Effects of condom social marketing on condom use in developing countries: a systematic review and meta-analysis, 1990–2010

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Objective To examine the relationship between condom social marketing programmes and condom use.

Methods Standard systematic review and meta-analysis methods were followed. The review included studies of interventions in which condoms were sold, in which a local brand name(s) was developed for condoms, and in which condoms were marketed through a promotional campaign to increase sales. A definition of intervention was developed and standard inclusion criteria were followed in selecting studies. Data were extracted from each eligible study, and a meta-analysis of the results was carried out.

Findings Six studies with a combined sample size of 23,048 met the inclusion criteria. One was conducted in India and five in sub-Saharan Africa. All studies were cross-sectional or serial cross-sectional. Three studies had a comparison group, although all lacked equivalence in sociodemographic characteristics across study arms. All studies randomly selected participants for assessments, although none randomly assigned participants to intervention arms. The random-effects pooled odds ratio for condom use was 2.01 (95% confidence interval, CI: 1.42–2.84) for the most recent sexual encounter and 2.10 (95% CI: 1.51–2.91) for a composite of all condom use outcomes. Tests for heterogeneity yielded significant results for both meta-analyses.

Conclusion The evidence base for the effect of condom social marketing on condom use is small because few rigorous studies have been conducted. Meta-analyses showed a positive and statistically significant effect on increasing condom use, and all individual studies showed positive trends. The cumulative effect of condom social marketing over multiple years could be substantial. We strongly encourage more evaluations of these programmes with study designs of high rigour.

Introduction

The social marketing of condoms began in earnest in developing countries in tandem with global family planning efforts and was dramatically expanded as an early response to the global pandemic of acquired immunodeficiency syndrome (AIDS). This brought about a coordinated effort to ensure a steady supply of quality condoms at the local level in developing countries as governments and donors injected considerable funds into large-scale condom social marketing programmes globally. 1 A standardized theoretical and conceptual model of condom social marketing emerged over time, as depicted in Fig. 1. Ongoing professional market research is used to inform three main intervention components of condom social marketing: condom branding, the development of a commodity logistics system and a sustained marketing campaign. 1–3 For all three components local adaptation and implementation are stressed. Condom brands are designed to be appealing and to reflect local cultural values, and multiple brands are established as needed to reach key segments of the market. The commodity logistics system is tailored to the local economy, with efforts made to ensure a steady supply of affordable quality condoms at existing sales venues. The commodity logistics system is also designed to track sales, warehouse supplies and ensure timely delivery of products. The marketing campaign uses professional marketing techniques based on market research and is updated regularly as the market changes. A key principle in such programmes is that condoms should be sold at an affordable price, except for free distribution to the truly destitute. On the supply side, condom branding and commodity logistics systems are designed to increase the availability of desirable and affordable quality condoms. On the demand side, the sustained marketing campaigns are designed to increase the desire for and use of condoms. The increased demand for condoms, coupled with enhanced condom availability, promotes condom sales and use, and this should ultimately reduce the transmission of human immunodeficiency virus (HIV) infection, sexually transmitted infections and unwanted pregnancies.

Ample evidence shows that condom social marketing programmes increase condom sales, 4,5 which have often been cited as an indication that condom use is increasing, although the evidence points to a weak relationship between condom sales and use. 6 It is important to the field of HIV prevention to understand how condom social marketing programmes influence condom use. Hence, we systematically examined the evidence on the relationship between condom social marketing campaigns and increases in condom use.

Methods

Inclusion criteria

We began by defining condom social marketing as including interventions in which condoms were sold, a local brand name was developed for the condoms, and the condoms were marketed through a promotional campaign to increase sales. Studies were included if they: (i) were conducted in a develop-
Fig. 1. Theoretical/conceptual model for condom social marketing

HIV, human immunodeficiency virus; STI, sexually-transmitted infection.

imported into a database for additional, separate screening of titles and abstracts by two senior staff members who then classified each citation as either: (i) accepted, in which case the paper was included in the meta-analysis; (ii) suitable as background material (included review papers and cost-effectiveness studies), used only to write the introduction and discussion (“qualitative”) sections of this paper but not included in the meta-analysis; or (iii) excluded. The citations screened by the two senior staff were then merged for comparison and differences were resolved through additional review and discussion. A list of citations for acquisition was thus generated, the citations were obtained, two independent coders screened the full citations and discordant results were resolved by a senior member of the team.

Coding

To extract data from each eligible citation the two independent coders used a highly detailed coding form covering 15 content areas: citation information; study inclusion criteria; study methods; study population characteristics; setting; sampling; study design; unit of analysis; rates of loss to follow-up; characteristics of the study arms or comparison groups; (11) characteristics of the intervention; questions specific to condom social marketing interventions, such as funder, charge for condom, condom sale venues, etc.; outcome measures; eligible outcomes, and additional information (e.g. costs, limitations, potential harms and community acceptance). We coded cited used as background ("qualitative" citations) less intensively; for these we only extracted data on study participants, setting, study design and key findings (as described in the original citation).

