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# Student-reported relationships and sex education coverage and knowledge among a diverse population of early adolescents: a cross-sectional survey of students in England

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## ABSTRACT

Student-reported quality and coverage of school-based relationships and sex education (RSE) vary, with gender/sexual-minority and disadvantaged students reporting poorer provision. Experience of RSE among younger adolescents is under-explored. We examined student-reported RSE coverage and priorities and how coverage, and sexual-health knowledge and awareness of services, varies between students and schools. The data came from a pre-intervention survey of students aged 12–13 years within a trial of an RSE intervention involving 50 English schools. There was most coverage of basic information, such as puberty and safeguarding. There was least coverage of topics more appropriate for older students, such as sexual relationships, and topics teachers might find difficult to broach, e.g. pornography and masturbation. Girls, gay/lesbian students, students of bisexual/other sexual orientation, minority-ethnic students and students reporting lower academic commitment reported lower coverage than others. Knowledge of RSE-related topics and sexual-health services was generally low. Boys, students of bisexual/other orientation and students with higher school commitment had higher knowledge. Students of bisexual/other orientation and students of lower commitment reported lower awareness of services. Coverage and knowledge did not vary with school-level attainment or local deprivation. Future forms of RSE provision should ensure content and teaching methods meet the needs of all students.

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sex education; early adolescents; relationships; knowledge; coverage; needs

## Introduction

In England, the rates of sexually transmitted infections (STIs) among young people aged 15–24 years are the highest of any age group and are increasing (UK Health Security

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Agency 2022). Despite significant declines in the last 20 years, the UK still has the highest rate of teenage births in Western Europe and teenagers remain in the age group with the highest rates of unplanned pregnancy (World Bank 2023). Age of sexual debut has been declining since the mid-twentieth century (Lara and Abdo 2016; Lewis et al. 2017) and most young people in Britain do not report competence at first sex, defined in terms of use of contraception, autonomy of decision-making, partners being equally willing and individuals judging it to have been the 'right time' (Palmer et al. 2017). Non-competence in first sex is associated with increased risk across adolescence and adulthood of unplanned pregnancy; STIs among young women; experiencing non-volitional sex and sexual-function problems (Palmer et al. 2017). Sexual harassment at school and dating and relationship violence among young people are also widespread in England, Scotland and Wales (Young et al. 2017; Sweeting et al. 2022).

There is systematic review evidence that good-quality relationships and sex education (RSE) delivered in school classrooms can contribute to promoting sexual health, preventing unintended pregnancies, STIs and dating and relationship violence and increasing disclosure of sexual abuse and violence (Walsh et al. 2015; DiCenso et al. 2002; Oringanje, Meremikwu, and Eko 2009; Shepherd et al. 2010; Rodriguez-Castro et al. 2021; Vaina and Perdikaris 2022; Goldfarb and Lieberman 2021). RSE should begin early enough to enable young people to navigate relationships safely and prepare for competent first sex (Coyle et al. 2001; Henderson, Wight, Raab, et al. 2007; Stephenson et al. 2004; Lohan et al. 2017, 2022; Department for Education 2019). The UK National Surveys of Sexual Attitudes and Lifestyles (Natsal) have asked representative cross-sectional samples of adults (age ranges varying between surveys) once per decade from 1990 to 2012 about their experience of RSE. During this time, participants citing school lessons as the main source of information about sex increased from under a third to approximately 40% among men and women (Tanton et al. 2015).

However, RSE provision can be variable in terms of coverage and quality (Davies 2013; Duberstein Lindberg, Maddow-Zimet, and Boonstra 2016; Waling et al. 2020; Cheedalla, Moreau, and Burke 2020; Ekstrand et al. 2011; Izdebski et al. 2022; Ofsted 2013). In England, a 2021 poll of a convenience sample of 1,002 English young people aged 16–17 years old reported only just over a third recalled that RSE in their schools had been good or very good, with lower ratings among girls (Sex Education Forum 2022). Over one-third had not learned about power imbalances in relationships, sexual pleasure, female genital mutilation, gender identity or pornography. About one-third had not learned about healthy relationships, grooming for sexual exploitation and accessing local sexual-health services. A 2018 survey of 6922 young people in England age 18–19 years found just under half of young people reported their school RSE was fairly or very useful (Stewart et al. 2021).

