Limits of teacher delivered sex education: interim behavioural outcomes from randomised trial

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Limits of teacher delivered sex education: interim behavioural outcomes from randomised trial

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Abstract

Objective To determine whether a theoretically based sex education programme for adolescents (SHARE) delivered by teachers reduced unsafe sexual intercourse compared with current practice.

Design Cluster randomised trial with follow up two years after baseline (six months after intervention). A process evaluation investigated the delivery of sex education and broader features of each school.

Setting Twenty five secondary schools in east Scotland.

Participants 8430 pupils aged 13-15 years; 7616 completed the baseline questionnaire and 5854 completed the two year follow up questionnaire.

Intervention SHARE programme (intervention group) versus existing sex education (control group) versus existing sex education (control programme).

Main outcome measures Self reported exposure to sexually transmitted disease, use of condoms and contraceptives at first and most recent sexual intercourse, and unwanted pregnancies.

Results When the intervention group was compared with the conventional sex education group in an intention to treat analysis there were no differences in sexual activity or sexual risk taking by the age of 16 years. However, those in the intervention group reported less regret of first sexual intercourse with most recent partner (young men 9.9% difference, 95% confidence interval – 18.7 to –1.0; young women 7.7% difference, –16.6 to 1.2). Pupils evaluated the intervention programme more positively, and their knowledge of sexual health improved. Lack of behavioural effect could not be linked to differential quality of delivery of intervention.

Conclusions Compared with conventional sex education this specially designed intervention did not reduce sexual risk taking in adolescents.

Introduction

In Britain problems associated with young people's sexual health include high rates of teenage pregnancy, a rising incidence of sexually transmitted diseases, and unsatisfactory early heterosexual relationships. Comprehensive sex education is regarded as essential to complement the provision of sexual health services for young people.

Several overviews of sexual health programmes for adolescents have concluded that sex education can effectively affect behaviour, although the evidence comes almost entirely from quasi-experimental studies rather than randomised trials. One review found only nine randomised trials of school based sex education, and only one trial showed a significantly positive effect on behaviour. A review of sexual health interventions for primary prevention found that quasi-experimental studies show that interventions work and randomised trials show that they do not. However, recent findings from the United States have been more positive. No randomised trials in the United Kingdom have been reported, and only one large scale UK evaluation of school sex education has been published.

Sex education is more likely to influence behaviour if it is narrowly focused, has a clear behavioural message, and develops negotiation skills. A review of 12 HIV programmes based on psychological theory found them to be effective, but only one was school based. To date, school sex education has been delivered by teachers, outside experts, older pupils, or a combination of all three. As most UK secondary schools have teachers designated to deliver sex education as part of the curriculum, this is the most sustainable mode of delivery.

Between 1993 and 1996 a sex education programme delivered by teachers was developed for 13-15 year olds in Scotland. We used a randomised trial to evaluate the programme between 1996 and 1999.

SHARE programme

The SHARE intervention (Sexual Health and Relationships: Safe, Happy and Responsible) is a five day teacher training programme plus a 20 session pack: 10 sessions in the third year of secondary school (at 13-14 years) and 10 in the fourth year (at 14-15 years). It is intended to reduce unsafe sexual behaviours, reduce unwanted pregnancies, and improve the quality of sexual relationships. The programme was developed and piloted in Scotland over two years in consultation with teachers, sex education specialists, and education and health promotion departments.

The psychosocial and sociological theoretical basis of the programme has been set out previously. The programme combines active learning (for example, work in small groups and games), information leaflets on sexual health, and development of skills, primarily
Flow chart of participants; * indicates those for whom demographic data, including social class, were collected at follow up

Methods

Recruitment and randomisation of schools

We invited all 47 non-Catholic state schools within 24 km of the main cities in Tayside and Lothian regions (excluding pilot schools) to participate. Incentives offered were the full cost of the SHARE teacher training, including supply cover, or in the control arm, the equivalent funds (£2000-£2500) for personal and social education, except sex education. We recruited 25 schools and allocated them by balanced randomisation to deliver the intervention programme or to continue with their existing sex education. The main reason the 22 remaining schools gave for not participating was the practical difficulty envisaged in implementing the programme (for example, timetabling), but a few referred to the explicit nature of the programme and research.

