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Original Research

School-based sex education is associated with reduced risky sexual behaviour and sexually transmitted infections in young adults

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SUMMARY

Objective: To quantify the effectiveness of school-based sexual education on risky sexual behaviour and sexually transmitted infection (STI) acquisition in adulthood.

Study design: Online survey of sexual attitudes and behaviours.

Methods: Students at a British university were surveyed regarding where they learnt most about sex at 14 years of age, how easy they found talking about sexual issues with their parents and age at first intercourse. The effects of these factors were modelled on risk of recent unprotected intercourse and self-reported STIs in adulthood.

Results: Seventy-eight of 711 (11%) students reported unprotected intercourse in the 4 weeks before the survey, and 44 (6.2%) students had ever been diagnosed with an STI. Both age at first intercourse (risk reduced by 11% per year of delayed intercourse, 95% confidence interval (CI) 3–19%) and learning about sex from lessons at school (66% reduction in risk compared with learning from one's mother, 95% CI 5–88%) were associated with reductions in risk of unprotected intercourse. Factors associated with fewer STIs were age at first intercourse (17% reduction per year of delayed intercourse, 95% CI 5–28%); and learning about sex from lessons at school (85% reduction, 95% CI 32–97%), from friends of the same age (54% reduction, CI 7–77%) and from first boy/girlfriend (85% reduction, 95% CI 35–97%) compared with learning from one's mother.

Conclusion: School-based sexual education is effective at reducing the risk of unprotected intercourse and STIs in early adulthood. Influence from friends in adolescence may also have a positive effect on the risk of STIs in later life.

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Introduction

School-based sex education is a contentious subject. It is generally regarded as effective in increasing knowledge, although debate exists with regard to whether interventions in the school may have an impact on increasing sexual activity.¹ The proposed statutory nesting of sex and relationships education within personal social health and economic education furthers this aim.² Generally, these interventions have parental support once the content of the curriculum is understood,² and it is accepted that they are effective at changing sexual behaviour at least in the short term.³ However, evidence is lacking regarding the effectiveness of these interventions in terms of long-term outcomes, such as teenage pregnancy,⁴ sexual behaviour in adulthood and impact on the transmission of sexually transmitted infections (STIs).

The present analysis of a survey of sexual attitudes and behaviours of students at a British university aimed to explore the influence of different ways of learning about sex in adolescence on risky sexual behaviour and risk of STIs in early adulthood.

Methods

In 2006, a web-based survey of university students' sexual attitudes and behaviours was conducted, and the results have been published elsewhere.^{5,6} An email was sent to all students registered for undergraduate studies at the University of East Anglia, Norwich, UK inviting them to participate in the survey. A maximum of three emails were sent one week apart as reminders. In the online questionnaire, students were asked questions about drug and alcohol use, current sexual behaviour and self-reported history of STIs. In addition, students were asked who they had learnt most about sex from when they were 14 years old. Students were also asked their age at first sexual intercourse.

This study examined the effect of how people learn about sex, the ease of discussing sex with one's parents, and age at first intercourse on sexual risk outcomes [measured in this study as 'unprotected intercourse in the past 4 weeks' and 'diagnosis of an STI' in young adults (i.e. 18–29 years) who have sex with partners of the opposite sex]. As such, students aged ≥ 30 years and students who have only had sex with same-sex partners were excluded from the analysis.

The proportions of students who had unprotected intercourse and those who reported an STI diagnosis were calculated based on where they learnt about sex and how easy they found it to talk about sex with their parents. Average age at first intercourse was also calculated. To compare the risk, odds ratios (OR) were estimated using logistic regression, and 95% confidence intervals (CI) were generated. Significance was assumed at the 95% level ($P < 0.05$). These factors were included in a multivariable logistic regression model to ascertain which were independently associated with unprotected intercourse and STIs in young adults, therefore calculating adjusted odds ratios. The analysis was repeated separately for female and male students. All analyses were

performed using STATA Version 10 (STATA – StataCorp LP, College Station, Texas, USA).

Results

Of the 827 students who completed the survey, 90 (10.9%) were excluded because they were aged ≥ 30 years, and another 26 (3.1%) were excluded because they had only had same-sex partners. Of the remaining 711 respondents, 492 (69.2%) were female. The median age for both female and male students was 21 years, with 27% aged ≤ 20 years, 61% aged 20–24 years and 12% aged 25–29 years. The median age at first intercourse was 17 years, with no significant differences between males and females. Seventy-eight students (11%, no significant difference between males and females, $P = 0.974$) reported unprotected intercourse in the 4 weeks before the survey, and 44 students (6.2%) reported that they had ever been diagnosed with an STI; the rate was significantly higher in male students (males 1.38% vs females 8.33%; $P < 0.001$).

