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.

Abstracts in عربي, 中文, Français, Русский and Español at the end of each article.

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.[1–5] 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,[6,7] 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.[7] 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-

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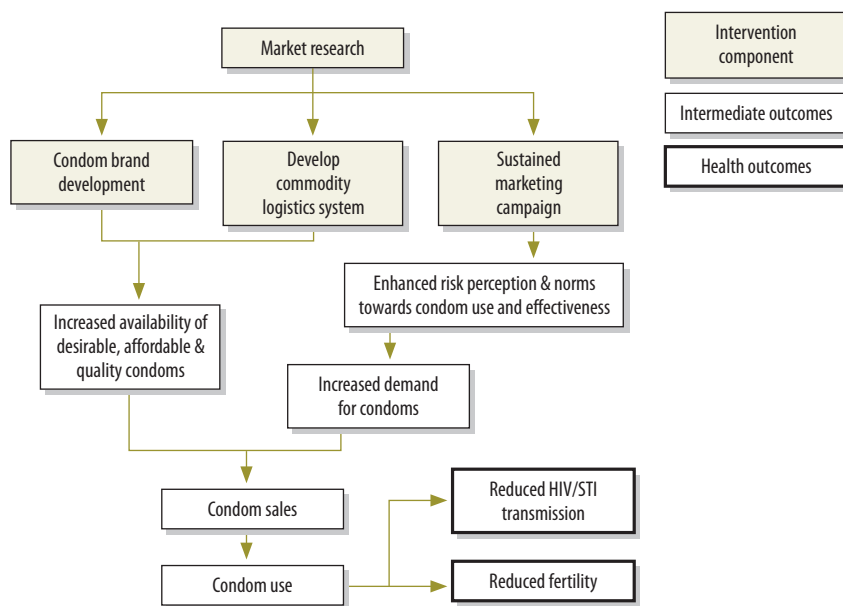[b] Family Health International, Durham, USA.
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Fig. 1. **Theoretical/conceptual model for condom social marketing**

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

ing country or emerging economy as defined by the World Bank[8]; (ii) evaluated a condom social marketing intervention as defined above; (iii) were a pre–post assessment or a controlled trial comparing a group exposed to an intervention with a control group exposed to none, to a less intensive form of the intervention, or to another intervention altogether; (iv) measured condom use behaviour; (v) were published between January 1990 and March 2010, and (vi) specifically sought to prevent HIV infection. Studies that compared more intensive with less intensive versions of the same intervention and those that measured outcomes across different levels of exposure to an intervention were included if they met all other criteria. Unpublished materials and conference abstracts were excluded from the review. In a separate process we also identified and coded background citations, studies with data on intervention costs, previous reviews and meta-analyses, and seminal reports addressing the theoretical or policy issues surrounding condom social marketing, regardless of their geographical focus. No materials published before 1990 were included, since earlier data would not have reflected the important developments that have occurred since then in HIV prevention.

Search and acquisition

Trained staff broadly searched the following databases: the National Library of Medicine's Gateway (which includes Medline and AIDSline), PsycINFO, Sociological Abstracts, the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and EMBASE. Staff then hand searched five HIV-related journals – *AIDS Care*, *AIDS*, *AIDS and Behaviour*, *AIDS Education and Prevention* and the *Journal of AIDS* – for any citation appearing to meet the inclusion criteria based on the title and abstract. Staff were given a preliminary list of search terms but were also free to explore search terms of their choice to increase the yield of relevant studies. The Boolean logic used for the database searches was as follows: (*marketing* OR *sale* OR *sold*); AND (*condom** OR *contraceptive**) AND (*HIV* or *AIDS*). Searchers were instructed to err on the side of including papers in the preliminary search, as references were later subjected to a more in-depth review. We also iteratively searched the references of those papers selected for inclusion until no new papers were identified. Finally, we carefully reviewed the references from previous review papers and meta-analyses for possible citations. References identified as potentially eligible were 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 citations 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.[9]

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.[10] 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.[11] To assess the degree of heterogeneity between studies, we used the I^2 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.