Internationally, a representative US study of young men aged 15–24 conducted in 2011–13 asking about experiences of school RSE reported that while most recalled having learned about STIs and refusing/delaying sex, fewer had learned about accessing or using contraception (Jaramillo et al. 2017). A Swedish convenience sample of young women aged 13–25 surveyed in clinic waiting rooms in 2008 found that sexual assault, sexual harassment, pornography, abortion, emergency contraception and fertility were rarely covered in RSE (Ekstrand et al. 2011). While these existing studies are useful, none has focused on younger adolescents' experiences of RSE.

Provision has been reported to be particularly variable for gender and sexual minorities, often failing to meet their needs (Garg and Volerman 2021). Research on the needs of such groups has involved qualitative research, small surveys and/or retrospective studies in late adolescence or adulthood (O'Farrell, Corcoran, and Davoren 2021; Pampati et al. 2021; Metro 2016). These studies suggest that most RSE focuses on straight, cisgender identity and heterosexual practices, neglecting the needs of sexual- and gender-minority students (Pound, Langford, and Campbell 2016; Haley et al. 2019; Pampati et al. 2021; Mata et al. 2022; O'Farrell, Corcoran, and Davoren 2021; Metro 2016). The UK's Natsal survey in 2012 found that adult women who have sex with women were more likely than other women to retrospectively report that their primary source of sex information was other than school and to report unmet knowledge needs (Burkill and Waterhouse 2019). An online convenience sample of 1,749 same-sex attracted youth aged 14–21 in Victoria, Australia, in 2008 found that RSE was perceived as not inclusive or useful (Hillier and Mitchell 2008). Similarly, the above-cited survey of 18–19 year-olds in England found that young people from sexual minorities were significantly more likely to report that RSE was not useful (Stewart et al. 2021). Reported gaps for sexual- and gender-minority students include content on same-sex practices, safer sex, healthy relationships, access to appropriate services, consent and condom use (Pampati et al. 2021; Gowen and Wings-Yanez 2014; Mata et al. 2022; O'Farrell, Corcoran, and Davoren 2021). UK qualitative studies have identified RSE provision in schools as often heterosexist and sometimes overtly homophobic (Buston and Hart 2001; Formby and Donovan 2020). No studies have surveyed current UK gender- and sexual-minority students in secondary schools on their experience of RSE provision.

Adolescents' experiences of, and needs relating to, RSE also appear to vary by other socio-demographic factors. Qualitative research in the USA suggests that RSE teaching can include racist assumptions, for example, about the promiscuity of some minority-ethnic girls (García 2009; Lamb, Roberts, and Plocha 2016). An study of an ethnically diverse convenience sample of 3,007 15–18 year-olds in England surveyed in a school in 2008 reported that minority-ethnic, particularly Black, students wanted to learn more about cultural/religious beliefs relating to sex as well as sexual behaviour and STIs. Asian students reported preferences for school as a source of learning and more information about STIs and contraception (L. Coleman and Testa 2007a). In a cross-sectional study of 3,334 13–17-year-olds from English urban and suburban secondary schools in 2012, Black students were less likely than White students to seek information from school RSE compared to other sources. There were no differences between ethnic groups in terms of topics they wanted covered (Newby et al. 2012). Again, no studies have focused on early adolescents.

In terms of knowledge, previous UK studies using convenience samples of secondary-school students have identified low levels of knowledge of certain topics, especially among boys, some minority-ethnic groups, students reporting being religious and younger students, particularly regarding STIs and emergency contraception (Westwood and Mullan 2006; Coleman and Testa 2008; Coleman and Testa 2007b). None of these studies focused on students in the early years of secondary school. Studies in other high-income countries report similar results and suggest lower knowledge among students of lower socioeconomic status (Matziou et al. 2009; Avery and Lazdane 2008; Stewart et al. 2021).

From the late 2020, RSE became a statutorily required subject in all English schools with topics to be covered by the end of primary and secondary schools specified by the government (Department for Education 2019). These include abortion, contraception, gender/sexual diversity, healthy relationships, female genital mutilation and sexual violence, although not sexual pleasure. The current study for the first time examines RSE coverage among a sample of early adolescents at the point when RSE was becoming statutorily required in all schools, albeit at a time when schools had been disrupted by the COVID-19 pandemic. It first examined student-reported coverage of RSE topics, RSE-related knowledge and knowledge of school-based and local sexual-health services before examining how these varied by student gender, sexual orientation, ethnicity, family affluence and school commitment and school-level attainment and local deprivation.