All outcome variables reported in a study were noted, but outcomes were only recorded in detail for studies with a pre–post or group comparison design. Such eligible outcomes were coded in a structured format that included: (i) the type of statistical analysis used; (ii) the effect size and base rate; (iii) the independent variable; (iv) catchments and/or follow-up times, (v) the confidence interval (CI) and/or P-value; (vi) the page number and table where the results were located, and (vii) any
additional brief information felt to be important (e.g. unusual statistical analyses or inconsistencies found in the published paper). All eligible outcomes, whether presented in the aggregate or by subgroups, were coded. Project staff resolved discrepancies between coders, corrected data entry errors and identified differences between coders in the interpretation of study results. Senior staff resolved any remaining discrepancies in consultation with the principal investigator of this systematic review project (MDS) and other senior collaborators. We tried contacting authors when necessary to resolve differences. Data from all coding forms were double entered into EpiData version 3.1 (EpiData Association, Odense, Denmark) and later transferred to a statistical database using SPSS version 19 (SPSS Inc., Chicago, United States of America).

**Study rigour**

We applied various criteria to control for methodological rigour: (i) for prospective cohort studies, we checked for pre- and post-intervention analyses or for a control or comparison group; serial cross-sectional studies and “post” only analyses were not held to these requirements; (ii) for studies comparing an intervention group with a control group receiving no intervention or a less intensive one, we checked for stratification in cross-sectional analyses and pre–post analyses; (iii) we checked whether pre- and post-intervention outcomes were compared or whether only post-intervention outcomes were presented; (iv) in multi-arm studies, we checked for random assignment to intervention groups; (v) in all studies we checked for random selection of subjects for assessment as a measure to reduce enrolment bias; (vi) we verified assessment of attrition and checked for a minimum follow-up of 80% at each analysis point in cohort studies; (vii) in multi-arm studies, we checked for sociodemographic matching of intervention and control subjects to rule out significant baseline differences; and (viii) we checked for outcome matching of intervention and comparison groups, also to rule out significant baseline differences in outcome measures.

**Meta-analysis**

We standardized the effect size estimates from study reports to the common metric of an OR, since all studies compared two groups and reported dichotomous outcomes. We used standard meta-analytic methods to derive standardized effect size estimates. We used the Comprehensive Meta-Analysis v.2.2 software package (Biostat, Englewood, USA) to conduct statistical analyses, and we sometimes hand-calculated effect sizes. All studies identified for this analysis reported effect sizes as the proportion of sexually active subjects who used, or did not use, a condom with various sexual partners. To test for the presence of heterogeneity across the studies included in the meta-analyses we used the Q statistic, a weighted sum of squared differences between individual effects and the pooled effect across studies. To assess the degree of heterogeneity between studies, we used the I² statistic.

**Selection of study endpoints**

Most studies report multiple endpoint measures, and for this analysis we specifically sought to examine the impact of HIV-related condom social marketing programmes on condom use rates. Thus, we focused our analysis only on behaviours linked to condom use rather than on factors such as the intention to use a condom or attitudes towards condoms. Condom use behaviour was measured slightly differently both within and across studies, and several studies reported results with multiple measures of condom use that met our inclusion criteria. We thus established guidelines for prioritizing the measures to include in primary meta-analysis. We chose: (i) the measure of condom use during the most recent sexual act when other measures of condom use over a longer term were also reported in the citation; (ii) the measure of condom use with the last partner rather than all partners; (iii) measures of condom use among casual partners rather than regular partners; and finally, (iv) measures of condom use whose denominator included only sexually active participants were selected. Based on this selection process we defined our primary outcome for analysis as condom use during the most recent sexual encounter. The outcomes that satisfied these criteria and that were selected for the primary meta-analysis are described in Table 1.

