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Evaluating HIV/STD interventions in developing countries: do current indicators do justice to advances in intervention approaches?

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ABSTRACT

HIV continues to spread unabated in many developing countries. Here we consider the interventions that are currently in place and critically discuss the methods that are being used to evaluate them as reported in the published literature. In recent years there has been a move away from highly individual-oriented interventions towards more participatory approaches that emphasise techniques such as community-led peer education and group discussions. However, this move towards more community orientated intervention techniques has not been matched by the development of evaluation methods with which to capture and explain the community and social changes which are often necessary preconditions for health-enhancing behaviour change. Evaluation research continues to rely on quantitative methodologies that fail to elucidate the complex changes that the newer interventions seek to promote within target communities. In addition, these methods of evaluation tend to rely on the use of highly individualistic and quantitative biomedical indicators such as HIV/STD rates, or knowledge, attitude, perception and behaviour (KAPB) survey questionnaires. We argue that such approaches are inadequate for the task of tracking and measuring important determinants of programme success such as psycho-social changes, features of the community-intervention interface and the degree of trust and identification with which members of target communities regard particular interventions. Rigorously conducted qualitative process evaluations taking account of the above factors could make a key contribution to the development of more successful HIV-prevention interventions.

Introduction

While the development of an effective vaccine and cure for HIV remain elusive, interventions aimed at HIV-prevention continue to be the best hope for limiting transmission of the virus and the spread of infection. Approaches to prevention have evolved from an early emphasis on information-based HIV-awareness campaigns and the aggressive detection and treatment of sexually transmitted diseases (operating at the behavioural and biomedical levels of analysis, and focusing on individual levels of awareness and infection) towards more community-based approaches involving peer education, and using participatory techniques such as peer-led role-plays and group discussions.

In this paper we analyse in detail current evaluation strategies for HIV-prevention interventions in developing countries. Our analysis forms the basis for a critique of the evaluation strategies that currently dominate the field of HIV-prevention. We

seek to show that despite the move towards more social and community orientated approaches within HIV-prevention interventions, project evaluators have tended to favour methodologies that give precedence to the individual level of analysis, and in particular methodologies that measure individual disease states (such as STD results) and knowledge, attitudes and reported behaviours, also measured as the properties of individuals.

In focusing on the individual levels of analysis, not only do these evaluations fail to capture the social and community level processes that state-of-the-art HIV prevention interventions seek to promote, they also squander a vital opportunity to improve our understanding of factors that promote or hinder sexual behaviour change in concrete social settings. Better understanding of the processes could lead not only to the development of a more refined battery of indicators of programme success – but could also contribute to the development of more effective interventions and policies in the field of sexual health promotion.

We argue here that the task of developing such indicators requires not only a shift away from individual towards the social and community levels of analysis but it also involves paying greater attention to the task of supplementing existing quantitative measures of programme success or failure with qualitative contextual material, and supplementing the current preference for outcome measures with greater attention to the development of process measures. Aggleton, Young, Moody, Kapila and Pye (1992) distinguish between 'outcome evaluation' and 'process evaluation'. Outcome evaluations are usually quantitative in nature, and aim to measure *whether* and *to what extent* the goals associated with a particular health intervention programme have been met. Process evaluations are usually qualitative in nature, and aim to examine *how* programme outcomes have been achieved. Our belief that greater efforts should be devoted to qualitative process evaluation strategies is not shared by all researchers, many of whom regard the randomized controlled study as the gold standard needed ensure the replicability and repeatability of HIV interventions (Choi & Coates, 1994; Oakley, Fullerton & Holland, 1995; Peterman & Aral, 1993). Randomised control trials (RCTs) are appropriate and even essential in many situations and are held in high regard by biomedical researchers who dominate the field of HIV-prevention. In addition, they appeal to many programme funders in a competitive funding climate, where money is often only available for short-term projects, judged in terms of their potential to quickly produce quantifiable outcomes, rather than to promote long-term community development processes. Many social scientists would argue that the latter are an essential precondition for ensuring that positive health outcomes are sustainable and generalisable beyond the life of the particular project and beyond the particular individual community members exposed to the project (Becker, Guenther-Grey & Raj, 1998; Gillies, Tolley & Wolstenholme, 1996). They argue further that we still lack adequate conceptual frameworks and indicators for operationalising these community development processes which are critical variables without which we cannot sensibly evaluate the results of RCT trials. This point is developed further below.

We argue that while RCTs clearly provide a valuable tool in a range of contexts, they are not necessarily relevant or appropriate in all contexts. In particular we argue that RCTs are not necessarily a feasible way of evaluating the often poorly funded, small-scale HIV-prevention programmes in developing countries. The first problem

concerns ethics. RCTs usually involve withholding, or at least not offering, treatment to control groups in order to show that a more pronounced change in the intervention group can be directly attributed to intervention. The ethics of withholding, or postponing, treatment from control groups in the interests of scientific investigation are now being debated. Furthermore, the literature suggests that the use of placebo in HIV interventions will no longer be acceptable (Abdool Karim, 1998; Lurie & Wolfe, 1997; Moodley, 1998). Some researchers try to deal with this ethical requirement by introducing treatment to the control group later in the intervention. However this issue remains controversial, with Angell (1997) arguing that placebo trials are only justifiable where there is no known effective treatment.

The second limitation is cost. Randomised control trials demand high levels of expertise and expense in their planning, design, execution and analysis and as such do not constitute 'appropriate technology' for often poorly funded research programmes in developing countries.