## Materials and methods

### *Design, sample and data collection*

Data were collected from a pre-allocation/intervention baseline survey of a phase-III cluster randomised controlled trial of the Positive Choice intervention comprising a convenience sample of 50 mainstream state secondary schools in England (Ponsford, Meiksin, et al. 2021).

Specialist schools for excluded students or those with special educational needs and disabilities, and schools deemed 'inadequate' by Ofsted, the school inspectorate in England were excluded. Recruitment proceeded via emails to schools, school networks and academy chains with follow-up phone conversations with interested schools.

Baseline surveys were undertaken with students in year 8 (aged 12/13) between November 2021 and March 2022. Paper questionnaires were completed confidentially in classrooms supervised by trained fieldworkers, with teachers remaining present to maintain quiet, but unable to see student responses. Absent students were surveyed by leaving questionnaires and stamped-addressed envelopes with schools, liaising with schools to maximise returns.

### *Measures*

Student sexual orientation was assessed as straight, gay/lesbian or bisexual/other (including asexual, unsure/questioning or other). Student gender was assessed as male (including transmale), female (including transfemale) and non-binary. These involved measures piloted in previous studies (Ponsford, Bragg, et al. 2021; Meiksin et al. 2020).

Student ethnicity was assessed as White, mixed/multiple ethnic groups, Asian/Asian British, Black/African/Caribbean/Black British, Arab and others using an established UK Office for National Statistics measure, collapsed to White versus minority-ethnic students given the need for imputation (see below). Student family affluence was assessed using the Family Affluence Scale (range 0–12 with higher values indicating higher affluence) (Currie et al. 2008). Student school commitment was assessed using the Beyond Blue School Climate Questionnaire (range 0–3 as an average of four items, with higher values indicating higher commitment) (Sawyer et al. 2010). School-level attainment was assessed

based on routine data on public examinations at age 16. Local deprivation was assessed data from the Income Deprivation Affecting Children Index (Department for Education 2015).

Students' perceived quality of coverage of school RSE was assessed first as a binary measure of whether each of a list of topics was reported well/very well covered. Additionally, a quantitative score for overall coverage was generated, taken as an average of over 23 items (developed with the Sex Education Forum specialist RSE charity to reflect key learning areas for secondary school students) ranging from 0 to 5, with higher scores indicating higher coverage (Table 1). Students' sexual-health knowledge (range 0–11 with higher scores indicating greater knowledge) and awareness of sexual-health services (range 0–5 with higher scores indicating greater awareness) were measured using scale scores drawn on existing measures (Henderson, Wight, Raab, et al. 2007) previously piloted in the pilot trial (alpha = 0.78, 0.83 respectively) (Ponsford, Bragg, et al. 2021). The topic being reported by students as a priority for learning in the next school year was assessed in terms of the proportion of students reporting each topic (from the same list of topics as the question on coverage) as a top-four priority for teaching in the next school year.

## **Analyses**

We first described outcomes by exposure categories for gender, sexual orientation and ethnicity, as well as RSE topic coverage and priorities for future learning, before turning to model estimation.

Our general approach to analysis was to use two-level random-intercept models. These models account for the nesting of students within schools by partitioning the variance between students on the outcome into between-school and within-school variance, a standard method in educational research. High levels of missing data for items reflected the number of questions included in each of the scales. To address this, we used multiple imputation, which uses the data available to generate a range of plausible values for missing data. Because multiple imputation in multilevel models requires that fewer parameters be estimated than there are clusters available, we collapsed relevant demographic categories into binary or ternary variables and used a pragmatic approach with scale scores. Regarding the latter, where less than a third of items were missing for RSE coverage, service awareness or school commitment, we generated a scale score as the average of non-missing items. Where any Family Affluence Scale items were missing, we coded the overall scale as missing. We subsequently imputed 20 datasets (i.e. created 20 versions of the dataset with a plausible value 'filled in' for each missing value) with an unrestricted joint-imputation method over two levels and a variance-covariance model including all analysis variables.

We then estimated intra-cluster correlation coefficients (ICCs) for our outcomes using unconditional random-intercept models. We then estimated a series of two-level random-intercept models including each predictor for each outcome and then used a forced-entry method to estimate multi-predictor models for the same outcomes. Our reported analyses categorise gender as male (including transmale), female (including transfemale) and non-binary. Sensitivity analyses categorised gender as cisgender male, cisgender female and trans/non-binary.

