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The Effectiveness of Social Marketing in Reduction of Teenage Pregnancies: A Review of Studies in Developed Countries

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ABSTRACT

The aim of this study was to determine the effectiveness of a social marketing approach in reduction of unintended teenage pregnancies. We identified studies undertaken between 1990 and 2008 through electronic searches of databases, manual searches of bibliographies, and consultations with experts. Twelve studies that met the inclusion criteria were selected for further analysis. Results showed variation in intervention effects across specified outcomes (reduction in unintended pregnancies, delayed sexual initiation, contraceptive use at last intercourse, knowledge of contraception and reproductive health, and self-efficacy to refuse unwanted sex). Of the 12 studies, 9 reported significant effects on at least one of the outcomes. Long-term interventions were generally more effective than short-term ones for most outcomes. The impact on male participants' sexual behavior was minimal in most studies. Overall, social marketing appears to be an effective approach in reducing teenage pregnancies and influencing sexual behavior change, but the evidence is limited to particular outcomes and context. There is, therefore, need for more primary studies specifically designed around social marketing principles for more robust evaluations. The minimal impact on male participants' behavior also warrants further investigation.

Introduction

Unintended teenage pregnancy is a significant health and social issue that affects both developing and developed countries. Worldwide, 16 million women aged 15–19 years give birth each year of which 95% occur in developing countries (World Health Organization, 2010). Evidence shows that births to unmarried adolescent mothers are more likely to be a result of unintended pregnancies often stemming from coercive sexual relationships with older males (World Health Organization, 2010). The relatively lower teenage pregnancy rates in developed countries have been mainly attributed to availability of effective contraception and abortion services rather than difference in adolescent behavior (Bearinger, Sieving, Ferguson, & Sharma, 2007; Treffers, 2003).

It is estimated that at least 1.25 million teenagers become pregnant each year in countries belonging to the Organisation for Economic Co-operation and Development (OECD) (Guilleband, 2007). Of those pregnancies, approximately half a million seek an abortion and the remainder become teenage mothers. The United States has the highest teenage birth rate among OECD countries (42.7/1000), twice the average for all OECD member countries (21.5/1000). The United Kingdom leads in Western Europe (24.4/1000) with a rate almost five times the rate of The Netherlands (4.8/1000), three times that of France (7.1/1000) and more than double that of Germany (9.6/1000) (Guilleband, 2007). Although in most developed countries the teenage pregnancy rate has been declining, the rate of decline is slow and the issue remains a priority (UNICEF, 2001).

The concern with unintended teenage pregnancies arises because of the associated short- and long-term health, social, and economic consequences. Teenage pregnancy is associated with medical complications such as pre-eclampsia, cephalopelvic disproportion, prolonged labor, and postnatal depression (Seamark & Pereira-Gray, 1997; Social Exclusion Unit, 1999). Babies born to teenage mothers are more at risk of sudden infant death syndrome, low birth weight, poor growth, hospital admissions for intestinal problems, and accidental and nonaccidental injuries (Social Exclusion Unit, 1999). The social, educational, and economic outcomes for the children born to teenage mothers, and for the mothers themselves, tend to be worse, with the danger of a poverty-trap/poverty-cycle developing.

The risk factors associated with teenage pregnancy are complex and vary among countries. However, some commonalities have been identified, such as insufficient sex education (Cromer & McCarthy, 1999; Department of Health, 2001; Imamura et al., 2007) peer pressure and pressure from older partners

(Cromer & McCarthy, 1999; Fullerton, Dickson, Eastwood, & Sheldon, 1997; Kirby, 2007), delay in accessing contraceptive services, a poor relationship between teenagers and available sexual health services (Cromer & McCarthy, 1999; Healthcare Commission, 2007; Imamura et al., 2007), and contraceptive failure and social deprivation (Fullerton et al., 1997; Imamura et al., 2007; Swann, Bowe, McCormick, & Kosmin, 2003; Wellings & Kane, 1999). Studies with teenagers have also typically found associations between alcohol, binge drinking, and sex (with multiple partners) (Department for Education & Skills, 2006; DiCenso, Guyatt, Willan, & Griffith, 2002; Seamark & Pereira-Gray, 1997).

Interventions to reduce teenage pregnancies that have been evaluated include school-based sex education programs, community-based education programs, changes to contraceptive services, personal development programs, and vocational and family outreach programs (DiCenso et al., 2002; Swann et al., 2003). The results have been mixed, and there is no clear, single best approach. However, Kirby (1999) in his review of reviews highlights key characteristics of successful teenage pregnancy interventions. The characteristics include a behavior change focus, appropriateness and sensitivity to participants, sufficient duration, variety in teaching methodology, attention to risk factors, and the provision of training in communication and assertiveness skills. Most of these characteristics share core elements with social marketing approaches that have been effectively applied to other health-behavior change interventions such as increasing use of family planning services by adolescents (Cromer & McCarthy, 1999), healthy eating, increasing physical exercise, and tackling the misuse of substances like alcohol, tobacco, and illicit drugs (Gordon, McDermott, Stend, & Anqus, 2006; Stead, Hastings, & McDermott, 2007). This raises the interesting prospect of social marketing as an appropriate approach to reduce teenage pregnancies.

Although individual teenage pregnancy related interventions that use social marketing approaches are often evaluated, there has been no systematic review to date to explore the effectiveness of the approach. This is a crucial gap because it is important to understand the efficacy of the approach in and of itself as well as its effectiveness in comparison with other interventions. The aim of this study was to explore the gap identified above; the efficacy of a social marketing approach in the reduction of unintended teenage pregnancies in selected OECD countries. Previous studies have demonstrated that relying solely on the label "social marketing" is problematic as it excludes many interventions which may not be labelled as such but, nonetheless, incorporate social marketing principles (McDermott, Stead, & Hastings, 2005).

TABLE 1

Andreasen's Benchmark Criteria for Social Marketing Interventions (Andreasen, 2002) and its Application to Unintended Teenage Pregnancy Interventions

BENCHMARK	EXPLANATION	TEENAGE PREGNANCY CONTEXT
Specific behavior change goal	Intervention seeks to change behavior and has specific measurable behavioral objectives	The specified aim or objective(s) are measurable and are relevant to unintended teenage pregnancy reduction
Consumer research	Formative research is conducted to identify target consumer characteristics and needs. Intervention elements are pretested with the target group	Before program implementation at least one of the following was carried out: quantitative survey, qualitative interviews, focus group discussions, pretesting of materials, pilot projects
Segmentation and targeting	Different segmentation variables are considered when selecting the intervention target group. Intervention strategy is tailored for the selected segment/s	The intervention considered "age" and at least one of the following in its participant selection and implementation strategy ethnicity, socioeconomic status, and educational level
Marketing mix	Intervention considers the best strategic application of the "marketing mix." This consists of the four Ps of product, price, place, and promotion. Other Ps might include "policy change" or "people" (e.g., training of intervention delivery agents)	The intervention used the promotion P and any other P as specified below: *Product* – Contraceptive provision or information on access, competency in avoiding unintended teenage pregnancy *Price* – Considered the cost, time effort, and inconvenience involved in accessing contraceptives and other intervention activities and had solutions to minimize these *Place* – Ensured that contraceptives and other intervention activities were easily accessible by teenagers *Promotion* – Integrated use of advertising, public relations, promotions, media advocacy, and entertainment vehicles to promote use of contraceptives and other skills of avoiding unintended pregnancy

(*Continued*)

TABLE 1

Continued

BENCHMARK	EXPLANATION	TEENAGE PREGNANCY CONTEXT
		Partnerships – Involved parents and other relevant organizations within the community *Policy* – Had a strategy in place to influence government or local policies on contraceptive use and other methods of unintended teenage pregnancy reduction *Personnel/People* – Ensured staff involved in the program were well trained and experienced in adolescent sexual health and in dealing with teenage pregnancy issues
Exchange	Intervention considers what will motivate people to engage voluntarily with the intervention and offers them something beneficial in return. The offered benefit may be intangible (e.g., personal satisfaction) or tangible (e.g., rewards for participating in the program and making behavioral changes)	Intervention had tangible (e.g., monetary rewards, gift vouchers, and entertainment opportunities) or intangible incentives (e.g., improved sexual health knowledge and skills, improved communication between parents and teenagers on sexual health matters)
Competition	Competing forces to the behavior change are analyzed. Intervention considers the appeal of competing behaviors (including current behavior) and uses strategies that seek to remove or minimize this competition	Intervention addressed at least one of the following: peer/social influence, cultural/religious beliefs, substance misuse, idleness, low self-esteem, and poor academic performance

Therefore in this review we extended the search using Andreasen's (2002) benchmark criteria for social marketing to select studies. Andreasen's benchmark criteria define six basic characteristics that must feature in a social marketing intervention: *consumer research, specific behavior change goal, segmentation and targeting, marketing mix, exchange, and competition*.

