

Social Factors Associated with Readiness for Sexual Activity in Adolescents: A Population-Based Cohort Study

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Abstract Various factors are associated with sexual activity in adolescence and it is important to identify those that promote healthy and adaptive romantic and sexual development. The objectives of this study were to describe rates of early sexual intercourse (before 16 years) and sexual readiness in adolescence and to assess the extent to which these were socially patterned. We prospectively studied nearly 5,000 15-year-olds from the Avon Longitudinal Study of Parents and Children, a UK birth cohort. Between 2006 and 2008, female and male participants answered a computer-assisted interview about romantic and sexual behaviors in the last year. Predictors of sexual intercourse and readiness for sexual intercourse were examined across a range of sociodemographic measures. Overall, 17.7 % (95 % CI 16.7 %, 18.9 %) of participants reported having had sexual intercourse in the last year, with more girls than boys reporting sexual experience (risk ratio 1.30, 95 % CI 1.15, 1.47). Of these, one-third of both male and female were classed as unready because they were unwilling, lacking in autonomy, felt regret or had not used contraception. There was strong evidence of social patterning for sexual activity with higher rates for young people from poorer homes, with lower social class, and with younger, less educated mothers. In contrast, among 860 young

people who had had sexual intercourse, there was no clear evidence of associations between social factors and sexual readiness. The lack of social patterning in sexual readiness supports the provision of comprehensive education to develop life skills for adolescents across all social groups.

Keywords ALSPAC · Adolescence · Early sexual activity · Sexual readiness · Social factors

Introduction

Although interpersonal sexual conduct is an almost universal human activity, early sexual activity, i.e., prior to age 16 (Wellings et al., 2001) is associated with a variety of adverse outcomes (Zimmer-Gembeck, Siebenbruner, & Collins, 2001), including unplanned pregnancy (Wellings et al., 2001), sexually transmitted infections (Kaestle, Halpern, Miller, & Ford, 2005; Kotchick, Shaffer, & Forehand, 2001), and poor relationship skills and sexual functioning in later life (Lammers, Ireland, Resnick, & Blum, 2000; Mardh et al., 2000). Early sexual behavior and associated adverse outcomes might also be more common among those from disadvantaged backgrounds (Lammers et al., 2000; Santelli, DiClemente, Miller, & Kirby, 1999; Valle, Torgersen, Roysamb, Klepp, & Thelle, 2005; Wellings et al., 2001) and individual, family, and social factors have all been shown to contribute (Buhi & Goodson, 2007; Paul, Fitzjohn, Herbison, & Dickson, 2000; Wellings et al., 2001). Some of the existing literature considers sexual activity in adolescence to be problematic (Madkour, Farhat, Halpern, Godeau, & Nic Gabhainn, 2010). This research is often grounded in the concept of problem behavior theory (Jessor & Jessor, 1977), which states that behaviors that violate socially defined norms by occurring too early are likely to provoke a negative reaction from society; early adolescent sexual activity is considered to be age-inappropriate

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(Golden, 2006) and hence problematic. Estimates of early sexual activity vary between high income countries: around 30 % of adolescents from the U.S. National Longitudinal Study of Adolescent Health (Add Health) report having had sexual intercourse prior to age 16 (Guo & Tong, 2006) compared to 44 % of those from an Australian cohort (Rosenthal, Smith, & de Visser, 1999) and around 26 % of European adolescents (Currie et al., 2012).

However, there is increasing evidence that adolescent sexual activity can be an appropriate part of healthy sexual development (Hawes, Wellings, & Stephenson, 2010) where sexual experiences are “free of coercion, discrimination and violence” (World Health Organization, 2012). Competence in social, behavioral, and cognitive domains can promote positive sexual and reproductive health for adolescents (House, Bates, Markham, & Lesesne, 2010). Wellings et al. (2001) have described adolescents who are ready to have sex as being “sexually competent” when sexual experiences are consensual, autonomous, i.e., take place without excessive use of drugs or alcohol, contraception is used appropriately, and experiences are not regretted. Sexual competence is not simply a function of age (Wellings et al., 2001) and so age at sexual debut might not be the most appropriate way to determine whether or not adolescent sexual activity is a problem behavior (Hawes et al., 2010).