Thirdly, and most relevant to the argument of this paper, randomised control trials have a limited contribution to make to the task of developing understandings of the complex environments in which interventions directed at sexual behaviour take place. Randomised control trials assume that we are already able to define the factors that need to be taken into account in explaining the success or failure of health promotion programmes. We argue that our understanding of health promotion factors shaping sexuality is still in its infancy, and that much more 'conceptual groundwork' needs to be done before we can be confident that the discrete quantitative indicators used in randomised control trials are indeed the best gauge of processes shaping sexuality.

What then are the community and social level *processes* which community-based, participatory HIV-prevention programmes seek to advance in pursuit of the *outcomes* of bringing about health-promoting behaviour change and reduced STD/HIV levels? Understanding of the processes underlying successful sexual behaviour change interventions is still very under-developed. Here we refer to three different areas in which researchers are currently seeking to answer this question.

i) Psycho-social factors involved in sexual behaviour change

Campbell (1997) and Campbell and Williams (1998) suggest that sexual behaviour is a complex and multi-determined phenomenon, determined by intra-individual, inter-individual, community, social and economic factors (see MacPhail, 1998). They argue that we currently lack the conceptual tools needed to adequately understand or measure the inter-acting effects of these factors, each operating at a different level, on peoples' sexuality. They try to unravel how some of these factors might operate through their attempts to understand the factors underlying sexual behaviour change in the context of HIV-prevention in the gold mining community of Carletonville. They argue that HIV-prevention programmes will succeed or fail in changing peoples' sexual behaviour to the extent that they:

(a) *Increase levels of perceived self-efficacy amongst target groupings.* The greater control people have over the important aspects of their lives, the greater likelihood there is that they will adopt health promoting behaviour (Syme, 1989).

Successful interventions will develop the individual's belief in his/her potential to influence his or her life circumstances, including his or her health status.

(b) *Provide the opportunity for target audience members to renegotiate their sexual and social identities at the collective level.* Dube and Wilson (1996) argue that sexual behaviour change is more likely to occur through the influence of peers than through conscious rational choices made by individuals in isolation. People are more likely to change their behaviour if they perceive that liked and trusted peers are changing theirs.

(c) *Promote the development of community contexts that enable and support the sexual behaviour changes that HIV-prevention programmes seek to bring about.* Campbell and Williams (1999) argue that such changes in self-efficacy and social identity are unlikely to occur unless attempts are made to simultaneously promote the development of 'health-enabling communities'. Thus for example, there is no point in devoting efforts to encouraging condom use amongst impoverished commercial sex workers, in a context where clients refuse to use condoms, and where there is no consensus amongst women to enforce condom use (Campbell, 1999). In this context, a 'health-enabling community' would be one where sex workers collectively debated the way in which competition for clients was placing their lives at risk, and they made a group-based decision to present a united front to reluctant clients (see also Tawil, Verster & O'Reilly, 1995).

ii) The interface between target community members and the intervention

Campbell and Williams (1998) consider the broader psycho-social and community-level processes that they believe are most likely to maximise the chances of programme success. Kreuter (1997, p. 8) focuses more narrowly on particular aspects of the programme-target audience interface most likely to enhance the effects of such health promotion programmes, arguing that:

Health promotion interventions and tactics will be effective to the extent that the target community has organisational entities and systems that are supportive of the enterprise, and that these entities and systems are activated. The activation of relevant community entities and systems depends in part on the extent to which community members are aware of, value and trust the proposed intervention.

Kreuter argues for the need to develop measurable indicators of notions such as 'activated organisational entities' and 'community trust' in order to evaluate the extent to which health promotional programmes set into motion processes most likely to result in desired outcomes (in this case outcomes such as condom use and lowered STD levels).

iii) Multi-sectoral alliances: broader organisational context of the intervention

In her study of 'best practices' in health promotion in a range of developed and developing countries, Gillies (1998) emphasises the importance of alliances or partnership initiatives between local health promotional efforts on the one hand, and other health-related initiatives at the local, provincial and national levels on the other. Thus, for example, grassroots women's health projects should interface with similar projects in the geographical vicinity, and as much as possible with representatives of as broad a range of provincial and national health bodies as possible. Such

networking is most likely to result in sustainable health promotion, through coordinating what might otherwise be piecemeal attempts by different bodies to develop health-promoting interventions and policies. Gillies also emphasises the importance of alliances between workers in a range of other sectors that impact on health (e.g. welfare, housing), as well as across lay and professional boundaries, and between public, private and non-governmental organisations.

Methodology

In reviewing existing accounts of HIV-prevention programme evaluations, a search was conducted on the *Current Contents* and *Medline* databases to generate a list of published articles discussing STD and HIV interventions in developing countries with the specific aim of investigating the evaluation of these projects. In *Current Contents* the keywords used were: human health intervention; peer education; behaviour change; community outreach; AIDS intervention; HIV intervention; STD intervention; sexual behaviour; AIDS prevention and AIDS evaluation. For *Medline* the keywords were similar but included STD intervention; AIDS intervention; behaviour change; intervention; condom use; evaluation; condom use; evaluation; sexual; education programme; AIDS; HIV intervention and condom promotion. In addition, a manual bibliographic search was conducted using the literature already generated by the electronic search. This manual search pointed to the existence of a large body of unpublished or 'grey' literature about HIV prevention programmes in developing countries¹.

