

this later serve as a source of information more likely to lead to behavior change, than information traditionally gained through impersonal agencies. For example, sexual behavior change programmes that are built from social networks were shown effective in reducing risky sexual behavior in homosexual men in Russia.

In settings where non-governmental organizations, groups, or other community-based organizations are marginalized, interventions that aim to change risky sexual behaviors should start with informal groups in which norms are maintained.

3.1 Intervention targeting adolescents and young People: Europe

This section outlines a systematic review that examined the effectiveness of interventions that were designed to prevent the spread of sexually transmitted infections, including HIV, among young people in the European Union [20].

This systematic review was inspired the European Union call to action outlined in the “Report on sexual and reproductive health and rights and the European Parliament Committee on Women's rights and Equal Opportunities.

The authors designed a highly sensitive search string of over 150 terms to capture all articles related to sexually transmitted infections and their preventions, treatment, epidemiology, and care among young people aged 10-24 published from 1995 to November 2005, and they included studies from 27 selected European Union countries. The data base used included MEDLINE, EMBASE, CINHALL, PsychoInfo, and POPLINE.

The search yielded 19 studies of intervention studies for preventing sexually transmission studies among young people in Europe, and covered 9 countries from United Kingdom [22,23,28,31,32,34,36,37,39], 3 studies from Italy [24,25,27], 2 from the Netherland [30,33], 2 from Spain [26,35], and the other studies were from Bulgaria [21], Estonia [29], and Sweden [38].

The studies were categories in terms of whether there was a targeted behavior outcome, and the nature or the type of the implementer of the intervention, and in terms of the target groups, and in terms of the implementation setting of the intervention. Based on the behavior change outcome, 10 studies targeted behavior change (eg. condom use)

[21,24,26,28,31,32,34,37-39], 2 studies did not measure any behavior change [23,29], and the other studies targeted knowledge and/or intentions as well as behavior change. In terms of the type the implementer of the interventions 6 studies were implemented by teachers [24-26,29,35,39], 8 studies by peers [21,24,29,30,33,36-38], 7 studies by health professionals [23,27,28,31-34], and 1 study used specially trained workers [22]. In terms of the target groups, 12 studies targeted secondary school students [22,24,27,29,32,35-37,39], 2 studies targeted post-secondary school students [31,38], and 2 other studies targeted genitourinary medicine clinic patients [28,34]. In terms of the setting, school based interventions included 11 [22,24-27,31,32,35-39] studies, clinic-based studies included 2 studies [28,34], and community-based interventions included 6 studies [21,23,29,30,31,33].

Overall, 11 of the 19 studies reported improvements in sexual knowledge and attitudes; however, only 3 of the studies which targeted behavior change reported a significant improvement in sexual behavior [21,26,37]. In the quest to elucidate the reasons behind the ineffectiveness of behavior interventions, the authors articulated the following: First, the problem could lie within the methodology of many studies. Methodologically sound studies of prevention interventions among young people are difficult to find. Of the hundreds of studies identified by the search, only 19 were deemed suitable for the review. Even though these latter were published in peer-reviewed journal, they did not seem all to be adequately designed. Second, the length of the intervention could be another possible reason to this failure of demonstrating an effective result of the interventions. In fact, most of studies had relatively short follow-ups, although behavior may take long to occur. Among the studies, 2 had no follow-ups [23,31], 2 had follow-ups of 18 months [28,37], 2 had follow-ups immediately after the interventions [29,38], and the others were between 4 weeks and 6 months. However, even though longer follow-up may provide better evidence, it is often unrealistic in terms of their feasibility (cost, time, etc). Thirdly, poor segmentation of the target population may be another problem. Most of the studies targeted large groups of young people but not sub-groups such as males, females, or migrants with differing needs, interest, and knowledge background. Interventions that are informed by careful segmentation could yield more positive results.

More importantly, most of studies in this review were based on the Information, Education Communication (IEC) strategy; while evidence have suggested that Behavioral Change Communication(BCC)-based studies tend to be more effective than IEC-studies [40].

Most of the studies were conducted in schools. School-based interventions are widely used, probably because they provide the easiest way to reach large groups of young people. However, the success of interventions within the school environment is attached to some factors such as the pupils' motivation, teachers' attitude, the curricula of the school, parental supports, etc. A recent review from European countries indicated that school sex education is not universally accepted in Europe, largely because of religious reasons [41].

In addition, most of studies in the review assessed knowledge and attitudes as a result of the intervention. While such studies may prove useful in increasing knowledge and sensitizing attitudes related to sexual behavior, it is important to underline that changes in knowledge and attitude do not necessarily lead to behavior change.

