,27} This type of approach has been particularly successful in pregnancy prevention efforts by youth development programs.¹⁰

Our findings also show that strong communication between parents and teenagers about everyday life issues is protective for females' birth outcomes, suggesting that parent-teenager conversations specifically about sex are not the only beneficial form of communication. Instead, encouraging parents to talk with their teenagers about a range of everyday issues may be protective for their children's reproductive health outcomes. This idea supports research showing that parents' and teenagers' communication in general has a more consistent association with delaying sex and contraceptive use than communication about sex-specific topics.⁵²

Overall, for females, controlling for family and individual characteristics attenuates the association between the age and partners' age difference measure and birth outcomes, suggesting that these characteristics are associated with the likelihood of having early sex with an older partner. This is consistent with research showing, for example, that Hispanic females, those whose parents have low education levels and those who do not grow up in an intact family are more likely than others to have early sex with an older partner, implying that these may be important target groups for interventions.^{7,53}

Study Limitations and Strengths

We note several limitations of our study. First, we cannot determine STD status at Waves 1 and 2, so we do not know if respondents were infected prior to any relationship with an older partner. Second, given the long time period between Waves 2 and 3, unobserved factors likely influence reproductive health outcomes in young adulthood. Third, we would have liked to examine pregnancies

in addition to birth outcomes, but pregnancy data are less reliable, given the typical underreporting of pregnancies not carried to term.⁵⁴ Fourth, we had to use household rosters to capture some birth information, and because men may be less likely than women to be living with their biological children,⁵⁵ birth histories are likely to be less complete for males than for females. Fifth, we relied on retrospective self-reports of age at sex and partner age, which may increase the risk of biased responses. However, the use of audio computer-assisted self-interviews in Add Health improved the validity of self-reports of risky or sensitive behaviors.⁵⁶ Finally, underlying, unmeasured factors may be linked both to age and partners' age difference and to reproductive health outcomes. For example, teenagers with a propensity for risk-taking may be more likely than others to choose older sexual partners and to engage in risky sexual behaviors. Such endogeneity of behaviors and decisions may partly explain the observed associations.

On the other hand, the use of longitudinal data and STD test results determined from biospecimens collected from respondents are unique strengths of our research. Biospecimen data are more accurate than self-reports, which may underestimate rates because many individuals who acquire STDs are asymptomatic or are not regularly screened.⁵⁷ In addition, the survey is a rich source of information on adolescent sexual relationship histories. Whereas many studies are limited to analyses of first or most recent sexual relationships, the Add Health data allowed us to examine all sexual relationships to identify those that occurred at a young age with an older partner.

Conclusions

Previous studies have established the risks of early first sex and have warned parents to discourage their teenage children from dating older partners. Our work adds to a growing body of evidence that the combination of having sex at a young age and having an older sexual partner is particularly detrimental, especially for STD outcomes among females. And consistent with previous studies,^{10,11} our findings highlight that risk-taking in early sexual relationships may have adverse consequences not only in the short term but into young adulthood.

Most pregnancy and STD prevention programs focus on school-aged teenagers, but our research highlights the need for programs to also address and promote healthy sexual behaviors among older teenage and young adult populations. For example, 55% of births to women aged 20–24 are nonmarital;⁵⁸ given the risks associated with nonmarital childbearing,^{21–23} youth would likely benefit not only from interventions in adolescence, but also from strategies and programs to carry them through a healthy transition to adulthood.

Our results emphasize the importance of programs to prevent early sex among both males and females. In addition, these findings suggest that adolescents, particularly young adolescents, should be made aware of the

risks associated with forming relationships with older partners. In particular, program providers should be alerted that young females who engage in early sexual activity with older partners are at especially high risk of adverse reproductive health consequences. Finally, programs that address characteristics of healthy romantic relationships and highlight problems associated with potentially unequal power dynamics between partners could benefit both males and females.

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