Using this approach also made it possible to exclude "poor" examples of social marketing. For example, it is not uncommon to find media campaigns erroneously referred to as social marketing interventions (Gordon et al., 2006; Stead & Hastings, 1997). Table 1 further provides details on the six components that we applied to unintended teenage pregnancy intervention context.

Methods

Search strategy

We searched for studies on unintended teenage pregnancy reported between January 1990 and October 2008 in the following databases: MEDLINE, PUBMED, SCIENCE DIRECT, COCHRANE Library, EMBASE, SCOPUS, CRD (Centre for Reviews and Dissemination, United Kingdom), CDC (Centers for Disease and Prevention, Control, United), TRIP, and Teenage Pregnancy Unit (TPU) Research database (United Kingdom). Bibliographies of selected studies were also manually searched and relevant articles identified. Experts in teenage pregnancy and social marketing were contacted regarding the existence of other published or unpublished studies not captured in the electronic search. Search terms included a combination of the following keywords: Teen, Adolescent, Pregnancy, Sexual health, Reproductive health, Abortion, Pregnancy termination, Contraceptive, Birth control, Condom, Social marketing, Health marketing, Prevention, Intervention, Abstinence, School health.

Article selection

Articles on unintended teenage pregnancy intervention were considered for inclusion if they were written in English and reported effectiveness studies (controlled trials or before and after studies), involving 11–19-year-olds carried out in the United States, Western Europe, Canada, New Zealand, or Australia. Additionally, the studies needed to have reported on at least one of the following outcomes: change in number of unintended pregnancies, delay in sexual initiation/abstinence among participants, contraceptive use, knowledge of contraception and reproductive health, and self-efficacy to refuse unwanted sexual intercourse.

Abstracts from the initial search were independently screened by two reviewers (Wakhisi and Dhillon) and a further search of full articles carried out from those short-listed. The short-listed articles were assessed as to whether they met the social marketing benchmark criteria or not (see Table 1). The two reviewers further discussed and agreed on the final full articles to be included. Disagreements were rare but whenever they occurred they were resolved by discussion and by consulting a social marketing specialist.

Quality assessment

The methodological quality of selected studies was assessed and rated as strong/high and moderate or weak using a tool adopted from the Effective Public Health Practice Project (2009; http://www.ephpp.ca/PDF/QATool.pdf). In rating the studies, principal consideration was given to the study design, appropriateness of randomization, participant selection and allocation, control of confounders, blinding of participants and assessors, validity and reliability of data collection methods, withdrawals and dropouts, intervention integrity, appropriateness of analysis, and whether it was an "intention to treat" analysis. Two researchers were involved in the quality assessment. Discrepancies were rare but whenever they occurred, they were resolved by joint review and consensus.

Data extraction and synthesis

Two researchers independently extracted data on the setting, sample size, participant characteristics, theoretical framework guiding the intervention, intervention components, social marketing characteristics, length of follow-up, proportion followed to study completion, and study outcomes. This approach is in line with the tool developed by DiCenso et al. (2002). Again, discrepancies were rare but whenever they occurred, they were resolved by joint review and consensus. Outcomes from the selected studies were summarized and presented in tables. The effects of various interventions were assessed by comparing outcomes in the intervention group and those in the control group. The odds ratio/relative risk, confidence intervals, and values were reported where available. A meta-analysis could not be performed because of the heterogeneity of the selected studies.

Ethical approval

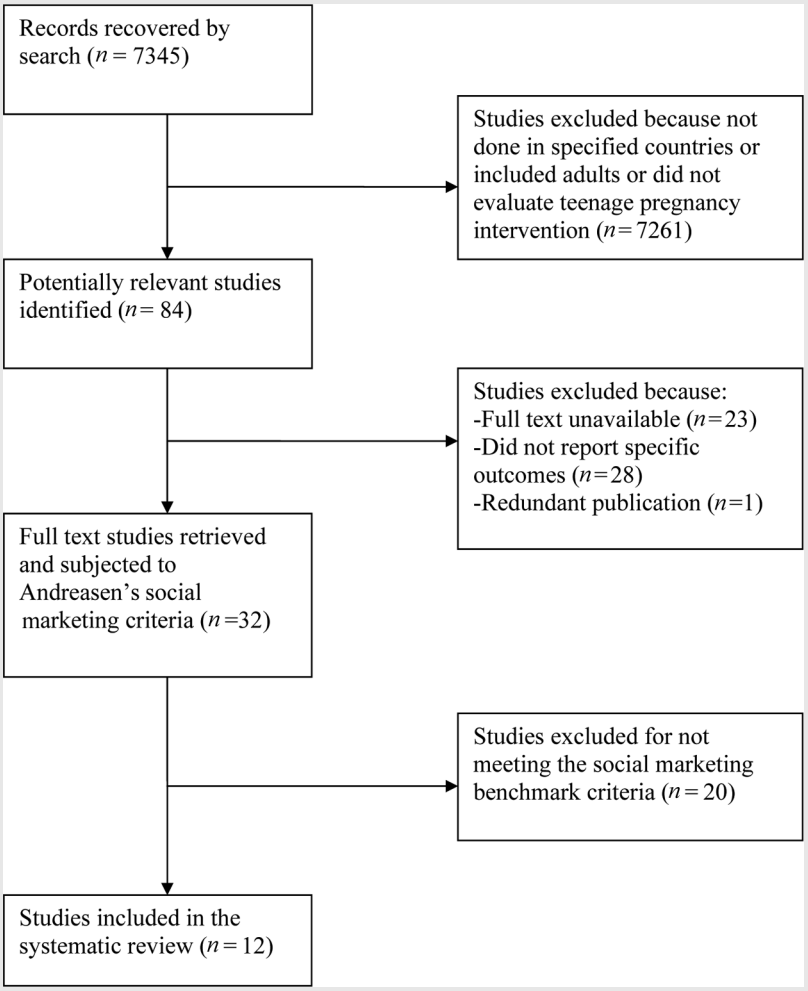
This review dealt entirely with data from secondary sources and was therefore exempt from a regular human research ethics review process. Exemption was secured via the Brunel Graduate School ethics process.

Results

The process from the searching of the databases through to the final selection of studies for the systematic review is shown in Figure 1. The search for relevant studies initially retrieved 7,345 records which included citations, abstracts, and protocols. A total of 84 of the initially retrieved records were judged to be potentially relevant and selected for further scrutiny. A further 52 were excluded on the basis of not being unintended teenage pregnancy interventions, not measuring the

FIGURE 1

Flowchart of Included Studies



outcomes of interest, or inaccessible full text. Fully 32 studies were retained and further evaluated using Andreasen's criteria for social marketing interventions (Andreasen, 2002). Twelve studies met the criteria and were included in the final systematic review.

