

Recent Evaluations of the Peer-Led Approach In Adolescent Sexual Health Education: A Systematic Review

CONTEXT: Peer-led interventions have become a popular method of providing sexual health education to adolescents, but the efficacy of this approach and the methodological quality of recent trials have not been systematically reviewed.

METHODS: Electronic and hand searches were conducted to identify quasi-randomized and randomized controlled trials of peer-led adolescent sexual health education published from 1998 to 2005. Studies were eligible if they had an appropriate comparison group, provided preintervention and postintervention data, and reported all outcomes. Study results were summarized and, where appropriate, pooled; in addition, 10 aspects of studies' methodological quality were assessed.

RESULTS: Thirteen articles met the inclusion criteria. Pooled, adjusted results from seven trials that examined the effects of peer-led interventions on condom use at last sex found no overall benefit (odds ratio, 1.0). None of the three trials that assessed consistent condom use found a benefit. One study reported a reduced risk of chlamydia (0.2), but another found no impact on STI incidence. One study found that young women (but not young men) who received peer-led education were more likely than nonrecipients to have never had sex. Most interventions produced improvements in knowledge, attitudes and intentions. Only three studies fulfilled all 10 of the assessed quality criteria; two others met nine criteria.

CONCLUSIONS: Despite promising results in some trials, overall findings do not provide convincing evidence that peer-led education improves sexual outcomes among adolescents. Future trials should build on the successful trials conducted to date and should strive to fulfill existing quality criteria.

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The sexual health of adolescents is a growing global public health issue. In developing countries, approximately 60% of new HIV infections occur among 15–24-year-olds,¹ and a similar proportion of pregnancies and births to adolescents are unintended.² In industrialized countries, the incidence of STIs among youth is increasing,³ and adolescent pregnancy is associated with poor social outcomes.⁴ These and other statistics have garnered adolescents attention as a group facing distinct issues.

Peer-led sexual health education is one means of addressing deficiencies in adolescent sexual health. Defined as the “teaching or sharing of information, values, and behaviors by members of similar age or status group,”⁵ peer-led sexual health education has been developed on the basis of two observations. First, the health beliefs and habits formed during childhood and adolescence are carried into adulthood;⁶ second, teenagers influence each other's attitudes and behavior.⁷ According to theory, peer educators may influence social behavior through their role as credible role models⁸ or as innovators.⁹ Moreover, peer-led education may be an approach by which young people, through partnerships, can define and tackle their own health needs.^{9,10}

Although several systematic reviews of adolescent sex-

ual health interventions have been conducted,^{11,12} to our knowledge only one has focused on peer-delivered health promotion interventions. Harden and colleagues reviewed outcome and process evaluations of peer-led interventions (half of them involving sexual health) from randomized and quasi-randomized controlled trials published through September 1998.¹³

Harden and colleagues also appraised the methodology of the trials. In systematic reviews, methodological appraisals generally evaluate four areas of potential systematic bias: selection bias (differences in comparison groups), performance bias (differences in the care provided, apart from the intervention being evaluated), attrition bias (differences in withdrawals from trials) and detection bias (differences in outcome assessment). The rationale and content of criteria for the assessment of these types of bias are similar across reviews.^{12–17}

While they were unable to reach robust conclusions regarding the effectiveness of peer-led interventions for young people, Harden and colleagues made a number of recommendations for the development and evaluation of such interventions.¹³ Although other guidelines for the development and evaluation of complex sexual health interventions have been devised,¹⁸ those of Harden and col-

leagues are, as far as we are aware, the only ones specifically developed to guide the development and evaluation of peer-led interventions for young people. Their criteria for intervention development were informed by the following perspectives: that young people should actively participate in meeting their own health needs,¹⁹ that adolescents are not a homogenous group with uniform needs⁷ and that peer-led health promotion is best delivered in the context of wider sociocultural and economic health promotion strategies.²⁰ In addition, the authors highlighted the importance of understanding the contribution that peer-led education can offer to wider health promotion strategies.