Once the 'grey' literature, and literature regarding similar issues in developed countries had been eliminated, 41 articles remained. These were accessed and carefully read by the first author, in order to develop an interpretative thematic analysis focusing on the **types of interventions** described in these papers as well as the **methodologies used to evaluate them**. In relation to the characteristics of the interventions, information regarding the country and target group was recorded, as were the various strategies utilised during the period of intervention. In most cases, a variety of intervention methods were employed within a single study. In relation to evaluation, the methodology considered the nature of the evaluation tools used ('method of evaluation'); the time frame in which the intervention/evaluation took place; whether the study presented quantitative and/or qualitative evaluation data; and the results obtained during the process of evaluation.

Results

Table 1 presents the results of the analysis of the 41 relevant articles. A descriptive summary of these results follows after the table.

¹ Campbell and Williams (1996) call for the development of a resource centre to house the unpublished literature on HIV prevention in South Africa. Such a centre is currently being established by the AIDS Consortium in Johannesburg. Aidscons@global.co.za

Date	Country	Subjects	Type of intervention	Method of evaluation	Time of post testing	Analysis	Results
1991 ²	Kenya	Sex workers	Free primary health care (mainly STD); individual and group health education; encourage clients to use condoms; condom distribution.	Questionnaire completed frequently; estimates of impact on HIV through modeling; numbers of condoms handed out; numbers of STDs compared to another area.	No post-testing but questionnaire every 6 months	Quantitative	Decreased rates of gonorrhoea not matched in other area; estimated 50% condom use.
1992 ³	Nigeria	Sex workers, clients and non-commercial partners	Peer education; condom promotion; STD clinic; educational videos; leaflet distribution.	Baseline survey and follow up KAPB; record of condoms distributed and individuals reached.	1 year	Quantitative	Increased STD clinic use; increased use and belief in protection methods.
1992 ⁴	Rwanda	Female outpatients and male partners	Videos; HIV testing and counseling; free condoms and spermicides; focus group discussions.	Baseline and follow up KAPB; HIV and gonorrhoea testing; diaries of sex acts to determine protection used.	1 year	Quantitative	Increased condom use; most effective in couples where male also tested and counseled; decrease in gonorrhoea among HIV infected women; decrease in seroconversion of women with counseled partners.
1992 ⁵	Zimbabwe	Student teachers	Lecture; question session; condom demonstration; role plays; psychodrama; video about well known PWA.	Pre- and post-test with two different intervention groups; KAPB; number of partners; measurement of sex without condoms	4 months	Quantitative	Skills trained students had increased knowledge about condoms; higher self efficacy; fewer barriers to action, sexual partners and sexual acts without condoms.
1993 ⁶	Zimbabwe	Sex workers	Committee formed; cards issued to healthy sex workers; sex workers with HIV or STDs prevented from working; monthly examinations for STDs; STD lectures.	Looked at STD rates at a local clinic.	No post-testing but evaluation continued for 6 months.	Quantitative	Decreased number of STD patients at mine hospitals; vaginal discharges decreased.

² Moses, S., Plummer, F.A., Ngugi, E.N., Nagelkerke, N.J.D., Anzala, A.O. & Ndinya-Achola, J.O. (1991) Controlling HIV in Africa: effectiveness and cost of an intervention in a high-frequency STD transmitter core group. *AIDS*, 5, 407-411.

³ Williams, E., Lamson, N., Weir, S. & Lamptey, P. (1992) Implementation of an AIDS prevention program among prostitutes in the Cross River State of Nigeria. *AIDS*, 6, 229-242.

⁴ Allen, S., Serufulira, A., Bogaerts, J., Van de Perre, P., Nsengumuremyi, F., Lindan, C., Carael, M., Wolf, W., Coates, T. & Hulley, S. (1992) Confidential HIV testing and condom promotion in Africa. *Journal of the American Medical Association*, 268, 3338-3343.

⁵ Wilson, D., Mparadzi, A. & Lavelle, S. (1992) An experimental comparison of two AIDS prevention interventions among young Zimbabweans. *The Journal of Social Psychology*, 132, 415-417.

⁶ Chipfakacha, V. (1993) Prevention of sexually transmitted diseases: the Shurugwi sex-workers project. *South African Medical Journal*, 83, 40-41.

1993 ⁷	Zaire	Community	Small group dynamics; role plays; case studies; condom demonstrations; adjusted AIDS message for individuals; work shops.	User-focused evaluation; meeting held to see what changes were being maintained.	No post-testing but user-focused evaluation at 3, 8 and approximately 36 months.	Qualitative	Sex workers easily influenced by those they perceive to have more knowledge.
1993 ⁸	Honduras	Sex workers	Weekly talks on STDs and HIV; free condom distribution.	Pre- and post-intervention KAP survey; condom diaries.	4 months	Quantitative	Increased knowledge about HIV transmission; little increase in safe sex; increased condom use among some.
1994 ⁹	Singapore	Brothel based sex workers	3 hour intervention session with educational lectures; video presentations; role playing.	Pre- and post-test case-control study; KAPB and gonorrhoea rates.	3 months	Quantitative	Misconceptions about HIV transmission declined; negotiated condom use barely changed but there was already high condom use.
1994 ¹⁰	Thailand	Sex workers and clients	Free condom distribution; identification of brothels without 100% condom use; mass advertising.	Ongoing STD monitoring; evaluation of numbers of clients; numbers using condoms; statistics on number of sex establishments.	No post-testing but evaluation continued for 4 years.	Quantitative	Increased condom use in commercial sex acts; steep decline in reported STDs among men; large decline in 5 most common STDs; new cases of STDs declined by half.
1994 ¹¹	Ghana	Sex workers	Peer education; role plays; condom distribution.	Pre- and post-test KAPB and measurement of impact of contact with project staff.	Final evaluation at 51 months but also at 4 and 7 months.	Quantitative	Increased condom use even after 3 years; maintained contact with project staff despite project stopping.
1994 ¹²	Peru	Secondary school students	Educational sessions within school hours by trained teachers.	Pre- and post-test case-control study; KAPB; intervention evaluated with questionnaire.	7 weeks	Quantitative and qualitative	Machismo and discrimination against PWA decreased; increased knowledge about and acceptance of condoms.