General description of studies

Table 2 gives a summary description of the 12 studies that met the inclusion criteria. Nine were randomized control trials (RCTs) (Aarons et al., 2000; Coyle et al., 2001; Coyle et al., 2006; Eisen, Zellman, & McAlister, 1990; Lederman, Chan, & Roberts-Gray, 2008; McBride & Gienapp, 2000; Philliber, Kaye, Herrlling, & West, 2002; Stephenson et al., 2003; Wight et al., 2002) and three were "before and after studies" (observational studies which measure specific participants' characteristics before and after intervention and compare the results) (Hughes, Furstenberg, & Teitler, 1995; Paine-Andrews et al., 1999; Tiezzi, Lipshutz, Wrobleski, Vaughan, & McCarthy 1997). Studies that met the inclusion criteria were mainly from the United States (10), with a few from the United Kingdom (Stephenson et al., 2003; Wight et al., 2002). A total of 31,921 adolescents between age 11 and 19 were enrolled in the 12 studies.

Seven studies were school-based (Aarons et al., 2000; Coyle et al., 2001; Coyle et al., 2006; Lederman, et al., 2008; Stephenson et al., 2003; Tiezzi et al., 1997; Wight et al., 2002). Three were both community and school-based (Eisen et al., 1990; McBride & Gienapp, 2000; Paine-Andrews et al., 1999). Only two were solely community-based (Hughes et al., 1995; Philliber et al., 2002).

Three studies (Coyle et al., 2006; Eisen et al., 1990; McBride & Gienapp, 2000; Paine-Andrews et al., 1999) were short-term (less than two years follow-up) and nine were long-term (two to three years follow up). Two studies (Aarons et al., 2000; Stephenson et al., 2003) were rated as of low intensity (less than 10 hr or sessions), four (Coyle et al., 2001; Eisen et al., 1990; Tiezzi et al., 1997; Wight et al., 2002) as medium (10 hr/sessions to 20 hr/sessions) and three (Coyle et al., 2006; McBride & Gienapp, 2000; Philliber et al., 2002) as high intensity interventions (more than 20 hr/sessions).

Control programs for the nine randomized control trials were mainly teacher or health professional led with less activities and contact time for participants as compared to intervention programs. They also had minimal involvement of participants in the learning process. The comparison groups for the "before and after studies" had no related intervention programs of any kind going on at the time of the studies.

TABLE 2

A Summary Description of the 12 Studies, Intervention Social Marketing Characteristics and Study Outcomes

AUTHORS, STUDY DESIGN, AND SETTING	PARTICIPANT CHARACTERISTICS, ALLOCATION, RANDOMIZATION, AND ANALYSIS	INTERVENTION AND CONTROL COMPONENTS, FOLLOW-UP PERIOD, AND SUCCESS RATE	INTERVENTION SOCIAL MARKETING CHARACTERISTICS	STUDY OUTCOMES AND BASELINE DIFFERENCE
1. Aarons et al., 2000 Randomized control trial A school based program for 7th grade students from 6 Washington, DC, junior high schools, U.S.	512 grade 7 students **Gender** 52% – females 48% – males **Ethnicity** 84% – African American 16% – others **Allocation** Intervention – 262 Control – 260 **Randomization** By school **Analysis** By individual Multivariate	**Theory** Sociocognitive theory **Exposure** 8 Lessons of 45 min each and booster activities **Components** Led by professionals and partially by pupils Reproductive and sexual health classes Health risk screening **Control** Regular teacher-led educational program **Follow-up** 2-year period Follow-up rates: 1st follow-up – 83% 2nd follow-up – 68% 3rd follow-up – 61%	**Behavior change goal:** To enable students to postpone sexual involvement by improving their attitudes toward abstinence, self-efficacy to refuse unwanted sex, and knowledge of reproductive health **Consumer research:** Utilized findings from the National Youth risk behavior survey and baseline survey **Segmentation & targeting**: Targeted 7th grade students **Marketing mix**: *Promotion* – Curriculum-based teaching and informal voluntary group discussions during lunch or midday free periods *Product and Place* – Provided information on use of and access to contraceptive services. *Personnel* – Facilitated by health professionals and partially by peers	**Delayed sexual initiation** Intervention group females had higher virginity rates at all the three follow-ups. At final follow-up the odds ratio was 1.88 (1.02, 3.47) Intervention group males had a significantly higher virginity rate only at first follow-up: 1.46 (0.79, 2.71) **Self-efficacy to refuse unwanted sex** Intervention females scored higher in all follow-ups. At final follow-up the odds ratio was 1.30 (0.73, 2.30) Intervention males scored significantly higher only at first follow-up: 1.71 (0.91, 3.19) **Contraceptive use at last intercourse** In all follow-ups intervention females were more likely to have used birth control at last intercourse. At final follow-up the odds ratio was 3.39 (1.16, 9.95) and 1.53 (0.55, 4.26) for males

(*Continued*)

TABLE 2

Continued

AUTHORS, STUDY DESIGN, AND SETTING	PARTICIPANT CHARACTERISTICS, ALLOCATION, RANDOMIZATION, AND ANALYSIS	INTERVENTION AND CONTROL COMPONENTS, FOLLOW-UP PERIOD, AND SUCCESS RATE	INTERVENTION SOCIAL MARKETING CHARACTERISTICS	STUDY OUTCOMES AND BASELINE DIFFERENCE
			Exchange: Enhanced communication on sexual issues between parents and teenagers Enhanced knowledge about available contraceptive methods and services Participation in contests and winners awarded monetary prizes All participants were given t-shirt with theme: "Be smart, Don't start" **Competition**: Program identified and addressed risk factors such as substance misuse, physical abuse, involvement in sexual activity, and emotional problems	**Knowledge of reproductive health and contraceptives** Intervention females had significantly higher knowledge scores than controls at final follow-up – 19% (−0.02, 0.39) On all three follow-ups intervention group males had higher scores. At final follow-up the mean score difference was 23% (0.03, 0.43) **Baseline difference** Not significant for all outcomes
2. Lederman, Chan, & Roberts-Gray, 2008 Randomized control trial Afterschool program for 12–15-year-old school youth in grades 6, 7, and 8 and their parents From 5 middle schools in 2 different school districts in South East Texas, U.S.	192 parent–adolescent dyads **Gender** 59% females 41% males **Ethnicity** Hispanics – 36% African American – 29% Caucasian – 24% others – 11%	**Theory** Social learning and cognitive behavioral models **Exposure** 7 sessions of 2.5 hr over 4 weeks and 3 booster sessions **Components** Led by professionals and partially by peers Involved parents and children	**Behavior change goal**: Increased frequency of communication between parents and teenagers on sex issues and parental involvement in youth activities Changes in teenagers' cognitive emotional and behavioral self-control **Consumer research**: Utilized findings from the national youth survey and baseline survey	**Knowledge of reproductive health and contraceptives** Minimal increase in knowledge was observed in intervention group at final follow-up ($\beta = 13\%$, $p < .01$) **Self efficacy to refuse unwanted sex** No significant difference between intervention and control group at final follow-up

	Allocation Intervention – 90 Control – 102 **Randomization** Individual **Analysis** By individual Multivariate	Adolescent reproductive and sexual health, communication lessons **Control** As intervention but delivered in a traditional didactic format **Follow-up** 2-year period Follow-up rates not reported	**Segmentation & targeting**: Targeted 12–15-year-old school youth in grades 6, 7, and 8 and their parents **Marketing mix**: *Promotion & Product* – Role plays, practice resistance skills, parent child discussions, and curriculum-based teaching *Personnel* – Sessions conducted by professionally trained counsellors and health educators *Partnership* – Involved parents **Exchange**: Gift certificates given as incentives for participation Enhanced parent–child relationship **Competition**: Program addressed peer influence, barriers to communication, risky sexual behaviors, alcohol use, and drug use	**Baseline difference** Not reported for both outcomes
3. Coyle et al., 2001 Randomized control trial A school-based multicomponent program for 9th and 10th grade students drawn from 10 schools in northern California and 10 schools in South East Texas, U.S.	3869 9th grade students **Gender** 48% – males 52% – females **Ethnicity** 31% – White 27% – Hispanic 17% – African American 18% – Asian or Pacific Islander **Allocation** Intervention – 1983 Control – 1886	**Theory** Sociocognitive theory, social influence theory, and models of social change **Exposure** 20 sessions, duration not specified **Components** Reproductive and sexual health lessons A safer choices peer team or club at every school Parents' education	**Behavior change goal**: To reduce the number of students beginning to have sex and increase condom use among those already sexually active **Consumer research**: Utilized findings from the evaluation of school-based sexual health programs and baseline survey **Segmentation and targeting**: Targeted 9th and 10th grade students and their school and home environments	**Contraceptive use at last intercourse** At final follow-up intervention students were 1.68 (1.02, 2.76) times more likely to have used condoms ($p < .05$) and 1.76 (1.01, 3.07) times more likely to have used effective pregnancy prevention methods ($p < .05$) at last intercourse as compared to students in comparison schools Higher rate for intervention group at baseline (60.5% vs. 56.3%) **Delayed sexual initiation**