Surveys

We developed a self completion questionnaire and validated it in five pilot schools. We recruited two successive cohorts of third year secondary school pupils (aged 13-14 years) in 1996 and 1997 and followed them up at the start of their fifth year (at 15-16 years), about six months after completion of the programme. Three pupils were excluded by teachers because of learning difficulties; others were excluded by only their own or their parents’ choice. Parents were informed by letter of the research and the intervention programme and were given the opportunity to withdraw their children. Researchers explained the study to individual classes and answered questions. Pupils had the option to withdraw or to omit questions they did not wish to answer. One education authority with nine study schools objected to some questions; this prevented us from asking about experience of pregnancy.

The questionnaires were administered in exam conditions with no teachers present. Pupils placed completed questionnaires, identified by study number only, in sealed envelopes. Absentees were followed up first within the school and then by post, while those who had left school at follow up were contacted by post.

Process evaluation

We carried out a process evaluation to understand enabling or confounding influences on either the delivery of the programme or its impact on pupils. We investigated the general school context, the extent and quality of delivery of the intervention and control programmes, and pupils’ responses to the programmes. We collected data through interviews, questionnaires, group discussions, and classroom observation.

Statistical methods

We calculated the sample size to have 80% power to detect a 33% decrease in the cumulative abortion rate by the age of 20 (at long term follow up) and a 28% decrease in the proportion not using a condom at first intercourse separately for each sex (at six months after the intervention). For the latter outcome we assumed that 27% of the control sample would first have sexual intercourse between the ages of 14 and 16 (and unpublished data from the national survey of sexual attitudes and lifestyles) and on 60% of these occasions no condom would be used, giving an overall rate of 16% for not using a condom at first intercourse. The sample size calculation assumed a design effect of 1.5.

We completed the analysis protocol and data checking blind to the arm of the trial. In all but one case we used a restricted randomisation test for differences between arms of the trial. We assigned the schools to arms of the trial by selecting an allocation that provided a good balance on all measures at school level. The randomisation test uses the set of the 20 000 possible allocations that might have been selected that allows confidence intervals to be calculated directly for the quantities of interest.

For the outcome of unwanted pregnancy (data unavailable in one local authority) we based tests and confidence intervals on the random effects logistic regression. Behavioural measures denoted by “after first year of programme” are those reported to have occurred since the Easter after baseline, by which time intervention pupils would have received the first half of the programme.


Results

Participant flow and follow up

The eligible population comprised pupils on school registers at the start of the programme. The figure shows the number and proportions of pupils who provided information at baseline (n=7616) and at follow up (n=5854). One school considered the baseline survey to be too explicit for pupils aged 13-14 years but took part in all other aspects of the study. The non-responders at baseline in the other schools (6%) were mainly persistent absentees, with only 32 pupils and seven parents refusing to take part.

The response rate to the questionnaire after the intervention was lower because some pupils had left school. From official figures we had predicted that about 20% of the sample would have left, but a new work experience scheme increased this to 27%. The response rate was lower for school leavers (41% control, 38% intervention) than for those still at school (82% control, 80% intervention). Non-response among those still at school was primarily among persistent absentees, but a small proportion refused to participate (2%). The response rates were similar in each arm of the trial.

Table 1 compares baseline data between arms of the trial for all pupils in the schools at baseline, and for those with follow up data. In both groups those with follow up data were more likely to come from higher social classes. A slight imbalance in the sex ratio was increased by a further small imbalance in follow up. Other baseline characteristics, including sex, age, experience in sex education, main subject, or seniority

Table 2 Comparison of arms of trial on sexual behaviour (restricted randomisation tests of school means, except for pregnancies). Figures are numbers* (percentage) of young people.

<table>
<thead>
<tr>
<th>Experience of sexual intercourse after 1st year (inexperienced before 1st year programme)</th>
<th>Intervention</th>
<th>Control</th>
<th>Difference (95% CI)</th>
<th>P value†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young men</td>
<td>258/1117 (23.6)</td>
<td>298/1246 (23.9)</td>
<td>-0.4 (-0.7 to 4.9)</td>
<td>0.89</td>
</tr>
<tr>
<td>Young women</td>
<td>423/1330 (31.8)</td>
<td>445/1350 (33.0)</td>
<td>-1.2 (-5.3 to 3.0)</td>
<td>0.59</td>
</tr>
</tbody>
</table>