⁷ Shoenf, B.G. (1993) AIDS action-research with women in Kinshasa, Zaire. *Social Science and Medicine*, 37,1401-1413.

⁸ Fox, L., Bailey, P.E., Clarke-Martinez, K.L., Coello, M., Ordonez, F.N. & Barahona, F. (1993) Condom use among high-risk women in Honduras: evaluation of an AIDS prevention program. *AIDS Education and Intervention*, 5, 1-10.

⁹ Archibald, CP. Chan, RKW. Wong, ML. Goh, A. and Goh, CL. (1994) Evaluation of a safe-sex intervention programme among sex workers in Singapore. *International Journal of STDs and AIDS*, 5, 268-272.

¹⁰ Hanenberg, R.S., Rojanapithayakorn, W., Kunasol, P. & Sokal, D.C (1994) Impact of Thailand's HIV-control programme as indicated by the decline of sexually transmitted diseases. *The Lancet*, 344, 243-245.

¹¹ Asamoah-Adu, A., Weir, S., Pappoe, M., Kanlisi, N., Nequaye, A. & Lamptey, P. (1994) Evaluation of a targeted AIDS prevention intervention to increase condom use among prostitutes in Ghana. *AIDS*, 8, 239-246.

¹² Cáceres, C.F., Rosasco, A.M., Mandel, J.S. & Hearst, N. (1994) Evaluating a school-based intervention for STD/AIDS prevention in Peru. *Journal of Adolescent Health*, 15,582-591.

1994 ¹³	Tanzania	Primary school students	Factual information; poster creation; performing songs and poetry; peer leaders; group discussions; role plays; panel discussions with community and meetings with parents.	Pre- and post-test case-control; KAPB.	6 months	Quantitative	Increased frequency of exposure to AIDS information and more AIDS related discussions; increased knowledge; positive attitudes to PWA; restricted attitudes towards engaging in sex.
1994 ¹⁴	Thailand	Rural community	Mass media intervention by central government.	Questionnaires on changes in sexual behaviour and places where people get AIDS information. Participant observation.	No post-testing but questionnaires administered at 3 months. Entire study over 7 months.	Quantitative and qualitative	Uncertainty about modes of transmission; most common modes of transmission understood; knowledge from medical profession, TV and headman; some reluctance to use sex workers; no or little condom use.
1994 ¹⁵	South Africa	Students	Structured information sessions; open discussions; role-plays; games; group work; language exercises with AIDS theme; videos; poster creation and exhibition; slogan competition; graffiti wall; stickers; condom distribution; leaflets.	Pre- and post-test case-control; KAPB; student evaluation of intervention.	2 weeks	Quantitative and qualitative	Increased knowledge and improved attitudes towards PWA; insignificant move towards changing personal behaviour; low belief in self risk; positive attitudes about intervention.
1994 ¹⁶	Zaire	Sex workers	Monthly interviews and STD diagnosis; 3 monthly HIV screening; free STD treatment among HIV negative women; individual health education; free condoms.	Condom use and numbers of clients evaluated in monthly interviews; intervention exposure estimated from attendance at appointments; STD and HIV tests performed.	Women followed for an average of 23 months with testing every 3 months. No post testing.	Quantitative	Increased condom use; decrease in STDs except chlamydia; decline in HIV conversion rates; increased STD clinic use if having unprotected sex.

¹³ Klepp, K., Ndeki, S.S., Seha, A.M., Hannan, P., Lyimo, B.A., Msuya, M.H., Irema, M.N. & Schreiner, A. (1994) AIDS education for primary school children in Tanzania: an evaluation study. *AIDS*, 8, 1157-1162.

¹⁴ Lyttleton, C. (1994) Knowledge and meaning: the AIDS education campaign in rural northeast Thailand. *Social Science and Medicine*, 38(1), 135-146.

¹⁵ Kuhn, L., Steinberg, M. & Mathews, C. (1994) Participation of the school community in AIDS education: an evaluation of a high school programme in South Africa. *AIDS Care*, 6, 161-171

¹⁶ Laga, M., Alary, M., Nzila, N., Manoka, A.T., Tuliza, M., Behets, F., Goeman, J., St Louis, M. & Piot, P. (1994) Condom promotion, sexually transmitted diseases treatment, and declining incidence of HIV-1 infection in female Zairian sex workers. *The Lancet*, 344, 246-248.

