Efficacy of behavioral interventions to increase condom use and reduce sexually transmitted infections: a meta-analysis, 1991 to 2010

Scott-Sheldon LA, Huedo-Medina TB, Warren MR, Johnson BT, Carey MP

CRD summary
This review found that behavioural interventions could increase condom use and reduce the incidence of sexually transmitted disease, including HIV. There was wide variation in the results, but the results and authors conclusions about components of successful interventions are likely to be reliable.

Authors' objectives
To examine the efficacy of behavioural interventions to increase condom use of reduce sexually transmitted infections (STIs) and HIV in participants who were ethnically Black or Latin American.

Searching
PubMed, PsycINFO and other EBSCO-hosted databases were searched for relevant studies to July 2010; search terms were reported. Databases and the document archives of HIV-related interventions held by the National Institute of Mental Health-funded Syntheses of HIV/AIDS Risk Reduction Project at the University of Connecticut and the Prevention Research Synthesis Database at the Center for Disease Control and Prevention were also searched. The reference lists of the retrieved articles were also checked to identify additional studies.

Study selection
Clinical trials were eligible for inclusion if they assessed HIV risk reduction strategies, condom use and laboratory-confirmed incident sexually transmitted infections that provided sufficient information to calculate effect sizes. The outcomes were condom use and incidence of sexually transmitted infections, including HIV. Studies without comparison groups and interventions that did not focus on reducing HIV risk, and studies that evaluated structural level interventions (such as mass media) were excluded from the review.

The studies were undertaken in North America, Asia, Africa, Europe and South America. The mean age of the populations studied was 26 years and women comprised 68% of the participants. The interventions comprised face-to-face delivery to groups and/or individuals and components of the interventions varied between studies. The interventions were provided by paraprofessionals in most of the studies, and some studies reported matching of facilitators to the ethnicity or gender of the study sample. Follow-up assessments typically occurred 13 weeks post-intervention (range zero to 208 weeks) and in studies with more than one follow-up assessment, the last assessment usually occurred 52 weeks post-intervention. The control condition in most studies was HIV education; other studies used an active comparison (brief intervention) or assessment-only controls. Most participants were offered incentives for participation and/or completing assessments.

The authors did not state how many reviewers performed the study selection.

Assessment of study quality
Three reviewers assessed methodological quality in terms of 16 items from the Jadad scale (randomisation, blinding and completeness of follow-up) and Miller et al.; the quality items were not specified in the review.

Data extraction
Three reviewers independently extracted data to calculate effect sizes (ES) and 95% confidence intervals (CI) for the outcomes. Where studies contained multiple effect size of the same outcome, the effect sizes were averaged.

Methods of synthesis
Pooled effect sizes and 95% confidence intervals were calculated using both fixed-effect and random-effects models. Statistical heterogeneity was evaluated using the Q-statistic and I². The pooled summary estimates were represented as a d-statistic. The authors assessed the potential for publication bias using the Begg and Egger tests. Regression analyses were conducted to evaluate the role of particular sample characteristics.
Results of the review
Forty-two studies (40,665 participants) of 67 interventions were included in the review. The methodological quality of the studies ranged from five points to 20 points (median 15 points).

Statistically significant benefits were observed for the participants in the intervention groups, with increases in condom use ($d=0.17$, 95% CI 0.04 to 0.29; $I^2=94\%$; 67 interventions), fewer incident sexually transmitted infections ($d=0.16$, 95% CI 0.04 to 0.29; $I^2=90\%$; 62 interventions) and fewer cases of HIV ($d=0.46$, 95% CI 0.13 to 0.79; $I^2=99\%$; 13 interventions).

Bivariate regression analyses found that the addressing of sociocultural barriers was the only variable that remained a moderator of condom use. Interventions that increased condom use by participants were those that excluded self-management skill training, addressed sociocultural barriers and focused on those who were ethnically black or Latin American.

Moderators on the impact of the intervention to reduce incident sexually transmitted infections were presentation with sexually transmitted infections at baseline, and non-provision of condoms as part of the intervention. Interventions that did not include self-management skills training were also associated with reductions in incident sexually transmitted infections. The results of the regression model showed that sexually transmitted infections or HIV diagnosed at baseline and self-management skills training accounted for 32% of the variance in the results.

The incidence of HIV was reduced when studies sampled fewer participants who were ethnically Black or Latin-American, did not provide condoms and was targeted to women. Contents of successful interventions included distal motivational components, condom skills training, active interpersonal skills training. On simultaneous entry in a regression model, the proportion of Latin-American participants remained significant.

There was no evidence of publication bias observed with the Begg and Egger tests.

Authors' conclusions
Behavioural interventions were associated with reductions in risky sexual behaviour, and could avert sexually transmitted infections including HIV infection.

CRD commentary
The review addressed a clear question and criteria for the inclusion of studies in the review were defined and reproducible. Appropriate databases were searched for relevant studies, but there were no attempts to identify unpublished studies. This meant there was some risk of publication bias; authors evaluated the potential for publication bias using validated methods. Steps were taken to minimise reviewer error and bias for data extraction and the assessment of methodological quality, but not for study selection.

Methodological quality of studies was assessed, but little information was provided on the quality items assessed. Summary of the results of quality assessment indicated that study quality was average. The high levels of clinical heterogeneity in the interventions and patient groups, and the statistically significant heterogeneity observed in the results means that the authors decision to combine the results in a meta-analysis may not have been appropriate. However, appropriate analyses were conducted to explore potential sources of heterogeneity.

The authors correctly acknowledged some of the limitations of the review in self-reports of behaviour, single-assessment follow-ups, variations in measurement of condom use and the diversity of participants in the review. In general, the authors conclusions regarding the evidence are likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that interventions that targeted Latin-Americans were urgently needed to prevent HIV infections in this particular group.

Research: The authors stated that future research should examine the contexts in which sexually transmitted infection diagnosis moderates behavioural and biological outcomes. Research that examines factors associated with sexual risk behaviours has an important role in determining the efficacy of behavioural interventions.
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