In this review we could learn that interventions to prevent the spread of HIV and other STIs among young Europeans can improve sexual health and STI prevention knowledge and attitudes, but their effect on actual sexual behavior remains limited. None of the major implementation models clearly reduced sexual risk behavior, though studies of one teacher-led and two peer-led interventions reported some statistically significant behavioral improvement. The other 16 studies we reviewed reported no significant behavior changes. This underlines the importance of new and innovative strategies to drive sexual behavior change; and interventions should directly target behavior change instead of just aiming to improve knowledge and attitudes.

A review of 48 research studies in the US found that about two-thirds of the HIV/STD prevention programs studied had a significant impact on reducing sexual risk behaviors, including a delay in first sexual intercourse, a decline in the number of sex partners, and an increase in condom or contraceptive use, and identified key common attributes among these programs. Effective HIV/STD prevention programs tend to be those that are delivered by trained instructors, are age-appropriate, include components on skill-building, support of healthy behaviors in school environments, and involvement of

parents, youth-serving organizations, and health organizations. These common traits should guide curriculum development and integration of program activities for HIV/STD prevention programs in schools and communities.

Sample of studies included in the review [20]				
Authors	Setting	Study design	Comparison group	Program implementers
Amirkhanian et al, 2003 [21]	Bulgaria, Russia	Pre- and post-intervention risk assessment, ethnographic observations, sociometric measures, statistical analysis- Community-based outreach	No	Peers (trained social leaders of young MSM networks)
Baraitser et al, 2002 [23]	South London, United Kingdom	Qualitative approach Community-based outreach	No	Health professional (sexual health outreach nurse)
Borgia et al, 2005 [24]	Rome, Italy	Randomized controlled trial (RCT) Social learning theory School based	Schools were randomly assigned to a peer- or teacher led program program	54 peers (trained by psychologists) 27 teachers (trained by health care workers)
Borgia et al, 1997 [25]	Lazio region, Italy	RCT School based	Schools were randomly divided into treatment and control groups	Teachers (trained by health workers)
Low et al, 2003 [31]	Inner London, UK	Pilot study evaluation Statistical analysis School and community-based	No	Sexual health advisor (qualified nurse), with assistance from project

				manager
Magnusson et al, 2004 [32]	Hertfordshire, UK	Pilot non-RCT Pre- and post-intervention School based	Intervention groups (given information at): a. family planning clinic, b. general practice, c. school drop-in clinic Control: usual school-based sex education	Health professionals (either family planner, general practitioner or a school nurse)
Martijn et al, 2004 [31]	Rotterdam, the Netherlands	Comparative study Theory of planned behavior Community-based outreach	a. no b. refugees were assigned to groups led by either a lay health advisor (LHA) or professional health advisor (PHA)	a. 4 trained LHAs b. 2 trained LHAs, 2 PHAs (public health nurses)
Stephenson et al, 2004 [37]	Central and Southern England, UK	RCT School based	15 intervention schools (peer-led sex education) 14 control schools (usual teacher-led sex education)	Peers (trained by external team)
Stephenson et al, 1998 [36]	Greater London, UK	RCT School based	2 intervention schools (peer-led sex education) 2 control schools (usual teacher-led sex education)	Peers (trained by experts)
Rebull et al, 2003 [35]	Southern Tarragona, Spain	Pre- and post-intervention study School based	No	Teachers

Wight et al, 2002 [39]	Scotland, UK	RCT (cluster randomized trial) School based	13 intervention schools: Sexual Health and Relationships Program 12 control schools: existing sex education	Teachers
Oakeshott et al, 2000 [34]	South London, UK	RCT (cluster randomized trial) Clinic based	Intervention group: 14 general practices Control group: 14 practices	Health professionals (nurses and general practitioners)
Kocken et al, 2001 [30]	Netherland	RCT Community-based outreach	Intervention group: n = 293 Control group: n = 296	Peer educators (men from same ethnic group as participants)
Kaldmäe et al, 2000 [29]	Estonia	Background study Interactive learning methods 2 school based projects 1 community-based outreach project	No	Teachers and peer educators
Donati et al, 2000 [27]	Rome, Italy	5 workshops 3 questionnaires School based	No	Health specialists (1 gynecologist, 1 psychologist)
Diez et al, 2000 [26]	Barcelona, Spain	Quasi-experimental study, pre- and post-intervention questionnaires Health belief model; social cognitive theory; theory of planned behavior School based	Intervention group: n = 220 students Information group: n = 593 Control group: n = 402	Teachers (one training session)