The criteria developed by Harden and colleagues were supported by findings from their review. First, echoing other authors,²¹ Harden and colleagues recommended that the health needs and views of the target group be assessed; they provided examples of how specific programs in their review used this information to tailor interventions to a particular context. Second, given the challenges that they identified within peer-led education interventions—including resource constraints, conflicting value systems and constraints on young people’s autonomy (especially in schools)—they recommended that the specific boundaries of working partnerships with young people be established prior to project implementation, such that the roles of researchers and youth are clearly defined. Third, they noted that evidence suggests that the beneficiaries of peer-led sex education include the peer educators themselves; thus, they recommended the evaluation of the effects that peer education has on peer educators, and of reciprocal education, in which each member of a target population alternates between being an educator and a recipient. Fourth, they recommended that both quantitative and qualitative methods (and if possible, an integration of the two) be used to evaluate outcomes and processes.* Fifth, they concluded that the important characteristics of peer educators are unclear and recommended that, to help elucidate the matter, authors describe how peer educators were recruited and selected. Finally, they recommended that young peoples’ views regarding the intervention, including negative views, be fully reported.

We conducted a systematic review and methodological appraisal of randomized and quasi-randomized controlled trials of peer-led sex education interventions. We also evaluated the extent to which Harden’s recommendations for the development and evaluation of peer-led interventions have been addressed in studies published since 1998.

*Several authors have subsequently made similar recommendations for all complex interventions, arguing that while quantitative outcome evaluations are essential, process evaluations, which often use qualitative methods, can help elucidate why an intervention may be implemented and received differently in diverse settings, whether failure of an intervention is due primarily to a problem inherent to the intervention or to implementation failure, and how contextual factors can influence an intervention (source: reference 11).

†The order of criteria in this article generally mirrors the order in which they appeared in the original guidelines and does not suggest any hierarchical level of importance.

METHODS

Eligibility Criteria and Methodological Appraisal

We examined all randomized and quasi-randomized controlled trials that evaluated interventions to promote adolescent sexual health using peer educators and that were published in 1998–2005. Any peer-led intervention intended to promote sexual health in any setting (e.g., health center, youth group, local extracurricular center, school) in high-, middle- or low-income countries was eligible. For inclusion in the review, studies had to have intervention and control groups, include adolescents aged 10–19 and be published in English.

In addition, studies were required to meet four methodological criteria: The studies had to include a control or comparison group whose social and demographic characteristics were similar to those of the intervention group, provide preintervention data for all groups, provide post-intervention data for all groups and report all outcomes. Primary outcomes of interest were the occurrence of pregnancy or STIs, age at first sex, number and types of sexual partnerships, condom use and contraceptive use. Relevant secondary outcomes were measures of knowledge of sexual health or contraceptive services; behavioral intentions regarding sex or contraceptive use; and attitudes about sex, sexual health or contraceptives.

To identify relevant studies, we searched the following databases: EMBASE, ERIC, PubMed, International Bibliography of Social Science, PsycINFO, specialized bibliographic registers, DoPHER and the Cochrane Central Register of Controlled Trials. We used the search terms “peers,” “adolescents,” “education” and “health promotion” in combination with the search strategy detailed in the *Cochrane Reviewers’ Handbook*.¹⁴ In addition, we contacted researchers, searched reference lists and hand searched all issues of the journals *Health Education and Behavior* and *Health Education Research* published in 1998–2005. The electronic records were scanned to identify potentially eligible studies. Because of resource constraints, we omitted unpublished works.

Given the similarity among existing guidelines for the methodological appraisal of randomized and quasi-randomized controlled trials,^{12,14–17} we used the criteria developed by the Evidence for Policy and Practice Information and Coordinating Centre,¹⁵ with additional criteria based on the Cochrane review guidelines.¹⁴ For each study, we determined whether the authors provided a clear statement of aims, whether the description of the study design provided sufficient detail to allow replication, whether there was a randomization process for allocation to different groups (even with quasi-randomized studies), whether the numbers of participants in the intervention and control groups were provided, whether preintervention and postintervention data for each group were provided, whether losses to follow-up were reported and whether outcome reporting related to the study aims.† We also examined whether all outcomes were evaluated for all participants and whether adjustments for cluster sampling

TABLE 1. Characteristics of randomized and quasi-randomized controlled trials assessing effects of peer-led sexual health education, 1998–2005