In an attempt to consider adolescent sexual behavior as an adaptive rather than a problematic process, we were guided by the positive youth development approach, which acknowledges that a successful transition to adulthood requires more than the avoidance of problems in adolescence. Rather, the promotion of social, emotional, and cognitive development in childhood and adolescence is the key to building individual strengths and promoting positive outcomes (Guo et al., 2002). Skills such as understanding the perspective of others (cognitive), recognizing emotions in the self and others (emotional), interpersonal negotiation strategies (social), verbal and non-verbal communication (behavioral) and knowledge of right and wrong (moral) are all critical to competence when making choices about healthy versus risky behaviors (House et al., 2010). The positive youth development approach is appropriate for considering the development of adolescent sexual behavior. Notwithstanding legal regulations about the age of consent, it is unclear why sexual behavior may be appropriate for someone who is 16 but not for someone who is 15. By following a positive youth development approach, we can investigate the nature of skills that promote adaptive and healthy behaviors, i.e., competence or readiness in adolescent sexual relationships (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004).

Given that the skills that predict readiness develop within the context of the family, it is also important to investigate the role of social and family factors in the development of adaptive and healthy adolescent sexual behavior. In a review of the literature around the onset of sexual activity in UK adolescents, Hawes et al. (2010) considered factors associated with

the timing of first sexual intercourse as well as those associated with aspects of competency. These included context (circumstances of the first occasion, such as whether it took place within an established relationship, motivating factors, and autonomy), risk reduction practices and consequences of the first experience (including psychological outcomes, such as regret and pleasure or enjoyment). Hawes et al. reported a decline in the age of first sexual activity since the mid-twentieth century and a reduced age difference for men and women.

Age at sexual debut is associated with social factors such as maternal age (Henderson et al., 2002; Wight et al., 2008), family composition (Wellings et al., 2001), and socioeconomic status (Wellings & Field, 1996; Wellings et al., 2001; Wight et al., 2008) such that increasing levels of social disadvantage are associated with reduced age at sexual debut. However, as Hawes et al. (2010) pointed out, it is important to note the likelihood of association between these factors. Regarding aspects of competency, the findings of this review show that adolescents from a more adverse background were less competent with respect to contraceptive use (Crocker & Carlin, 2002; Pawlby, Mills, & Quinton, 1997) and autonomy (Pawlby et al., 1997). Younger age (Wellings et al., 2001) and sexual debut outside an established relationship or resulting from a lack of autonomy (being drunk or coerced) was more likely to be regretted and less likely to be perceived as pleasurable or enjoyable (Wight et al., 2008). Similar findings have been reported globally (Boisard & Poulin, 2011; Longmore, Manning, Giordano, & Rudolph, 2004; Madkour et al., 2010; Price & Hyde, 2009; Rosenthal et al., 1999; 2001; Valle et al., 2005).

The aim of this study was to describe sexual behaviors and readiness for sexual intercourse in a population cohort of adolescents. Specific objectives were to determine the extent to which social and family factors predicted early sexual activity and sexual readiness. In this longitudinal study, we examined prospective and concurrent individual, family, and social predictors in a population-based British birth cohort.

Method

Participants

The sample comprised participants from the Avon Longitudinal Study of Parents and Children (ALSPAC) (Golding, Pembrey, & Jones, 2001). ALSPAC is an ongoing population-based cohort study in the South-West of England (<http://www.alspac.bris.ac.uk>). Pregnant women resident in the former Avon Health Authority (which included the city of Bristol), who had an estimated date of delivery between 1 April 1991 and 31 December 1992, were invited to take part, resulting in a cohort of 14,541 pregnancies which resulted in 13,796 singletons and first-born twins who were alive at 1 year of age. The primary source of data collection was via self-completion questionnaires but, since the

age of 7 years, the ALSPAC young people have been invited to annual clinics for a variety of hands-on assessments.

At age the age of 15½, 9,979 young people were invited to a clinic and 5,246 (52.6 %) attended. Of these attendees, a total of 4,999 young people started the romantic relations CASI session from which our outcomes were obtained. A total of 119 indicated that they did not spend time with other young people, thus leaving a total of 4,880 (46.7 % male, 53.3 % female) who provided usable outcome data. Table 1 shows the characteristics of participants and non-participants. Participants were more likely to be female and more likely to have better-educated, older mothers from a higher social class. Ethical approval for the ALSPAC study was obtained from the ALSPAC Law and Ethics Committee, which is registered as an Institutional Review Board, and the Local Research Ethics Committee.