James et al, 1998 [28]	Nottingham, UK	RCT Social learning theory Clinic based	Intervention (individual counseling and skills training): n = 148 Control (written materials only): n = 162 Control (usual clinic procedure): n = 182	Health advisors (trained)
Tyden et al, 1998 [38]	Uppsala, Sweden	Quasi-experimental study, mass media campaign, peer education School based	Intervention group: n = 600 Control group (no campaign): n = 400 Control group (post-intervention questionnaire only): n = 600	19 trained peer educators (first-year medicine and nursing students)
Bagnall and Lockerbie, 1996 [22]	Lothian region, Scotland	Pre- and post-intervention evaluation School based	No	Specially trained sessional workers (young adults from outside)

3.2 Intervention targeting Men who have Sex with Men (MSM):

MSM represent the largest category for HIV infection in many developed countries and continue to be at great risk for HIV infection. Most of interventions study to reduce risky sexual behaviors among MSM have been conducted within the arena of HIV prevention, and have targeted diverse groups within MSM [42].

The effectiveness of HIV/STI preventive interventions targeted at MSM has been assessed in various publications. Most recently, a systematic Cochrane review [42] to reduce risk for sexual transmission of HIV among MSM. This review included 58 randomized controlled trials (RCT), of which almost three quarters were from the United States (US). The review concluded that behavioral interventions reduced UAI by 27% compared to minimal or no HIV preventive intervention. A number of other reviews have examined the effectiveness of HIV prevention interventions, and most of these were specific to MSM. Further, the majority of reviews have neither used a comprehensive search strategy nor clear inclusion criteria, and many of the reviews are out of date, having been published before or shortly after the year 2000, highlighting the need for a systematic review that incorporates explicit inclusion criteria and that updates the current knowledge base about HIV/STI preventive interventions targeted at MSM in Europe [42]

Prior to this, reviews of interventions to reduce risky sexual behavior and to prevent HIV transmission have been conducted across a broad range of population at risk. One of these reviews indicate that there is a paucity of research on interventions for MSM of color, young MSM, and MSM who do not identify themselves as gay [43].

Furthermore, the reviews of the research indicated that critical intervention components include information, motivation and skills training, with successful interventions having high attendance rates or including an extensive formative research component [42,43].

One review found diminishing effects of interventions as follow-up time increased from 1 month to 6 months. In parallel, another review indicated that community-level interventions were effective to reach people who would not participate in facility-based interventions and who may be actually be at higher risk compared to those who attend enroll in small-group or facility-based interventions [42].

However, there is a need to summarize and analyze the lessons learned in HIV prevention for MSM. This is a brief outline of the Cochrane review [2] that summarizes the behavioral effects of interventions designed to reduce risky sexual behaviors and prevent HIV transmission among MSM in developed settings, including Europe, USA, and Australia.

Summary of findings

This brief review examined controlled trials designed to reduce risky sexual behaviors among MSM. The studies included in this review examined individual-level, community-level and small-group interventions. The interventions were designed to reduce unprotected sex and included individual counselling, and social behavioral support such as peer education. Interventions that targeted communities and small groups included group counselling, workshop, training community leaders.

Overall, the results for the effectiveness of interventions for MSM within the arena of HIV prevention indicate that such interventions could reduce risky sexual behaviors, subsequently reduce the risk of sexually transmitted infections.

The summary effect of these diverse interventions indicates that 23% fewer men reported unprotected anal sex (one of the riskiest behaviors for transmission of HIV and other sexually transmitted infections) after receiving intervention. It is of note to report that the risk reduction observed across the trials occurred after relatively short interventions. Findings suggest that community-level interventions reached and influenced substantial proportions of the study population, whether through direct exposure to the formal intervention mechanisms or by informal social diffusion, and these interventions were at least as favorable as those of small-group and individual-level interventions. The present analysis also confirmed that interventions that promote personal skills yielded clearly favorable effects.

Policy considerations

Reduction in unprotected anal sex and sexually transmitted diseases can have an important public health impact. Among interventions, community-level interventions, those that served populations in their twenties (rather than their thirties) and those that promoted interpersonal skills have yielded slightly more favorable results. The reduction in risk would likely be even greater if intervention efforts could be guided

towards the most effective strategies. There are a small number of rigorous controlled trials for MSM, which are not compensated by a large number of study group participants. Thus, more research is needed to ascertain the effects of specific intervention components, population characteristics and methodological features and to identify the best intervention strategies.

In Europe, there is still little behavioral HIV/STI prevention interventions have been rigorously evaluated, and the paucity of controlled studies underscores the needs for more research in this area. While there is no other reliable substitute for evaluating the effect of interventions than controlled trials, other designs such as interrupted time series designs can also be used. Researchers who are concerned about the ethics of allocation to experimental groups can use waiting list controls whereby the control group receives the potential beneficial intervention post data collection. The drawback is the difficulty of establishing long-term effectiveness of the intervention. It also remains important to integrate process assessment into the evaluation design in order to learn about feasibility, acceptability, practical constraints, and related issues.