Study	Design and setting	Sample	Peer educators	Educational sessions
Aarons et al., 2000 ²⁵	Randomized trial; USA; school	582 youth aged 14–18; >50% low SES	Aged 15–17; recruited from nearby schools; training not specified	5 sessions, 45 minutes each
Agha and Van Rossem, 2004 ²⁶	Quasi-experimental; Zambia; school	416 youth aged 17–18; middle or higher SES	Aged 18–22; recruitment and training not specified	1 session, 105 minutes
Borgia et al., 2005 ²⁷	Randomized trial; Italy; school	1,697 youth aged 18; mixed SES	Aged 14–18; chosen by teacher; 5 days of training	5 sessions, 10 hours total
Brieger et al., 2001 ²⁸	Quasi-experimental; Ghana and Nigeria; community	3,585 youth	Educator characteristics and training not specified	5 months; number and length of sessions not specified
Caron et al., 2004 ²⁹	Quasi-experimental; Canada; school	1,422 youth aged 15–17	High school seniors aged 17–18; 25 hours of training	Not specified
DiClemente et al., 2004 ³⁰	Randomized trial; USA; community	522 youth aged 14–18	Aged 14–18; recruitment and training not specified	4 sessions, 16 hours total
Fisher et al., 2002 ³¹	Quasi-experimental; USA; school	1,532 inner-city youth aged 14–15	Aged 14–18; peer-nominated; trained at weekend workshop	3 weeks; number and length of sessions not specified
Kinsler et al., 2004 ³²	Quasi-experimental; Belize; school	150 youth aged 13–17; mixed SES	Aged 14–19; staff-selected; 32 hours of training	7 sessions
Mellanby et al., 2001 ³³	Quasi-experimental; UK; school	1,685 youth aged 13–14	Aged 16–17; selection and training not specified	4 sessions
Ozcebe and Akin, 2002 ³⁴	Quasi-experimental; Turkey; community	441 rural youth aged 15–24; low income	Aged 14–26; volunteers; 40 hours of training	Not specified
Smith et al., 2000 ³⁵	Quasi-experimental; USA; school	255 youth aged 14–15	Tenth graders; peer-selected; 36 hours of training	Not specified
Speizer et al., 2001 ³⁶	Quasi-experimental; Cameroon; community	12,000 youth	Selected based on scores on oral and written tests; 1 week of training	18 months; number and length of sessions not specified
Stephenson et al., 2004 ³⁷	Randomized trial; UK; school	469 youth aged 13–14	Aged 16–17; volunteers; 1 weekend plus 2 sessions of training	3 sessions, 45 minutes each

Notes: For inclusion, studies had to include a control or comparison group whose social and demographic characteristics were similar to those of the intervention group, provide preintervention data for all groups, provide postintervention data for all groups and report all outcomes. SES=socioeconomic status.

were made in clustered studies.

For the randomized controlled trials, we determined whether randomization and allocation concealment met the criteria of Jüni et al.²² Adequate approaches for randomization included use of a table of random numbers, coin tossing or computer generation of random numbers; inadequate strategies included systematic allocation, such as alternating the intervention assignment of clinic attenders. Allocation is generally considered adequately concealed if neither investigators nor subjects can foresee the latter's assignments; however, the nature of interventions reviewed here precluded the blinding of those providing or receiving interventions. Instead, we ascertained the blinding of the researchers who assessed outcomes. When necessary, we contacted authors for clarification of these and other study details.

We also assessed the extent to which Harden and col-

leagues' recommendations for the development and evaluation of peer-led interventions were addressed in study reports. For intervention development, we determined whether adolescents' health needs and views were assessed in the initial phases of intervention development, whether young people took an active role in developing the intervention, whether subgroups of adolescents provided input, whether the research looked beyond individual change and took the community into account, and whether the authors provided a clear statement regarding working boundaries between the youth and adults.