1994 ¹⁷	India	Sex workers	Group discussions; counseling of madams, pimps, sex workers and nochtis; posters; pamphlets and Hindi video; peer education.	Pre- and post-intervention KAPB surveys with HIV testing.	2 years after baseline.	Quantitative	Increased awareness of HIV; increased condom use.
1995 ¹⁸	India	Sex workers and madams	Group discussions; educational videos; condom demonstrations.	Pre- and post-test case-control with HIV, Hep B and syphilis testing; questionnaire on demographics, clients, STDs and KAPB.	1 year.	Quantitative	More condoms used; sex workers more likely to refuse clients without condoms; greater understanding of STDs and HIV, especially transmission.
1995 ¹⁹	Malawi	STD patients	Trained counselors discussed the seriousness of STDs; condom demonstrations.	Pre- and post-test case-control study; risk behaviour; STD occurrence and behaviour.	4 months.	Quantitative	Greater knowledge of STDs; increased condom use; reduction in number of partners.
1995 ²⁰	Uganda	Adult rural community	Condom distribution; AIDS pamphlets; meetings at village level.	Pre- and post-intervention KAPB questionnaire; investigated how well intervention had reached community.	18 months	Quantitative	Improved knowledge; decrease in men's casual partners; increased condom use in casual sex; decreased STDs; increased condom use and less discrimination.
1995 ²¹	Thailand	Sex workers, clients and brothel owners.	Peer educators; educational lectures; condom demonstrations; games and small group training sessions.	Volunteer clients requested sex without condoms and offered to pay 3 times the usual price at baseline and 2 follow ups.	2 months and 1 year.	Quantitative	93% refusal of sex without a condom; maintained at 76% a year after the intervention.
1995 ²²	Philippines	High school students	Role playing; condom promotion; games; didactic lectures; group discussions; exercises; focus groups.	Pre- and post-test case-control KAPB. Actual intervention also evaluated by external review committee.	2 weeks and 8 weeks.	Quantitative	Increased knowledge; positive attitudes to PWA; thought sex should wait until adulthood; no changes in actual or intended behaviour.

¹⁷ Singh, Y.N. & Malaviya, A.N. (1994) Experience of HIV prevention interventions among female sex workers in Delhi, India. *International Journal of STDs and AIDS*, 5, 56-57.

¹⁸ Bhave, G., Lindan, C.P., Hudes, E.S., Desai, S., Wagle, U., Tripathi, S.P. & Mandel, J.S. (1995) Impact of an intervention on HIV, sexually transmitted diseases, and condom use among sex workers in Bombay, India. *AIDS*, 9 (suppl 1), s21-s30.

¹⁹ Wynendaale, B., Bomba, W., Manga, W.M., Bhart, S. & Fransen, L. (1995) Impact of counselling on safer sex and STD occurrence among STD patients in Malawi, *International Journal of STDs and AIDS* 6: 105-109.

²⁰ Schopper, D., Doussentousse, S., Ayiga, N., Ezatirale, G., Idro, W.J. & Homsy, J. (1995) Village-based AIDS prevention in a rural district in Uganda. *Health Policy and Planning*, 10, 171-180.

²¹ Visrutaratna, S., Lindan, C.P., Sirhorachai, A. & Mandel, J.S. 1995. 'Superstar' and 'model brothel': developing and evaluating a condom promotion program for sex establishments in Chiang Mai, Thailand. *AIDS*, 9 (suppl 1), s69-s75.

²² Ablasca, M.A., Siegel, D., Mandel, J.S., Santana-Arciaga, R.T., Paul, J., Hudes, E.S., Monzon, O.T. & Hearst, N. (1995) Results of a model AIDS prevention program for high school students in the Philippines. *AIDS*, 9 (suppl 1), s7-s13.

1995 ²³	Tanzania	Community	STD syndromic management; staff training; supervisory visits; regular supply of drugs; group health education.	Pre- and post-test case-control questionnaire on sexual practices; testing for HIV, syphilis, gonorrhoea and chlamydia.	2 years	Quantitative	HIV incidence and STD prevalence lower in intervention villages; no changes in sexual behaviour; acceptance and use of condoms remained low.
1995 ²⁴	Zimbabwe	Students	No information given except that education was provided by student nurses in a structured manner. 14 classes. Presume group education.	Pre- and post-test case-control knowledge questionnaire on AIDS, STDs and alcohol and drug abuse. Also questionnaire on performance of student nurses.	7 weeks	Quantitative	Increase in knowledge about AIDS, STDs and drugs and alcohol. Ratings by teachers and pupils showed the acceptability of student nurses as health educators.
1996 ²⁵	Indonesia	Sex workers, clients and pimps	Interactive lectures; informal advice and condom distribution; formal training sessions; client media in brothels (posters and pamphlets).	Pre- and post-test case-control with sex workers and clients; KAPB.	6 months	Quantitative	Increased knowledge in all areas but particularly intervention areas; decreased misinformation about transmission of HIV; increased condom use.
1996 ²⁶	Nicaragua	Adult community	Informal presentation; condom demonstration; stickers; posters; free condoms; HIV leaflets.	Pre- and post-test case-control KAPB.	14 months	Quantitative	Less fear of AIDS but no increased idea of personal risk.
1996 ²⁷	India	Sex workers and general community	Peer educators; condom and information distribution; co-operation with people connected to the industry; posters; pamphlets; meetings; dances and films.	Attempt to make full and effective use of community participation; used simulated clients; some qualitative interviews..	No post-testing and very little formal evaluation.	Qualitative	Project became more concerned with implementation rather than evaluation; peer recruitment not maintained and decline in community participation.
1996 ²⁸	Zambia	Community	Radio drama broadcast in local language.	Pre- and post-intervention KAPB survey with case-control. Control group selected from area unlikely to have heard drama.	14 months	Quantitative	No proof that small increases in HIV knowledge were due to drama. Did increase parent-child discussion of HIV.

