

Improving teenagers' knowledge of emergency contraception: cluster randomised controlled trial of a teacher led intervention

Anna Graham, Laurence Moore, Deborah Sharp, Ian Diamond



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Abstract

Objective To assess the effectiveness of a teacher led intervention to improve teenagers' knowledge about emergency contraception.

Design Cluster randomised controlled trial.

Setting 24 mixed sex, state secondary schools in Avon, south west England.

Participants 1974 boys and 1820 girls in year 10 (14-15 year olds).

Intervention Teachers gave a single lesson on emergency contraception to year 10 pupils. The teachers had previously received in-service training on giving the lesson. The pupils were actively involved during the lesson.

Main outcome measures Questionnaires distributed to pupils at baseline and six months after the intervention assessed their knowledge of the correct time limits for hormonal emergency contraception and for use of the intrauterine device as emergency contraception, the proportion of pupils who were not virgins, the proportion who had used emergency contraception, and the pupils' intention to use emergency contraception in the future.

Results The proportion of pupils knowing the correct time limits for both types of emergency contraception was significantly higher in the intervention group than in the control group at six months' follow up (hormonal contraception: proportion of boys 15.9% higher (95% confidence interval 6.5% to 25.3%), girls 20.4% (10.4% to 30.4%); intrauterine device used as emergency contraception: boys 4.2% (0.7% to 7.7%), girls 10.7% (0.4% to 21.0%). The number of pupils needed to be taught for one more pupil to know the correct time limits was six for boys and five for girls. The intervention and control groups did not differ in the proportion of pupils who were not virgins, in the proportion who had used emergency contraception, and in the proportion intending to use emergency contraception in the future.

Conclusions The intervention significantly improved the proportion of boys and girls knowing the correct time limits for both types of emergency contraception. The intervention did not change the pupils' sexual activity or use of emergency contraception.

Introduction

In recent decades in England the age at which first sexual intercourse is reported as having occurred has declined steadily.¹ The conception rate among teenagers under 18 years old in England is among the highest in the developed world. Reducing this rate by a half by 2010 is a government priority.² Use of contraception has increased, including an increase since the 1980s in the use of condoms as the sole method of contraception, but it is generally accepted that much sex remains unprotected.³ Emergency contraception can be used when sex is unprotected or when other methods fail, for example when condoms split.

Emergency contraception is a safe, effective, and cheap way to prevent pregnancy.⁴⁻⁶ Appropriate use of emergency contraception could prevent up to 75% of unplanned pregnancies.⁷ Awareness of emergency contraception among school age pupils is high, but knowledge of specific details, such as timing, is poor.⁸

This study evaluated whether a teacher led lesson on emergency contraception could increase the proportion of pupils aware of the correct time limits for hormonal emergency contraception and use of the intrauterine device for emergency contraception. The teachers were trained before the lesson, which they gave to year 10 pupils (14-15 years old). The pupils were actively involved in the different components of the lesson.

Participants and methods

Recruitment and randomisation

Head teachers of all mixed sex, state secondary schools in the four local education authorities in the county of Avon were sent a letter in May 1999 inviting their school to participate in the study. To ensure that the control and intervention groups were balanced with respect to factors likely to influence the outcome, we used a minimisation strategy in randomising schools to the groups.⁹ These factors were the percentage of pupils entitled to free school meals, size of year group, whether sex education was taught by a tutor or specialised team of teachers, and whether sex education was taught mainly in year 9 or in year 10.

Intervention

The aims of the in-service training of the teachers were to improve their knowledge about emergency contra-

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Myths about emergency contraception discussed with teachers during the in-service training

- “Morning after” means you can use the pill up to 12 hours after unprotected sex
- You can use emergency contraception only once in a lifetime
- If you are under 16 and you get emergency contraception from your GP, your GP has to ask permission from your parents
- You have to pay for emergency contraception
- You can only get emergency contraception from a specialist family planning clinic
- Hormonal emergency contraception is a “mega” dose of hormone that works by poisoning you
- Hormonal emergency contraception is the only method of contraception that can be used after sex
- Emergency contraception always prevents pregnancy
- Contraception after unprotected sex is really the same as having an abortion
- Hormonal emergency contraception always makes you vomit

ception, to examine myths about the method (box), and to develop skills for use in a lesson for year 10 pupils on emergency contraception. The two hour training session was given by one of the authors (AG, who is trained in family planning) to teachers involved in delivering sex education at each school.