Recent unprotected intercourse was independently associated with younger age at first intercourse (11% reduction per year of delayed intercourse, 95% CI 3–19%) and learning about sex from lessons at school (66% reduction compared with learning from one's mother, 95% CI 5–88%).

Equally, an STI diagnosis was independently associated with younger age at first intercourse (17% reduction per year of delayed intercourse, 95% CI 5–28%); and learning about sex from lessons at school (85% reduction, 95% CI 32–97%), from friends of the same age (54% reduction, 95% CI 7–77%) and from first boy/girlfriend (85% reduction, 95% CI 35–97%) compared with learning from one's mother.

When both sexes were analysed separately (data not shown), the likelihood of an STI diagnosis for female students was associated with younger age at first intercourse (27% reduction, 95% CI 10.9–61.4%) and finding it difficult to discuss sex with one's parents (150% increased risk, 95% CI 100–600%). No significant associations were found with unprotected intercourse in females, although age of first intercourse was close to being significantly associated with unprotected intercourse (9.6% reduction per year of delayed intercourse, 95% CI 21.1% reduction to 3% increase).

For male students, unprotected intercourse was associated with younger age of first intercourse (27.6% reduction per year of delayed intercourse, 95% CI 9.3–42.1%). It was not possible to calculate a multivariable logistic regression model for STIs for male students alone.

Discussion

This survey of university students suggests that exposure to school-based sex education as an adolescent reduces risky sexual behaviour and STIs in sexually active young adults. Younger age at first intercourse was also independently associated with unprotected intercourse and self-reported STIs in this group of young adults. This study found that delayed age of first intercourse was key to lower risk of unprotected intercourse or STIs for both male and female students, while an important factor in determining risk of STIs for females was

whether they found it easy or difficult to discuss sexual issues with their parents, therefore suggesting that parental education also plays a key role in developing sexual health.

As discussed in greater detail elsewhere, the sample of students was representative of the population of students at the university in terms of age, ethnicity and proportion of international students, with a slightly larger representation from female students.⁶ The sample was younger than that of general population surveys, had a similar proportion of respondents reporting inconsistent use of condoms, and a lower rate of STIs compared with the National Survey of Sexual Attitudes and Lifestyle.^{7,8} Therefore, the study sample is likely to be representative of a younger age group, over-representing females and perhaps with higher educational attainment; extrapolation of results to the general population needs to be made with care.

It is recognized that there are limitations when using an online survey tool; evidence suggests that response rates are higher among younger, wealthier and better-educated populations.⁹ This study may therefore represent views and behaviours of more-educated students.

Despite most school-based programmes being acceptable to parents and having parental support, the scientific evidence of their effectiveness in changing behaviour is divided.¹⁰ School-based sexual education may reduce risky sexual

behaviour shortly after the intervention and lead to greater use of condoms.^{3,11,12} However, there is little evidence to support an effect on medium- to long-term outcomes such as abstinent behaviour or teenage pregnancy.⁴ Moreover, a recent randomized controlled trial of teacher-led sex education in Scotland found no difference in the intervention arm compared with the control arm in subsequent conceptions and terminations.¹³ Research is further complicated by recognition that school-connectedness may influence teenage sexual risk taking, particularly with regard to resulting teenage pregnancies.¹⁴

This study did not look at the components of school sexual health education programmes, or whether these were delivered on their own or as part of a multiple risk behaviour reduction approach. Also, students in the sample came from different backgrounds and were exposed to a variety of programmes. Therefore, it is not possible to extrapolate what works from the results of this study.

So, what are the characteristics of a successful school-based sexual education programme that one can draw from the literature? Most successful interventions have a multi-component approach, addressing a range of personal and structural determinants of risk.^{3,4} Teaching social skills relevant to maintaining sexual relationships is likely to lead to less unprotected intercourse in young people; however,

Table 1 – Associated risk of unprotected intercourse and sexually transmitted infections by age at first intercourse, where people learnt most about sex at 14 years of age, and how they found discussing sexual issues with their parents in university students aged 18–29 years.