Similarly, we examined whether the studies fulfilled Harden and colleagues' recommendations for the evaluation of peer-led interventions. Specifically, we assessed whether the study used both qualitative and quantitative methods, whether it provided details about how peer leaders were recruited and selected, whether young people's

TABLE 2. Randomized and quasi-randomized controlled trials assessing effects of peer-led sexual health education, by adherence to Harden's recommendations on development of interventions

Study	Needs assessment	Youth input in development	Context of youth's lives	Part of wider strategy	Input from subgroups	Boundaries
Aarons et al. ²⁵	No†	Yes	Yes	Yes	Yes	No
Agha and Van Rossem ²⁶	Yes	No	u	Yes	No	u
Borgia et al. ²⁷	Yes	Yes	No	Yes	No	u
Brieger et al. ²⁸	No	Yes	Yes	Yes	No	Yes
Caron et al. ²⁹	u	No	No	Yes	No	No
DiClemente et al. ³⁰	Yes	Yes	Yes	Yes	No	u
Fisher et al. ³¹	Yes	u	Yes	Yes	Yes	u
Kinsler et al. ³²	Yes	Yes	No	Yes	No	u
Mellanby et al. ³³	No	No	Yes	Yes	No	u
Ozcebe and Akin ³⁴	No	No	u	Yes	Yes	u
Smith et al. ³⁵	Yes	Yes	Yes	Yes	No	u
Speizer et al. ³⁶	No	No	u	Yes	No	u
Stephenson et al. ³⁷	Yes	Yes	Yes	Yes	Yes	No

†Although a needs assessment was conducted, it was not thorough. Note: u=unavailable.

views were prioritized, whether the applicability of the peer-led method to the study population was critically examined, whether the relative contribution of the intervention to a broader health promotion strategy was explored, whether reciprocal peer education and the intervention's effects on peer leaders were examined, whether the quantitative and qualitative work were integrated and whether researchers engaged in skills sharing (e.g., whether those working on outcome evaluations used data from process evaluations to explain findings).

Other Analyses

We performed a narrative analysis, describing studies according to the use, training and recruitment of peers, composition of target population, intervention site, intervention components, theoretical basis and outcome findings. We used random effects meta-analysis to estimate pooled effects when four or more studies used the same outcome measure; odds ratios were calculated using results from final follow-up. For cluster randomized controlled trials that did not provide an intraclass correlation coefficient (a measure of consistency for a data set that has multiple groups), the results were adjusted using a conservative value of 0.05 for rho. Analyses were conducted using STATA 9 and Review Manager 4.2.

We examined heterogeneity by using the I^2 test for consistency (an I^2 value of 0.75 or greater indicates that variability across studies is due to heterogeneity rather than chance).²³ We explored the effect of methodological diversity on heterogeneity (i.e., variance of the studies between methodological quality and Harden's methodological and reporting recommendations, such as setting,

session lengths and peer responsibilities).¹⁴ Finally, to examine effects of smaller studies and explore the possible presence of publication bias, we created a funnel plot.^{*14,24}

RESULTS

Search Results

The combined searches yielded 4,500 electronic records. We screened these records for eligibility and obtained 33 articles for further assessment. Thirteen of the 33 articles met all four core methodological inclusion criteria and were included in the review;^{25–37} nine were quasi-experimental and four were randomized controlled trials (Table 1, page 91). Modes of evaluation were questionnaire, interview, survey and (in the studies testing for STIs) vaginal swab testing (not shown). Eight of the studies were conducted in developed countries, mainly the United Kingdom and the United States, and three of the five remaining studies were set in Africa. Nine studies were conducted in school settings and four were community based (e.g., health center).

Peer leaders ranged in age from 14 to 26. Several studies tried to balance the proportion of male and female peer educators, but those that relied on volunteer peer educators tended to have more females than males (not shown).

Methodological Quality

Only three studies met all 10 of the quality criteria.^{30,31,37} Two met nine criteria, in both cases failing to provide an intraclass correlation coefficient.^{34,35} Two studies did not provide a clear definition of aims,^{25,29} and two lacked sufficient description of the study design and intervention to allow replication.^{27,36} Random allocation was noted in all but three trials.^{29,32,33} Ten studies evaluated all participants; the others assessed outcomes in a random sample.^{26,28,36} Three studies did not report attrition by group.^{28,32,36} All of the studies reported results for each outcome measure and provided the number of participants per condition as well as pre- and post-intervention data.

Cluster sampling was used in all 13 studies. Effects of cluster sampling were taken into account in seven studies: Three used intraclass correlation coefficients,^{27,32,33} while

*Smaller studies provide less precision and have larger standard errors than bigger studies do. Therefore, plotting the standard error of the log odds ratio against the reported log odds ratio tends to yield widely scattered points for smaller studies, and points close to the plot's midline for larger studies. In the absence of bias, the resulting plot may look like a symmetrical inverted funnel. Possible causes of asymmetrical funnel plots include not only publication bias but also poor methodological quality in smaller studies, true heterogeneity, artifacts and chance (source: Tang JL and Liu JL, Misleading funnel plot for detection of bias in meta-analysis, *Journal of Clinical Epidemiology*, 2000, 53(5):477–484).