The content and delivery of the in-service training of teachers and the delivery by teachers of the lesson to pupils were piloted in one school in the area in the summer term of 1999. The lesson was taken from a resource produced for schools by Brook Advisory Centres.¹⁰ The scenario chosen for the pilot involved a young woman having unprotected sex while drunk on a Friday night (box).

Evaluation of the intervention

The outcome data comprised the pupils’ answers to a confidential, self completed questionnaire administered at baseline and to a similar follow up questionnaire six months later. The questionnaires included questions used in a previous study by one of the authors (AG) and in a concurrent study in Scotland.^{8 11} In schools in the intervention group, the teachers were trained and the pupils were given the lesson within two weeks of the baseline questionnaire. Schools in the control group received the intervention after the follow up questionnaire was completed. All the schools continued to deliver their usual sex education programme. The study was completed in the academic year 1999-2000.

Study outcomes and analysis of data

The primary outcome was the proportion of pupils able to identify correctly the 72 hour limit for use of hormonal emergency contraception. Secondary outcomes were knowledge of the correct time limit (five days) for the use of the intrauterine device as emergency contraception, the proportion of pupils who weren’t virgins, the proportion of pupils who had used emergency contraception, and the pupils’ intention to use emergency contraception in the

future. A regression analysis, weighted for schools rather than individuals, was used to analyse primary and secondary outcomes separately for boys and girls. The analysis was adjusted for baseline score and the four factors used in the minimisation strategy.¹²

Results

Participants

Of the 82 secondary schools in the four local education authorities in Avon, 49 were eligible to take part in the study, and 24 were recruited. Details of reasons why schools were excluded from the study or declined to take part are available on bmj.com. Numbers of pupils who completed the study are given in the figure, which shows the flow of pupils and schools through the study.

Schools eligible to take part in the study were similar to all state secondary schools in Avon when compared on factors important to the primary outcome. Schools declining to take part in the study were less likely, compared with schools agreeing to take part, to teach sex education to younger year groups or to use a specialised team of teachers. Schools in the control group had larger year groups and more specialist teams teaching sex education than schools receiving the intervention.

Effect of the intervention on the primary outcome

Tables 1 and 2 show the results of the intervention on the proportions of pupils knowing the correct time limit for hormonal emergency contraception. At six months’ follow up the proportion of pupils in the intervention group who knew the correct time limit was significantly higher than the proportion in the control group (boys 15.9% higher (95% confidence interval 6.5% to 25.3%, $P < 0.01$), girls 20.4% higher (10.4% to 30.4%, $P < 0.01$)). To examine the effect of absent pupils on the results, we did a sensitivity analysis assuming that all absent pupils at both baseline and

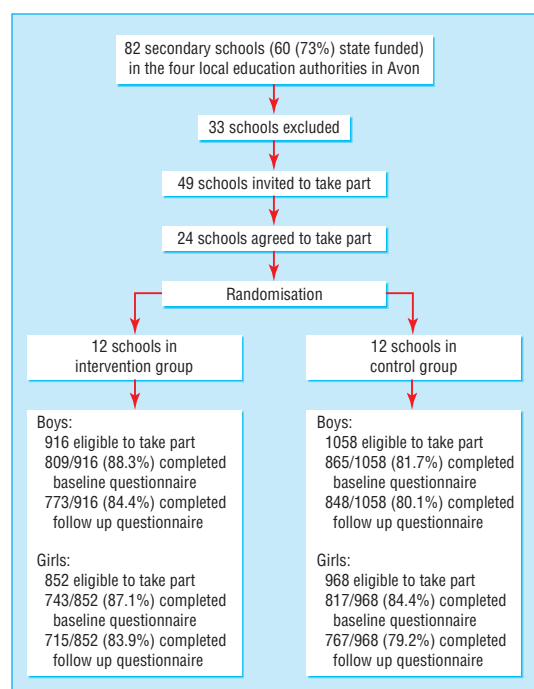
The scenario and quiz

The scenario used in the study was entitled “A weekend away.” It tells the story of Lorraine, who joins friends at the bus stop on Monday morning on her way to school. She had been at a disco on Friday night and met Mike, someone she had previously fancied. After drinking and dancing all evening she possibly had sex in the early hours of Saturday morning on the way home from the disco. She does not know what to do and is obviously very upset.