We conducted an additional meta-analysis based on an average effect size for all condom use outcomes within a study meeting our inclusion criteria.

Table 1. **Outcomes of studies on condom use included in meta-analyses**

Study	Condom use behavioural outcomes reported in primary studies
Agha et al., 2001[12]	Percentage of participants who reported using a condom in last sex with a non-regular partner[a]
Lipovsek et al., 2010[13]	Used condom during last sexual encounter with an FSW[a]
	Always used a condom with FSWs over the past 12 months
	Confirmed having never failed to use a condom with a FSW in past 12 months
Meekers, 2000[14]	Used condom during last sexual encounter, any type of partner[a]
	Used condom with wife
	Used condom with long-term partners
	Used condom with other partners
Plautz & Meekers, 2007[15]	Ever used condom
	Used condom during last sexual encounter with a regular partner
	Always used condoms with regular partners
	Used condom during last sexual encounter with a casual partner[a]
	Used condom with casual partner
Van Rossem & Meekers, 2000[16]	Used condom during last sexual encounter[a]
	Used condom during last sexual encounter with an occasional partner
	Ever used condoms
	Used condoms for family planning
Van Rossem & Meekers, 2007[17]	Ever used condoms
	Used condom during last sexual encounter[a]

FSW, female sex worker.
[a] Measure used in meta-analysis of condom use during most recent sexual encounter.

Fig. 2. **Flow diagram of study selection for systematic review of the literature on condom social marketing and condom use**
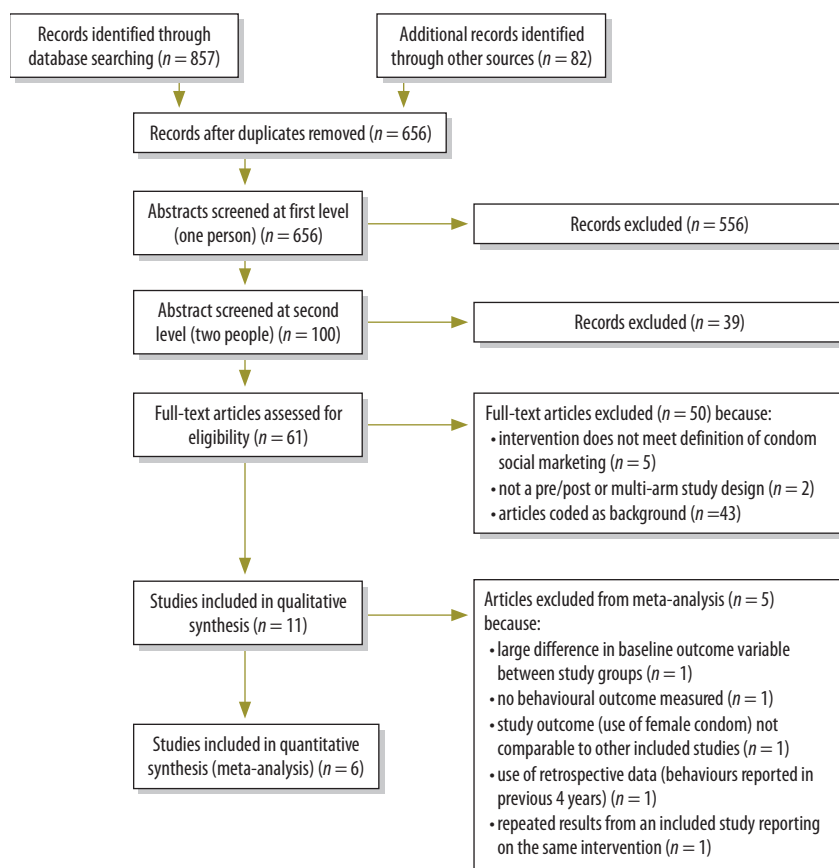
Average within-study effect sizes were estimated by converting ORs to a standard Hedges' *g* statistic, with associated standard errors (SEs) and sample sizes. Hedges' *g*, standard errors and sample sizes were then averaged across measures within each study, and this composite effect size was used in 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[4,12–21] and 6 studies[12–17] 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.[4,18–21] In three studies ultimately included in the quantitative synthesis and meta-analysis,[15–17] 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.[13] The remaining five were conducted in sub-Saharan Africa. Three programmes targeted broad population groups[12,16,17]; the other two targeted urban youth[15] and male miners.[14] Of the four mixed gender studies, two had approximately equal numbers of males and females,[12,15] another was approximately 75% female[17] and the other did not report the sex distribution.[16] Only three studies reported the age range of study subjects.[13,15,17] Four used a serial cross-sectional design to compare outcomes before and after the intervention, with random selection of study participants.[13–16] One study[12] 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.[17] In the South African study among male miners,[14] baseline assessment sites differed from follow-up assessment sites, although the authors reported them as "similar". Two studies were described as national in scope.[12,14] 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[12] and 9803.[17] 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