Measures

Romantic and Sexual Behaviors

Information on romantic and sexual behaviors was collected during the clinic held when the young people were around the age of 15½ (interquartile range, *IQR* 15 years 3 months to 15 years 7 months). The “romantic relations” questions formed part of a longer computer assisted structural interview (CASI) and consisted of 14 stem questions referring to activities within the last year (Waylen, Ness, Wolke, McGovern, & Low, 2010). Each question was followed by further nested questions that asked whether the young person had enjoyed the activity, whether they had wanted it to happen, and whether they had been drinking or using drugs at the time. These contextual questions were only asked if the young person answered yes to the specific stem question.

Table 1 Characteristics of study sample used in analyses

Risk factor at enrolment	Category	Not invited to clinic ($n \leq 3,997$) (%)	Invited to clinic but did not attend ($n \leq 5,099$) (%)	Data available ($n \leq 4,880$) (%)	χ^2, p
Gender of study child	Male	54.4	54.2	46.7	73.3 < .001
	Female	45.6	45.8	53.3	
Ethnicity of main carer	White	93.2	94.2	95.5	22.1 < .001
	Non-white	6.8	5.81	4.5	
Maternal age at delivery	<25 years	34.6	24.7	14.3	592.8 < .001
	25-29	35.7	40.9	38.8	
	30-34	22.2	25.5	34.1	
	35+	7.6	8.9	12.9	
Partner status	Husband	77.8	71.8	80.9	75.3 < .001
	Other partner	11.3	16.4	11.8	
	No partner	10.9	11.8	7.3	
Home ownership status	Mortgaged/owned	61.3	70.5	85.4	655.7 < .001
	Privately rented	14.5	11.1	7.3	
	Subsidized housing	24.2	18.4	7.4	
Parity	1st child	43.5	40.9	49.2	105.4 < .001
	2nd	34.0	36.4	34.7	
	3rd or greater	22.5	22.7	16.1	
Maternal education	Beyond high school	26.0	30.0	46.8	641.4 < .001
	High school	33.6	35.4	34.6	
	No high school quals	40.4	34.6	18.7	
Equivalentized income ^a	Top 20 %	15.2	17.6	24.7	261.4 < .001
	Middle 60 %	55.8	60.0	61.4	
	Bottom 20 %	29.0	22.5	13.9	
Parental social class ^b	I/II	47.1	50.8	63.9	246.3 < .001
	IIINM or lower	52.9	49.2	36.1	

Note Starting sample = 13,976; 9,979 were invited to clinic, 4,880 attended and provided data on romantic relations and sexual behavior

^a Equivalentized income: quintiles of household disposable income when the child was a toddler and accounting for family size and composition, estimated housing benefits

^b Parental social class: the highest social class of either parent: I/II (professional/managerial and technical) versus IIINM or lower (skilled non-manual/manual, semiskilled, and unskilled)

The first 12 questions about nine increasingly intimate behaviors were given to all participants (three questions were asked from two perspectives: Have you had this done to you and Have you done this to someone else?): (1) hugging another young person, (2) holding hands, (3) spending time alone, (4–5) kissing on the mouth (followed by being kissed), (6) cuddling, (7) lying down with another young person, (8–9) having another young person touch you under your clothes (followed by touching under their clothes), (10) being undressed with another young person with private parts showing, (11–12) fondling the private parts of another young person (followed by having another young person fondle your private parts). These responses were used to create a set of nine binary variables indicating whether or not each activity had happened within the last year. A positive response to either kissing *or* being kissed indicated a positive response to kissing, with similar treatment for touching and fondling.

A question about sexual intercourse was presented only to participants who responded positively to the questions on fondling private parts (a restriction put in place at the request of the ethics committee). This question was accompanied by further contextual questions, which were used to create our measure of readiness for sexual intercourse. Those reporting sexual intercourse were also asked whether they had had more than one sexual partner in their lifetime and whether they had had sex more than once. A 14th stem question, relating to oral sex, was not analyzed as it was strongly correlated with the previous question on intercourse.

