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Effectiveness of peer education interventions for HIV prevention, adolescent pregnancy prevention and sexual health promotion for young people: a systematic review of European studies

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Abstract

Peer education remains a popular strategy for health promotion and prevention, but evidence of its effectiveness is still limited. This article presents a systematic review of peer education interventions in the European Union that were published between January 1999 and May 2010. The objective of the review is to determine the effectiveness of peer education programs for human immunodeficiency virus (HIV) prevention, adolescent pregnancy prevention and promotion of sexual health among young people. Standardized methods of searching and data extraction were utilized and five studies were identified. Although a few statistically significant and non-significant changes were observed in the studies, it is concluded that, overall, when compared to standard practice or no intervention, there is no clear evidence of the effectiveness of peer education concerning HIV prevention, adolescent pregnancy prevention and sexual health promotion for young people in the member countries of the European Union. Further research is needed to determine factors that contribute to program effectiveness.

Introduction

Peer education, defined as 'the teaching or sharing of health information, values and behaviours by members of similar age or status' [1], has become a popular strategy for health promotion and prevention in recent years. Peer education programs can be used in diverse populations and ages. However, these programs have been mostly used for work with young people, based on the assumption that the young person's peer group has a strong influence on the way he or she behaves. Young people learn from and influence each other, as much in risky as in safe behaviours [2, 3].

It is considered that peer education has some advantages over other sexual and reproductive health promotion methods. Among them, there is the perceived credibility of peer educators for the target group. The fact of sharing background, interests and use of language would facilitate the transfer of information. Another advantage is that young people tend to talk with their peers about most subjects, including sensitive issues such as reproductive health and human immunodeficiency virus (HIV). This is because youth peer educators are not seen as an authority telling them how to behave, but as another member of their own group. A related advantage of this method is that it promotes among the peer educators positive life skills such as leadership and communication skills and allows the participation of young people in activities that affect them [2].

Although peer education has been applied in different areas, it is possible to highlight HIV prevention and sexual health by the number of implemented programs and the enthusiasm with which the method has been adopted. As a result of its

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popularity, there have been also increasing efforts to synthesize the evidence from existing programs to produce a better guide for decision-making and program planning [3]. To the author's knowledge, four systematic reviews have been conducted targeting effectiveness of peer education for sexual health promotion. Harden *et al.* [4] conducted a systematic review about effectiveness and adequacy of peer education regarding adolescent health promotion, where 49 outcome evaluations and 15 process evaluations were included (half of them about sexual health). Although the results of the study showed some evidence supporting effectiveness of peer education for the promotion of healthy behaviour, few of the evaluations attained the necessary methodological quality to produce reliable conclusions. Kim and Free [5] published a systematic review and meta-analysis of 13 peer education programs about sexual health in adolescents in countries of low, middle and highincome. No clear evidence of positive effects by the programs was found. With a focus on developing countries, Medley *et al.* [6] performed a systematic review and meta-analysis concerning effectiveness of peer education for HIV prevention. The analysis of the 28 included studies indicates that the peer education programs were moderately effective at improving behavioural outcomes, such as increasing knowledge regarding HIV or increasing the use of condoms, but had no significant impact on biological outcomes, such as sexually transmitted diseases (STDs). Matticka-Tyndale and Barnett [3], in their recent review of peer education programs about HIV in adolescents in countries of low and middleincome, discuss 24 program evaluations. The results suggest that peer education had positive effects regarding the increase of knowledge and the use of condoms, as well as producing changes in attitudes and community norms, but changes regarding sexual behaviour and STDs were not consistent. Summarizing the studies performed so far, it can be concluded that although some evidence regarding effectiveness of peer education for the promotion of sexual health has been found, especially concerning transfer of knowledge and behaviour change, the evidence in favour of its effectiveness is still quite limited.

The present work aims to perform a systematic description of peer education programs for HIV prevention, adolescent pregnancy prevention and promotion of sexual health among young people conducted in the European Union in order to determine their effectiveness. Therefore, we carried out a systematic review of peer education programs conducted in member countries of the European Union published between January 1999 and May 2010, presented in this article.