First intercourse without condom after 1st year (inexperienced before 1st year programme)

| Young men | 57/1099 (5.2) | 70/1224 (5.7) | -0.5 (-2.5 to 1.5) | 0.63 |
| Young women | 127/1309 (9.7) | 120/1320 (9.1) | 0.6 (-1.9 to 3.1) | 0.66 |

Any evidence of sex unprotected against STDs ever (whole follow up sample)

| Young men | 175/1252 (14.0) | 191/1376 (13.9) | 0.1 (-2.1 to 2.3) | 0.93 |
| Young women | 364/1534 (23.7) | 337/1520 (22.2) | 1.6 (-2.4 to 2.8) | 0.45 |

Mean score for condom use (1=never, 5=always) (sexually experienced)

| Young men | 3.80 (n=421) | 3.79 (n=451) | 0.0 (-0.2 to 0.2) | 0.93 |
| Young women | 3.57 (n=629) | 3.58 (n=623) | -0.1 (-0.3 to 0.1) | 0.55 |

Most recent intercourse without condom (sexually experienced)

| Young men | 142/423 (33.6) | 158/453 (34.9) | -1.3 (-5.9 to 3.3) | 0.60 |
| Young women | 288/644 (44.9) | 275/625 (44.0) | 0.9 (-5.7 to 7.4) | 0.81 |

Most recent intercourse with oral contraception, with or without condom (sexually experienced)

| Young men | 78/423 (18.7) | 96/453 (21.2) | -2.5 (-8.0 to 2.9) | 0.38 |
| Young women | 196/644 (30.4) | 175/625 (28.0) | 2.4 (-4.1 to 8.9) | 0.48 |

Unwanted pregnancies (young women given unmodified questionnaire)

| Young men | 48/1201 (4.0) | 35/916 (3.8) | 1.0 (0.6 to 1.8) | 0.91 |

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*Denominators exclude participants with missing outcome data and “don’t know” responses to questions about contraceptives.
†Confidence interval and P value from restricted randomisation test of school means except for unwanted pregnancies for which they are from random effects logistic regression adjusted for baseline characteristics.
‡Any report of sex without condoms for three specific events of intercourse or report of own pregnancy or that of girlfriend or answering less than “always” or “most of the time” to “How often did you ever use a condom?”
§Pregnancy deemed unwanted if young woman reported she did not want it or pregnancy had ended in termination; excludes nine schools where question could not be asked: tested by random effects regression.

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of teachers, were similar in both groups. According to the 1991 census data the baseline sample was representative of all 14 year olds in Scotland in terms of social class and family structure, though of course Catholic young people were under-represented.

Delivery of intervention

Initially 80 teachers were trained to deliver the intervention programme. Nearly all welcomed the training and preferred the intervention pack to the courses previously provided. In 10 of the 13 intervention schools almost all pupils received over 15 sessions, including those on sexual negotiation and use of condoms. In three schools timetabling and the low priority attached to sex education meant that most of the pupils did not receive this minimum package. In six schools timetabling constraints and teacher mobility led to non-trained teachers delivering the programme to a small minority of classes. Skills based sessions remained challenging even after training, and some teachers modified or cut them.

Sexual behaviour

Overall 41% of young women (1278/3090) and 31% of young men (890/2692) reported having had sexual intercourse by the two year follow up. There were no differences between the groups in any of the main behavioural measures defined in the protocol (table 2). Similar proportions of young men and women in both groups became sexually active after half the programme. For those with more than one partner there was evidence that those in the intervention group (especially young men) reported less regret at the timing of their first intercourse with their most recent partner, and fewer young men in the intervention group reported pressure at this event. This effect was more pronounced for those who were sexually experienced before the programme. The levels of regret and pressure in both groups were lower than those reported at baseline. Overall there were high levels of reported enjoyment of most recent sexual intercourse, with no difference between arms of the trial.

Pupils’ knowledge and evaluation of sex education

We calculated a mean score from eight questions on practical knowledge about sexual health. Pupils in the intervention arm were more knowledgeable than those in the control arm (table 5), with young men being less informed than young women in each arm. We also calculated a mean score from questions about how well sex education about five practical issues had been covered in school. Pupils in the intervention arm had higher scores (table 5).