Sexual Intercourse and Readiness

Two binary measures were derived indicating (1) sexual intercourse in the last year (yes/no) and (2) whether the participant was ready *the last time* they had intercourse (yes/no) (Spurgeon & Wright, 2010). The measure of readiness was derived from contextual data about sexual intercourse. The questions were developed by Wellings et al. (2001) as a measure of ‘sexual competence’ and comprised: *willingness*—the participant wanted to have sex and was not made to have sex; *autonomy*—the participant did not have intercourse in order to avoid being dumped, because their friends did it, or because they got carried away; *regret*—the participant did not regret having sex; *contraception*—the participant reported using a condom or another type of contraception. Participants fulfilling all four conditions were classed as ready.

Sociodemographic Measures

Sociodemographic measures were measured at the level of the family and derived from questionnaires administered to the main carer during pregnancy and the first few years of life: gender of the participant, maternal age at delivery (<25/25–29/30–34/35+ years); and ethnicity (white/non-white) of

the main carer; partner status at enrolment (husband, other partner, no partner); home ownership status at enrolment (owned/mortgaged, privately rented, state-subsidized housing); parity, maternal educational attainment at enrolment (no high school qualifications, high school, beyond high school), quintiles of household disposable income when the child was a toddler and accounting for family size and composition, estimated housing benefits (Melotti et al., 2011) and parental social class (the highest social class of either parent) at enrolment based on the Registrar General’s classification of occupations: I/II (professional/managerial and technical) versus IIINM or lower (skilled non-manual/-manual, semiskilled and unskilled).

Statistical Analysis

Chi square tests were used to assess the association between gender and each of the nine pre-coital activities, sexual intercourse, and readiness, the individual components of readiness, and the reported number of sexual partners and encounters. Associations between sociodemographic measures and the binary measures of sexual intercourse and readiness were then assessed with χ^2 tests and univariable regression models. Due to the strong inter-relationships between many sociodemographic measures, multivariable models for these associations were not explored. As the prevalence of the two outcomes was high, the log-link was used rather than the logit-link so that estimated effects could be directly interpreted as risk ratios. Models for sexual readiness were fitted only within the sample who reported sexual intercourse.

Missing Data

Attrition is an issue in most cohort studies. The proportion of the ALSPAC cohort that continues to take part has experienced fewer adverse circumstances than those who no longer attend (Wolke et al., 2009). We used multiple imputation to assess whether non-response bias had an impact on the estimated prevalence of and readiness for sexual intercourse and the effect of sociodemographic factors on intercourse and readiness. Preliminary association analysis was restricted to the sample that attended the clinic and completed the CASI session. Multivariate Imputation by Chained Equations (van Buuren, Boshuizen, & Knook, 1999) was carried out using the “ice” routine (Royston, 2004) in Stata version 10.1 MP2 (StataCorp., 2007). The method is based on the Missing at Random assumption that, conditional on the other data in the imputation model, there should not be systematic differences between observed and missing values for a given variable. Imputation was used to estimate missing values for those among the sample of 4,880 with data on sexual behavior but an incomplete set of demographic data and then to increase

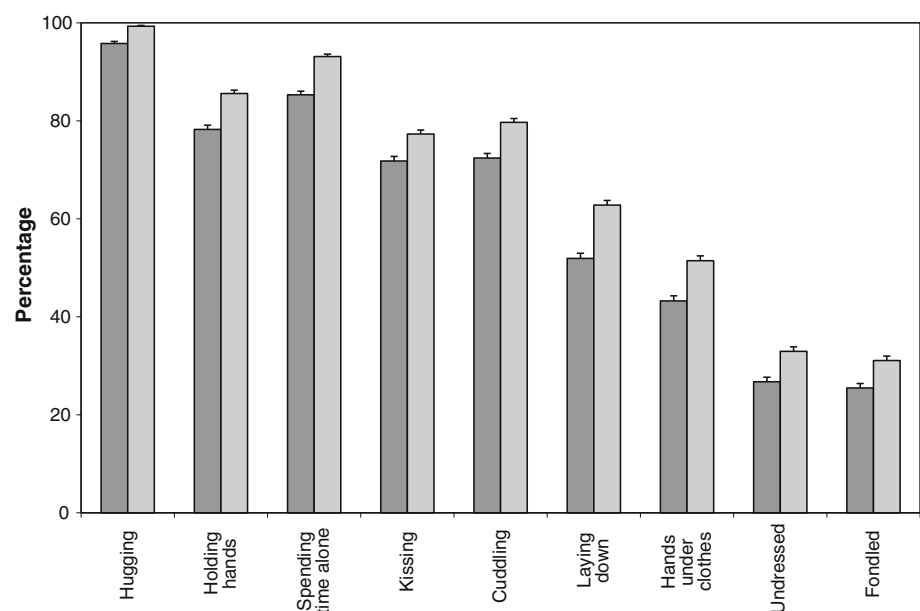
the sample to include all 9,979 young people invited to attend the 15-year clinic, many of whom would have reported demographic information but did not provide sexual behavior data. Auxiliary variables to assist with the imputation included indicators of family adversity at enrolment (home overcrowding, financial problems, lack of social support, etc.) and proximal measures, such as young person's substance use in early adolescence and measures of parent–child conflict, peer relationships, and peer behavior collected during the same clinic session. Missing data for a three-category measure of sexual activity (no intercourse/not-ready for intercourse/ready for intercourse) were imputed using multinomial logistic models and additional data on demographics employed binary and multinomial logistic models as appropriate. We compared the results obtained when imputing 25, 50, and 100 datasets (each with 10 cycles of regression switching), and paid close attention to the Monte Carlo (MC) error associated with the parameter estimates (White, Royston, & Wood, 2011).