(*Continued*)

TABLE 2

Continued

AUTHORS, STUDY DESIGN, AND SETTING	PARTICIPANT CHARACTERISTICS, ALLOCATION, RANDOMIZATION, AND ANALYSIS	INTERVENTION AND CONTROL COMPONENTS, FOLLOW-UP PERIOD, AND SUCCESS RATE	INTERVENTION SOCIAL MARKETING CHARACTERISTICS	STUDY OUTCOMES AND BASELINE DIFFERENCE
	Randomization By school **Analysis** By individual Multivariate	School-community linkages **Control** A standard knowledge-based sexual health and HIV prevention curriculum **Follow-up** 31-month period Follow-up rates: 7 months – 95% 19 months – 83% 31 months – 79%	**Marketing mix**: *Promotion and Product* – Peer-led resource area on campus with guidance of an adult coordinator curriculum-based teaching *Partnership* – Parents received newsletters three times a year on the program and served on health promotion council *Product and Place* – Students, teachers, and parents received resource guides on available services in the community *Personnel* – Classroom curriculum implemented by trained teachers **Exchange**: Better communication between parents and children on sexual issues Enhanced knowledge about available contraceptive methods and services Newsletter for parents **Competition**: Program addressed the school and home environment factors that influence adolescent sexual behavior	No statistically significant difference between intervention students and students in comparison schools at final follow-up Higher rate for intervention group at baseline (31.1% vs. 25.5%) **knowledge of reproductive health and contraceptives** Intervention students had higher scores than comparison students – adjusted mean difference of 10% ($p < .05$) at final follow-up Baseline difference not reported **Self-efficacy to refuse unwanted sex** No significant differences observed between groups at all follow-ups Baseline difference not reported

4. Stephenson et al., 2003 Randomized control trial School-based intervention implemented over a 4-year (1997–2001) period involving 29 schools in central and southern England	8766 – 13- to 14-year-old pupils (year 9) Gender and ethnic proportions not reported **Allocation** Intervention – 4516 Control – 4250 **Randomization** By school **Analysis** By individual Multivariate	**Theory** No theoretical model **Exposure** 3 sessions of about 1 hr each **Components**: Pupil-led reproductive and sex education Communication Use of condom skills Sexual health services orientation **Control** As above but teacher-led **Follow-up** 3-year period Final follow-up rates: 94% for intervention 84% for control	**Behavior change goal**: To improve the younger pupils' skills in sexual communication and condom use and their knowledge about pregnancy, sexually transmitted infections, contraception, and local sexual health services **Consumer research**: Program was piloted across different types of schools and needs assessment carried out **Segmentation & targeting**: Targeted year 9 pupils (13–14 years) **Marketing mix**: *Promotion* – Reproductive and sexual health sessions Participatory learning strategies and activities used, e.g., role play, quizzes, games, condom use demonstration *Product and Place* – Provided information on access to condoms and contraception *Personnel* – Program was designed by an external team of health promotion practitioners. Peer educators trained and given support in preparing and delivery of classroom sessions **Exchange**: Better quality of relationship with current partner Enhanced quality of sexual experience Enhanced sexual health knowledge Confidence in using condoms and contraception **Competition**: Program addressed risk factors such as peer influence, access to local sexual health services, ethnicity, and education attainment	**Delayed sexual initiation** By age 16 fewer girls reported intercourse in the peer-led arm (34.7% as compared to 40.8% for teacher-led arm) (OR 0.82, CI 0.68, 0.98) No significant difference was observed for boys (32.7% vs. 31.1%), $p = 0.35$) (0 R 0.92, CI 0.65, 1.28) **Unintended pregnancy** A small difference was observed at age 16 between intervention and control arms among females (96.7% vs. 97.7%) Adjusted odds were higher in favor of intervention 1.40 (0.97, 2.02) **Self-efficacy to refuse unwanted sex** At age 16 more intervention arm girls were able to say no to unwanted sex (83.7% vs. 79.7%) (OR 0.86 CI 0.74, 1.00) No significant difference was observed among boys (64.1% vs. 68.7%) (OR 1.31 CI 1.02, 1.68) **Knowledge of reproductive health and contraceptives** Knowledge levels were higher for intervention group at final follow-up for both boys and girls (82.3% vs. 77.8%) (OR 1.34 CI 0.97, 1.84) and (68.7% vs. 64.1%) (OR 1.31 CI 1.02, 1.68), respectively **Baseline difference** Not reported for all outcomes

(*Continued*)

TABLE 2

Continued

AUTHORS, STUDY DESIGN, AND SETTING	PARTICIPANT CHARACTERISTICS, ALLOCATION, RANDOMIZATION, AND ANALYSIS	INTERVENTION AND CONTROL COMPONENTS, FOLLOW-UP PERIOD, AND SUCCESS RATE	INTERVENTION SOCIAL MARKETING CHARACTERISTICS	STUDY OUTCOMES AND BASELINE DIFFERENCE
5. Philliber et al., 2002 Randomized control trial Intervention was based in 6 youth centers in New York City run by Children's Aid Society, U.S.	484 disadvantaged children aged 12–16 **Gender** 268 – females 216 – males **Ethnicity** 44% – African American 26% – Hispanic 5% – White 25% – Asian and others **Allocation** Intervention – 242 Control – 242 **Randomization** By individual **Analysis** By individual Multivariate	**Theory** Based on the Carrera model (named after founder, Dr. Carrera) **Exposure** 16–22 hr per month over 3 years **Components**: Work-related intervention – job club Academic support Comprehensive family life and sexuality education Arts and sports Mental health, medical, and dental care **Control** Regular program mainly consisting of recreational activities, arts and crafts, and help with homework **Follow-up** 3-year period Final follow-up rates: 79% – intervention 36% – control	**Behavior change goal**: To delay sexual debut and increase contraceptive use among those already sexually active **Consumer research**: Utilized findings from previous studies on job-related interventions and baseline survey **Segmentation & targeting**: Targeted 13–15-year-old teenagers and their parents **Marketing mix**: *Promotion and Product* – Comprehensive youth development program and curriculum-based sex education *Place and Product* – Contraceptive provision, mental health care, and medical care *Personnel* – Program was delivered by trained staff and supervised by program director **Exchange**: Stipends provision, help with bank accounts and careers, homework help, exam preparation, sexual	**Knowledge of reproductive health and contraceptives** Intervention females' knowledge improved by 25% as compared to 14% ($p < .001$) among controls Knowledge levels were higher for males as well: 18% vs. 6% ($p < .001$) at final follow-up (3 years) Baseline difference not reported **Self-efficacy to refuse unwanted sex** 75% of intervention female participants chose not to have sex under pressure as compared to 36% among controls ($p < .05$) at final follow-up Baseline difference not reported **Delayed sexual initiation** Intervention female participants were less likely to be sexually active as compared to controls (OR 0.5, $p < .05$) at final follow-up Higher rates were reported for intervention males (5%) and control females (5%) at baseline **Unintended pregnancy** Intervention female participants were less likely to have experienced pregnancy