TABLE 3. Randomized and quasi-randomized controlled trials assessing effects of peer-led sexual health education, by adherence to Harden's recommendations on evaluation of future interventions

Study	Mixed research methods	Recruitment/ selection described	Effects of being peer educator	Reciprocal peer education	Prioritized youth's views	Applicability examined	Contribution to wider health promotion	Integrated techniques	Skills sharing
Aarons et al. ²⁵	No	No	No	No	No	Yes	Yes	No	No
Agha and Van Rossem ²⁶	Yes	No	No	No	Yes	No	Yes	No	No
Borgia et al. ²⁷	Yes	Yes	No	No	u	No	Yes	Yes	No
Brieger et al. ²⁸	Yes	No†	No	No	Yes	Yes	Yes	Yes	No
Caron et al. ²⁹	No	No	Yes	No	No	No	Yes	No	No
DiClemente et al. ³⁰	Yes	No	No	No	u	Yes	Yes	Yes	No
Fisher et al. ³¹	No	Yes	No	No	Yes	Yes	Yes	No	No
Kinsler et al. ³²	No	Yes	No	No	No	Yes	Yes	No	No
Mellanby et al. ³³	No	No	No	No	u	Yes	Yes	No	No
Ozcebe and Akin ³⁴	No	No	No	No	No	No	Yes	No	No
Smith et al. ³⁵	Yes	Yes	Yes	No	u	Yes	Yes	No	No
Speizer et al. ³⁶	No	Yes	Yes‡	No	No	No	Yes	No	No
Stephenson et al. ³⁷	Yes	Yes	Yes‡	No	Yes	Yes	Yes	Yes	No

†Recruitment and selection were not described thoroughly. ‡Findings presented in a separate article. Note: u=unavailable.

the other four mentioned adjustment for clustering effects but did not provide the coefficient.^{29-31,37}

Two of the four randomized controlled trials had adequate allocation sequence and concealment.^{30,37} The blinding of outcome assessors was not reported in any study.

Development and Evaluation Criteria

None of the studies fulfilled all of Harden and colleagues' recommendations for intervention development (Table 2, page 92). Seven reported assessing youth health needs and views,^{26,27,30-32,35,37} and the same number involved young people in the development process^{25,27,28,30,32,35,37} or took context into account.^{25,28,30,31,33,35,37} All of the studies reported targeting the individual as well as broader sociocultural or economic factors. Four studies sought input from subgroups of youth.^{25,31,34,37} Establishment of boundaries between peers, adults and research staff was described in only one study.²⁸

Similarly, no study met all nine of Harden and colleagues' recommendations for evaluation of interventions (Table 3). Six studies used a mix of quantitative and qualitative methods,^{26-28,30,35,37} and an identical number detailed the peer recruitment and training process.^{27,31,32,35-37} Four studies referred to the effects of being a peer educator,^{29,35-37} though none examined reciprocal peer education. Four studies reported prioritizing the views of young people.^{26,28,31,37} Applicability of peer education to high-risk groups was discussed in eight studies.^{25,28,30-33,35,37} All of the studies discussed the relative contribution to community well-being that sexual health education would make. Four studies integrated quantitative and qualitative methods;^{27,28,30,37} none utilized skills sharing.

Intervention Effects

Eleven of the reviewed studies assessed contraceptive usage, in most cases condom usage; several also examined other behavioral outcomes. Some of the studies measured

outcomes at multiple time points; we focused on results reported at final follow-up.