After the scenario was given, groups of four pupils (two boys and two girls) discussed a series of questions about Lorraine’s possible courses of action, including emergency contraception, and how her friends could help her. Each group then completed a quiz on emergency contraception. The questions in the quiz included:

- What is emergency contraception?
- Is it free?
- When can it be used?
- Where can people get it?
- How effective is it?
- What are the advantages and disadvantages?

The pupils were given a booklet with the answers after completing the quiz.



Flow of schools and pupils through the study

follow up in both groups did not know the correct time limit for hormonal emergency contraception. The results show that the intervention effect remained (boys 14.8% higher (6.6% to 23.0%, $P < 0.01$), girls 19.8% higher (12.0% to 27.6%, $P < 0.01$). The number of pupils needed to be taught for one more pupil to know the correct time limit was six for boys ($1/0.159=6.29$) and five for girls ($1/0.204=4.90$).

Secondary outcomes

Table 3 shows the effect of the intervention on the secondary outcomes. The proportion of pupils knowing the correct time limit for use of the intrauterine device as emergency contraception was significantly higher in the intervention group than in the control group (boys 4.2% higher (0.7% to 7.7%, $P=0.02$), girls 10.7% higher (0.4% to 21.0%, $P=0.04$). The proportion of pupils who were not virgins did not differ significantly between the groups, and of these pupils the proportion who said they had used emergency contraception did not differ significantly between the groups. There was no difference between the groups in the proportion of pupils intending to use emergency contraception in the future.

Discussion

A single lesson to pupils given by teachers who had previously been instructed by a general practitioner significantly increased the proportion of boys and girls knowing the correct time limit for hormonal emergency contraception, compared with a control group who did not receive the lesson until after the study. The lesson also increased the proportion of pupils knowing the correct time limit for use of the intrauterine device as emergency contraception.

Design of the study

Reviews of interventions in sexual health education aimed at young people concluded that the design of

such evaluations needed to be improved so that evidence of the effectiveness of different interventions could be generated.^{13 14} We believe our evaluation to be rigorously designed, with a defined focus and clear objectives.

Kirby et al state that active learning activities help pupils personalise information.¹⁵ Teachers need to feel confident enough to deliver such lessons. This “one off” intervention was limited in its ability to develop such teaching skills. However, our observations of a number of lessons in the course of the study led us to believe that active rather than didactic methods were used. There were some differences between the intervention and control groups at baseline. This did not, however, result in bias, because there were no real differences between the results of the adjusted and unadjusted analyses.

Analyses were done at the level of schools rather than individuals for two reasons: the intervention was delivered to clusters of pupils (schools), and the pilot lesson showed that pupils felt more confident completing the questionnaires without individual identification codes.

Our intervention showed no evidence of changed sexual behaviour—whether increased sexual activity or greater use of emergency contraception. It was important for us to show this lack of effect, in view of the ongoing debate on the effects of sex education and the argument that promoting the use of contraception encourages sexual activity.¹⁵

The schools in the study were similar to state schools in England generally in terms of standard measures of deprivation and academic attainment, but sex education in our schools was more likely than in schools nationally to be team led, which may reduce

Table 1 Percentages (numbers) of pupils at baseline and six months’ follow up knowing the correct time limit for hormonal emergency contraception, before and after sensitivity analysis*

	Baseline		Follow up	
	Intervention	Control	Intervention	Control
Before sensitivity analysis				
Boys	9.3 (75/809)	11.9 (103/865)	31.8 (233/733)	15.9 (135/848)
Girls	26.2 (195/743)	31.6 (258/817)	54.8 (392/715)	39.2 (301/767)
After sensitivity analysis				
Boys	8.2 (75/916)	9.7 (103/1058)	25.4 (233/916)	12.8 (135/1058)
Girls	20.1 (195/968)	30.3 (258/852)	40.5 (392/968)	35.3 (301/852)

*Assumes that all pupils who were absent at both baseline and follow up did not know the correct time limit.