Table 1. Measures.

Measure	Question	Question component	Response options
Student RSE coverage	In your school, how well do you think the following topics have been covered?	<p>How the body changes in puberty</p> <p>The correct names for the different parts of the genitalia (reproductive organs)</p> <p>Conception (how a woman becomes pregnant)</p> <p>Contraception options (the different ways for you to protect yourself or a partner from becoming pregnant)</p> <p>Sexually transmitted infections (STIs) (infections that are passed on through sexual activity)</p> <p>How to use a condom</p> <p>What types of sexual activity are safest</p> <p>How to spot the signs of abuse in a relationship</p> <p>Who to contact if you have experienced abuse</p> <p>Sexual consent</p> <p>Sexual pleasure</p> <p>Masturbation</p> <p>Pornography including legal issues</p> <p>Sharing naked photographs by phone or online including legal issues</p> <p>How to resist pressure or say 'no' to doing something sexual that you don't want to do</p> <p>How the media affects how we think about our bodies</p> <p>FGM (Female genital mutilation/cutting)</p> <p>What it means to be in love</p> <p>How to manage conflict and differences of opinion in relationships</p> <p>The options available if you or your partner become pregnant, including abortion</p> <p>How to know if you are ready to be intimate or have sex with someone</p> <p>Sexual and reproductive rights (for example, the right not to face discrimination based on sexual identity or the right to make your own decisions about your sexual health)</p> <p>Respectful versus unacceptable behaviour including sexual harassment</p> <p>As above</p>	<p>Don't remember it being covered</p> <p>Very well</p> <p>Well</p> <p>Okay</p> <p>Not well</p> <p>Not well at all</p>
Student priority RSE topic for learning in next school year	Which of the following topics do you think it would be <i>most</i> important to learn about at school in year 9?		Priority or not
	Please ✓ <i>four</i> boxes for what is most important		

(Continued)

Table 1. (Continued).

Measure	Question	Question component	Response options
Students' knowledge	Are the following statements true or false?	A girl can get pregnant the first time she has sex with a boy	True
		All infections caught from having sex can be cured with medical treatment	False
		If someone has an STI (sexually transmitted infection), they may not show any sign of it at all	Don't know
		If a girl under 16 tells a doctor she may be pregnant, legally the doctor must inform her parents	
		A girl can get pregnant if she has sex standing up with a boy	
		A girl cannot get pregnant if the boy withdraws his penis from her vagina before ejaculation / coming	
		Wearing two condoms is better protection against STIs and unplanned pregnancy than wearing one condom	
		Young people under 16 can get free access to condoms and contraception from a sexual health clinic without their parents knowing	
		The IUD (copper coil) can be used as emergency contraception if inserted up to five days after having sex	
		Sexual assault refers to a sexual act inflicted on someone without their consent	
Student service awareness	If using emergency contraception (the morning after pill) to prevent pregnancy, it is most effective		Within 12 hours of unprotected sex
			Within 24 hours of unprotected sex
			Within 2 days (48 hours) of unprotected sex
			Within three days (72 hours) of unprotected sex
			Within a week (168 hours) of unprotected sex
			Don't know
		Do you know where you could get medical advice from a trained health professional about contraception?	Yes
		Do you know where you could get medical advice from a trained health professional about STIs (sexually transmitted infections)?	No
		Do you know who you could speak to at your school if you were to experience sexual, physical or other abuse?	
		Do you know who you could speak to at your school if you were to experience sexual harassment from another pupil?	
Do you know who you could speak to at your school about contraception and sexual health?			



## Ethics

Ethical approval for the study was obtained from the London School of Hygiene & Tropical Medicine Ethics Committee (Reference 26,411). Informed written opt-in consent was sought from students judged competent by teachers to assess this. Parents/carers could opt out their children if they wished. Students and parents/carers were sent an information sheet 1 week before data collection. Just before data collection, participants who had not previously opted out or been opted out by parents/carers received oral and written descriptions of the study and could ask questions. Participants were advised that participation was voluntary, and they could withdraw at any point or skip questions they did not feel comfortable answering. Students were then asked for their written consent to participate by a fieldworker. Students were informed that the information they provided would be treated with anonymity and confidentiality unless they reported sex before age 13 or other ongoing risk of serious abuse or requested a safeguarding referral, in which case we would break confidentiality to inform school safeguarding officers. This was done in 262 cases by the fieldwork team (accessing secure data linking student names to unique-identifier codes) collaborating with the clinical trial unit (accessing secure data linking student self-report data with unique-identifier codes). School safeguarding leads interviewed these students to assess need for support. In most cases, students reported that they had ticked the wrong box to request a referral.