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

Study	Cohort	Control/ comparison group	Pre–post design	Participants randomly assigned to intervention	Participants randomly selected for assessment	Follow-up ≥ 80%	Comparison groups equivalent at baseline	
							Sociodemo- graphically	In outcome measure
Agha et al., 2001[12]	No	Yes	No	No	Yes	NA	NA	NA
Lipovsek et al., 2010[13]	No	Yes	No	NA	Yes	NA	NA	NA
Meekers, 2000[14]	No	No	Yes	NA	Yes	NA	No	NA
Plautz & Meekers, 2007[15]	No	No	Yes	No	Yes	NA	No	NA
Van Rossem & Meekers, 2007[17]	No	Yes[a]	No	NA	Yes	NA	NA	NA
Van Rossem & Meekers, 2000[16]	No	Yes	Yes	No	Yes	NA	No	Yes

NA, not available.
[a] High versus low exposure to the same intervention.

five study interventions[12,14–17]; interpersonal communication supporting condom use was reported in the sixth.[14] 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 pre-post intervention design that included a comparison group, only one reported equivalent baseline rates of condom use across study arms.

Meta-analysis results

Table 4 shows the results of the primary meta-analysis for the outcome of interest: condom use during the most recent sexual encounter. In three studies, results were reported separately by gender, and we replicated this in the meta-analysis. 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

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

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

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

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 5 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 6 presents the results of all meta-analyses, including several subanalyses. When results were stratified by gender, the odds of having used a condom during the most recent sexual encounter were 1.69 higher for males and 2.18 higher for females who had been exposed to condom social marketing than among males and females who

Table 5. **Random effects model meta-analysis of overall condom use composite measure**

Study	Subgroup within study	Outcome	OR (95% CI)	Z^a	P
			Statistics		
Agha et al., 2001[12]	Males and females	Condom use last sexual encounter	3.6 (2.7–4.8)	8.9	0.000
Lipovsek et al., 2010[13]	Males	Condom use composite with FSW	3.7 (3.2–4.2)	17.7	0.000
Meekers, 2000[14]	Males	Condom use composite	1.5 (1.1–2.1)	2.4	0.014
Plautz & Meekers, 2007[15]	Females	Condom use composite	4.0 (3.3–4.8)	14.5	0.000
Plautz & Meekers, 2007[15]	Males	Condom use composite	2.9 (2.5–3.4)	12.6	0.000
Van Rossem & Meekers, 2000[16]	Females	Condom use composite	1.5 (1.0–2.3)	1.8	0.080
Van Rossem & Meekers, 2000[16]	Males	Condom use composite	1.9 (1.2–3.0)	2.9	0.004
Van Rossem & Meekers, 2007[17]	Females	Condom use composite	1.1 (1.1–1.2)	4.3	0.000
Van Rossem & Meekers, 2007[17]	Males	Condom use composite	1.0 (1.0–1.1)	1.9	0.062
Pooled	–	–	**2.1 (1.5–2.9)**	**4.4**	**0.000**

CI, confidence interval; FSW, Female Sex Worker; OR, odds ratio.
[a] 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).[12,13,15] 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.[15] 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[14] and clients of female sex workers.[13] 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.[16] We also had to eliminate one study from analysis due to the large and statistically significant baseline differences in condom use across study groups.[22] 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.[23] 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**