Methods

Inclusion criteria

We considered as relevant for this systematic review, all studies that described and evaluated an intervention designed to be implemented, in full or partially, by peer educators and that had as objective the prevention of HIV, the prevention of adolescent pregnancy and/or the promotion of sexual health in young people, aged between 10 and 24 years.

In addition, the studies were required to meet the following criteria: (i) the intervention was conducted in any of the 27 member countries of the European Union, (ii) it was evaluated using randomized controlled trials (RCTs), it was a non-randomized controlled study (CTs) or it had a before-and-after study design (non-CTs) (iii) at least one of the outcomes considered relevant in the present work were evaluated. The primary outcomes of interest were occurrence of unintended pregnancy and STDs, sexual experience, age at first sexual intercourse, number of sexual partners and use of contraceptive methods. Relevant secondary outcomes were knowledge about sexual health, HIV, contraceptive methods or sexual health services; behavioural intentions regarding sex or contraceptive methods; skills regarding communication and negotiation and attitudes toward sex, sexual health, contraceptive methods or people living with AIDS, (iv) as acceptable comparators for the intervention are taken no intervention or standard practice and (v) the article describing the intervention and evaluation was available in English, German or Spanish.

We have focused on member countries of the European Union for two main reasons. First, peer education varies greatly with respect to demography and culture of each target group, including the environment and the socio-economical context. In Europe, guidelines have been established concerning the use of peer education regarding HIV among young people with the aim of providing guidance on setting up, running and evaluation of projects [7]. This provides a framework to compare the actual interventions with what an intervention is expected to be in this context and allows us to see if those guidelines are being taken into account.

The other main reason is that, up to this point and to the best of the reviewer's knowledge, there are no systematic reviews concerning peer education for the promotion of sexual health in young people that analyse effectiveness of the interventions in this context, and it is therefore currently not possible to compare if peer education is more or less effective in this setting.

Search strategies

Searches were conducted using three electronic databases: Medline, Psyinfo and Psyindex, for the period from January 1999 to May 2010. Highly sensitive strategies were developed using a combination of controlled vocabulary and free-text terms. Separate search strategies were developed for each of the databases. For Medline and Psyinfo terms to denote 'peer education' interventions (e.g. 'PEER TUTORING', peer deliver*; student* led) were combined with general and specific terms related with HIV prevention, adolescent pregnancy and sexual health promotion (e.g. 'HIV PREVENTION', 'ADOLESCENT PREGNANCY', 'SEX EDUCATION'). For Psyindex, only terms to denote 'peer education' were included.

Study selection

Figure 1 shows the process of study selection that was conducted in two stages. A first selection was made using titles and abstracts, assessed against the inclusion criteria. For studies that appeared to meet the inclusion criteria or in cases where a definite decision could not be made based on the title or abstract alone, the full paper was obtained for detailed assessment against the inclusion criteria. When there were multiple reports arising from the same study, they were treated as a single study. A reference management program was used to organize references and record decisions made for each article.

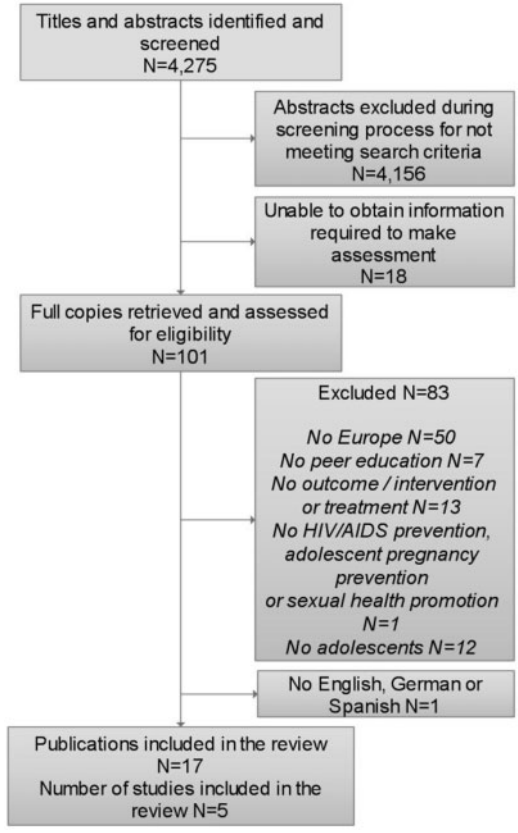

Fig. 1. Study selection process.