## Results

In total, 2845 schools were invited to participate in the trial, and we recruited the first 50 to agree to participate. Recruited schools were in less disadvantaged areas and had lower rates of student poverty than the average for schools in England. Schools were more likely to have good Ofsted inspection ratings. All other characteristics were similar to other English schools (Table 2). The student survey response rate was 77%. Descriptive characteristics of the sample of 7,060 students across 50 schools are reported in Table 3. The sample was evenly split between those identifying as boys (47.9%) and those identifying

**Table 2.** Comparison of recruited schools with secondary schools in England.

		Positive Choices trial schools	England average mainstream secondary schools
		Mean (SD) / % (n)	
School IDACI		.125 (.097)	0.148
Eligible for free school meals (any time during past 6 years)		23.1 (14.2)	25.8
Attainment 8 score (data for state schools)		47.5 (8.8)	47.8
Ofsted rating	<i>Outstanding</i>	14.6 (7)	14.2
	<i>Good</i>	66.7 (42)	52.5
	<i>Requires improvement</i>	8.3 (4)	12.7
	<i>Not available</i>	1.4 (5)	20.6
School sex makeup	<i>Mixed sex</i>	88.0 (44)	84.9
	<i>Girls only</i>	8.0 (4)	9.3
	<i>Boys only</i>	4.0 (2)	5.8

Table 3. Descriptive sample statistics.

Category	% (n) /mean (SD)	RSE coverage mean (SD)	Knowledge mean (SD)	Service awareness mean (SD)
<b>Overall mean</b>		2.668 (1.047)	3.265 (2.033)	2.466 (1.608)
<b>Attainment</b>	48.675 (9.342)			
<b>Deprivation</b>	0.1118 (0.097)			
<b>Gender</b>				
Boys	47.9 (3,335)	2.775 (1.052)	3.365 (2.064)	2.530 (1.627)
Girls	47.9 (3,334)	2.588 (1.039)	3.122 (1.983)	2.423 (1.587)
Non-binary	4.2 (290)	2.477 (1.011)	3.627 (2.114)	2.364 (1.572)
<b>Sexual orientation</b>				
Straight/heterosexual	80.1 (5,338)	2.734 (1.043)	3.230 (2.029)	2.535 (1.618)
Gay/lesbian	2.8 (184)	2.346 (1.040)	3.426 (1.950)	2.251 (1.642)
Bisexual/other	17.1 (1,139)	2.437 (1.027)	3.426 (2.065)	2.227 (1.528)
<b>Ethnicity</b>				
White	78.1 (4,880)	2.699 (1.034)	3.315 (2.027)	2.507 (1.603)
Minority-ethnic	21.9 (1,368)	2.559 (1.047)	3.215 (2.035)	2.367 (1.626)
<b>Family affluence scale</b>	6.867 (1.636)			
<b>Commitment</b>	2.458 (0.534)			

as girls (47.9%); the remaining students identified as non-binary (4.2%). Four-fifths (80%) of students reported a straight/heterosexual orientation. The average Family Affluence Scale score was near the middle of the range for this scale (6.867). On average, student commitment to school was high (2.458 out of 3). Seventeen students (0.24%) reported having had sex.

Mean student-reported RSE coverage was just under half of the items assessed. The mean knowledge score was 3.265 out of a maximum score of 11. The mean awareness of services score was 2.466 out of a maximum score of 5. The topics reported by more than 60% of students as being well/very well covered were, in descending order of coverage, body changes in puberty; conception; how the media affects how we think about our bodies; who to contact if experienced abuse; how to say no to something sexual that is unwanted and correct names for genitalia (Table 4). The topics reported by less than 30% of students to be well or very well covered were in descending order of coverage: sexual pleasure; readiness for intimacy or sex; how to use a condom; pornography including legal issues; what sexual activities are safe; female genital mutilation and masturbation. Other topic coverage lay between these extremes.