			knowledge, talent and confidence development, impulse control through sports, counselling, free medical examination and tests, access to contraceptives **Competition**: Program addressed risks such as idleness, lack of motivation, low self-esteem, poor academic performance, and access to contraceptives	(10% vs. 22%) (OR 0.3, $p < .01$) at final follow-up Baseline difference not reported **Contraceptive use at last intercourse** Intervention female participants were more likely to have used contraceptives at last intercourse (36% vs. 20%) (OR 2.4, $p < .05$) Baseline difference not reported
6. Eisen, Zellman, & McAlister, 1990 Randomized control trial 13–19-year-old adolescent males and females in 1 independent school and 6 community-based family planning agencies, Texas and California, U.S.	1444 adolescents age range 13–19 years **Gender** 52% – females 48% – males **Ethnicity** 15% – White 24% – Black 53% – Hispanic 8% – Others **Allocation** Intervention – 722 Control – 722 **Randomization** By classroom and individual **Analysis** By individual Multivariate	**Theory** Health belief model and social learning theory **Exposure** 12–15 hr **Components**: Professional led Adolescent sexuality Group discussions on values, feelings, and emotions Decision-making skills Training on responsible sexual behavior **Control** Did not focus on perception by teenagers and had less active pupil involvement **Follow-up** 1-year period Follow-up rates: Immediate – 92% After 1 year – 61%	**Behavior change goals**: To increase teenagers' awareness as regards sexual and reproductive health issues To decrease the psychological and interpersonal and logistical barriers to abstinence and contraceptive use **Consumer research**: Curriculum was piloted and participant views incorporated **Segmentation & targeting**: Targeted 13–19-year-old adolescents **Marketing mix**: *Promotion* – Reproductive and sexual health sessions facilitated using a combination of lectures, simulations, leader-guided discussions, role playing, and trigger films *Product and Place* – Information on use of contraceptives and access provided *Personnel* – Program facilitated by trained family planning agency educators and school staff	**Knowledge of reproductive health and contraceptives** At immediate follow-up mean increase of about 8 points (20%) for intervention group (from 24.68 to 32.85, $p < .001$) and 6.8 points increase for control group (25.55 to 32.36, $p < .001$) **Delayed sexual initiation** Minimal difference between intervention and control at 1-year follow-up (71% vs. 70%, $p < 0.001$) for males but highly significant for females (77% vs. 61%, $p < .001$) **Contraceptive use at last intercourse** *At 1-year follow up:* 55% of males in intervention as compared to 65% in control had used effective contraceptive method at last intercourse ($p < .05$). 35% of females in intervention as compared to 65% in control had used effective contraceptive method at last intercourse ($p < .05$)

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TABLE 2

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AUTHORS, STUDY DESIGN, AND SETTING	PARTICIPANT CHARACTERISTICS, ALLOCATION, RANDOMIZATION, AND ANALYSIS	INTERVENTION AND CONTROL COMPONENTS, FOLLOW-UP PERIOD, AND SUCCESS RATE	INTERVENTION SOCIAL MARKETING CHARACTERISTICS	STUDY OUTCOMES AND BASELINE DIFFERENCE
			Exchange: Enhanced knowledge on adolescent sexuality Easier contraceptive access **Competition**: Program addressed psychological, interpersonal, and logistic barriers to abstinence or consistent contraceptive use	**Baseline difference** Not significant for all outcomes
7. McBride & Gienapp, 2000 Randomized control trial A School- and community-based intervention for 14–17-year-old female adolescents from high risk group in Washington State, U.S. (Study at Site G only)	232 adolescent females age 14–17 years Ethnic proportions not reported **Allocation** Intervention –127 Control – 105 **Randomization** By individual **Analysis** By individual Multivariate	**Theory** Client-centred approach No theoretical model **Exposure** 27 hr **Components**: Professionals led weekly adolescent support groups Reproductive and sexual health classes Counselling and referrals to family planning and community services	**Behavior change goal**: To empower young women, improve their self-esteem, and help them avoid early pregnancy **Consumer research**: Needs assessment and process evaluation. **Segmentation & targeting**: 14–17-year-old female adolescents from high risk group **Marketing mix**: *Promotion* – Reproductive and sexual health lessons support groups, use of videos, guest speakers, counselling, and mentorship	**Delayed sexual initiation** Percentage of adolescents who were sexually active was almost similar in intervention and control groups at final follow-up (57% vs. 59%). The difference was not statistically significant **Contraceptive use at last intercourse** Percentage of adolescents who had used contraceptives at last intercourse was higher in control than intervention group (100% vs. 80%) The difference was not statistically significant.

		Mentorship by older women from local colleges **Control** Did not receive individualized services such as counselling and mentorship and had only 2–5 hr contact per year **Follow-up** 6-month period Follow-up rate: 68%	*Product and Place* – Provision of free contraceptives and information on future access *Personnel* – Program delivered by trained health and sexuality educators and social workers. **Exchange**: Incentives for participation such as coupons for pizza or movies Knowledge on adolescent sexuality, abstinence, and contraceptive access and use Free counselling services Mentorship Recreation opportunities **Competition**: Program addressed risk factors such as drug and alcohol misuse, low self-esteem, educational aspirations, communication with parents, and peer pressure	**Baseline difference** Not significant for all outcomes
8. Coyle et al., 2006 Randomized control trial 14–19-year-old teenagers in 24 alternative schools (community day schools) located in 4 large urban counties in northern California, U.S.	988 students aged 14–18 years ***597 in intervention group:*** African American – 29% Asian American – 16.9% Hispanic/Latino – 27.6% White – 12.2% Others – 14.2% Males – 61.2% Females – 38.8%	**Theory** Social cognitive theory, theory of reasoned action, and theory of planned behavior **Exposure** 26 hr/14 sessions **Components** Reproductive and sexual health lessons Negotiation skills	**Behavior change goal**: To reduce the number of students who have unprotected sex **Consumer research**: Program was piloted before implementation **Segmentation & targeting**: Targeted 14–19-year-old teenagers with discipline, substance misuse, and absenteeism problems	**Contraceptive use at last intercourse** No statistically significant difference between intervention and control group at final follow-up **Unintended pregnancy** No statistically significant difference between intervention and control groups at final follow-up **Knowledge of reproductive health and contraceptives**

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TABLE 2

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AUTHORS, STUDY DESIGN, AND SETTING	PARTICIPANT CHARACTERISTICS, ALLOCATION, RANDOMIZATION, AND ANALYSIS	INTERVENTION AND CONTROL COMPONENTS, FOLLOW-UP PERIOD, AND SUCCESS RATE	INTERVENTION SOCIAL MARKETING CHARACTERISTICS	STUDY OUTCOMES AND BASELINE DIFFERENCE
	391 in control group: African American –25.8% Asian American – 12.8% Hispanic/Latino – 31.5% White – 12.3% Others – 17.6% Males – 65% Females – 35% **Randomization** By school **Analysis** By individual Multivariate	Condom use skills **Control** Regular program – teacher-led curriculum-based sex education **Follow-up** 18-months period Follow-up rates: 6 months – 73% 12 months – 62% 18 months – 56%	**Marketing mix**: *Promotion* – Reproductive and sexual health sessions involving students creating posters, watching videos, use of skits to demonstrate vulnerability, role playing, advice columns, group discussions, and demonstrations *Product and Place* – Guided practice in use of condoms and information on contraceptive access *Partnerships* – Community service visits *Personnel* – Program delivered by trained and experienced health educators **Exchange**: Knowledge on adolescent sexuality and contraceptive access and use **Competition**: Program addressed attitudes toward having sex and use of condoms, substance misuse, poor school performance and reinforced pro-social attitudes through community activities	No statistically significant difference between intervention and control groups at final follow-up **Self-efficacy to refuse unwanted sex** No statistically significant difference between intervention and control groups at final follow-up **Delayed sexual initiation** No statistically significant difference between intervention and control groups at final follow-up **Baseline difference** Higher rate of contraceptive use at last intercourse for control group (7%). Other outcomes not reported