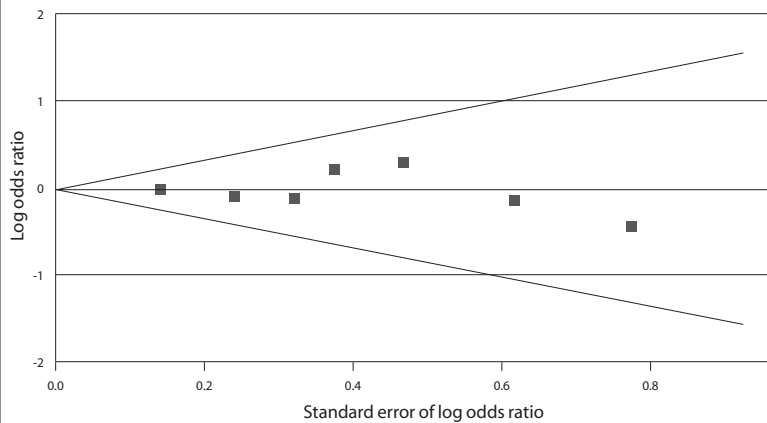
Eight studies measured condom use at last intercourse. For the cluster studies that did not provide an intraclass correlation coefficient, we adjusted the odds ratios reported by the authors. However, the report by Aarons and colleagues²⁵ did not provide the number of participants of each gender; without that information, we could not adjust the odds ratio for clustering. * For the remaining seven studies, the pooled odds of condom use at last intercourse were 1.1 (95% confidence interval, 0.9-1.2). After adjustment for clustering, the effect estimate was 1.0 (Table 4). The I² value for these studies was 77% (not shown). The funnel plot for these studies is nearly symmetrical (Figure 1, page 94); the symmetry would be more apparent if the plot included more data points. Nevertheless, the figure shows the larger studies (represented by the three leftmost points) falling close to the midline, while the smaller studies (the remaining points) are farther from the midline. This reveals that the small studies did not show a greater treatment effect than the larger, more precise studies.

The heterogeneity of studies did not fall below 75% when they were examined in subgroups according to methodological quality criteria or to most of Harden's criteria (not shown). The exception was for the subgroup of studies that had detailed the recruitment and selection

TABLE 4. Adjusted odds ratios (and 95% confidence intervals) of condom use at last sex in randomized and quasi-randomized controlled trials

Study	No. of subjects	Odds ratio
Agha and Van Rossem ²⁶	193	0.55 (0.12-2.47)
Borgia et al. ²⁷	653	1.03 (0.78-1.36)
Brieger et al. ²⁸	569	1.28 (0.63-2.60)
DiClemente et al. ³⁰	460	1.34 (0.56-3.17)
Smith et al. ³⁵	51	0.98 (0.29-3.26)
Speizer et al. ³⁶	816	0.99 (0.54-1.80)
Stephenson et al. ³⁷	2,112	1.00 (0.60-1.67)
All studies		1.04 (0.85-1.28)

Note: Odds ratios are adjusted for cluster effects.

FIGURE 1. Funnel plot of relationship between the log odds ratio of intervention effect on condom use at last sex and standard error of log odds ratio

Note: From left to right: Borgia et al.,²⁷ Stephenson et al.,³⁷ Speizer et al.,³⁶ Brieger et al.,²⁸ DiClemente et al.,³⁰ Smith et al.,³⁵ and Agha et al.²⁶

process of the peer leaders; these had an I^2 value of 0.

Three studies reported findings regarding consistent condom use (not shown).^{29,30,35} None of these three showed statistically significant effects, although the 95% confidence intervals for the odds ratios were very wide.

Other behavioral measures assessed in the studies were number of partners, sexual activity and incidence of STIs (not shown). One study showed a clear reduction in the risk of testing positive for chlamydia (odds ratio, 0.17; 95% confidence interval, 0.03–0.92),³⁰ but another found no impact on STI incidence.³⁵ Aarons and colleagues reported an increase in the odds that female adolescents had never had sex (1.88, 1.02–3.47); no effect was observed among males.²⁵ Other studies failed to show clear evidence of benefit in reducing the number of regular or casual partners,²⁶ recent partners³¹ or unintended pregnancies.³⁷

All 13 studies assessed knowledge, attitudes or intentions (not shown). Twelve of the studies measured knowledge of the information provided by peer educators, including information about STI symptoms, types of contraceptives, how to use condoms, and means of HIV transmission and prevention;^{25–28,30–37} all but two^{32,33} of these studies showed improvements in knowledge. Moreover, all 10 of the studies that assessed attitudes and intentions reported positive effects.^{25–29,31–33,35,37}

DISCUSSION

This paper provides an overview of peer-led sex education interventions published in 1998–2005. Overall, we found no clear evidence that peer-led sex education promotes condom use or reduces the odds of pregnancy or of having a new partner. However, study results were highly heterogeneous, suggesting that there may be real differences in the effects of interventions included in the review. One study reported a statistically significant reduction in chlamydia incidence,³⁰ and another showed an increase in the odds that female participants had never had sex.²⁵ Both studies were randomized controlled trials and ful-

filled all but one of the methodological criteria (blinding of the outcome assessors was not reported).