Results

Gender Differences in Romantic Behaviors

Figure 1 shows the prevalence of the nine early (pre-coital) romantic behaviors. The prevalence of each activity decreased as the level of intimacy increased, with around three quarters of participants reporting activities as far as cuddling, but only a third having been undressed with another young person or having fondled their genitals. There was strong evidence of gender differences ($p < .001$) for all activities, with girls more likely to have experienced each of the pre-coital behaviors.

Fig. 1 Gender differences in rates of pre-coital behaviors. Percentage of boys (dark grey) and girls (light grey) reporting each pre-coital (romantic) behavior. Error bars denote 1 SE above percentage estimate



Prevalence of Intercourse and Readiness

Within the sample of 4,880, the estimated prevalence of sexual intercourse in the last year was 17.7 % (95 % CI 16.7, 18.9 %). More girls ($n = 517$, 19.9 %) reported that they had had sexual intercourse than boys ($n = 349$, 15.3 %) equivalent to a risk ratio of 1.30 (95 % CI 1.15, 1.47). Two-thirds ($n = 866$, 61.4 %) of those reporting recent intercourse were categorized as being ready and 38.6 % (equivalent to 6.8 %, 95 % CI 6.1 %, 7.6 %, of the whole population) were defined as not being ready to have sexual intercourse. There was little evidence of a difference in readiness between boys and girls.

When using imputation (100 imputed datasets) and the sample size of 9,979, the estimated prevalence of intercourse rose slightly to 19.3 % (95 % CI 18.1 %, 20.5 %) but the prevalence of readiness as a proportion of those reporting intercourse remained stable at 61.1 %. The higher prevalence of intercourse among girls (relative risk 1.26, 95 % CI 1.11, 1.41, $p = .0002$) and the lack of a gender difference for readiness remained in this larger imputed sample.

Components of Readiness and Other Contextual Factors

In the sample of 4,880 participants (data not shown), 5.4 % reported a lack of willingness the last time they had sexual intercourse, 27.0 % reported a lack of autonomy, 13.7 % reported regret, and 9.0 % had not used contraception. Gender differences were only observed for contraceptive use ($p = .003$) where the prevalence of intercourse *without* contraception was twice as high for girls compared to boys. Nearly half of the sample of both genders reported that this was their first sexual encounter but boys (46.3 %) were more likely than girls (38.5 %) to report having had more than one sexual partner ($p = .026$). Those who

were categorized as being ready for sexual intercourse were less likely to have had more than one sexual partner than those who were not ready (35.0 and 52.0 %, respectively, $p < .001$). They were also more likely to report that the event being described was their first sexual encounter (57.4 and 47.5 % respectively, $p = .004$). There were only three missing cases for “first sexual intercourse” and 24 for “more than 1 sexual partner.”

Sociodemographic Factors and Sexual Intercourse and Readiness

Tables 2 and 3 show results for the complete-case sample and for the first imputation sample (100 datasets) where predictors, but not the sexual behavior outcome, were imputed. Results for the larger sample of 9,979 were similar in magnitude to these results but with larger MC-errors, indicating little gain from extending the models in this way.