9. Wight et al., 2002 Randomized control trial 13–15-year-old teenagers in 25 non-Catholic schools located in Tayside and Lothian regions, UK	8430 pupils aged 13–15 years **Intervention – 4197** Male – 49% Female – 51% **Control – 4233** Male – 51% Female – 49% Ethnic proportions not reported **Randomization** By school **Analysis** By individual Multivariate	**Theory** Psychosocial and sociological theoretical framework **Exposure** 20 sessions Duration not specified **Components**: Delivered by trained teachers Reproductive and sexual health lessons Negotiation skills Condom use skills **Control** Provision of information and discussion sessions Limited training of teachers. **Follow-up** 2-year period Follow-up rates: Intervention – 72% Control – 73%	**Behavior change goal**: To reduce unsafe sexual behaviors, unwanted pregnancies, and improve quality of sexual relationships **Consumer research**: Program was piloted before implementation **Segmentation & targeting**: 13–15-year-old teenagers in secondary schools **Marketing mix**: *Promotion* – Reproductive and sexual health lessons Role playing, group work, games, information leaflets on sexual health including contraceptives and interactive video *Product and Place* – Demonstrations on use of condoms and information on contraceptive access *Personnel* – Delivered by trained teachers **Exchange**: Full cost coverage for training teachers Enhanced quality of sexual relationships for participants Enhanced knowledge on adolescent sexuality, pregnancy, and contraceptive access and use **Competition**: Program addressed peer and social pressures on sexual behaviors	**Delayed sexual initiation** No significant difference between intervention and control participants: males – 23.6% vs. 23.9% ($p = .89$); Females – 31.8% vs. 33% ($p = .59$) Slightly higher rate for intervention group at baseline (4%) **Contraceptive use at last intercourse** No significant difference between intervention and control participants: males – 18.7% vs. 21% ($p = .38$); females – 30.4% vs. 28% ($p = .48$) Baseline difference not significant **Unintended pregnancy** No statistically significant difference between intervention and control participants (4% vs. 3.8%) Baseline difference not significant **Knowledge of reproductive health and contraceptives** Mean difference between intervention and control was minimal but significant – 0.7%, $p < .05$ for boys and 0.5%, $p < .05$ Baseline difference not reported

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TABLE 2

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AUTHORS, STUDY DESIGN, AND SETTING	PARTICIPANT CHARACTERISTICS, ALLOCATION, RANDOMIZATION, AND ANALYSIS	INTERVENTION AND CONTROL COMPONENTS, FOLLOW-UP PERIOD, AND SUCCESS RATE	INTERVENTION SOCIAL MARKETING CHARACTERISTICS	STUDY OUTCOMES AND BASELINE DIFFERENCE
10. Tiezzi et al., 1997 Before and after observational study Grade 6, 7, and 8 teenagers of mean age 12.9 years attending school-based clinics in 4 New York City junior schools, U.S.	3738 junior high school students **Gender** Female – 46% Male – 54% **Ethnicity** Hispanic – 81% Black – 10% Other – 9% **Analysis** Univariate Cross tabulations	**Theory** Not based on any theoretical framework **Exposure** 15 lessons, duration not reported **Components**: Reproductive and sexual health lessons Individual education and counselling Interdisciplinary support, i.e., social workers, medical providers, and psychiatrists Decision-making skills **Follow-up** 3-year period Follow-up rates not reported	**Behavior change goal**: To reduce the risk of unintended pregnancy by providing information, counselling, support, and referral for reproductive health care **Consumer research**: Health and risk factor survey was conducted and curriculum pre-tested **Segmentation & targeting**: Targeted grade 6, 7, and 8 students **Marketing mix**: *Promotion* – Reproductive and sexual health sessions Role plays, group games, brainstorming exercises, audiovisual presentations and exploratory learning to discover own vulnerability *Product and Place* – Information on contraceptives, referrals, and assistance from health educators to obtain contraceptives *Personnel* – Program was facilitated by an experienced multidisciplinary team	**Unintended pregnancy** Pregnancy rate overall in the 4 intervention schools dropped from 8.8 per 1000 in year 1 to 5.3 per 1000 in year 2 and 6.8 per 1000 in year 3 Pregnancy rate in 1 school that dropped out of the program due to funding was three times that of the schools in the program (16.5 pregnancies per 1000 female students vs. 5.8 per 1000)

			Exchange: Enhanced knowledge on adolescent sexuality, pregnancy, and contraceptives Free counselling service Referral and assistance in obtaining contraceptives **Competition**: Program addressed peer and social pressures on sexual behaviors and other risk factors such as alcohol and substance misuse	
11. Paine-Andrews et al., 1999 Before and after observational Study (with comparison groups) 14–17-year-old teenagers in 3 schools and community-based programs in Kansas, U.S.	Grade 9–12 students Geary – 1004 students Franklin – 710 students Wichita – not reported Gender and ethnicity details of participants not reported **Analysis** Multivariate	**Theory** Theory of change **Exposure** Duration not reported **Components**: Delivered by trained project staff Sexual education for teachers and parents Age appropriate sex education Increased access to health services Use of mass media Community Involvement Peer support and education Alternative activities for young people Involvement of the faith community **Comparison groups** No intervention	**Behavior change goal**: To reduce teenage pregnancies, to delay the age of first intercourse, and to increase contraceptive use among sexually active teenagers **Consumer research**: Program was piloted before implementation **Segmentation & targeting**: 14–17-year-old females **Marketing mix**: *Promotion* – Reproductive and sexual health classes for teachers, students, and parents Use of mass media *Product and Place* – Enhanced access to health services and contraceptives *Partnerships* – Involvement of parents, faith community, schools and health department officials, media, and local businesses	**Delayed sexual initiation** In Geary county adolescents reporting ever having had sex reduced from 51% in first year of program to 38% among females and 63% to 43% among males in third year ($p < .05$) In Franklin county adolescents reporting ever having had sex increased from 33% in first year of program to 40% among females and 54% to 68% among males in third year ($p < .05$). **Contraceptive use at last intercourse** No statistically significant change in Geary county In Franklin county more males reported using condoms in third year (55%) as compared to 39% in first year ($p < .05$). **Unintended pregnancy** Pregnancy rate decreased in Geary County – from 63/1000 pre intervention to about 56/1000 postintervention Comparison area increased from 60/1000 to 69/1000 ($p < .05$)

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AUTHORS, STUDY DESIGN, AND SETTING	PARTICIPANT CHARACTERISTICS, ALLOCATION, RANDOMIZATION, AND ANALYSIS	INTERVENTION AND CONTROL COMPONENTS, FOLLOW-UP PERIOD, AND SUCCESS RATE	INTERVENTION SOCIAL MARKETING CHARACTERISTICS	STUDY OUTCOMES AND BASELINE DIFFERENCE
		Follow-up 3-year period Follow-up rates: Geary – 68% Franklin – 79% Wichita – not reported	**Exchange**: Enhanced knowledge on adolescent sexuality, pregnancy, and contraceptives Enhanced access to health and contraceptive services Afterschool and holiday activities Peer support groups Mentorship opportunities **Competition**: Program addressed social pressures on sexual behavior, idleness during holidays and afterschool. Involved faith community and local businesses	In Franklin county pregnancy rates reduced from 41/1000 to 37/1000 Comparison area had a minimal decrease from 39/1000 to 37/1000 ($p < .05$)
12. Hughes, Furstenberg, & Teitler, 1995 Before and after observational study (With comparison group)	14–18-year-old adolescents from family planning clinic catchment areas and entire city	**Theory** Theoretical framework not specified **Exposure** Not reported	**Behavior change goal**: To increase awareness of teenage pregnancy and encourage responsible sexual decision-making	**Delayed sexual intercourse** No significant change in the percentage of teenagers who Reported ever having sex pre- and postintervention (51% vs. 52%)