<table>
<thead>
<tr>
<th>Study</th>
<th>Condom use behavioural outcomes reported in primary studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agha et al., 2001</td>
<td>Percentage of participants who reported using a condom in last sex with a non-regular partner</td>
</tr>
<tr>
<td>Lipovsek et al., 2010</td>
<td>Used condom during last sexual encounter with an FSW&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Always used a condom with FSWs over the past 12 months</td>
</tr>
<tr>
<td></td>
<td>Confirmed having never failed to use a condom with a FSW in past 12 months</td>
</tr>
<tr>
<td>Meekers, 2000&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Used condom during last sexual encounter, any type of partner&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Used condom with wife</td>
</tr>
<tr>
<td></td>
<td>Used condom with long-term partners</td>
</tr>
<tr>
<td></td>
<td>Used condom with other partners</td>
</tr>
<tr>
<td>Plautz &amp; Meekers, 2007</td>
<td>Ever used condom</td>
</tr>
<tr>
<td></td>
<td>Used condom during last sexual encounter with a regular partner&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Always used condoms with regular partners</td>
</tr>
<tr>
<td></td>
<td>Used condom during last sexual encounter with a casual partner&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Used condom with casual partner</td>
</tr>
<tr>
<td>Van Rossem &amp; Meekers, 2000</td>
<td>Used condom during last sexual encounter&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Used condom during last sexual encounter with an occasional partner</td>
</tr>
<tr>
<td></td>
<td>Ever used condoms</td>
</tr>
<tr>
<td></td>
<td>Used condoms for family planning</td>
</tr>
<tr>
<td>Van Rossem &amp; Meekers, 2007</td>
<td>Ever used condoms</td>
</tr>
<tr>
<td></td>
<td>Used condom during last sexual encounter&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> Measure used in meta-analysis of condom use during most recent sexual encounter.
Average within-study effect sizes were estimated by converting ORs to a standard Hedges' g statistic, with associated standard errors (SEs) and sample sizes. Hedges' g, standard errors and sample sizes were then averaged across measures within each study, and this composite effect size was used in our secondary meta-analysis. When available, adjusted effect sizes were used in the meta-analysis rather than unadjusted values. Given the limited number of studies and the large heterogeneity between intervention model, moderator analyses and multivariate meta-analysis could not be conducted. Thus, we are unable to examine how factors such as variations in programme implementation or type of target population affected intervention outcomes.

Results

Fig. 2 is a flow diagram showing the study selection process and the reasons for excluding studies at various stages. Of an initial 656 citations, successive rounds of review yielded 11 final citations and 6 studies for inclusion in the qualitative and the quantitative syntheses, respectively. Of the 11 studies in the qualitative synthesis, 5 were excluded from meta-analysis for the reasons shown in Fig. 2. In three studies ultimately included in the quantitative synthesis and meta-analysis, the authors analysed and reported the results separately by gender, and we treated each gender separately in meta-analysis with no double counting of results.

Studies, participants and interventions

Table 2 (available at: http://www.who.int/bulletin/volumes/90/8-11-094268) describes the characteristics of the six studies in the quantitative synthesis and their participants. All interventions were highly similar, perhaps because they were funded and operated by the same donor organization (Population Services International). All studies evaluated interventions that followed standard condom social marketing conventions, as depicted in Fig. 1, including condom branding based on pilot studies of acceptability, a commodity logistics system, and a sustained professional, media-based marketing campaign. One study was conducted in India among clients of female sex workers. The remaining five were conducted in sub-Saharan Africa. Three programmes targeted broad population groups; the other two targeted urban youth and male miners. Of the four mixed gender studies, two had approximately equal numbers of males and females, another was approximately 75% female and the other did not report the sex distribution. Only three studies reported the age range of study subjects. Four used a serial cross-sectional design to compare outcomes before and after the intervention, with random selection of study participants. One study used a single cross-sectional design to compare provinces where condom social marketing programmes had operated for 18 months versus less than 6 months. One cross-sectional study examined condom use by measuring intervention exposure. In the South African study among male miners, baseline assessment sites differed from follow-up assessment sites, although the authors reported them as "similar". Two studies were described as national in scope. The mass media were used extensively in all interventions, supplemented by community-based outreach efforts. All studies randomly selected study participants for all assessments. Among serial cross-sectional studies, the average baseline sample size was 1723 (range: 928–2401) and the average follow-up assessment sample size was 1896 (range: 200–3370). The two cross-sectional studies had sample sizes of 5412 and 9803. In the four serial cross-sectional studies, follow-up ranged from 12 to 36 months, and the six studies were conducted between 1995 and 2008. Detailed descriptions of the interventions evaluated were limited in the source citations. However, the general social marketing strategy was very similar across studies, as mentioned before, with some differences only in the communication channels used. Peer education was reported in
five study interventions (12,14–17); interpersonal communication supporting condom use was reported in the sixth. Radio advertisements were used in five interventions (12,14–17) and television ads in three (12,15,17).  

### Study rigour

Overall study quality was low (Table 3). There were no randomized controlled trials. None of the six studies followed individual subjects prospectively; instead they conducted serial cross-sectional surveys. Only three studies had a control or comparison group. No study randomly assigned participants to intervention arms; for studies on condom social marketing interventions, a group randomized trial would have been needed. All studies randomly selected participants for assessments. In the three studies with a comparison group, study arms differed sociodemographically at baseline. Of the three studies with a comparison group, study randomly assigned participants to intervention arms; for studies on condom use, ranged from 1.10 versus those not exposed to a social marketing intervention, to 6.21. The random-effects pooled OR for all studies was 2.01. The Q statistic, a significant 553.87, indicated the presence of heterogeneity across studies.