²³ Grosskurth, H., Mosha, F., Todd, J., Mwijarubi, E., Klokke, A., Senkoro, K., Mayaud, P., Chagalucha, J., Nicoll, A., ka-Gina, G., Newell, J., Mugeye, K., Mabey, D. & Hayes, R. (1995) Impact of improved treatment of sexually transmitted diseases on HIV infection in rural Tanzania: randomised controlled trial. *The Lancet*, 346, 530-536.

²⁴ Munodawafa, D., Marty, P.J. & Gwede, C. (1995) Effectiveness of health instruction provided by student nurses in rural secondary schools of Zimbabwe: a feasibility study. *International Journal of Nursing Studies*, 32, 27-38.

²⁵ Ford, K., Wirawan, D.N., Fajans, P., Meliawan, P., MacDonald, K. & Thorpe, L. (1996) Behavioural interventions for reduction of sexually transmitted disease/HIV transmission among female commercial sex workers and clients in Bali, Indonesia. *AIDS*, 10, 213-222.

²⁶ Pauw, J., Ferrie, J., Villegas, R.R., Martinez, J.M., Gorter, A. & Egger, M. (1996) A controlled HIV/AIDS-related health education programme in Managua, Nicaragua. *AIDS*, 10, 537-544.

²⁷ Asthana, S. & Oostvogels, R. (1996) Community participation in HIV prevention: problems and prospects for community-based strategies among female sex workers in Madras. *Social Science and Medicine*, 43, 133-148.

²⁸ Yoder, P.S., Hornik, R. & Chirwa, B.C. (1996) Evaluating the program effects of a radio drama about AIDS in Zambia. *Studies in Family Planning*, 27, 188-203.

1996 ²⁹	Kenya and Zimbabwe	Sex workers	Peer education and improved STD management in Kenya.	Pre- and post-intervention surveys with consideration of STD rates in Kenya. Rapid formative assessment initially and then in-depth interviews in Zimbabwe. Also questioned on programme exposure.	Kenya was 1 year and Zimbabwe 2 years.	Quantitative	Kenya had increased condom use, price per sex act and reduction in number of partners. Zimbabwe had increased condom use and a decline in STDs among the general population.
1996 ³⁰	Mozambique	Prisoners	Pamphlets and cartoons about HIV and STDs; peer education; theatre group.	Pre- and post-intervention KAPB surveys.	6 months	Quantitative	Improved knowledge about true transmission of HIV although false transmission methods still believed.
1996 ³¹	India	Students	School-based education programme.	Pre- and post-test with questionnaire on transmission and prevention of HIV/AIDS.	1 month	Quantitative	Increase in correct knowledge about transmission of HIV, potential cure for HIV and that HIV is transmitted sexually.
1997 ³²	Kenya	Trucking company workers	HIV serological testing; individual counseling; condom promotion; STD diagnosis and management.	Baseline with regular follow-up interviews and STD and HIV testing.	Every 3 months for a year.	Quantitative	Significant decline in extramarital sex and sex with a CSW; no change in condom use; decrease in ulcerative and non-ulcerative STDs.
1997 ³³	Tanzania	Women at truck stops (sex workers)	Already had peers education and condom distribution in place, now provided improved STD treatment. Comparison of 4 different methods.	Pre- and post-intervention questionnaire on demographics and acceptance of STD services. 3 case groups and one control group.	12 months	Quantitative	There was acceptability of all methods of STD treatment. No information on changes in STD or HIV rates.
1997 ³⁴	Uganda	Community	Government intervention - posters; condom distribution; availability of information through a number of mass media sources.	Baseline survey with a number of follow-up surveys using KAPB. HIV testing at one early survey.	7 years	Quantitative	Increased support for condoms but still little use; decrease in number of sexual partners; decreased STD incidence.

²⁹ Ngugi, E.N., Wilson, D., Sebstad, J., Plummer, F.A. & Moses, S. (1996) Focused peer-mediated educational program among female sex workers to reduce sexually transmitted disease and Human Immunodeficiency Virus transmission in Kenya and Zimbabwe. *The Journal of Infectious Diseases*, 174 (suppl 2), s240-s247.

³⁰ Vaz, R.G., Gloyd, S. & Trindade, R. (1996) The effects of peer education on STD and AIDS knowledge among prisoners in Mozambique. *International Journal of STDs and AIDS*, 7, 51-54.

³¹ Sankaranarayan, S., Naik, E., Reddy, P.S., Gurunani, G., Ganesh, K., Gandewar, K., Singh, K.P. & Vermund, S.H. (1996) Impact of school-based HIV and AIDS education for adolescents in Bombay, India. *Southeast Asian Journal of Tropical Medicine and Public Health*, 27(4), 692-695.

³² Jackson, D.J., Rakwar, J.P., Richardson, B.A., Mandaliya, K., Chohan, B.H., Bwayo, J.J., Ndinya-Achola, J.O., Martin, H.L., Moses, S. & Kreiss, J.K. (1997) Decreased incidence of sexually transmitted diseases among trucking company workers in Kenya: results of a behavioural risk-reduction programme. *AIDS*, 11, 903-909.