Differences by gender were especially apparent for sexual pleasure, where 31% of boys but 21% of girls and 20% of non-binary pupils reported this was well covered; masturbation, where 22% of boys but only 11% of girls and 15% of non-binary pupils reported this was well covered; what it means to be in love, where 53% of boys but 40% of girls and 31% of non-binary pupils reported this was well covered; and respectful behaviour, where 56% of boys but 47% of girls and 46% of non-binary pupils reported this was well covered. Student-reported priority topics included body changes in puberty, how to say no to something sexual that is unwanted, spotting signs of abuse in relationships, sexually transmitted infections and how to use a condom. In contrast, correct names for genitalia,

**Table 4.** Students reporting topics covered.

Topic	Students reporting covered well or very well % (n)	Students reporting topic is priority for learning % (n)
Body changes in puberty	73.1 (4,784)	19.4 (1,278)
Conception	7.8 (4,562)	11.7 (761)
How the media affects how we think about our bodies	64.2 (4,159)	8.8 (575)
Who to contact if experienced abuse	63.3 (4,099)	7.5 (487)
How to say no to something sexual that is unwanted	6.2 (3,931)	18.7 (1,229)
Correct names for genitalia	6.0 (3,917)	4.2 (276)
Sexual consent	56.0 (3,574)	9.6 (615)
Contraception options	55.6 (3,556)	11.9 (768)
Sharing naked photos including legal issues	53.3 (3,479)	9.1 (593)
Respectful vs unacceptable behaviour including sexual harassment	51.0 (3,312)	1.9 (713)
Spotting signs of abuse in relationship	47.8 (3,083)	21.4 (1,397)
What it means to be in love	45.9 (2,982)	15.1 (988)
Managing conflict and differences of opinion in relationships	4.6 (2,643)	6.0 (388)
Sexual and reproductive rights	38.7(2,511)	9.4 (614)
Sexually transmitted infections	32.0 (2,028)	19.9 (1,286)
Pregnancy options including abortion	31.9 (2,077)	8.8 (576)
Sexual pleasure	26.0 (1,629)	6.3 (399)
Readiness for intimacy or sex	22.9 (1,490)	13.6 (890)
How to use a condom	22.8 (1,381)	2.6 (1,280)
Pornography including legal issues	22.7 (1,460)	12.6 (816)
What sexual activities are safest	22.1 (1,393)	16.9 (1,078)
Female genital mutilation	2.6 (1,305)	8.3 (528)
Masturbation	16.3 (1,011)	11.7 (730)

managing conflict in relationships and sexual pleasure were least likely to be rated as priorities.

Table 5 reports single-predictor and multi-predictor models for RSE coverage. An unconditional model for this outcome had an ICC of 0.080. In single-predictor models, school-level attainment and deprivation did not significantly explain RSE coverage. However, both girls and non-binary pupils perceived RSE to be less well covered than did boys. Similarly, gay/lesbian students and bisexual/other students perceived RSE to be less well covered than heterosexual/straight students, as did minority-ethnic students compared to White students. Increasing family affluence was linked to greater perceived RSE coverage, as was school commitment. Findings were largely similar in a multi-predictor model; however, family affluence no longer significantly predicted perceived RSE coverage, and non-binary gender was no longer associated with the outcome.

Regarding knowledge (Table 5), an unconditional model for this outcome had an ICC of 0.100. School-level attainment and deprivation were not associated with knowledge. Girls had statistically lower knowledge than boys. Non-binary students had higher knowledge than boys but only in single-predictor models. Similarly, gay/lesbian and bisexual/other students reported statistically greater knowledge in single-predictor models, but differences were only significant for bisexual/other students in the multi-predictor model. Ethnicity and family affluence were not linked to knowledge, but students with higher school commitment reported statistically higher knowledge.

Table 5. Single-predictor and multi-predictor models for outcomes.