### Meta-analysis results

Table 4 presents the results of the meta-analysis using a composite measure of condom use. Interestingly, differences across the two meta-analyses were minimal, with a random effects pooled OR of 2.10. In addition, the same four ORs were statistically significant, whether a single or an average outcome was used. The Q statistic, 645.4, was statistically significant and showed heterogeneity across studies. The study by Agha (12) only reported on condom use during the most recent sexual encounter, and we used this outcome in this analysis. When we ran a separate analysis without the Agha (12) study, the pooled OR was 1.96.

### Table 3. Assessment of methodological rigour of studies on condom use

<table>
<thead>
<tr>
<th>Study</th>
<th>Cohort</th>
<th>Control/comparison group</th>
<th>Pre-post design</th>
<th>Participants randomly assigned to intervention</th>
<th>Participants randomly selected for assessment</th>
<th>Follow-up ≥ 80%</th>
<th>Comparison groups equivalent at baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agha et al., 2001 (12)</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Lipovsek et al., 2010 (13)</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>NA</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Meekers, 2000 (14)</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Plautz &amp; Meekers, 2007 (15)</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Van Rossem &amp; Meekers, 2007 (16)</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>NA</td>
<td>Yes</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Van Rossem &amp; Meekers, 2000 (17)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>NA</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

NA, not available.

This yielded nine discrete effect size estimates, five of which showed statistically significant effects of condom social marketing on condom use. ORs across the four significant effect size estimates, for the comparison of those exposed versus those not exposed to a social marketing intervention, ranged from 1.10 to 6.21. The random-effects pooled OR for all studies was 2.01. The Q statistic, a significant 553.87, indicated the presence of heterogeneity across studies.

### Table 4. Random effects model meta-analysis of condom use during most recent sexual encounter

<table>
<thead>
<tr>
<th>Study</th>
<th>Subgroup within study</th>
<th>Outcome</th>
<th>OR (95% CI)</th>
<th>Z</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agha et al., 2001 (12)</td>
<td>Males and females</td>
<td>Condom use last sexual encounter</td>
<td>3.6 (2.7–4.8)</td>
<td>8.9</td>
<td>0.000</td>
</tr>
<tr>
<td>Lipovsek et al., 2010 (13)</td>
<td>Males</td>
<td>Condom use FSW last 12 months</td>
<td>2.3 (1.8–2.9)</td>
<td>7.0</td>
<td>0.000</td>
</tr>
<tr>
<td>Meekers, 2000 (14)</td>
<td>Males</td>
<td>Condom use last sexual encounter</td>
<td>1.2 (0.9–1.7)</td>
<td>1.4</td>
<td>0.174</td>
</tr>
<tr>
<td>Plautz &amp; Meekers, 2007 (15)</td>
<td>Females</td>
<td>Condom use last sexual encounter</td>
<td>6.2 (5.1–7.5)</td>
<td>18.8</td>
<td>0.000</td>
</tr>
<tr>
<td>Plautz &amp; Meekers, 2007 (15)</td>
<td>Males</td>
<td>Condom use last sexual encounter</td>
<td>2.8 (2.3–3.3)</td>
<td>11.8</td>
<td>0.000</td>
</tr>
<tr>
<td>Van Rossem &amp; Meekers, 2000 (16)</td>
<td>Females</td>
<td>Condom use last sexual encounter</td>
<td>1.7 (1.0–2.8)</td>
<td>1.8</td>
<td>0.071</td>
</tr>
<tr>
<td>Van Rossem &amp; Meekers, 2000 (16)</td>
<td>Males</td>
<td>Condom use last sexual encounter</td>
<td>1.6 (1.0–2.6)</td>
<td>1.9</td>
<td>0.053</td>
</tr>
<tr>
<td>Van Rossem &amp; Meekers, 2007 (17)</td>
<td>Females</td>
<td>Condom use last sexual encounter</td>
<td>1.0 (1.0–1.0)</td>
<td>0.3</td>
<td>0.762</td>
</tr>
<tr>
<td>Van Rossem &amp; Meekers, 2007 (17)</td>
<td>Males</td>
<td>Condom use last sexual encounter</td>
<td>1.1 (1.0–1.2)</td>
<td>3.0</td>
<td>0.004</td>
</tr>
<tr>
<td>Pooled</td>
<td>–</td>
<td>–</td>
<td>2.0 (1.4–2.8)</td>
<td>4.0</td>
<td>0.000</td>
</tr>
</tbody>
</table>

CI, confidence interval; FSW, female sex worker; OR, odds ratio.

* The Z-test is an additional test of heterogeneity and reflects the deviation from the mean of the combined effect size divided by the standard error across included studies.
had not. Similarly, the odds of using condoms overall were 2.00 times higher for exposed males and 1.88 times higher for exposed females. The test for heterogeneity remained significant within each gender stratum.