	All ^a n = 711	Unprotected sex ^a n = 78	OR (95% CI)	AOR (95% CI)	Self-reported STI ^a n = 44	OR (95% CI)	AOR (95% CI)
Mean age at first intercourse (years)	17.21 (0.16) ^b	16.43 (0.22) ^b	0.89 (0.81–0.97)	0.89 (0.81–0.97)	16.27 (0.2.7)	0.88 (0.79–0.98)	0.83 (0.72–0.95)
Discussed sex with parents:							
Easy	115 (16.17%)	13 (16.67%)	1		7 (15.22%)	1	
Difficult	77 (10.82%)	9 (11.54%)	1.06 (0.43–2.61)		8 (19.57%)	2.08 (0.74–5.82)	2.08 (0.91–4.90)
Didn't discuss	338 (47.54%)	37 (47.54%)	1.02 (0.53–1.99)		15 (34.78%)	0.77 (0.31–1.91)	
Varied depending on topic	181 (25.46%)	19 (24.36%)	0.94 (0.45–1.99)		14 (30.43%)	1.32 (0.52–3.38)	
Learning about sex (at 14 years of age):							
Mother	77 (10.83%)	8 (10.26%)	1		7 (15.91%)	1	
Father	5 (0.70%)	2 (2.56%)	6 (0.87–41.44)	4.77 (0.77–29.35)	0	^c	
Brother(s)	20 (2.8%)	0	^c		0	^c	
Sister(s)	12 (1.69%)	1 (1.28%)	0.75 (0.09–6.55)		2 (4.55%)	2 (1.74–11.01)	
Other relative(s)	3 (0.42%)	1 (1.28%)	4.5 (0.37–55.32)		0	^c	
Lessons at school	100 (14.06%)	4 (5.13%)	0.46 (0.14–1.45)	0.33 (0.12–0.95)	2 (4.55%)	0.20 (0.167–1.01)	0.15 (0.03–0.68)
Friends (same age)	232 (32.63%)	28 (35.90%)	1.21 (0.53–2.77)		13 (29.55%)	0.59 (0.29–1.55)	0.46 (0.23–0.93)
First boy/girlfriend	90 (12.66%)	8 (10.26%)	0.84 (0.3–2.34)		2 (4.55%)	0.23 (0.186–1.13)	0.15 (0.03–0.65)
Health professional	3 (0.42%)	0	^c		0	^c	
Television/radio	45 (6.33%)	7 (8.97%)	1.54 (0.52–4.55)		1 (2.27%)	0.23 (0.2–1.91)	0.19 (0.25–1.44)
Videos	2 (0.28%)	0	^c		0	^c	
Books	44 (6.19%)	6 (7.69%)	1.54 (0.52–4.55)		6 (13.64%)	1.58 (0.93–5.04)	
Magazines or newspaper	80 (11.25%)	11 (14.10%)	1.44 (0.55–3.78)		10 (22.73%)	1.43 (0.74–3.97)	
Other	16 (2.27%)	2 (2.56%)	1.2 (0.23–6.22)		1 (2.27%)	0.67 (0.74–5.83)	

OR, odds ratio; AOR, adjusted odds ratio; CI, confidence interval.

a Column reports total number of students (and percentage) unless otherwise stated.

b Mean (standard deviation).

c Excluded from the analysis because of zero value.

teaching this in a school setting requires careful programme design and delivery by trained educators.^{2,15} Also, practical advice, such as how to use a condom correctly, is related to a greater intention to use a condom in the future.⁹

Traditionally, sexual health education has mainly been teacher or adult led. However, there is growing support for peer-led education.¹⁶ This approach is more likely to lead to conservative sexual attitudes, while adult-led educators are better at imparting factual knowledge.¹⁷ While research found a peer-to-peer programme did not change the number of teenage abortions, it may have led to fewer teen births and was popular among pupils.¹⁶ This study found evidence that learning about sex from friends of the same age or first boy/girlfriend also leads to reductions in the risk of STI similar to those seen for school lessons (Table 1), suggesting that learning from peers is as important as school-based education. Successful school-based peer-led interventions for smoking prevention further illustrate this potential tool.¹⁸ Therefore, in a programmatic approach, there is probably room for a combination of both types of interventions.

There is little evidence regarding the most appropriate age at which to start sexual education. One study in London found that the median age at which adolescents reported starting sexual education was 11 years; whereas the majority of those surveyed felt that this was an appropriate age, approximately one-third felt that this was too late.¹¹ This study did not find any link between timing and behavioural intention. The UK's new sexual health education curriculum proposes an early start; however, most of the focus on the early years is on social skills, which are the base for healthy sexual relationships.

Although there appears to be evidence in favour of school-based sex education, there are only a few good-quality evaluations of such types of interventions in the literature.^{3,4,16} In particular, there is no evidence of the effect of sexual education in school on risky sexual behaviour in early adulthood and subsequent STI transmission.

Adolescence is a period of increased risk-taking behaviour, when young people experiment with smoking, alcohol and drugs and take sexual risk. It is common to engage in multiple risk behaviours, and there is interconnectedness between them.¹⁹ Therefore, programmes aimed at reducing these risks need to be thought through carefully. There is growing evidence that interventions that address multiple risk behaviours and promote protective factors, enhancing family interaction and the school environment, are most effective.²⁰

Sexual health education in schools may play an important role in the sexual health development of adolescents, and may shape future sexual behaviour and risk of STIs. This study suggests that school-based sexual education interventions should continue; however, there is a need to better evaluate their long-term effectiveness.

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Ethical approval

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Competing interests

None declared.

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