Most of the studies found positive effects on measures of knowledge, attitudes and intentions. These results should be viewed cautiously, however, as it was not always clear how many variables were measured and whether the length of time between intervention exposure and outcome assessment was consistent among all studies.

Another reason for caution is that the methodological quality of studies was generally poor. Only 13 of 33 potentially eligible studies fulfilled the four basic methodological inclusion criteria. Even among the studies included in the review, just three met all of Harden and colleagues' quality criteria.^{30,31,37} The low methodological quality suggests the potential for bias in the study results.

No study addressed all of Harden and colleagues' recommendations for the development and evaluation of peer-led sexual health interventions. Although nearly all of the studies examined the interventions' applicability to high-risk groups and their relative contribution to broader health strategies, each of the remaining criteria was met by fewer than half of the studies.

In general, the high level of heterogeneity across studies was not reduced by subgroup analysis according to quality criteria or fulfillment of Harden and colleagues' recommendations, perhaps because different sources of heterogeneity were acting in different directions. However, in the analysis by selection and recruitment process for peer educators, four studies showed homogeneity ($I^2=0$).^{27,35–37} The peer recruitment methods used in these four studies varied, so it is not clear why the studies were homogeneous. The finding could be a statistical artifact, and should be reassessed in future systematic reviews.

Our review had a number of limitations. In making adjustments for clustering, we used a conservative value of rho; however, this did not influence the main findings, as both the adjusted and unadjusted 95% confidence intervals of the odds ratio for condom use at last sex included 1.0. Because of resource constraints, data in this review were extracted by only one reviewer; use of a second reviewer would have reduced the risk of error and subjectivity. Most authors did not respond to requests for missing information, and therefore the review reflects the information provided in published reports; the degree to which these reports correspond to how the studies were conducted cannot be ascertained. The assessment of whether studies addressed Harden and colleagues' recommendations was inevitably subjective for some factors and represents a limitation in using these recommendations to evaluate peer-led sexual health interventions. Only published studies were reviewed, which could bias the results toward interventions that have shown changes in outcome. Finally, there were insufficient studies using the same outcome measures to use regression to robustly assess the impact of study quality and bias, intervention components or adherence to Harden's recommendations on efficacy.

Implications and Recommendations

Fulfillment of the four core methodological criteria should be a standard in future research and program development. Although the randomized controlled trial design, which can show a causal association, is the “most rigorous way to evaluate the effectiveness of an intervention,”³⁸ it is vital that such trials be of high methodological quality. Cluster sampling calculations should be part of the trial design, and analysis should demonstrate similarity among the groups assessed.

Harden and colleagues’ recommendations emerged from an analysis of the key issues, problems and gaps in peer-led interventions and their evaluation. Authors should address these recommendations or explain why they have not done so. For example, assessment of youth health needs and views would be a rational and essential component of the initial phase of project development, as identifying youths’ needs would help in determining whether peer delivery is an appropriate method. Yet only half of the studies in this review assessed youth health needs and views. Similarly, only a few studies have evaluated how interventions affect peer leaders.^{39,40}

Although we focused on outcome evaluations in this review, process evaluations are also important. Process evaluations can assess the full impact of interventions on adolescents and peer leaders,³⁸ and can be instrumental in developing these programs by ascertaining youth health needs and views. Process and outcome evaluations are complementary and should be implemented in all evaluations in order to attain a full overview of a program’s effects.

Finally, although most of the studies examined in this review did not find unambiguous support for peer-led interventions, we believe that this approach should not be abandoned but rather fine-tuned. Because the peer-led approach seemed to hold so much promise, interventions were sometimes designed without much thought to the details. Given that the jump from theory to practice was not quite successful, researchers should look back on the shortcomings of prior studies, and place greater emphasis on details of intervention design, when creating, implementing and evaluating future peer-led programs.