Table 2 Weighted regression analysis* of difference between intervention and control groups in the proportion of pupils knowing the correct time limit for hormonal emergency contraception. Values are differences between the proportions (%) in the two groups (95% confidence interval)

	Increase of intervention group over control group ($P < 0.01$ for all)	
	Unadjusted	Adjusted†
Before sensitivity analysis‡		
Boys	12.9 (4.8 to 21.0)	15.9 (6.5 to 25.3)
Girls	15.8 (6.2 to 25.3)	20.4 (10.4 to 30.4)
After sensitivity analysis‡		
Boys	11.8 (4.1 to 19.5)	14.8 (6.6 to 23.0)
Girls	15.0 (5.8 to 24.1)	19.8 (12.0 to 27.6)

*Weighted for schools rather than individuals, using methods described by Donner and Klar.¹²

†Adjusted for baseline results, percentage of pupils entitled to free school meals, size of year group, whether sex education was taught by a tutor or a specialised team of teachers, and whether sex education was taught mainly in year 9 or 10.

‡The sensitivity analysis assumes that all pupils who were absent at both baseline and follow up did not know the correct time limit.

Table 3 Percentages (numbers*) of pupils in secondary outcomes at baseline and at six months' follow up

	Baseline		Follow up		Weighted regression analysis of difference between groups†	
	Intervention	Control	Intervention	Control	Difference (%)	95% CI
Pupils knowing correct time limit for use of the intrauterine device as emergency contraception						
Boys	2.2 (17/783)	3.7 (31/845)	7.1 (54/756)	3.5 (29/836)	4.2	0.7 to 7.7 (P=0.02)
Girls	4.6 (33/724)	5.1 (41/802)	21.1 (150/711)	9.9 (74/751)	10.7	0.4 to 21.0 (P=0.04)
Pupils who were not virgins						
Boys	19.1 (149/781)	19.3 (158/819)	26.6 (198/744)	26.0 (212/816)	-0.3	-6.2 to 5.6 (P=0.9)
Girls	20.5 (148/722)	23.0 (184/800)	28.5 (199/699)	29.5 (240/747)	0.8	-7.2 to 8.7 (P=0.8)
Pupils who were not virgins who said they had used emergency contraception						
Boys‡	18.8 (27/144)	24.2 (36/149)	20.1 (38/189)	15.6 (33/211)	-0.1	-8.9 to 8.7 (P=1.0)
Girls	29.0 (42/145)	29.1 (51/175)	32.3 (63/195)	35.9 (79/220)	-8.0	-20.8 to 4.7 (P=0.2)
Pupils intending to use emergency contraception in the future when contraception not used during intercourse§						
Boys	N/A	N/A	83.1 (629/757)	83.7 (689/823)	N/A	N/A
Girls	N/A	N/A	87.6 (621/709)	86.9 (652/750)	N/A	N/A

*Denominators exclude pupils not responding to that question.

†Weighted for schools rather than individuals, using methods described by Donner and Klar,¹² and adjusted for baseline results, percentage of pupils entitled to free school meals, size of year group, whether sex education was taught by a tutor or a specialised team of teachers, and whether sex education was taught mainly in year 9 or 10.

‡Boys' responses are likely to be less reliable than the girls', as girls will have accessed emergency contraception themselves.

§Question not asked at baseline.

the generalisability of the findings. However, this method of teaching may become more common, after a recent report from the Office for Standards in Teaching encouraged the use of teams.¹⁶ Even in the schools that already had this good practice, pupils' understanding of emergency contraception improved.

Usefulness of the intervention

Lack of awareness of correct time limits for use of emergency contraception is not the only factor preventing its use. It is likely that concerns about the safety of emergency contraception also act as a deterrent. Women seeking emergency contraception, as well as personal, social, and health education teachers, have been shown to have concerns of this nature.^{17, 18} Of 87 teachers in a survey undertaken in the study area, only 45 agreed with the statement "Using emergency contraception is safe."¹⁸

There is now some evidence that hormonal emergency contraception is more effective the sooner it is used after unprotected sexual intercourse.⁵ However, it remains effective—and is licensed for use—up to 72 hours after sex. Our study was undertaken before emergency contraception was made available over the counter.