Data extraction and quality assessment

For the data extraction and quality assessment, a criteria catalogue developed by the Institute of Health Economics and Clinical Epidemiology of the University of Cologne [8] was used. The catalogue was developed on the basis of current internationally used quality tools (PREFFI, Closing the Gap, IDM, QSP und Quintessenz) and contains 68 items. Among them, 8 are used to assess the quality

of the study design as in evidence-based medicine (e.g. power calculation prior to study, inclusion of comparable intervention and control groups), 12 are used to assess quality of intervention as in best practice and quality assurance (e.g. participation of the intended population, empowerment) and the other 48 are descriptive or of informational import. For each item in the catalogue between 0 and 1 point is given to the study, following a defined procedure. The maximum score for the quality of the study design depends on its type, being 7 points for RCTs, 6 points for CTs and 5 points for non-CTs. According to the criteria catalogue, using the results of the quality assessment in combination with the assessment of effects done by the study authors, the studies can be separated in four groups regarding recommendation for implementation. High recommendation corresponds to studies with ratings $>80\%$ in both quality of the study and intervention quality; strong recommendation if the studies obtain ratings $>60\%$ in both quality of study and intervention quality; weak recommendation for studies with ratings above average in each field; or no recommendation possible. As the average score for studies included in the present review was high (64% for quality of the intervention and 73% for quality of study design), it was decided to locate the limit for weak recommendation at 50% for study and intervention quality.

Data synthesis

To synthesize the materials, a narrative synthesis was made where the studies, characteristics, training, recruitment and supervision of peer educators, composition of target population, intervention site, theoretical basis, program activities and outcome findings are described.

Results

Characteristics of the interventions

In total, 17 publications were identified corresponding to five interventions (some interventions had more than one publication), which fulfilled the inclusion criteria: Borgia *et al.* [9], Stephenson *et al.* [10], Kleiber and Appel [11], Mellanby *et al.* [12] and Merakou and Kourea-Kremastinou [13]. Three of these interventions [9, 10, 12] were also identified by Kim and Free [5]. The interventions were carried out in Italy [9], Germany [11], England [10, 12] and Greece [13]. Two studies consisted of cluster-randomized trials with comparison arm [9, 10] and three evaluations used a quasi-experimental design with a control group [11–13]. Table I summarizes the characteristics of the programmes and Table II presents the evaluation designs. Three interventions consisted in sexual education programs [10–12] and two in HIV prevention programs [9, 13], all interventions were carried out in secondary schools and the participants were students of both sexes aged between 12 and 20 years. All interventions were implemented by peer educators, four fully [9–11, 13] and one partially [12]. Four publications included information regarding program activities and the way they were delivered [10–13]. Those programs used different activities, the most common being the provision of information, followed up by the practising of life skills and the demonstration of condom use. The program activities were carried out through the use of dramatization, role-play, discussions, group activities, games, printed material and community events.

Quality assessment

Tables III and IV show the results of quality assessment of the interventions. After calculating the scores for quality of study design and quality of intervention, the interventions were classified based in Klever-Daichert *et al.*'s [8] criteria. All interventions were considered as partially effective by their authors and obtained scores high enough to be recommended. None of the interventions could be classified as highly recommendable, one was classified as strongly recommendable [10] and four as weakly recommendable [9, 11–13].

Evaluation results

In what follows, we present the evaluation results separated according to each of the outcomes that are considered as relevant for this review.