Table 3 Young people who did not use condom at first intercourse (if this was after first year of programme) according to whether they were still at school. Figures are numbers (percentage) of participants

<table>
<thead>
<tr>
<th></th>
<th>Left school</th>
<th>Still at school</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>Young men</td>
<td>11/83 (13)</td>
<td>16/122 (13)</td>
</tr>
<tr>
<td>Young women</td>
<td>35/151 (23)</td>
<td>36/178 (20)</td>
</tr>
</tbody>
</table>

Table 4 Results for quality of sexual relationships by arm of trial. Figures are numbers* (percentage) of participants

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
<th>Difference (95% CI†)</th>
<th>P value†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regret of first sexual intercourse (first experience after 1st year of programme)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young men</td>
<td>211 (18.0)</td>
<td>249 (18.1)</td>
<td>-0.1 (-0.9 to 0.7)</td>
<td>0.98</td>
</tr>
<tr>
<td>Young women</td>
<td>361 (34.6)</td>
<td>381 (33.1)</td>
<td>1.6 (-0.1 to 3.2)</td>
<td>0.09</td>
</tr>
<tr>
<td>Regret of first sexual intercourse with most recent partner (experienced &gt;1 partner)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young men</td>
<td>157 (9.8)</td>
<td>170 (19.4)</td>
<td>-9.9 (-17.8 to -1.0)</td>
<td>0.02</td>
</tr>
<tr>
<td>Young women</td>
<td>304 (26.0)</td>
<td>285 (33.7)</td>
<td>-7.7 (-16.6 to 1.2)</td>
<td>0.09</td>
</tr>
<tr>
<td>Pressure at first sexual intercourse (first experience after 1st year of programme)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young men</td>
<td>242 (13.6)</td>
<td>274 (15.7)</td>
<td>-2.1 (-8.1 to 4.0)</td>
<td>0.52</td>
</tr>
<tr>
<td>Young women</td>
<td>402 (19.2)</td>
<td>415 (21.5)</td>
<td>-2.3 (-8.5 to 3.9)</td>
<td>0.49</td>
</tr>
<tr>
<td>Mean enjoyment of last sexual intercourse (scale strongly agree, 1 strongly disagree)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young men</td>
<td>184 (14.1)</td>
<td>198 (20.5)</td>
<td>-6.4 (-13.7 to 0.9)</td>
<td>0.09</td>
</tr>
<tr>
<td>Young women</td>
<td>326 (12.5)</td>
<td>318 (14.6)</td>
<td>-1.8 (-9.8 to 6.2)</td>
<td>0.60</td>
</tr>
<tr>
<td>*Denominators exclude participants with missing outcome data and “don’t know” responses to questions about regret.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>†Confidence interval and P value from restricted randomisation test of school means.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
behavioural interventions, however, it would be difficult
effects. If active volunteering is critical to the success of
required little attention or effort because there are no
personal and social education is perceived by pupils to
emphasise motivation, yet in UK secondary schools
Psychological models of the antecedents of action
require higher motivation to be successful, implying
distant to be remembered when needed.
Skills based exercises in 40-80 minute lessons might be
instance, family, local culture, and the mass media.
These results could be interpreted as evidence of the failure of the programme, the delivery, or the evaluation.

Programme
There are several reasons why this intervention programme might not affect sexual behaviour compared with conventional programmes. Firstly, more of the young people in our study used condoms than we had expected from data from the early 1990s. This corresponds with other recent findings and makes the further reduction of unsafe sex by a new programme much more challenging.

Secondly, the impact of a 20 period school sex education programme might be unimportant compared with long term and pervasive influences from, for instance, family, local culture, and the mass media. Skills based exercises in 40-80 minute lessons might be too short to develop sexual interaction skills and too distant to be remembered when needed.

A third possibility is that skills based lessons might require higher motivation to be successful, implying that participants should opt into an intervention. Psychological models of the antecedents of action emphasise motivation, yet in UK secondary schools personal and social education is perceived by pupils to require little attention or effort because there are no exams. If active volunteering is critical to the success of behavioural interventions, however, it would be difficult to recruit young men without innovative approaches.

Delivery
Possibly the intervention programme may be effective but was not delivered as intended. However, when we analysed our data taking into account the extent and quality of delivery of sex education (summarised above) we got the same results as the intention to treat analysis, suggesting that the lack of effectiveness cannot be attributed to differential quality of delivery.