An interesting question is whether the intervention effect lasts: whether the outcome is sustained over a longer period than six months, and how frequently the in service training would need to be repeated in order to continue to be effective.

Limitations of the study

The main limitation is that we did not evaluate health gains, as advocated by previous reviews.^{13, 14} Also, our sample size was too small to show a reduction in the rate of conceptions.

The change in the pupils' knowledge may not translate to a change in behaviour, as so many other factors undoubtedly play a role. However, educating teenagers on the time limits for use of emergency contraception after unprotected sex is more likely to have an impact on behaviour than, say, encouragement to use a condom.

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Competing interests: Schering Health Care provided, free of charge, samples of emergency contraception (hormonal and the intrauterine device) used in the lesson. AG has received fees from Schering Health Care for speaking at educational events.

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What is already known on this topic

Use of condoms as a sole method of contraception is increasing

Emergency contraception—either hormonal or the intrauterine device used as emergency contraception—can be used when condoms or other methods fail or are not used

Awareness of emergency contraception in school pupils is high, but knowledge of specific details, such as the time period within which it can be used, is poor

What this study adds

A single lesson on emergency contraception given by teachers who had previously been trained improves the proportion of pupils aware of the correct time limits for use of both types of emergency contraception

Such a lesson does not increase sexual activity or use of emergency contraception

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Increasing response rates to postal questionnaires: systematic review

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Abstract

Objective To identify methods to increase response to postal questionnaires.

Design Systematic review of randomised controlled trials of any method to influence response to postal questionnaires.

Studies reviewed 292 randomised controlled trials including 258 315 participants

Intervention reviewed 75 strategies for influencing response to postal questionnaires.

Main outcome measure The proportion of completed or partially completed questionnaires returned.

Results The odds of response were more than doubled when a monetary incentive was used (odds ratio 2.02; 95% confidence interval 1.79 to 2.27) and almost doubled when incentives were not conditional on response (1.71; 1.29 to 2.26). Response was more likely when short questionnaires were used (1.86; 1.55 to 2.24). Personalised questionnaires and letters increased response (1.16; 1.06 to 1.28), as did the use of coloured ink (1.39; 1.16 to 1.67). The odds of response were more than doubled when the questionnaires were sent by recorded delivery (2.21; 1.51 to 3.25) and increased when stamped return envelopes were used (1.26; 1.13 to 1.41) and questionnaires were sent by first class post (1.12; 1.02 to 1.23). Contacting participants before sending questionnaires increased response (1.54; 1.24 to 1.92), as did follow up contact (1.44; 1.22 to 1.70) and providing non-respondents with a second copy of the questionnaire (1.41; 1.02 to 1.94). Questionnaires designed to be of more interest to participants were more likely to be returned (2.44; 1.99 to 3.01), but questionnaires containing questions of a sensitive nature were less likely to be returned (0.92; 0.87 to 0.98). Questionnaires originating from universities were more likely to be returned than were

questionnaires from other sources, such as commercial organisations (1.31; 1.11 to 1.54).

Conclusions Health researchers using postal questionnaires can improve the quality of their research by using the strategies shown to be effective in this systematic review.

Introduction

Postal questionnaires are widely used to collect data in health research and are often the only financially viable option when collecting information from large, geographically dispersed populations. Non-response to postal questionnaires reduces the effective sample size and can introduce bias.¹ As non-response can affect the validity of epidemiological studies, assessment of response is important in the critical appraisal of health research. For the same reason, the identification of effective strategies to increase response to postal questionnaires could improve the quality of health research. To identify such strategies we conducted a systematic review of randomised controlled trials.

Methods

Identification of trials

We aimed to identify all randomised controlled trials of strategies to influence the response to a postal questionnaire. Eligible studies were not restricted to medical surveys and included any questionnaire topic in any population. Studies in languages other than English were included. Strategies requiring telephone contact were included, but strategies requiring home visits by investigators were excluded. We searched 14 electronic bibliographical databases (see bmj.com). Two reviewers independently screened each record for eligibility by examining titles, abstracts, and keywords. We searched the reference lists of relevant trials and reviews, and two journals in which the largest number of eligible trials had been published (*Public Opinion*



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