Table I. *Characteristics of programs*

Evaluated by	Country	Health focus	Setting	Theory	Targeted outcomes	Participants	Number of participants (students)	Peer educators	Training	Main activities	Delivery method	Duration	Monitored
Borgia *et al.* [9]	Italy	AIDS prevention	School	Social learning	Contraceptive use, number of sexual partners, knowledge, communication and negotiation skills, attitudes	Students in the last 2 years of high school. Average age: 18 years	1295	Same age, mixed sex, chosen by teachers	5 days	Not stated	Not stated	5 months	Not stated
Kleiber and Appel [11]	Germany	Sexual health education	School	Social learning	Knowledge, communication and negotiation skills, behavioural intentions	Students in the eighth to 10th school year. Age range: 12–17 years. Average age: 14.8 years	1411	Older, mixed sex, volunteers	60 h	Information, practising life skills, condom use demonstration	Presentations, games, dramatization by the peer educators	4–6 months	Not stated
Mellanby *et al.* [12]	United Kingdom	Sexual health education	School	Social learning	Knowledge, communication and negotiation skills, attitudes	Students aged between 13 and 14 years	1320	Older, mixed sex, chosen by teachers	Not stated	Information, practising life skills	Presentations, discussion groups, role-play	Not stated	Not stated
Merakou and Kourea-Kremastinou [13]	Greece	AIDS prevention	School	Diffusion of Innovation	contraceptive use, sexual experience, knowledge, attitudes	Students aged between 15 and 20 years	702	Same age, mixed sex, chosen by teachers	60 h (36 h training and 24 h support)	Information	Information kiosk, anonymous question box, condom provision, printed material, seminars, festival	8 months	Yes
Stephenson *et al.* [10]	United Kingdom	Sexual health education	School	No theoretical model	Contraceptive use, unintended pregnancy, STDs	Students aged between 13 and 14 years	>9000	Older, mixed sex, volunteers	2 days of training plus three meetings	Provision of information, practising life skills, condom use demonstration	Games, group work, discussions, brainstorms, role-play	4 months	Not stated

Table II. *Evaluation designs*

Evaluated by	Design	Number of conditions/Sample size	Data collection
Borgia *et al.* [9]	RCT	18 schools assigned to two groups I: peer-delivered = nine schools ($n = 682$) C: teacher-delivered = nine schools ($n = 613$)	Assessment at baseline and 5 months
Kleiber and Appel [11]	CT	1411 students assigned to two groups I: peer-delivered = 924 C: control = 487	Assessment at baseline and 6 months
Mellanby *et al.* [12]	CT	1320 students assigned to two groups: I: peer-delivered = 859 C: teacher-delivered = 461	Assessment at baseline and 1 week after intervention
Merakou and Kourea-Kremastino [13]	CT	702 students assigned to two groups: I: peer-delivered = 493 C: control = 209	Assessment at baseline and 6 months
Stephenson *et al.* [10]	RCT	27 schools assigned to two groups I: peer-delivered = 14 C: teacher-delivered = 13	Assessment at baseline, first follow-up 6 months post-intervention at ages 14–15 years, second follow-up 18 months post-intervention at ages 15–16 years and third follow-up 54 months after baseline

I: intervention; C: control.

Table III. *Quality of study design*

Evaluated by	Study design	Hypothesis statement	Mode of randomization	Comparability of intervention and control group	Validation of instruments	Power calculation	Type of analysis	Description of statistical methods	Total	Maximal score	Score (%)
Borgia *et al.* [9]	RCT	1	1	1	1	1	1	1	7	7	100
Kleiber and Appel [11]	CT	1	X	0	1	0	0	1	3	6	50
Mellanby *et al.* [12]	CT	1	X	1	1	0	0	1	4	6	67
Merakou and Kourea-Kremastino [13]	CT	1	X	0	1	0	0	1	3	6	50
Stephenson *et al.* [10]	RCT	1	1	1	1	1	1	1	7	7	100

If a question does not apply according to the Klever-Daichert *et al.*'s [8] criteria, then an X appears, otherwise there is assigned a 1, 0.5 or 0.

Unintended pregnancy

Unintended pregnancy was evaluated by one intervention [10] using abortion routine data and live births data. No significant changes were observed in the estimated cumulative proportion of girls with one or more abortions by the age of 20 years. Although the proportion of girls who had one or more live births at the age of 20.5 years was lower in the peer education led intervention, this difference was not statistically significant.