Outcome	No. of studies	OR (95% CI)	Q	P for Q	I²
Used a condom during last sexual encounter					
Overall					
males and females	6	2.0* (1.4–2.8)	553.87	< 0.001	98.56
males only	5	1.7* (1.1–2.7)	129.75	< 0.001	96.92
females only	3	2.2 (0.5–8.7)	340.18	< 0.001	99.41
With casual partner[a]					
males and females	3	3.5* (2.2–5.4)	55.24	< 0.001	94.57
males only	2	2.6* (2.1–3.1)	1.84	0.175	45.72
In general population[b]					
males and females	4	2.1* (1.4–3.1)	519.62	< 0.001	98.85
males only	3	1.7 (0.8–3.5)	103.32	< 0.001	98.06
Overall condom use, composite score					
Overall					
males and females	6	2.1* (1.5–2.9)	645.37	< 0.001	98.76
males only	5	2.0* (1.0–4.0)	416.63	< 0.001	99.04
females only	3	1.9 (0.7–4.8)	162.29	< 0.001	98.77
In general population[b]					
males and females	4	2.0* (1.5–2.8)	398.39	< 0.001	98.49
males only	3	1.8 (0.8–4.0)	150.41	< 0.001	98.67

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)[14] and Lipovsek et al. (study population: clients of female sex workers).[13]

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

promotion associated with reproductive health campaigns, and they note that short-term evaluations can obscure the long-term cumulative benefits of such intervention programmes. If the same is true for condom social marketing, the results presented herein speak to the need to evaluate systems that track changes in behavioural outcomes over the duration of these interventions. Moreover, having more information on how condom social marketing differentially affects uptake by partner type would be valuable. Without such longer-term follow up of behavioural impacts by partner type it is difficult to accurately assess programme success. Basic ongoing behavioural sentinel surveillance would be relatively affordable, and the methods for conducting such evaluations have been well defined and tested.[24,25]

The limitations of this synthesis and meta-analysis include the potential for publication bias, self-reporting bias, and an inability to identify some aspects of the interventions originally studied. In our overall synthesis project examining a variety of interventions for the prevention of HIV infection, of which this review is a part, we also purposively focused on developing countries, which represent a neglected area of research and are uniquely different from wealthy countries socially, politically and economically. Furthermore, the most severe national epidemics of HIV infection have occurred in developing countries. Publication bias may have also affected this analysis, since studies with negative findings are seldom published,[26] although other studies have not found systematic publication bias[27] and this is an area of some controversy. After initially attempting to cull data from unpublished sources, we found that the quality of data identified was always below that required by our inclusion criteria. We also found that conference abstracts often reported results that differed substantially from the reports on the same study that appeared later in the peer-reviewed literature. Such unpublished reports also tended to lack the requisite level of detail on the intervention and results. Self-reporting bias and social desirability bias may have also been present. Finally, many of the published reports also failed to fully describe the interventions tested or to report on important aspects of the study findings and study populations. We did not always succeed in contacting authors to obtain missing data, and new studies have emerged since 2010. One final limitation is the heterogeneity in the study results. While this is a concern, a positive association between condom social marketing and condom use was found in all studies, albeit not always statistically significant.

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. ■

ملخص

تأثيرات التسويق الاجتماعي للعازل الذكري على استخدام العازل الذكري في البلدان النامية: استعراض منهجي وتحليل وصفي، في الفترة من 1990 إلى 2010

الغرض دراسة العلاقة بين برامج التسويق الاجتماعي للعازل الذكري واستخدام العازل الذكري.

الطريقة تم اتباع الاستعراض المنهجي القياسي وطرق التحليل الوصفي. وشمل الاستعراض دراسات التدخلات التي تم بيع العوازل الذكرية فيها، والتي تم من خلالها تطوير اسم العلامة التجارية (أسماء العلامات التجارية) المحلية للعازل الذكري، وتسويق العوازل الذكرية من خلال حملة ترويجية لزيادة المبيعات. وتم وضع تعريف للتدخل واتباع معايير إدراج قياسية في انتقاء الدراسات. وتم استخلاص البيانات من كل دراسة مؤهلة وإجراء تحليل وصفي للنتائج.