14–18-year-old teenagers attending family planning clinics in Philadelphia area, USA.	**Catchment areas – 907** Black – 46% Other ethnic proportions not reported Females – 82% Males – 18% **Entire city –117** Black – 41% Other ethnic proportions not reported Female – 81% Males – 19% **Analysis** Multivariate	**Program components**: Delivered by health professionals After school or evening clinic services Teenage walk in hours Reduced waiting time for teenagers' appointments Increase of hours reserved for teenagers only Educational sessions at community institutions for teenagers and parents Community health fairs Peer education **Comparison group**: No intervention **Follow-up** 3-year period Only 20% of participants interviewed at baseline were re-interviewed at final evaluation as planned	**Consumer research**: Baseline survey was carried before program implementation. **Segmentation & targeting**: 14 to 18-year-old teenagers **Marketing mix**: *Promotion* – Reproductive sexual health sessions for teenagers and parents Use of posters, public transit cards with program slogan – "Pregnancy: It's not for me." Community fairs, radio program, newspaper articles *Product and Place* – After school or evening clinic services, teenage walk in hours, reduced waiting time for teenagers' appointments, and increase of hours reserved for teenagers only *Personnel* – Facilitated by health professionals **Exchange**: Enhanced knowledge on adolescent sexuality, pregnancy, and contraceptives Enhanced access to sexual health and contraceptive services **Competition**: Program addressed negative attitudes toward use of contraceptives, logistic barriers to accessing contraceptive services, and peer pressures on sexual behavior	**Contraceptive use at last intercourse** Use of contraceptive in the last intercourse increased slightly from 67% to 73% but was not statistically significant **Unintended pregnancy** Pregnancy rate rose slightly from 6% to 8% but was not statistically significant **Comparison area** No significant difference between intervention and comparison groups for the three outcomes

Social marketing characteristics

The social marketing characteristics and outcomes for the 12 included studies are provided in Table 2. The main *behavior change goal* in all the 12 interventions was to delay involvement in sexual activity or use contraceptives effectively for those already active. All interventions carried out baseline surveys (*consumer research*) before commencement of the main program. Five interventions (Coyle et al., 2006; Eisen et al., 1990; McBride & Gienapp, 2000; Stephenson et al., 2003; Tiezzi et al., 1997) had more intense involvement of the target groups through needs assessments and pilot projects. *Targeting and segmentation* was mainly by age and academic level for all interventions. All interventions included sexual health lessons in their curricula. They also trained teenagers in skills of delaying sexual initiation and provided information on use and access to contraceptives for those already sexually active (*product and promotion*).

Others (Coyle et al., 2001; Eisen et al., 1990; Lederman et al., 2008; Paine-Andrews et al., 1999; Philliber et al., 2002) actively involved parents, relevant community and peer groups in program planning and implementation (*partnerships*). Six interventions (Aarons et al., 2000; Coyle et al., 2001; Lederman et al., 2008; McBride & Gienapp, 2000; Paine-Andrews et al., 1999; Philliber et al., 2002) provided tangible incentives such as t-shirts, monetary rewards, and recreation opportunities to encourage long-term participation in their programs (*exchange*). All interventions addressed competing behaviors and other risk factors that would influence negatively the sexual behavior of teenagers (*competition*). These included social/ peer pressure, communication barriers with parents or teachers, substance misuse, idleness, low self-esteem, and cultural/ religious influences.

Study quality

The quality of one of the studies was high (Stephenson et al., 2003) whereas two were rated as weak (Lederman et al., 2008; Tiezzi et al., 1997). The rest were rated moderate (Aarons et al., 2000; Coyle et al., 2001; Coyle et al., 2006; Eisen et al., 1990; Hughes et al., 1995; McBride & Gienapp, 2000; Paine-Andrews et al., 1999; Philliber et al., 2002; Wight et al., 2002).

Outcomes

The five outcomes reported in the 12 studies were examined in turn. These were change in rate of unintended teenage pregnancies, delayed sexual initiation, contraceptive use at last intercourse, knowledge of contraception and reproductive health, and self-efficacy to refuse unwanted sexual intercourse.

Unintended pregnancy

Seven studies assessed participants' self-reported incidence of unintended pregnancy. Male participants reported the incidence of causing a pregnancy. Two RCTs (Philliber et al., 2002; Stephenson et al., 2003) and two "before and after studies" (Paine-Andrews et al., 1999; Tiezzi et al., 1997) reported significant intervention effects. The four interventions were all long term. The intervention with the largest effect (Philliber et al., 2002) was relatively more intense than the rest (up to 22 hr monthly over a three year period). In this study, female participants were up to 70% less likely to report having experienced unintended pregnancy at final follow-up as compared to control group female participants. No study reported a significant effect among male participants. The follow-up rate was relatively low in two of the three studies that reported no effect. Coyle et al. (2006) had an attrition rate of 44% while Hughes et al. (1995) only interviewed 20% of the participants at final follow-up.

Delayed sexual initiation

Ten studies assessed participants' self-reported incidence of sexual initiation. Four RCTs (Aarons et al., 2000; Eisen et al., 1990; Philliber et al., 2002; Stephenson et al., 2003) and one "before and after study" (Paine-Andrews et al., 1999) reported significant intervention effects. Two studies with the lowest follow-up rates reported no significant impact (Coyle et al., 2006; Hughes et al., 1995). The largest intervention effect was among females reported by Aarons et al. (odds ratio [OR] 1.88 95% confidence interval [CI] 1.02, 3.47). Only two studies (Eisen et al., 1990; Paine-Andrews et al., 1999) reported significant effects among male participants of 16% ($p < .001$) and 17% ($p < .05$) reduction in sexual activity since baseline, respectively.

Contraceptive use at last sexual intercourse

Nine studies assessed participants' self-reported use of contraceptive at last sexual intercourse. Three RCTs (Aarons et al., 2000; Coyle et al., 2001; Philliber et al., 2002) and one "before and after study" (Paine-Andrews et al., 1999) reported significant intervention effects. The four interventions that reported significant effects were long term whereas in one short-term study (Eisen et al., 1990), control participants had better outcomes. Again the two studies with the lowest follow-up rates (Coyle et al., 2006; Hughes et al., 1995) reported no impact.

Aarons et al. (2000) reported the largest intervention effect. In this study, intervention females were more than three times as likely to have used contraceptives at last sexual intercourse than control females (OR 3.39, 95% CI 1.16, 9.95).

Only one study (Paine-Andrews et al., 1999) reported a significant intervention effect among particularly male participants of 16% ($p < .05$) increase in contraceptive use since baseline.

Knowledge of reproductive health and contraceptives

Eight randomized control trials assessed participants' self-reported knowledge of reproductive health and contraceptive use. Only one study (Coyle et al., 2006) did not report a significant impact. The largest intervention effect was among male participants in the Aarons et al. (2000) study in which intervention males had a mean score improvement of up to 23% ($p < .05$) higher than those in the control group at final follow-up. The same study had the largest effect among female participants as well (19%, $p < .05$).

Self-efficacy to refuse unwanted sex

Five randomized control trials assessed participants' self efficacy to refuse unwanted sex. Only one study (Philliber et al., 2002) reported a significant effect (39%, $p < .05$) among female participants, indicating that 39% more female participants in the intervention group had chosen not to have sex when pressured as compared with the control group. None of the studies reported any significant effect among males. Philliber's intervention (Philliber et al., 2002) was community-based, long term, and was implemented for the longest duration (22 hr monthly over a three year period).

Discussion

This review assessed 12 studies conducted in the United States and and United Kingdom to determine the effectiveness of a social marketing approach in reducing unintended teenage pregnancy and influencing related behavior change. Although all studies reported interventions that fully met the specified social marketing criteria, the actual implementation of programs varied in content, follow-up periods, intensity, settings, and program content. Results showed variation in intervention effects across specified outcomes with 9 studies out of 12 reporting significant effects on at least one of the specified outcomes.