Sexually transmitted diseases

One intervention evaluated STDs using self-report [10]. Through a questionnaire, the students were asked if they had ever been diagnosed with an

Table IV. *Quality of intervention*

Evaluated by	Quality control	Scientific evidence prior to initiation	Participation	Empowerment	PE involved in planning	PE carrying out the intervention	PE were trained	Demand for the project was assessed	Context was taken into account	Project management had clear structures	Intervention process was documented	Process was evaluated	Total	Maximal score	Score (%)
Borgia *et al.* [9]	0	1	0	0	0	0.5	0.5	1	0	1	1	1	6	10.5	57
Kleiber and Appel [11]	0	1	0	1	0.5	0.5	0.5	1	0	1	1	1	7.5	10.5	71
Mellanby *et al.* [12]	0	1	0	0	0	0.5	0.5	1	1	1	1	0	6	10.5	57
Merakou and Kourea-Kremastino [13]	0	1	0	0	0.5	0.5	0.5	0	1	1	1	1	6.5	10.5	61
Stephenson *et al.* [10]	0	1	0	1	0	0.5	0.5	1	1	1	1	1	8	10.5	76

PE: peer educators.

STD. No significant differences were found between the intervention group and the control group.

Contraception use

From the three studies that report results regarding condom use [9, 10, 13], none of them found statistically significant effects.

Number of sexual partners

The number of sexual partners was addressed by one of the interventions [9] and no statistically significant differences between the control group and the experimental group were found.

Sexual experience

One of the interventions assesses sexual experience [13]. A statistically significant increment in the percentage of students having sexual experience was observed in the intervention group.

Knowledge

All included studies-assessed knowledge as outcome, but only in one of the publications statistically significant effects were observed [9]. Of the other studies, one reports a positive but not significant trend towards the intervention group [11], the other two studies found no statistically significant differences between the groups [10, 13] and one of the studies found that the control group obtained better results than the intervention group [12].

Communication and negotiation skills

The skills for communication and negotiation were evaluated by three studies. Two of them found no significant differences [9, 13] and the third found a trend in favour of the intervention group, but not statistically significant [11].

Attitudes

Three studies evaluated attitudes. One of the publications reported significant differences in favour of the intervention group [12], whereas in the other two

no statistically significant differences were found [9, 13].

Behavioural intentions

Only one study assessed behavioural intentions [11], specifically the intention to use condom. In comparison with the control group, no statistically significant effects of the intervention were found.

Discussion

Results on effectiveness of peer education

Of the five interventions considered, two studies consisted of cluster-randomized trials with comparison arm [9, 10] and three evaluations used a quasi-experimental design with a control group [11–13]. The methodological quality of studies was generally acceptable.

One study reported a statistically significant improvement in knowledge about HIV [9] and another showed a significant change in attitudes related to sexual behaviour [13]. One of the remaining reported positive but not significant trends on measures of knowledge of sexual health services and communication skills [11]. However, in one study the percentage of students who started having sexual intercourse during the intervention was higher in the intervention group [13]. Also, no significant differences were found with respect to unintended pregnancy, STDs, contraceptive use, number of sexual partners or behavioural intentions.

Overall, when compared to standard practice or no intervention, no clear evidence of peer education effectiveness for young people of member countries of the European Union was found concerning HIV prevention, adolescent pregnancy prevention and sexual health promotion. This result coincides with the one obtained in the systematic review performed by Kim and Free [14] on peer education evaluations concerning sexual education in adolescents of countries of high, middle and lowincome.

Contributing factors to the success of a peer education intervention

The results of the present review indicate that the benefits of peer education are not as evident as the popularity of the method suggests. However, this result may be attributable to the way in which the interventions were implemented. Following the 'European guidelines for youth AIDS peer education' [7] possible factors that may have contributed to the programs not showing effectiveness regarding HIV prevention, adolescent pregnancy prevention and sexual health promotion in young people will be identified and analysed.

Recruiting of the peer educators

According to the 'European guidelines' [7], the peer educators recruitment is one of the most important factors for the success of the programs. The peer educators must be acceptable for the target group and their personality must be adequate for the training and work they will do. Four of the included interventions describe the peer educators' selection methods [9–11, 13] and only one describes the criteria used for the selection [9]. Despite the fact that the selection of natural opinion leaders is one of the fundamental principles of peer education, as they are prone to spread information and change, none of the interventions performed a social network analysis to identify and select the natural opinion leaders to be the peer educators. In two of the interventions, the peer educators volunteered themselves to participate [10, 11] and in the other two, the peer educators were chosen by the teachers [9, 13]. Only two out of the five articles discussed how their recruitment strategies could have affected the implementation or the success of the interventions [9, 13].