There was strong evidence of an association between almost all sociodemographic measures and reported sexual intercourse in the last year, with the exception of ethnicity of the main carer. Sexual intercourse was more common among participants whose mother reported no partner at enrolment, those in subsidized housing, from larger families, and those whose mothers had lower levels of education, less available income, and lower parental social class. Table 3 shows that, among those reporting sexual intercourse, there was no strong evidence for an association between any of the measured sociodemographic variables and readiness to have sex. There was little evidence of a sex difference in the strength of associations between sociodemographic factors and either having had sexual intercourse or readiness for sex.

Discussion

In this study, 16–20 % of 15½ year old adolescents taking part in a population-based cohort study reported having had sexual intercourse in the previous 12 months. Girls were more likely than boys to report having had sex, but boys were more likely than girls to report having had sex with more than one partner. The majority of those who had sex in the last year could be categorized as being ready for sex or competent: they had done so willingly, without coercion, did not regret their involvement, and used contraception. There was no statistical evidence of a gender difference in sexual readiness. There were strong associations between a range of sociodemographic factors and having had sex but not between sociodemographic factors and sexual readiness. The decision to have intercourse at this age and, alternatively, the readiness of those involved might therefore be influenced by different contributory factors.

This study had several strengths. We used data from a large population-based sample to examine the association between

the sociodemographic background of participants and prospectively collected data about their recent sexual activity and sexual readiness. Data about sexual behaviors related to the last year, so problems with recall of these activities should be minimal. We collected data about a variety of sexual activities and contextual factors anonymously using CASI so our responses are likely to be reliable (Boothkewley, Edwards, & Rosenfeld, 1992). In addition, the comparison of our results with data from imputed models did not markedly alter our findings: the differences that did occur indicated that, if anything our findings suggested a slight underestimate of sexual involvement in the population as a whole. One weakness of our study is that, although ALSPAC remains a socially diverse sample, individuals from more adverse backgrounds are under-represented in later rounds of data collection because of differential attrition. We acknowledge the limitations of this on our ability to examine the possible effects of disadvantage in adolescence (Wolke et al., 2009). Nevertheless, we demonstrated a robust association between social disadvantage and earlier sexual activity but no strong association with sexual readiness. The prevalence of recent sexual intercourse at age 15½ years appears low when compared with the UK National Survey of Sexual Attitudes and Lifestyles in 2000 (NATSAL) (Johnson, Wadsworth, Wellings, Bradshaw, & Field, 1992); about a quarter of participants aged 16–24 years reported having had sex before the age of 16 (Wellings et al., 2001). It was also lower than published estimates from the U.S., Australia, and Europe (Currie et al., 2012; Guo & Tong, 2006; Rosenthal et al., 1999). In part, this may be due to the conditional restrictions placed on the order of questions by the ethics committees. We may have missed a proportion of our sample who have had sexual intercourse but who did not progress through the preceding behavioral stages as listed in the questionnaire. Consequently, we may have underestimated the proportion of our sample that has had sexual intercourse but over-estimated the proportion that was ready for intercourse. We did not have information about partners' age or sexual orientation, which limits our interpretation of the gender differences.

However, other research indicates findings that support our own. Data from the U.S. National Survey of Family Growth 2002 showed that around 20 % of 15-year-old women reported having had sex in the last year (see Appendix to Heijne, Tao, Kent, & Low, 2010). Similarly, the prevalence of other adolescent risk behaviors in ALSPAC participants, such as substance use at age 15½, was comparable to other samples of young people in the UK (Macleod et al., 2008; Melotti et al., 2011). Our measure of sexual readiness has not been formally validated in other samples but has face validity based on the measure of sexual competence developed in the second U.K. NATSAL (Wellings et al., 2001). Wellings et al. reported that sexual competence at the first episode of heterosexual intercourse was not associated with parental social class, which was consistent with our findings. Data collected

Table 2 Univariable regression models predicting sexual intercourse at age 15½ yrs