Because studies reported on condom use with different partner types, we conducted an additional meta-analysis with studies that reported on condom use during the most recent sexual encounter with a non-regular/casual partner (including female sex workers). The odds of having used a condom during the most recent sexual encounter with a casual partner, for males and females combined, was 3.45 times higher among those who had been exposed to condom social marketing interventions than among those who had not. The intervention effects remained significant when the outcome was restricted to males only (OR = 2.56). This analysis was the only one for which the Q statistic, 1.84, was not statistically significant.

An analysis for females only could not be conducted because only one of the studies included in the overall meta-analysis reported on condom use during the most recent sexual encounter with a non-regular partner among females. We also performed meta-analysis of the results from studies that focused on the general population by excluding studies conducted among specific high-risk populations, such as miners and clients of female sex workers. When the four remaining studies were meta-analysed, the odds of having used a condom during the most recent sexual encounter for males and females combined was 2.0 times higher than among the unexposed. When the meta-analysis was restricted to males, the odds were 1.69 higher. A separate analysis for females was not conducted because all studies that included female participants were performed in the general population and are thus included in the analyses for females only. For overall condom use, the OR among studies of the general population, for males and females combined, was 2.01; the OR for males only was 1.78. The results of meta-analyses stratified by population type were similar to those of the overall meta-analysis, which included all studies.

**Discussion**

Given the global scale and scope of condom social marketing as an intervention for the prevention of HIV infection, we were surprised to find only six studies meeting our minimal inclusion criteria that were suitable for meta-analysis. Five of these studies were conducted in sub-Saharan Africa, which makes the results difficult to generalize to other settings. Further, these six studies generally lacked methodological rigour. There were no randomized trials or cohort studies. Only one of the studies had a high degree of equivalence across comparison groups in the baseline rate of condom use. We also had to eliminate one study from analysis due to the large and statistically significant baseline differences in condom use across study groups. The limited number of studies, lack of methodological rigour and lack of more recent studies render it difficult to definitively determine whether current implementation of condom social marketing is likely to increase condom use across developing countries. Despite these methodological weaknesses, the meta-analysis revealed that participants exposed to condom social marketing had twice the odds of reporting condom use when compared with either baseline rates or comparison groups.

The overall effect of condom social marketing on condom use was moderate (OR approximately 2). In addition, when the effect of the intervention was examined by gender and type of sexual partner, the results remained nearly the same. Larger effects were seen for condom use with casual partners. In analyses by gender we found only minor differences in intervention effectiveness. In addition, when studies of special risk groups (sex workers or miners) were removed from the analysis, the intervention effect changed very little.

Over time social marketing of condoms can result in substantial changes in condom use in the general population. The follow-up time frame for these six studies ranged from only 1 to 2 years. It is possible that if this effect were cumulative over a much longer period, a sustained programme could substantially increase the use of condoms. Cleland and Ali, in an interesting study of long-term trends in condom use among African women, examined data across a host of surveys conducted in 18 African countries between 1993 and 2001. They found that over these eight years the median proportion of women who used condoms to prevent pregnancy rose substantially, from 5.3% to 18.8%. However, the median annual increase in condom use was only 1.4%. The authors attribute these changes to sustained condom...
### Table 6. Summary of meta-analysis results, by outcome and target population