³³ Nyamuryekung'e, K., Laukamm-Josten, U., Vuylsteke, B., Mbuya, C., Hamelmann, C., Outwater, A., Steen, R., Ocheng, D., Msauka, A. & Dallebetta, G. (1997) STD services for women at truck stops in Tanzania: evaluation of acceptable approaches. *East African Medical Journal*, 74(6), 343-347.

³⁴ Konde-Lule, J.K., Tumwesigye, M.N. & Lubanga, R.G.N. (1997) Trends in attitudes and behaviour relevant to AIDS in Ugandan community. *East African Medical Journal*, 74(7), 406-410.

1997 ³⁵	Brazil	Students	Group discussions; training for teachers; peer support; public events; condom demonstrations; role plays.	Baseline surveys using KAPB at case and control schools. Follow-up questionnaires at end of intervention.	Follow-up at 6 months and 1 year. Results from 6 months due to loss to follow-up.	Quantitative and qualitative	Positive perception of the programme; Only women had significant changes in increased communication about sex/AIDS after the intervention.
1997 ³⁶	Mexico	Homosexual men	Intervention designed by participants to empower community by enhancing collective action, skills development and resource creation.	KAPB survey. No control group and not known if pre- and post-testing completed.	Unknown	Quantitative and qualitative	Improvement in HIV-related behaviour and knowledge.
1997 ³⁷	Zimbabwe	Students	Unknown (presumed to be group education)	Pre- and post-test case-control KAPB questionnaires.	9 months but with testing also at 5 months	Quantitative	Increased knowledge on menstruation, family planning, contraception, STDs and HIV.
1998 ³⁸	Uganda	Muslim community	Education provided by imams and family AIDS workers to increase HIV knowledge and condom use; to encourage support from the community towards those infected.	Pre- and post-intervention questionnaires as well as focus groups and in-depth interviews.	2 years	Quantitative and qualitative	Increase in correct knowledge of HIV transmission, methods of preventing HIV infection and the risks involved in circumcision and ablution of the dead; reduction in sexual partners and increased condom use.
1998 ³⁹	Thailand	Youth in factories	Education through videos, cartoons and other unknown methods.	Pre- and post-test case-control study with KAPB questionnaire, in-depth interviews and focus groups	Unknown	Unknown	Higher levels of knowledge among the workers receiving the intervention
1998 ⁴⁰	Nepal	Pharmacists	Syndromic management training	Pre- and post-intervention interviews using simulated patients	2 groups: 1 evaluated immediately, the other 7-9 months after training.	Quantitative	Decline in pharmacists suggesting injections; increase in correct drug prescriptions; increase in partner notification and suggested condom use but not sale of condom or HIV testing.

³⁵ Antunes, M.C., Stall, R.D., Paiva, V., Peres, C.A., Paul, J., Hudes, M & Hearst, N. (1997) Evaluating an AIDS sexual risk reduction program for young adults in public night schools in São Paulo, Brazil. *AIDS* 11 (suppl 1): s121-s127.

³⁶ Zimmerman, M.A., Ramirez-Valles, J., Suarez, E., de la Rosa, G. & Castro, M.A. (1997) An HIV/AIDS prevention project for Mexican homosexual men: an empowerment approach. *Health Education and Behaviour*, 24(2), 177-190.

³⁷ Rusaniko, S., Mbizvo, M.T., Kasule, J., Gupta, V., Kinoti, S.N., Mpanju-Shumbushu, W., Sebina-Zziwa, J., Mwateba, R. & Padayachy, J. (1997) Trends in reproductive health knowledge following a health education intervention among adolescents in Zimbabwe. *Central African Journal of Medicine*, 43(1), 1-6.

³⁸ Kagimu, M., Marum, E., Wabire-Mangen, F., Nakyanjo, N. & Hogle, J. (1998) Evaluation of the effectiveness of AIDS health education interventions in the Muslim community in Uganda. *AIDS Education and Prevention*, 10(3), 215-228.

³⁹ Sakondhvat, C., Sittitrai, W., Soontharapa, S., Werawatanakul, Y. & Pinitsoontorn, P. (1998) AIDS education and intervention trials among youths in factories: a pilot project. *Journal of the Medical Association of Thailand*, 81(11), 872-878.

⁴⁰ Tuladhar, S.M., Mills, S., Acharya, S., Pradhan, M., Pollock, J. & Dallabetta, G. (1998) The role of pharmacists in HIV/STD prevention: evaluation of an STD syndromic management intervention in Nepal. *AIDS*, 12(suppl 2), s81-s87.

1998 ⁴¹	Singapore	Sex workers	Development of negotiation skills, educating clients and mobilizing support from peers and health staff for condom use	Pre- and post-test case-control study using KAPB and gonorrhoea testing.	At 5 months, 1 year and 2 years.	Quantitative	Increase in refusals of unprotected sex and a decline in gonorrhoea incidence.
1998 ⁴²	Uganda	Community	Single oral dose of STD treatment; HIV prevention education and counseling; condoms and free health care.	Randomized controlled trial with baseline and post-testing using KAPB, HIV and STD testing.	Testing and interviewing every 10 months but unknown date of final evaluation.	Quantitative	Decrease in syphilis, chlamydia, gonorrhoea and BV in intervention group. No difference in HIV incidence rates.

TABLE 1: Analysis of the published literature on HIV/AIDS intervention programmes in developing countries

⁴¹ Wong, M.L., Chan, K.W. & Koh, D. (1998) A sustainable behavioural intervention to increase condom use and reduce gonorrhoea among sex workers in Singapore: 2-year follow-up. *Preventative Medicine*, 27(6), 891-900.