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RESUMEN

Contexto: Las intervenciones conducidas por pares se han convertido en un método popular en la educación sexual a adolescentes, pero la eficacia de este enfoque y la calidad metodológica de ensayos recientes no han sido revisadas de manera sistemática.

Métodos: Se condujo una serie de búsquedas electrónicas y manuales para identificar los ensayos controlados cuasi-aleatorios y aleatorios de actividades de educación en salud publicados de 1998 a 2005. Los estudios fueron elegibles si tenían un grupo de comparación apropiado; si proporcionaban datos de pre- y post-intervención; y si reportaron todos los resultados. Se hizo un resumen de los resultados del estudio y, cuando fue apropiado, se los combinaron; adicionalmente, se hizo una evaluación de 10 aspectos de la calidad metodológica de los estudios.

Resultados: Trece artículos cumplieron con los criterios de inclusión. Los resultados combinados y ajustados de siete ensayos que examinaron los efectos de intervenciones conducidas por pares sobre el uso del condón en la última relación sexual no encontraron algún beneficio (razón de momios, 1.0). Ninguno de los tres ensayos que evaluaron el uso consistente del condón encontró un beneficio. Un estudio reportó una reducción de riesgo de clamidia (0.2), pero otro no encontró impacto en la incidencia de ITS. Un estudio encontró que las mujeres jóvenes (pero no los hombres jóvenes) que recibieron educación conducida por pares tuvieron

menor probabilidad que las que no la recibieron de haber tenido alguna vez relaciones sexuales. La mayoría de las intervenciones produjo mejoras en conocimientos, actitudes e intenciones. Solamente tres estudios cumplieron con los 10 criterios de calidad evaluados; otros dos cumplieron con nueve criterios.

Conclusiones: A pesar de los resultados promisorios en algunos ensayos, los hallazgos generales no proporcionan evidencia convincente de que la educación conducida por pares mejore los indicadores de salud sexual en adolescentes. Futuros ensayos deben basarse en los ensayos exitosos conducidos a la fecha y deben tratar de cumplir con los criterios de calidad existentes.

RÉSUMÉ

Contexte: Les interventions menées par les pairs représentent aujourd'hui une méthode prisée d'apport de prestations d'éducation à la santé sexuelle aux adolescents. L'efficacité de l'approche et la qualité méthodologique d'essais récents n'ont cependant pas fait l'objet d'un examen systématique.

Méthodes: Des recherches électroniques et manuelles ont été effectuées pour identifier les essais comparatifs quasi-aléatoires et aléatoires d'éducation par les pairs à la santé sexuelle des adolescents publiés de 1998 à 2005. Les études admises devaient comporter un groupe témoin approprié, présenter des données pré- et post-intervention et rapporter toutes les issues. Les résultats de l'étude ont été résumés et, dans la mesure où il convenait de le faire, groupés; 10 aspects de qualité méthodologique des études ont aussi été évalués.

Résultats: Treize articles se sont avérés conformes aux critères d'inclusion. Les résultats ajustés groupés de sept essais portant sur les effets d'interventions menées par les pairs sur l'usage du préservatif lors des derniers rapports sexuels n'ont révélé aucun avantage global (rapport de probabilités, 1,0). Aucun des trois essais d'évaluation d'usage constant du préservatif n'a révélé d'avantage. Une étude a signalé un risque réduit de chlamydia (0,2), mais une autre n'a constaté aucun effet sur l'incidence des IST. Une étude a conclu que les jeunes femmes (mais pas les jeunes hommes) qui avaient reçu une éducation menée par leurs pairs étaient moins susceptibles d'avoir jamais eu de rapports sexuels. La plupart des interventions ont produit une amélioration de la connaissance, des attitudes et des intentions. Trois études seulement ont satisfait aux 10 critères de qualité évalués; deux autres ont satisfait à neuf.

Conclusions: Malgré les résultats prometteurs de certains essais, les résultats globaux n'apportent pas d'indices convaincants quant aux effets bénéfiques de l'éducation par les pairs sur les issues sexuelles des adolescents. Les essais à venir devront renforcer les succès remportés à ce jour tout en cherchant à satisfaire aux critères de qualité existants.

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