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No. of studies</th>
<th>OR (95% CI)</th>
<th>Q</th>
<th>P for Q</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Used a condom during last sexual encounter</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>6</td>
<td>2.0* (1.4–2.8)</td>
<td>553.87</td>
<td>&lt;0.001</td>
<td>98.56</td>
</tr>
<tr>
<td>males and females</td>
<td>6</td>
<td>2.0* (1.4–2.8)</td>
<td>553.87</td>
<td>&lt;0.001</td>
<td>98.56</td>
</tr>
<tr>
<td>males only</td>
<td>5</td>
<td>1.7* (1.1–2.7)</td>
<td>129.75</td>
<td>&lt;0.001</td>
<td>96.92</td>
</tr>
<tr>
<td>females only</td>
<td>3</td>
<td>2.2 (0.5–8.7)</td>
<td>340.18</td>
<td>&lt;0.001</td>
<td>99.41</td>
</tr>
<tr>
<td>With casual partnera</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males and females</td>
<td>3</td>
<td>3.5* (2.2–5.4)</td>
<td>55.24</td>
<td>&lt;0.001</td>
<td>94.57</td>
</tr>
<tr>
<td>males only</td>
<td>2</td>
<td>2.6* (2.1–3.1)</td>
<td>1.84</td>
<td>0.175</td>
<td>45.72</td>
</tr>
<tr>
<td>In general populationb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males and females</td>
<td>4</td>
<td>2.1* (1.4–3.1)</td>
<td>519.62</td>
<td>&lt;0.001</td>
<td>98.85</td>
</tr>
<tr>
<td>males only</td>
<td>3</td>
<td>1.7 (0.8–3.5)</td>
<td>103.32</td>
<td>&lt;0.001</td>
<td>98.06</td>
</tr>
<tr>
<td><strong>Overall condom use, composite score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>6</td>
<td>2.1* (1.5–2.9)</td>
<td>645.37</td>
<td>&lt;0.001</td>
<td>98.76</td>
</tr>
<tr>
<td>males and females</td>
<td>6</td>
<td>2.1* (1.5–2.9)</td>
<td>645.37</td>
<td>&lt;0.001</td>
<td>98.76</td>
</tr>
<tr>
<td>males only</td>
<td>5</td>
<td>2.0* (1.0–4.0)</td>
<td>416.63</td>
<td>&lt;0.001</td>
<td>99.04</td>
</tr>
<tr>
<td>females only</td>
<td>3</td>
<td>1.9 (0.7–4.8)</td>
<td>162.29</td>
<td>&lt;0.001</td>
<td>99.77</td>
</tr>
<tr>
<td>In general populationb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>males and females</td>
<td>4</td>
<td>2.0* (1.5–2.8)</td>
<td>398.39</td>
<td>&lt;0.001</td>
<td>98.49</td>
</tr>
<tr>
<td>males only</td>
<td>3</td>
<td>1.8 (0.8–4.0)</td>
<td>150.41</td>
<td>&lt;0.001</td>
<td>98.67</td>
</tr>
</tbody>
</table>

CI, confidence interval; OR, odds ratio; * P < 0.05.

a Includes only studies that reported on condom use at the most recent sexual encounter with a casual/non-regular partner or a sex worker.
b Excluding Meekers (study population: male miners)24 and Lipovsek et al. (study population: clients of female sex workers).25

Note: The Q statistic indicates the presence or absence of study heterogeneity in meta-analysis, whereas I² represents the degree of study heterogeneity. F ranges between 0% and 100%, with lower values representing less heterogeneity.

Conclusion

There is evidence that condom social marketing can increase condom use, although such evidence comes from studies lacking sufficient rigour. Community-randomized controlled trials of condom social marketing would provide much stronger evidence, but they are expensive, so large-scale condom social marketing programmes are supported by little evidence. More studies in subpopulations would also be valuable to the field. Our meta-analyses did show a positive and statistically significant effect of condom social marketing on increasing condom use, and all individual studies showed trends for a positive effect. Although the effect size across studies was moderate, the cumulative effect of condom social marketing could be substantial in longer-term evaluations. It is regrettable that with so many resources being devoted to condom social marketing for so long that there is not a larger evidence base available, especially in light of the debates over the relative benefits of abstinence versus condom use. We also recognize that in many cases the groups working diligently to provide and promote low cost quality condoms in developing country settings have not been given the resources to fully evaluate their programmes. We strongly encourage more, and more robust, research and evaluation of the efficacy of condom social marketing programmes.

Acknowledgements

We wish to thank the following individuals for their help throughout the various stages of our systematic review.
Trends in social marketing of male condoms in developing countries: Systematic review and meta-analysis

1990-2010: Linking social marketing interventions to condom use 2010–2010

Purpose
To examine the relationship between condom social marketing interventions and condom use.

Methods
A systematic mixed-methods review was conducted. Interventions were classified into three categories: social marketing, mass media, and policy intervention. For each category, a narrative synthesis was conducted, followed by a meta-analysis of condom use data from eligible studies.

Results
Six studies were included in the meta-analysis, with a total of 23,048 participants. Significant positive effects were found in three studies for recent condom use and seven studies for overall condom use. The effect sizes were moderate to large, with p-values ranging from 0.01 to 0.001.

Conclusion
Social marketing interventions have a positive impact on condom use, with evidence suggesting that interventions can lead to increased condom use. However, more research is needed to understand the mechanisms behind these effects and to optimize intervention strategies.

Résumé
Effets du marketing social sur l'utilisation du préservatif dans les pays en voie de développement: examen systématique et méta-analyse, 1990-2010

Objectif
Étudier la relation entre les programmes de marketing social du préservatif et l'utilisation du préservatif.

Méthodes
Une revue systématique a été menée. Les interventions ont été classées en trois catégories: marketing social, médias de masse et politiques. Chaque catégorie a été synthétisée de manière narrative, suivie d'une méta-analyse de données d'utilisation du préservatif.

Résultats
Six études ont été incluses dans la méta-analyse, avec un total de 23,048 participants. Des effets significatifs positifs ont été trouvés dans trois études pour l'utilisation de préservatifs récents et dans sept études pour l'utilisation d'ensemble des préservatifs. Les tailles d'effets étaient modérées à grandes, avec des p-values variant de 0.01 à 0.001.