Peer educators' self-determination and empowerment

The 'European guidelines' [7] consider that the peer educators must be allowed to influence the content and direction of the intervention starting at the recruiting moment. This improves their capabilities for decision taking, their motivation and their

management responsibilities in the project. Only in two interventions the peer educators were involved during the planning phase of the project and were allowed to choose the intervention activities [11, 13].

Training and supervision of the peer educators

Training and supervision of the peer educators is another factor that influences effectiveness of the intervention. According to the 'European guidelines' [7], all training programmes should include the following elements: a preparatory meeting; imparting of formal knowledge; a focus on personal development and cultural issues; skills training and continuing support, supplementary training and assistance. All studies reported that the peer educators were trained to deliver the intervention and all but one described the type of training [9–11, 13]. In those that did report this information, the length of training was diverse, but in all cases the recommendations of the 'European guidelines' [7] seem to have been followed regarding content. However, supervision, supplementary training and assistance seem to be a deficiency of the programs. Only one study mentioned that peer educators were supervised [13], with the supervision being twice a month. The guidelines recommend that the support should include regular supervision sessions, technical support in the form of information, skills training, answers to questions, help in setting up presentations and activities, social and community support in maintaining links with project collaborators and other peer education projects and personal assistance in the form of emotional support [7].

Limitations of the systematic review

Limitations to this review should be considered when interpreting these findings. One possible limitation during the search for publications is that this was restricted to the use of electronic data bases, therefore it is unlikely that unpublished evaluations have been identified and that entails publication bias. Another possible limitation is language bias. However, the search was performed in three languages to minimize this risk and only one publication was not considered because of language (it was published in Italian). This exclusion was performed in the second stage of the selection process and no study was excluded due to language during the first stage.

This systematic review was performed by one reviewer; the participation of a second reviewer would have reduced the risk of error and subjectivity. Also, the information included in the present review is only that included in the publications, contacting the study authors to ask for missing information was not possible given the time available for this review. Therefore, if any information was missing in the publications, it was also not considered in the review analysis.

Finally, the data synthesis was based on a small number of studies and among them, there were insufficient studies using the same outcome, this limited the possibility of comparing the results of the evaluations.

Implications and recommendations

Although the studies considered in the present review did not show evidence supporting the effectiveness of peer education, this method should not be ruled out as an intervention form. There is a multitude of factors that could be influencing effectiveness and were not considered in the present review. Among them, we could mention the theoretical framework used in the interventions, the training of the teachers for the control groups and the influence of other sources of information as mass media, family and friends.

In general, the 'European guidelines for youth AIDS peer education' [7] were not taken into account. In some of the evaluations, this may be due to the interventions being designed before the appearance of the guidelines. It would be important for future peer education interventions in the European Union to take those guidelines as a framework for setting up, running and evaluating projects. In the cases were the guidelines are not followed, it would be important to know why that is the case,

especially for AIDS peer education, as that is the target for which they were created.

It is of primary importance that further studies are conducted in order to evaluate some of the fundamental assumptions in peer education. For example, it is commonly stated that one of the advantages of this method is that it is inexpensive in relation to other types of interventions [1]. However, in one of the included studies [8], peer education was significantly more expensive than teacher-led intervention. Therefore, cost-effectiveness analyses are necessary, and usually lacking. Also, it is usually thought that in peer education, as the information is delivered through a friend or peer, who shares the same situation, conflicts and interests, the process is facilitated by making the involved more comfortable and committed with the situation [2]; still, in one of the studies [12], the students in the intervention felt more embarrassed during the peer education session than the teacher-led session.

In conclusion, even though how promising the peer education method is, the evidence in its favour is still sparse. Therefore, further research is needed, putting particular attention to the possible factors influencing effectiveness during the setting up, running and evaluation of projects.

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Conflict of interest statement

None declared.

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