Implementation and adherence are typically difficult to measure in multi component intervention programmes, but provide critical information. For example, Elford et al. [43] process evaluation helped explain the likely reasons for lack of programme effectiveness. Researchers and journal editors should strive to disseminate also null findings and related issues in intervention research [44]

Sample of studies selected in the Cochrane review of behavioral intervention of MSM [44]				
Authors	Setting and study sample	Study design	Comparison group	Program implementers
Herbst (2005) [45]	USA,* Puerto Rico, Canada, Mexico, England, Scotland, New Zealand, Australia, Brazil, Russia, Bulgaria	Individual, group† and community interventions		Theoretical basis Interpersonal-skills training Skills training delivered by role plays or lectures Multiple delivery methods Greater intervention exposure complexity (number of sessions, duration and time span)
Johnson	USA,* Australia, New	Individual,		Community interventions

(2002) [46]	Zealand, Canada	group † and community interventions		Targeting young populations Interpersonal-skills training
Rees (2004) [47]	USA, UK*	Complex interventions multiple techniques: counselling, workshops, peer involvement, and social marketing		Peer-led community based interventions had implementation problems (recruitment and retention of peer educators); indicative of difficulty in transferring an intervention from one context (USA) to another (UK)
Carballo- Diéguez 2005 [48]	141 Latino MSM in New York	RCT	wait list control	8 sessions on themes of oppression, transgression of rules, excuses (or rationalizations), substance use, goal setting, the role of pleasure, self- efficacy and plans for the future.
Dilley 2002 [49]	138 MSM, San Francisco, 1997-2000	RCT		Individual standard counseling (ISC, one 1-hr session) plus self- justifications (SJ) session, where the client reviewed and challenged his own self- justifications for a recent occasion of unsafe sex, AND diary of sexual activity for 90 days
Dilley 2007 [50]	305 MSM attending San Francisco HIV CT clinic, 2002-04	RCT	Control received usual CT only	Individual personalized cognitive counseling by a paraprofessional along with usual CT
Explore 2004	3775 MSM in 6 US	RCT		Ten 1-on-1 counseling

[51]	cities 1999-2003			sessions followed by maintenance sessions every 3mo. Risk assessment, sexual communication, knowledge of HIV serostatus, alcohol and drug use, triggers for unsafe sex, motivational interviewing. Total span up to 48 months.
Healthy Living 2007 [52]	936 HIV+ people in Los Angeles, Milwaukee, New York, and San Francisco. 57% were MSM	RCT	Wait list	Individual level. 15 90-minute sessions in 3modules: stress, coping, adjustment; safer behaviors; and health behaviors
Harding 2004 [53]	19 MSM in London 2000	RCT	Wait list	'SM sex: an introduction to the SM scene'. Sessions address assumptions and knowledge, practical tools of SM sex, risk taking, emotional aspects, sexually transmitted infections and HIV transmission, rights and responsibilities, legal issues, the role of fantasy, and limits and boundaries. Up to 25 group members, 4 sessions of 7 hrs
Imrie 2001 [54]	252 gay men attending a sexual health clinic with acute STI or unprotected sex in past year. London 1995-98	RCT	Standard management only	Gay Men Project: standard mgt (1-to-1 counseling & referrals, 20 minutes) plus 1-day small group workshop
Kalichman 2001 [55]	164 MSM with HIV (62% of participants were MSM, 74% African Americans), Atlanta 1997	RCT	Support group for health	Support group to create sexual health and relationship plans, develop

			maintenance. Five 120-min sessions	communication and disclosure skills, learn hazards of co-infection with other STI. Five 120-min sessions
Patterson 2003 [56]	USA	RCT	Three 90-min sessions on diet and exercise	Booster-enhanced social cognitive intervention in 3 domains (condom use, negotiation of safer sex, disclosure of HIV status). One 90-min comprehensive session plus two 90-min booster sessions
Read 2006 [57]	110 MSM age 18+ who receive HIV negative test results at the Hollywood gay service center [year?]	RCT	Peer counseling only	Individual level. Interactive video (IAV) with peer counseling vs peer counseling alone.
Richardson 2004 [58]	402 MSM patients at 6 HIV treatment clinics, California 1999	2 clinics were assigned to each of 3 conditions gain frame (G), loss frame (L) or control	2 attention-control clinics were assigned to medication adherence intervention	Two clinics assigned to use a gain-framed approach (G) (positive consequences of safer-sex). Prevention counseling from medical providers supplemented with written information
Shoptaw 2005 [59]	162 meth-dependent MSM in Los Angeles, 1998-2000	RCT		CBT+CR: both treatments simultaneously.

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