Variable	RSE coverage		Knowledge		Service awareness	
	Single-predictor $\beta$ (SE)	Multi-predictor $\beta$ (SE)	Single-predictor $\beta$ (SE)	Multi-predictor $\beta$ (SE)	Single-predictor $\beta$ (SE)	Multi-predictor $\beta$ (SE)
<b>Attainment</b>						
<b>Deprivation</b>	-.005 (.005)	-.005 (.005)	.002 (.007)	.001 (.008)	-.001 (.006)	-.004 (.006)
<b>Gender</b>	-.122 (.444)	-.151 (.423)	-.807 (.873)	-.665 (.965)	-.348 (.552)	-.276 (.537)
Boy/trans boy	Reference	Reference	Reference	Reference	Reference	Reference
Girl/trans girl	-.137 (.030)***	-.100 (.030)***	-.267 (.052)***	-.301 (.053)***	-.044 (.044)	-.001 (.043)
Non-binary	-.241 (.058)***	-.011 (.065)	.287 (.117)*	.056 (.132)	-.144 (.110)	.141 (.122)
<b>Sexual orientation</b>						
Straight/heterosexual	Reference	Reference	Reference	Reference	Reference	Reference
Gay/lesbian	-.310 (.080)***	-.306 (.083)***	.296 (.135)*	.230 (.136)	-.136 (.143)	-.112 (.146)
Bisexual/other	-.257 (.039)***	-.239 (.043)***	.226 (.061)***	.234 (.062)***	-.260 (.064)***	-.254 (.067)***
<b>Ethnicity</b>						
White	Reference	Reference	Reference	Reference	Reference	Reference
Minority-ethnic	-.086 (.037)*	-.099 (.038)**	-.115 (.069)	-.090 (.068)	-.082 (.058)	-.102 (.059)
<b>Family affluence scale</b>	.021 (.009)*	.014 (.009)	.016 (.019)	.024 (.019)	.021 (.127)	.008 (.014)
<b>School commitment</b>	.080 (.027)**	.067 (.026)*	.217 (.048)***	.204 (.048)***	.464 (.041)***	.458 (.041)***

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

For service awareness (Table 5), an unconditional model for this outcome had an ICC of 0.043. Most predictors in our analyses were non-significantly associated with lower service awareness. Only higher student family affluence and higher school commitment were significantly associated with higher service awareness. Students reporting bisexual/other sexual orientation were significantly lower in terms of service awareness than their peers. These findings were maintained in a multi-predictor analysis. Sensitivity univariate analyses categorising gender as cisgender male, cisgender female and trans/non-binary did not change the pattern of associations found in our primary analyses.

## Discussion

### *Summary of key findings*

Our findings provide new insights into the experience and unmet RSE needs of a large, diverse population of early adolescents in England. Overall student-reported RSE coverage was generally quite low, in line with previous research (Davies 2013; Duberstein Lindberg, Maddow-Zimet, and Boonstra 2016; Waling et al. 2020; Cheedalla, Moreau, and Burke 2020; Ekstrand et al. 2011; Izdebski et al. 2022). RSE coverage may have been lower than normal in this cohort of students because of disruption to schooling as a result of COVID-19 prevention measures, as has been found in previous research (Sex Education Forum 2022). These students experienced online-only learning for some of the winter months of 2020–21. It is also possible that some students who reported that topics were not well covered had been withdrawn from RSE teaching by their parents, although this is likely to involve a very small proportion of students consenting to participate in our survey. There was evidence that the most foundational RSE topics had higher, although not anywhere near 100%, coverage. For example, there was higher coverage of topics such as puberty the body, saying no, and safeguarding. There was lower coverage of topics concerned with sexual relationships, which few of the participants reported having embarked on (Lewis et al. 2017). It may be that lower coverage of topics such as sexual pleasure, pornography and masturbation reflects teachers' discomfort addressing such topics (Cumper et al. 2023), and perhaps giving priority for addressing topics covered by the Government guidance, which do not include masturbation or pleasure. Low coverage of female genital mutilation may reflect a perception in some schools in less diverse areas that this is not a concern in their local communities, but this is a required topic in English RSE. In some cases, low rates of reported coverage may have reflected students not being familiar with certain terms, such as 'masturbation'. Students themselves reported body changes in puberty, how to say no to something sexual that is unwanted, spotting signs of abuse in relationships, STIs and how to use a condom as priorities. This was despite some of these, such as body changes in puberty and how to say no to something sexual that is unwanted, being reported as already relatively well covered in RSE experienced to date. Others, such as how to use a condom, spotting signs of abuse in relationships and sexually transmitted infections, were not reported as previously well covered.

In line with previous research (Pound, Langford, and Campbell 2016; Haley et al. 2019; Pampati et al. 2021; Mata et al. 2022; O'Farrell, Corcoran, and Davoren 2021), we found that gay/lesbian and bisexual/other students reported lower RSE coverage than did heterosexual/straight-identifying students. Similarly, in line with existing research (L.