النتائج حققت ست دراسات حجم عينتها المشتركة 23048 معايير الإدراج. تم إجراء واحدة منها في الهند وخمسة في أفريقيا جنوب الصحراء الكبرى. وكانت جميع الدراسات متعددة القطاعات أو تسلسلية متعددة القطاعات. وشملت ثلاث دراسات فئة مقارنة، على الرغم من افتقار جميعها إلى التكافؤ في الخصائص الاجتماعية الديمغرافية عبر أذرع الدراسة. وانتقت جميع الدراسات على نحو

عشوائي المشاركين لتقييمهم، على الرغم من عدم تخصيص أي دراسة على نحو عشوائي المشاركين في أذرع التدخل. وكانت نسبة الاحتمال المجمّعة للتأثيرات العشوائية الخاصة باستخدام العازل الذكري 2.01 (فاصل الثقة 95 ٪، فاصل الثقة: من 1.42 إلى 2.84) بالنسبة للعلاقات الجنسية الأحدث و2.10 (فاصل الثقة 95 ٪، فاصل الثقة: من 1.51 إلى 2.91) بالنسبة لمركب من جميع نتائج استخدام العازل الذكري. وأسفرت اختبارات التغايرية عن نتائج هامة لكلا التحليلين الوصفيين.

الاستنتاج قاعدة البيّنات الخاصة بتأثير التسويق الاجتماعي للعازل الذكري على استخدام العازل الذكري صغيرة بسبب إجراء القليل من الدراسات الصارمة. وأظهرت التحليلات الوصفية تأثيراً إيجابياً وكبيراً من الناحية الإحصائية على زيادة استخدام العازل الذكري، وأظهرت جميع الدراسات الفردية اتجاهات إيجابية. وقد يكون التأثير التراكمي للتسويق الاجتماعي للعازل الذكري على مدار أعوام عديدة كبيراً. ونشجع بشدة على إجراء مزيد من التقييمات لهذه البرامج باستخدام تصميمات دراسية ذات صرامة عالية.

摘要

1990-2010 年发展中国家有关安全套使用的安全套社会营销的效果：系统回顾和元分析

目的 检查安全套社会营销计划和安全套使用之间的关系。

方法 使用标准的系统回顾和元分析方法。回顾包括含安全套销售、开发本地安全套品牌、通过促销活动增加销售量等干预措施的研究。对干预措施进行定义，在选定的研究中遵循标准纳入条件。从每个合格的研究中提取数据，对结果执行元分析。

结果 六个研究符合纳入标准，合并样本量为23048。其中一个研究在印度开展，五个在撒哈拉以南的非洲开展。所有的研究都是横断面或系列横断面研究。有三项研究设有比对，但是所有研究组都缺乏社会人口学特性的等效性，。所有研究都随机选择评估的参与者；但所有研究

都没有将参与者随机指定到干预措施组。最近性行为的安全套使用的随机效应汇集优势比为2:01（95%置信区间，CI：1.42-2.84），而复合的所有安全套使用的优势比为2:10（95% CI：1.51-2.91）。异质性检验中两个元分析都产生显著的效果。

结论 有关安全套使用的安全套社会营销效果的证据基础很小，这是因为严谨执行的研究很少。元分析显示出增加安全套使用的积极和统计学意义的效果，所有各个研究都表明了积极的趋势。安全套社会营销持续多年的累积效应可能会很大。我们强烈鼓励使用高度严谨的研究设计对这些计划展开更多评估。

Résumé

Effets du marketing social du préservatif 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 On a recouru à des méthodes de méta-analyse et d'examen systématique standard. L'examen comprenait des études d'interventions dans le cadre desquelles des préservatifs étaient vendus, un ou des noms de marque locale étaient développés pour les préservatifs, et les préservatifs étaient commercialisés par le biais d'une campagne de promotion visant à augmenter les ventes. Une définition de

l'intervention a été élaborée et des critères d'inclusion standard ont été appliqués dans la sélection des études. Les données ont été extraites de chaque étude éligible, et une méta-analyse des résultats a été effectuée.