Risk factor at enrolment	Available sample	Category	Complete case sample (sample size varies)		Imputed sample (<i>n</i> = 4,880) Unadjusted OR
			Rates of intercourse <i>n</i> (%)	Unadjusted OR	
Gender of study child	4,880	Male	349 (15.3)	1.00 ref	1.00 ref
		Female	517 (19.9)	1.30 [1.15, 1.47]	1.30 [1.15, 1.47]
Ethnicity of main carer	4,857	White	824 (17.8)	1.00 ref	1.00 ref
		Non-white	35 (16.1)	0.90 [0.66, 1.23]	0.91 [0.67, 1.24]
Maternal age at delivery	4,880	<25 years	159 (22.8)	1.56 [1.31, 1.88]	1.56 [1.31, 1.88]
		25–29	364 (19.2)	1.32 [1.14, 1.53]	1.32 [1.14, 1.53]
		30–34	242 (14.6)	1.00 ref	1.00 ref
		35+	101 (16.0)	1.10 [0.89, 1.36]	1.10 [0.89, 1.36]
Partner status	4,070	Husband	503 (15.3)	1.00 ref	1.00 ref
		Other partner	97 (20.1)	1.32 [1.08, 1.60]	1.31 [1.08, 1.58]
		No partner	78 (26.4)	1.73 [1.41, 2.13]	1.72 [1.42, 2.09]
Home ownership status	4,730	Mortgaged/owned	696 (17.2)	1.00 ref	1.00 ref
		Privately rented	55 (16.0)	0.93 [0.72, 1.20]	0.93 [0.72, 1.19]
		Subsidized housing	84 (24.1)	1.40 [1.15, 1.70]	1.39 [1.14, 1.70]
Parity	4,730	1st child	377 (16.2)	1.00 ref	1.00 ref
		2nd	290 (17.7)	1.09 [0.95, 1.26]	1.10 [0.95, 1.26]
		3rd or greater	159 (20.9)	1.29 [1.09, 1.52]	1.29 [1.09, 1.52]
Maternal education	4,735	Beyond high school	323 (14.6)	1.00 ref	1.00 ref
		High school	331 (20.2)	1.39 [1.21, 1.59]	1.39 [1.21, 1.60]
		No high school quals	180 (20.4)	1.40 [1.18, 1.65]	1.41 [1.20, 1.66]
Equivalized income ^a	4,370	Top 20 %	147 (13.6)	1.00 ref	1.00 ref
		Middle 60 %	487 (18.2)	1.33 [1.12, 1.60]	1.31 [1.11, 1.55]
		Bottom 20 %	129 (21.2)	1.56 [1.26, 1.93]	1.50 [1.21, 1.84]
Parental social class ^b	4,551	I/II	470 (16.2)	1.00 ref	1.00 ref
		IIINM or lower	334 (20.4)	1.26 [1.11, 1.43]	1.26 [1.11, 1.42]

^a Equivalized income: quintiles of household disposable income when the child was a toddler and accounting for family size and composition, estimated housing benefits

^b Parental social class: the highest social class of either parent: I/II (professional/managerial and technical) versus IIINM or lower (skilled non-manual/manual, semiskilled, and unskilled)

in future follow up of ALSPAC will allow us to examine the association between this measure of sexual readiness and subsequent sexual health outcomes to infer predictive validity. We will also be able to examine wider questions, such as the attributable risk for adverse sexual health outcomes of lack of sexual readiness in the population.

Our findings allow us to estimate the overall proportion of young people continuing to participate in the ALSPAC study

who portray adaptive behaviors: 93 % reported either competent behaviors or were currently abstaining from intercourse. Nevertheless, the remaining 7 % represents a sizeable number, in population terms, of the young people who cannot be regarded as ready for a sexual relationship and therefore may be exposed to adverse outcomes such as unplanned pregnancy (Wellings et al., 2001), sexually transmitted infections (Kaestle et al., 2005; Kotchick et al., 2001), and difficult

Table 3 Univariable regression models predicting readiness at age 15½ yrs among those adolescents who are currently sexually active