Coleman and Testa 2007a; Newby et al. 2012), we found that minority-ethnic students reported lower coverage than white students. Additionally, we found that girls reported lower coverage than boys and that higher school commitment was linked to greater perceived RSE coverage. While some of these differences may reflect school-level differences in RSE delivery, some may reflect differences between groups in the perceived adequacy of coverage.

Knowledge of RSE topics and school-based and local services were both generally low with the mean being below half the maximum score in both cases. In contrast to previous research (Westwood and Mullan 2006; Coleman and Testa 2008; Coleman and Testa 2007b), we found that girls had lower RSE-related knowledge overall than boys, which may provide further evidence that girls' needs are not being met in RSE. Furthermore, students identifying as bisexual/others reported greater knowledge than other students, which has not previously been reported in the literature. However, students reporting a bisexual/other sexual orientation reported significantly worse awareness of services than their peers, which may reflect that such students are not being engaged by this aspect of RSE teaching. Students with higher school commitment reported higher awareness of services, likely reflecting their greater engagement in lessons. The above findings cannot be attributed to knowledge of the impacts of school RSE.

### ***Limitations***

The schools involved in this study did not come from a random probability sample but had volunteered to participate in a randomised trial of an RSE intervention (which was delivered after the surveys reported here in half of the 50 schools) and hence wider generalisability is not claimed. These schools were less socio-economically disadvantaged and were rated by inspectors as performing better than other English schools, but other characteristics were broadly similar. Our sample of transgender students was not large enough to analyse separately, and we included these students with cisgender students of the same self-reported gender. Sensitivity univariate analyses categorising gender as cisgender male, cisgender female and trans/non-binary did not change the pattern of associations found in our primary analyses. Since ethnic categories were collapsed to white versus minority-ethnic, this prevented more nuanced analysis by ethnicity. We used the full item set for the Family Affluence Scale, but it was likely that scores were lower than typical because of the low rate of overseas holidays during the survey period due to the COVID-19 pandemic. The meaning of some of the items on our questionnaire, such as 'masturbation' may not have been clear to some students.

### ***Implications for policy and research***

Our results suggest that, at the point at which RSE was becoming a statutory requirement in schools in England, RSE coverage was variable by topic, with students overall reporting low coverage and knowledge of some topics. Internationally, it is recommended that RSE provides young people with information about and skills to deal with the sexual and emotional aspects of intimate relationships before they embark on such relationships and is inclusive of all learners (UNESCO and UNAIDS 2018). Although not all the topics examined in this study would necessarily need to be comprehensively addressed by the

time students are aged 12–13, our findings suggest that some important topics, such as how to report abuse, how to say no to something sexual that is unwanted, sexual harassment and the sharing of sexual imagery, were not as well covered for all students as might be expected by this age.

It may be that teachers need better selection, training and materials to ensure they are able to provide this learning and engage with challenging or potentially embarrassing topics without discomfort as well as more dedicated time within their timetable for teaching such topics comprehensively. RSE provision should ensure that content and teaching methods are oriented towards the needs of all students including girls, gender- and sexual-minority students and minority-ethnic students. Not doing so risks compounding existing health inequalities concerning adverse sexual health outcomes among these groups (Mercer et al. 2016; Macdowall et al. 2013; Wayal et al. 2017). We plan to repeat the survey in 2024 to explore how the reported RSE coverage evolves over time.

Our study did not aim to explain the processes underlying our quantitative findings. Qualitative research is needed to understand schools' and teachers' reasoning and motivation in delivering RSE, how school timetable and select staff to teach RSE and how they access materials to support this, particularly in the context of statutory guidance. Qualitative research should also explore how schools decide to sequence RSE lessons and topics and what factors affect how they decide to address important but sometimes controversial issues, such as pornography, female genital mutilation and abortion and early adolescents' views about how these should be addressed. In England, our trial will examine the feasibility and effectiveness of delivering a comprehensive RSE intervention during early adolescence, including the above questions related to implementation (Ponsford, Meiksin, et al. 2021).

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## Data availability statement

Once trial analyses are complete, the data will be available upon reasonable request to the principal investigator (CB). <https://www.lshtm.ac.uk/aboutus/people/bonell.chris>

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