Résultats Six études, avec une taille d'échantillon combinée de 23 048, ont rempli les critères d'inclusion. Une étude a été effectuée en Inde et cinq en Afrique subsaharienne. Toutes les études étaient transversales ou transversales en série. Trois études disposaient d'un groupe de comparaison, mais aucune n'avait d'équivalent en termes de

caractéristiques sociodémographiques entre segments de l'étude. Toutes les études choisissaient aléatoirement les participants aux évaluations, mais aucune ne désignait aléatoirement les participants aux segments d'intervention. Le rapport des cotes regroupé à effets aléatoires pour l'utilisation du préservatif était de 2,01 (intervalle de confiance de 95%, IC: 1,42–2,84) pour la dernière relation sexuelle et de 2,10 (IC de 95%: 1,51–2,91) pour un composé de tous les résultats d'utilisation du préservatif. Les tests d'hétérogénéité ont donné des résultats significatifs pour les deux méta-analyses.

Conclusion La base probante de l'effet du marketing social du préservatif sur l'utilisation du préservatif est faible, car peu d'études rigoureuses ont été menées. Les méta-analyses ont montré un effet positif et statistiquement significatif sur l'utilisation accrue du préservatif, et toutes les études individuelles ont montré des tendances positives. L'effet cumulatif du marketing social du préservatif sur plusieurs années pourrait être considérable. Nous encourageons fortement de nouvelles évaluations de ces programmes avec des plans d'étude très rigoureux.

Резюме

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 удовлетворяющему критериям исследованию, и на их основе был проведен мета-анализ результатов.

Результаты Критериям включения соответствовали шесть исследований с общим размером выборки, равным 23 048. Одно из них было проведено в Индии, а пять – в Африке южнее Сахары. Все исследования были кросс-секционными или последовательными кросс-секционными. В трех исследованиях присутствовала группа сравнения, однако в них всех отсутствовало равенство социально-демографических характеристик между исследуемыми группами. Во всех исследованиях участники для оценки отбирались случайно, однако ни в одном из них не был случайным отбор участников в интервенционные группы. Обобщенное отношение шансов с учетом случайных эффектов для использования презерватива составляло 2,01 (95% доверительный интервал, ДИ: 1,42-2,84) для последнего полового акта и 2,10 (95% ДИ: 1,51-2,91) для суммы всех случаев, когда использовался презерватив. Проверка гетерогенности показала 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 carecieron de equivalencia 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.

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

Study	Setting	Population	Intervention description	Study design
Agha et al., 2001[12]	Mozambique (all 10 provinces)	Adults, youth, and high-risk populations Gender: 45.3% male, 54.7% female Age: NR	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 televisions.	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.
Lipovsek et al., 2010[13]	India (Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu)	Male clients 18 years and older of FSW in southern India Gender: 100% male Mean age range: 29–31 years	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 >65 000 retail outlets.	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.
Meekers, 2000[14]	South Africa (Welkom)	Male miners Gender: 100% male Age: NR	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).	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.
Plautz & Meekers, 2007[15]	Cameroon (Douala and Yaounde)	Unmarried adolescents aged 15–24 Gender (2000, 2002, 2003): 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%	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.	Serial cross-sectional study design with surveys spaced 18 months apart in 2000 (n=1 956), 2002 (n=3 237), and 2003 (n=3 370). Random selection of study participants.
Van Rossem & Meekers, 2000[16]	Cameroon (Edéa and Bafia)	Young adults Gender: NR Age: NR	Youth-targeted behaviour change communication and promotion, distribution of "Prudence Plus" condoms and "Novelle" 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.	Serial cross-sectional study design comparing two communities (purposefully sampled). Baseline, n=1 606; follow-up, n=1 633. Random selection of study participants.
Van Rossem & Meekers, 2007[17]	Zambia (nationwide)	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	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.	Cross sectional design. Overall sample 9803 (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.

FSW, female sex workers; NR, not reported.