Conclusions
Les interventions de marketing social ont un effet positif sur l'utilisation des préservatifs, avec des preuves suggérant que les interventions peuvent conduire à une augmentation de l'utilisation des préservatifs. Cependant, plus de recherche est nécessaire pour comprendre les mécanismes derrière ces effets et pour optimiser les stratégies d'intervention.
Влияние социального маркетинга презервативов на использование презервативов в развивающихся странах: систематический обзор и мета-анализ, 1990–2010 гг.

Цель Изучить связь между программами социального маркетинга презервативов и использованием презервативов.

Методы Были использованы стандартные методы систематического обзора и мета-анализа. В обзор были включены исследования мероприятий, связанных с продажей презервативов, разработкой местных марок презервативов и рекламными кампаниями для увеличения продаж. Было разработано определение термина «вмешательство» и использованы стандартные критерии включения при отборе исследований. В качестве исходных данных выступали данные, полученные по каждому участникам вмешательства.

Результаты Критериям включения соответствовали шесть исследований. В каждом из них были получены данные по использованию презервативов, причем все отдельные исследования показали положительное и статистически значимое влияние на увеличение использования презервативов, причем все отдельные исследования показали значимые результаты для обоих мета-анализов.

Вывод Доказательная база для оценки эффекта социального маркетинга презервативов на использование презервативов мала, поскольку не проводилось достаточного количества основательных исследований. Мета-анализ показал положительное и статистически значимое влияние на увеличение использования презервативов, причем все отдельные исследования показали позитивные тенденции. Кумулятивный эффект социального маркетинга презервативов в течение нескольких лет может оказаться существенным. Мы настоятельно рекомендуем проводить дополнительные исследования этих программ на основе строгих научных планов исследования.

Resumen

Efectos de la comercialización social de los preservativos sobre el uso de los mismos en países en desarrollo: examen sistemático y meta-análisis, 1990–2010

Objetivo Examinar la relación entre los programas de comercialización social del preservativo y el uso del mismo.

Métodos Se aplicaron diversos métodos de meta-análisis y de examen sistemático estándar. El examen incluyó estudios sobre intervenciones en las que se vendieron preservativos, en las que se desarrollaron una o varias marcas locales para los preservativos y en las que los preservativos se comercializaron mediante una campaña promocional para aumentar las ventas. Para seleccionar los estudios, se desarrolló una definición de intervención y se siguieron unos criterios de inclusión estándar. Se obtuvieron datos de todos los estudios que cumplían los requisitos y se realizó un meta-análisis de los resultados.

Resultados Seis estudios con un tamaño muestral combinado de 23 048 cumplieron los criterios de inclusión. Uno se realizó en India y cinco en África Subsahariana. Todos los estudios fueron transversales o transversales seriados. Tres de ellos contaron con un grupo de comparación, si bien todos ellos tuvieron en cuenta en las características sociodemográficas dentro de las ramas del estudio. Todos los estudios seleccionaron a sus participantes para las evaluaciones de manera aleatoria, aunque ninguno asignó aleatoriamente participantes para las diversas ramas de intervención. La razón de posibilidades acumulada de efectos aleatorios para el uso del preservativo fue del 2,01 (intervalo de confianza, IC del 95%: 1,42–2,84) para el encuentro sexual más reciente y del 2,10 (IC del 95%: 1,51–2,91) para el conjunto de todos los resultados del uso del preservativo. Las pruebas de heterogeneidad arrojaron resultados significativos para ambos meta-análisis.

Conclusión La evidencia del efecto de la comercialización social del uso de preservativo es reducida porque se han realizado pocos estudios rigurosos sobre el tema. Los meta-análisis mostraron un efecto positivo y estadísticamente significativo sobre el aumento en el uso del preservativo. Además, todos los estudios individuales mostraron tendencias positivas. El efecto acumulativo de la comercialización social del preservativo durante muchos años podría ser considerable. Alentamos encarecidamente la realización de evaluaciones de estos programas con modelos de estudio de elevado rigor.
References


Table 2. Characteristics of studies on condom use included in quantitative synthesis

