Effectiveness of peer education interventions for HIV prevention in developing countries: a systematic review and meta-analysis

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CRD summary
The authors concluded that peer education programs in developing countries were moderately effective at improving behavioural outcomes but showed no significant effect on biological outcomes. The authors' conclusions reflected the reported results. The reliability of the conclusions is limited by weak study designs and heterogeneity in the included studies.

Authors' objectives
To assess the effectiveness of peer education interventions on human immunodeficiency virus (HIV) knowledge, injection drug equipment sharing, condom use and sexually transmitted infections in developing country settings.

Searching
NLM Gateway, PsycINFO, Sociological Abstracts, EMBASE and CINAHL were searched without language limitations. Search terms were reported. Four relevant acquired immunodeficiency syndrome (AIDS) journals and reference lists of included articles were handsearched. Only studies published in a peer-reviewed journal during the period January 1990 to November 2006 were included.

Study selection
Studies of peer education interventions in developing country settings that employed an evaluation design (pre/post or multi-arm design that included post-only exposure analysis) were eligible for inclusion. Peer education interventions were defined as sharing of HIV/AIDS information in small groups or one to one by a peer matched (either demographically or through risk behaviour) to the target population. Only studies that reported behavioural, psychological, social, care or biological outcomes were considered. Where two articles presented data from the same project and target population, only the article with the longest follow-up was included.

Included studies were conducted in sub-Saharan Africa, East and Southeast Asia, Central Asia and Latin America and the Caribbean. Target populations were varied and included: youth, commercial sex workers, injection drug users, transport workers, heterosexual adults, prisoners and miners. Ages of included participants were varied (details reported in paper). Outcomes assessed included HIV knowledge, condom use, sexually transmitted infections and equipment sharing.

One reviewer initially screened studies based on title and abstract information; two reviewers then independently selected studies for inclusion following a review of full-text articles. Disagreements were resolved by discussion.

Assessment of study quality
The rigour of included studies was assessed using an eight-point scale with a point awarded for each of the following items: prospective cohort; control or comparison group; pre/post intervention data; random assignment of participants to the interventions; random selection of subjects for assessment; follow-up rate of 80% or more; comparison groups equivalent on socio-demographic measures; and comparison groups equivalent at baseline on outcome measures.

It appeared that two independent reviewers performed the assessment, with disagreements resolved by discussion with a third reviewer.

Data extraction
Two reviewers independently extracted data to permit the calculation of odds ratios (ORs) with 95% confidence intervals (CIs) using a systematic coding form. Effect size estimates for dichotomous outcomes reported in percentages were converted into odds ratios. $\chi^2$ or mean differences, where presented, were converted to standardised mean effect sizes.
differences and then converted to odds ratios. Disagreements were resolved by discussion with a third reviewer.

**Methods of synthesis**

Pooled odds ratios for effect sizes were calculated using random-effects models. Average effect sizes were calculated where studies presented multiple measures of the same outcome (such as condom use at last sex and ever condom use). Statistical heterogeneity was assessed using Q tests. The influence of potential effect modifiers was explored using stratified meta-analysis.

**Results of the review**

Thirty studies (28 articles) were included (more than 16,764 participants; number of participants not reported in one study): three randomised controlled design; 12 serial cross-sectional studies; two post-only cross-sectional studies; 10 before/after studies; and three non-randomised trials. Study design scores were mixed; rigour scores ranged from 1 to 6.

Peer education interventions were significantly associated with increased HIV knowledge (OR 2.28, 95% CI 1.88 to 2.75; 18 studies), reduced equipment sharing among injection drug users (OR 0.37, 95% CI 0.20 to 0.67; four studies) and increased condom use (OR 1.92, 95% CI 1.59 to 2.33; 19 studies).

Peer education programs had a non significant effect on sexually transmitted infections (OR 1.22, 95% CI 0.88 to 1.71; seven studies).

**Authors’ conclusions**

Peer education programs in developing countries were moderately effective at improving behavioural outcomes, but showed no significant effect on biological outcomes.

**CRD commentary**

The review question was clear with regard to eligible study designs, interventions and outcome measures. Inclusion criteria with regard to eligible participants were not stated explicitly. Several relevant databases were searched without any language restrictions, which minimised the possibility of language bias. Appropriate steps were made to minimise reviewer error and bias in review processes. Validity was assessed using appropriate criteria. Study quality was reported to be mixed and suboptimal. The decision to combine results using a meta-analysis may not have been appropriate given the presence of clinical heterogeneity in the included studies. The authors acknowledged the generally weak designs of included studies.

The authors’ conclusions reflected the reported results. The reliability of the conclusions is limited by weak study designs and heterogeneity in the included studies.

**Implications of the review for practice and research**

**Practice:** The authors stated that peer education can be an effective strategy for changing behaviour among hard-to-reach hidden populations such as commercial sex workers and injection drug users. However, given limited resources, public health practitioners need to consider what effect sizes are pragmatically significant.

**Research:** The authors stated that further research with more rigorous design was needed to examine the long-term impact of peer education programs on sexually transmitted infection and HIV incidence/prevalence. Operational research to identify the factors that maximise program success was also needed. Future studies on peer education interventions should report more detailed descriptions of their programs to enable identification of best practices and examination of the impact of different strategies on outcomes. Future studies should also aim to define a standardised set of measures of outcomes to facilitate comparisons across studies.

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