Risk factor at enrolment	Available sample	Category	Complete case sample (sample size varies)		Imputed sample (<i>n</i> = 866)
			Readiness <i>n</i> (%)	Unadjusted OR	Unadjusted OR
Gender of study child	866	Male	221 (63.3)	1.00 ref	1.00 ref
		Female	311 (60.2)	0.95 [0.85, 1.06]	0.95 [0.85, 1.06]
Ethnicity of main carer	859	White	508 (61.7)	1.00 ref	1.00 ref
		Non-white	19 (54.3)	0.88 [0.65, 1.20]	0.89 [0.65, 1.20]
Maternal age at delivery	866	<25 years	71 (44.7)	0.91 [0.77, 1.08]	0.91 [0.77, 1.08]
		25–29	131 (36.0)	1.05 [0.93, 1.20]	1.05 [0.93, 1.20]
		30–34	95 (39.3)	1.00 ref	1.00 ref
		35+	37 (36.6)	1.04 [0.87, 1.25]	1.04 [0.87, 1.25]
Partner status	678	Husband	195 (38.8)	1.00 ref	1.00 ref
		Other partner	38 (39.2)	0.99 [0.83, 1.18]	1.00 [0.85, 1.18]
		No partner	33 (42.3)	0.94 [0.77, 1.15]	0.99 [0.82, 1.19]
Home ownership status	835	Mortgaged/owned	272 (39.1)	1.00 ref	1.00 ref
		Privately rented	20 (36.4)	1.04 [0.85, 1.29]	1.05 [0.85, 1.29]
		Subsidized housing	29 (34.5)	1.07 [0.91, 1.27]	1.07 [0.91, 1.27]
Parity	826	1st child	146 (38.7)	1.00 ref	1.00 ref
		2nd	114 (39.3)	0.99 [0.88, 1.12]	0.99 [0.87, 1.12]
		3rd or greater	60 (37.7)	1.02 [0.88, 1.17]	1.02 [0.88, 1.17]
Maternal education	834	Beyond high school	123 (38.1)	1.00 ref	1.00 ref
		High school	136 (41.1)	0.95 [0.84, 1.08]	0.96 [0.85, 1.08]
		No high school quals	68 (37.8)	1.00 [0.87, 1.16]	1.02 [0.89, 1.17]
Equivalentized income ^a	763	Top 20 %	46 (35.7)	1.00 ref	1.00 ref
		Middle 60 %	195 (40.0)	0.98 [0.84, 1.14]	0.99 [0.85, 1.15]
		Bottom 20 %	57 (38.8)	1.05 [0.88, 1.26]	1.06 [0.89, 1.27]
Parental social class ^b	804	I/II	183 (38.9)	1.00 ref	1.00 ref
		IIINM or lower	131 (39.2)	1.00 [0.89, 1.11]	1.00 [0.90, 1.12]
				ns	ns

^a Equivalentized income: quintiles of household disposable income when the child was a toddler and accounting for family size and composition, estimated housing benefits

^b Parental social class: the highest social class of either parent: I/II (professional/managerial and technical) versus IIINM or lower (skilled non-manual/manual, semiskilled, and unskilled)

relationships in adulthood (Lammers et al., 2000; Mardh et al., 2000). Regarding the factors that indicate increased risk of adverse outcomes, adolescents who were not ready reported that they either had sexual intercourse when they were unwilling or coerced, did not use contraception, and/or regretted their sexual experience. In order to ensure that all adolescents protect themselves from adverse outcomes associated with sexual behavior, more work is needed to

investigate how components of sexual competence relate to positive youth development. In this way, adolescents may be enabled and motivated to make appropriate decisions about their sexual experiences (House et al., 2010). Certainly in the United States, positive youth development programs are reported to promote sexual and reproductive health in adolescence by developing knowledge as well as life skills (Gavin, Catalano, David-Ferdon, Gloppen, & Markham, 2010)

and youth assets (Vesely et al., 2004) together with the motivation and confidence to use them effectively (Gavin et al., 2010).

Our findings suggest that early sexual activity was governed by social factors, whereas readiness for sexual activity behavior that is autonomous, free from coercion, and characterized by the use of contraception and a lack of regret was not socially patterned. Others have noted that much of the social patterning in adolescent sexual behavior disappears once educational factors are taken into account (Wellings et al., 2001). Evidence showing that positive youth development programs promote healthy and adaptive adolescent sexual behaviors (Gavin et al., 2010; House et al., 2010; Vesely et al., 2004) supports the argument that education about life skills rather than simply sexual behavior (House et al., 2010) is a critical factor. Education in life skills has also been shown to be effective in preventing other adolescent risk behaviors (Foxcroft & Tsertsvadze, 2011; House et al., 2010; Moore, Rothwell, & Segrott, 2010) and this is something that can be targeted universally so that it reaches adolescents in all social groups.

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