<table>
<thead>
<tr>
<th>Study</th>
<th>Setting</th>
<th>Population</th>
<th>Intervention description</th>
<th>Study design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agha et al., 2001</td>
<td>Mozambique (all 10 provinces)</td>
<td>Adults, youth, and high-risk populations Gender: 45.3% male, 54.7% female Age: NR</td>
<td>National condom social marketing programme for JeitO condoms. Communications strategy included peer education debates known as fogo cruzado (crossfire) and community based street theatre with messages promoting safer sex. The project invested heavily in training and materials development for both interpersonal and mass media communications. Mass media advertising, particularly through radio, was positioned to complement behaviour change activities at the individual level. Radio spots were aired thousands of times in 10 local languages as well as in Portuguese to promote safer sex and the use of JeitO condoms. Other media used by the project include print, outdoor advertising and television.</td>
<td>Cross-sectional assessment comparing provinces in which the CSM campaign was active for 18 months to those where it was active for less than 6 months. Overall sample, n = 5,142. Random selection of study participants.</td>
</tr>
<tr>
<td>Lipovsek et al., 2010</td>
<td>India (Andhra Pradesh, Karnata, Maharashtra, Tamil Nadu)</td>
<td>Male clients 18 years and older of FSW in southern India Gender: 100% male Mean age range: 29–31 years</td>
<td>Integrated behaviour change communication programme targeted at adult male clients of female sex workers. Programme used multiple media channels including interpersonal communication, outdoor static promotional materials and mid-media activities to deliver message around consistent condom use which were changed every 3 months. Programme introduced affordable condoms in &gt; 65,000 retail outlets.</td>
<td>Serial cross-sectional study design. Sample for each cross-sectional design: Apr 06, n = 2,401; Dec 06, n = 1,756; May 07, n = 1,741; Feb 08, n = 1,779; Nov 08, n = 2,382. Random sampling of hotspots and systematic sampling of individuals.</td>
</tr>
<tr>
<td>Meekers, 2000</td>
<td>South Africa (Welkom)</td>
<td>Male miners Gender: 100% male Age: NR</td>
<td>Distribution of “Lovers Plus” condoms to traditional and non-traditional outlets and promotion of their use through peer education and distribution, and mass media campaigns (including point-of-sale materials, a radio campaign, press advertisements and billboard messages, and road shows using video show, question and answer sessions, and condom use demonstrations in hostels and mining areas).</td>
<td>Serial cross-sectional study design. Baseline, n = 928; follow-up, n = 200. Random selection of study participants. Baseline and follow-up sites were not the same, but were similar types of mining operations.</td>
</tr>
<tr>
<td>Plautz &amp; Meekers, 2007</td>
<td>Cameroon (Douala and Yaounde)</td>
<td>Unmarried adolescents aged 15–24 Gender: 50.0%, 54.2%, 55.0% Male: 54.0%, 54.2%, 55.0% Female: 46.0%, 45.8%, 45.0% Age: 2000, 2002, 2003: 15–19: 57.3%, 61.1%, 60.3% 20–24: 42.7%, 38.9%, 39.7%</td>
<td>The 100% Jeune programme included peer education sessions, a weekly radio call-in show, a monthly magazine, 100% Jeune Le Journal, and a serial radio drama titled Solange, Let’s talk about Sex. In addition, integrated television, radio, and billboard campaigns and a network of branded youth-friendly Vendeurs des Amis des Jeunes condom outlets supported intervention activities. Programme activities were integrated into a pre-existing national contraceptive social marketing programme. Condoms were available and sold in youth-friendly distribution points.</td>
<td>Serial cross-sectional study design with surveys spaced 18 months apart in 2000 (n = 1956), 2002 (n = 2,237), and 2003 (n = 3,370). Random selection of study participants.</td>
</tr>
<tr>
<td>Van Rossen &amp; Meekers, 2000</td>
<td>Cameroon (Edéa and Bafor)</td>
<td>Young adults Gender: NR Age: NR</td>
<td>Youth-targeted behaviour change communication and promotion, distribution of “Prudence Plus” condoms and “Nouveaux” oral contraceptives, peer education, youth clubs (club members received promotional items as T-shirts, caps, belt packs, carrying the logo of the Prudence Plus condom), mass media advertising and information, education and communication campaigns. All campaign messages were disseminated through youth-oriented promotional events; peer education and counselling, radio talk shows, brochures and other media.</td>
<td>Serial cross-sectional study design comparing two communities (purposively sampled). Baseline, n = 1,606; follow-up, n = 1,633. Random selection of study participants.</td>
</tr>
<tr>
<td>Van Roossem &amp; Meekers, 2007</td>
<td>Zambia (nationwide)</td>
<td>Women aged 15–49 and men aged 15–59 in the Demographic and Health Survey of 2001–2002 in Zambia Gender: 21.9% male, 78.1% female Age: females, 15–49; males, 15–59</td>
<td>Social marketing and health communication campaigns targeted at general population and high-risk groups including women, adolescents, young adults, truck drivers and commercial sex workers. Included four radio and four television programmes aired nationwide. In addition, it included a condom social marketing campaign that used intensive mass media and interpersonal communications and distributed subsidized condoms.</td>
<td>Cross-sectional design. Overall sample 9,803 (females = 7,658, males = 2,145) Respondents were drawn from a 2001–2002 Zambia Demographic and Health Survey. Probability sampling comparisons made by level of exposure to intervention.</td>
</tr>
</tbody>
</table>

FSW, female sex workers; NR, not reported.