Overall no particular social marketing component or activity was independently associated with effective interventions except for one behavioral outcome (self-efficacy to refuse unwanted sex). Here, the only intervention that reported a significant effect (Philliber et al., 2002) appeared to have a relatively more intense "*marketing mix*" and provided more participant incentives (*exchange*). Longterm interventions also appeared to be more effective as compared to

short-term ones for most outcomes. The impact on male participants' sexual behavior was minimal in most studies.

The significance of employing multifaceted/multicomponent approaches (*marketing mix*) in teenage pregnancy interventions has been highlighted by other similar studies (Card, 1999; Cheesebrough, Ingham, & Massey, 1999; DiCenso et al., 2002). These studies observed that interventions which combined school and community strategies and media and health service provision reported greater impact on teenagers' sexual behavior and reduction in unintended pregnancies. The idea of using incentives (*exchange*) to encourage behavior change has recently been gaining favor in public health practice (Jochelson, 2007; Thaler & Sustein, 2008).

However, evidence on the sustainability of the behavior change on the long term is limited. Some evidence suggests that financial/monetary incentives are more effective in changing "one off" behaviors such as keeping appointments and participating in programs whereas nonfinancial incentives that enhance individuals motivation, confidence, and skills are more effective on the long term (Jochelson, 2007). Overall the use of incentives is recommended in motivating behavior change especially among hard to reach groups (Arai, 2003; Kirby, 2001, 2007; Teenage Pregnancy Unit, 2006).

This study observed an association between program duration and impact, a finding which is consistent with those of other studies (Card, 1999; Cheesebrough et al., 1999; Robin et al., 2004) which have also highlighted the futility of implementing well-designed interventions over short periods (less than two years). Rotheram-Borus, Gwadz, Fernandez, & Srinivasan (1998) in their study on intervention program duration also found that short session interventions implemented over long periods were more effective than long sessions implemented over short periods.

Although these findings underscore the importance of long-term interventions, in practice this might be a major challenge for such institutions as schools which often have limited time and resources to implement programs within an academic year. Also, there are important implications for the cost-effectiveness of the approach. Although time limitation may not be a major challenge for community-based programs, the need for extra resources to implement multiple sessions may be a notable barrier (Kirby, 2007; Peersman & Levy, 1998; Stanton, Kim, Galbraith, & Parrott, 1996).

The minimal impact on male participants' sexual behavior observed in this study raises important questions. First is the appropriateness of evaluation tools used in studies included in this review and whether they were cognitively tested

with male participants before actual use. Perhaps males do not know about their partner's pregnancy and possibly refusal of unwanted sex is more female-related than male? Second, what if a large of proportion of females are using other forms of contraception which makes it unnecessary for males to use condoms for the purpose of pregnancy prevention? Currently evidence on male participation in teenage pregnancy interventions is limited. However, some qualitative studies have indicated that most of the current approaches are mainly designed for females and may be inappropriate for males (Trivedi, Brooks, Bunn, & Graham, 2009). These findings and related questions seek further investigation to establish why males appear to be highly receptive to sexual health messages but are unable or unwilling to put them into practice. There is need for more studies to help understand the male sexual behavior and for the development of better intervention and evaluation strategies.

The 12 included studies had several methodological limitations worth considering while interpreting the results of this review. Some of the RCTs (Aarons et al., 2000; Coyle et al., 2001; Stephenson et al., 2003) did participant randomization at the school/institution/group level and carried out data analysis at individual level, an anomaly which could have lead to spurious results. Only 4 studies reported analyzing final data either with "intention to treat" (Stephenson et al., 2003; Wight et al., 2002) or used multilevel logistic models to investigate the participant loss to follow-up effect (Coyle et al., 2001; Coyle et al., 2006) whereas attrition rates were more than 20% in most RCTs. In a number of RCTs (Aarons et al., 2000; Coyle et al., 2001; Coyle et al., 2006; Philliber et al., 2002; Wight et al., 2002) the baseline differences between intervention and control groups were significant. This might have lead to a discrepancy in measuring rates of change in outcomes between groups. Most of the RCTs did not report the followup success rates for control groups making it difficult to compare the effect of attrition on outcomes for the two arms of study. The heterogeneity in outcome measures where some studies used percentage and others odds ratios made it difficult to accurately compare levels of impact as well.

The intervention program contents varied across studies despite all meeting the social marketing criteria. This meant it was not possible to comprehensively assess program intensity. This was made more difficult with some studies not specifying duration of intervention exposure or simply stating number of sessions.

Another limitation to be considered here is that, in the reported RCTs, the control groups received a conventional intervention rather than no intervention. This means that the test applied was not whether social marketing interventions were effective, but whether they were more effective than the conventional

interventions. However, this situation is not peculiar to the studies reviewed here, and it is a problem common to many RCTs. As is also common with other controlled studies, the possibility of contamination across groups was high especially where randomization was done at individual level which might have contributed to some studies reporting low or null effects.

This review included studies only reported in the English language and may, therefore, have missed studies done within western Europe reported in other languages. Indeed, the studies that met the inclusion criteria were all conducted in the United States and United Kingdom. This could reflect language limitations or the fact that teenage pregnancy has been viewed as a priority problem in the United States and United Kingdom for over a decade and therefore attracted more research (Imamura et al., 2007). The majority of the interventions evaluated involved participants from ethnic minority groups, mainly Hispanics and African American groups and the wider relevance of these findings beyond those groups need further consideration. However, in support of the wider generalization of the results, three studies (Coyle et al., 2001; McBride & Gienapp, 2000; Paine-Andrews et al., 1999) which had a majority of White participants, reported comparable outcomes.

Last, the quality of two studies (Lederman et al., 2008; Tiezzi et al., 1997) was rated as weak, which brings into question the true intervention effects. However, the low rating could have been due to underreporting of vital methodological details by the authors due to word limitations. All studies relied mostly on participant self-reported data for analysis, a known inevitable source of bias for studies evaluating sexual behaviors, as there is the tendency for respondents to agree with statements associated with healthier behaviors or attitudes (McFarlane & St. Lawrence, 1999; Sieving et al., 2005). However, this potential setback was ameliorated by participant privacy and confidentiality in most studies.

Implications for Social Marketing

The results of this study indicate that the mere application of social marketing principles in unintended teenage pregnancy interventions may not be adequate to consistently produce favorable outcomes. Other factors such as program duration and intensity play a major role. In this study, long-term interventions were more effective as compared to short-term ones for most outcomes. Furthermore, the only program that reported significant effects across all five outcomes was long term and had the highest exposure period of up to 22 hr a month over a period of three years (Philliber et al., 2002).This implies that the social marketing potential is more likely to be fully exploited when a long-term approach is

employed. However, considering the vast resources required to run such long-term programs, further research to inform the design of medium term and cost effective interventions is recommended.

Philliber's intervention was also the most intensive, featured a better marketing mix, and used incentives extensively to encourage participation in its programs. These findings underline the need for well-designed social marketing programs which address adequately the identified needs of a well-defined target group while ensuring regular participation in intervention activities for significant effects to be realized.

Conclusion

This is the first systematic review to our knowledge that has assessed the effectiveness of a social marketing approach in teenage pregnancy interventions in the developed countries. Results indicate that social marketing can be an effective approach in reducing teenage pregnancies and influencing related behavior change, but evidence is limited to particular outcomes/context and therefore inconclusive. The fact that all the included studies were not necessarily designed as typical social marketing interventions meant the implementation of the specific program activities varied widely despite all meeting the minimum specified inclusion criteria, a factor which might have contributed to the inconsistent impact.

There is therefore need for more teenage pregnancy interventions and studies that are specifically designed around social marketing principles which would permit a more robust evaluation of social marketing than the incidentally social marketing interventions currently do. The minimal impact of the interventions on male participants' sexual behavior also warrants further investigation.

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