The intervention might not have been delivered as well as an established programme that had been developed over years to suit teachers’ needs. However, the intervention programme was not perceived to have been imposed against teachers’ will: most had been consulted about participating in the trial and the training gave them a sense of ownership of the programme.

Discussion
In comparison with conventional sex education, a programme specially developed to incorporate current theories on behavioural change had a limited beneficial effect on the quality of relationships but no effect on use of condoms for the third of pupils who have had sexual intercourse by the age of 16 years. These results could be interpreted as evidence of the failure of the programme, the delivery, or the evaluation.

Table 5 Pupils’ knowledge about sexual health and evaluation of sex education by arm of trial. Figures are mean scores (number of participants*)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Control</th>
<th>Difference (95% CI)</th>
<th>P value†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young men</td>
<td>4.35 (n=1200)</td>
<td>3.66 (n=1343)</td>
<td>0.7 (0.2 to 1.2)</td>
</tr>
<tr>
<td>Young women</td>
<td>5.11 (n=1489)</td>
<td>4.66 (n=1489)</td>
<td>0.5 (0.1 to 0.9)</td>
</tr>
</tbody>
</table>

*Denominators exclude participants with missing data.
†Confidence interval and P value from restricted randomisation test of school means.
‡Range of scores from –8 (poor) to 8 (good).
§1—can’t remember any items, 6—all items very well covered.

Evaluation
At follow up only about one third of the respondents reported having had sexual intercourse and they are likely to be those who are least responsive to interventions delivered by teachers. The programme may have influenced the behaviour of the remaining two thirds of the sample, but this will be detected only in the planned future follow ups. Furthermore, our analysis did not distinguish between those who had received only the first year of the programme and those who had received the full two years before having sex.

Although the groups were well balanced, the design of the study could have been inadequate to detect real effects. Comparison with sex education in control schools might have obscured any effect if some control programmes also influenced behaviour. Furthermore, use of self assessments of sexual relationships as an outcome is problematic because the intervention may have changed perceptions or reporting, or both. However, the good internal consistency of our follow up data does not support this interpretation.

Finally, the intervention programme might have been effective with certain, as yet unidentified, subgroups, but the effects are obscured within the whole sample.

Conclusion
Our analysis does not suggest that the lack of impact on behaviour can be attributed to quality of delivery. The results imply that the potential for teacher

What is already known on this topic
Despite the widespread assumption that sex education delivered by teachers can reduce sexual risk taking in young people, there have been few randomised trials large enough to show this and none in the United Kingdom.

What this study adds
Improvements in teacher delivered whole class sex education have some beneficial effect on the quality of young people’s sexual relationships but do not influence sexual behaviour.
delivered, whole class sex education to influence sexual behaviour in adolescents might have already been reached by conventional provision. If behavioural change among this age group is a central objective of school sex education then it should be further refined and other means of delivery should be rigorously evaluated. The intervention programme was rated more positively by pupils than comparison programmes, led to greater practical knowledge about sexual health, and did not encourage earlier sexual activity. We are following up these young people to the age of 20 to assess any effect on the cumulative rate of sexual health, and did not encourage earlier sexual activity. We are following up these young people to the age of 20 to assess any effect on the cumulative rate of reporting bias or attrition.

We thank the young people and teachers involved for their cooperation and support and our administrators and fieldworkers for their conscientious work. We also thank the advisory committee and colleagues in the MRC Social and Public Health Sciences Unit and Applied Statistics Group, Napier University, for their advice and encouragement; Sally Macintyre for helping to design the study and supporting it throughout; Katrina Turner for collecting data on sexual health services; and Geoff Der and Izzy Butcher for their careful reading of the final draft.

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Contributors: DW, SS, CA, GMR, and GH designed the study, and MH and KB contributed to subsequent modifications. DW, CA, SS, MH, GMR, and GH designed the questionnaire, and KB helped adapt it for the follow up. MH, DW, and KB collected the data with assistance from GMR in fieldwork and GH in negotiating access. The outcome data were analysed and interpreted by GMR, MH, DW, and CA and the process data by DW, KB, MH, and GMR. DW and GMR drafted the paper, which all authors commented on. DW, GMR, and MH are the guarantors.

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Competing interests: DW, CA, and SS had a professional interest in the efficacy of the SHARE programme, having led in its design and published on its theoretical basis.