⁴² Wawer, M.J., Gray, R.H., Sewankambo, N.K., Serwadda, D., Paxton, L., Berkley, S., McNairn, D., Wabwire-Mangen, F., Li, C., Nalugods, F., Kiwanuka, N., Lutalo, T., Brookmeyer, R., Kelly, R. & Quinn, T.C. (1998) A randomized, community trial of intensive sexually transmitted disease control for AIDS prevention, Rakai, Uganda. *AIDS*, 12(10), 1211-1225.

- 1) *Country*: Within the 41 studies reported on here, 42 countries were used as intervention sites. The largest percentage (57%) were in Africa (n=24). Of these, 4 each were from Zaire and Uganda; 3 each from Kenya, Zimbabwe and Tanzania; and a single intervention each from Nigeria, Rwanda, Ghana, South Africa, Malawi, Zambia and Mozambique. A further 18% of the interventions were from Thailand and India (4 each), and the remainder from a mix of countries including Honduras, Singapore (2 interventions), Peru, the Philippines, Indonesia, Nicaragua, Brazil, Mexico and Nepal.
- 2) *Subjects*: The 41 interventions were directed at a total of 51 different groups. 32% (16) of the subjects were sex workers and 20% were directed at communities and 20% at young people (10 in each case). The interventions for young people included 8 for school students (only one of which was for primary school children), one for student teachers and one for youth working in factories in Thailand. Four interventions were aimed at the clients of commercial sex workers and 3 at their madams, pimps or brothel owners. All of these 7 interventions were carried out in conjunction with interventions aimed at sex workers. In addition, one intervention for sex workers also had a general community component. Groups targeted with a single intervention include non-commercial partners of sex workers, female outpatients and their male partners, STD patients, prisoners, trucking company workers, homosexual men and pharmacists.
- 3) *Type of intervention*: Only seven studies made use of only a single intervention methodology but this may be because they chose not to expand on their intervention methodologies. In one case no details of the intervention were available (Rusaniko *et al.*, 1997). The majority of studies used a number of different intervention methods (Mean=3.7 per study), with a total of 152 intervention methods being used across the 41 studies. 17% of the intervention methods related to health education within groups (20) or directed at individuals (5). Other commonly used interventions included condom promotion and/or distribution (11%), peer education (7%), provision of or improvement of STD care (7%), educational videos/films (7%), distribution of pamphlets (5%), condom demonstrations (5%), lectures (5%), role plays (5%), educational posters (4%) and use of mass media (3%). A few innovative interventions were recorded across the different studies, but were especially concentrated in two school-based interventions (Klepp *et al.*, 1994; Kuhn, Steinberg & Mathews, 1994). These include the use of cartoons (n=2), poster creation (n=2), drama (n=2), collective action (n=2) and skills development (n=1).
- 4) *Method of evaluation*: Within the 41 studies mentioned here, 42 evaluations were conducted with one study (Ngugi, Wilson, Sebstad, Plummer & Moses, 1996) evaluating projects in both Zimbabwe and Kenya. A total of 90 evaluation methods were used within the studies (Mean=2.2). The most common form of evaluation (38%) relied on KAPB questionnaires or surveys (n=34). The next most commonly used evaluation method relied on STD test results from the study populations (11%), and a further 4% used routinely collected data. Collection of HIV test results, monitoring of unprotected sex acts through some form of diary and evaluation of acceptability of the intervention were frequently utilized and made up 10%, 7% and 7% of the evaluation strategies, respectively. Qualitative

evaluation methods were less common but a small number of studies (7%) used in-depth interviews and focus groups (n=4 and n=2 respectively). One study used rapid formative assessment and another used participant observation

- 5) *Study design:* The evaluations (n=42) were almost completely divided between those that used control groups (43%) and those that did not (53%). Post-testing was used in 83% of the studies.
- 6) *Time of post-testing:* HIV interventions frequently take time to implement and changes in behaviour are therefore monitored over time. 34 studies made use of a baseline and post-testing design with the mean time lapse between the two being 14 months. The shortest time lapse between baseline and post-testing was 2 weeks while the longest was 7 years. Shorter time lapses between baseline and post-testing tend to be in interventions directed towards school children due to the limited time available during school hours.
- 7) *Type of analysis:* Of the 42 evaluations 81% were entirely quantitative (n=34). Researchers in only two of the evaluations concentrated on qualitative evaluation alone while a further 5 made use of a combination of both qualitative and quantitative. In one study the details of the evaluation are unknown.

Discussion

Types of interventions

The interventions in the current review date from between 1991 and 1998. The subjects of the interventions from developing countries ranged across a number of target groups. In some cases entire adult communities were targeted, but in most cases commercial sex workers formed the target for intervention. A smaller number of interventions of shorter duration were targeted at school-going children at both primary and high school level.

The interventions investigated rarely focused on a single intervention strategy but incorporated a number of different methods which, in most cases, were utilised simultaneously. In a few cases, however, the different intervention methods formed the basis of comparison between multiple intervention groups (see Nyamuryekung'e *et al.*, 1997; Wilson, Mparadzi & Lavelle, 1992).

Interventions ranged from the purely biomedical to those with a mix of biomedical and community participatory approaches. The extent of community participation in interventions varied, but on the whole the studies investigated involved some form of participation. Participatory approaches varied widely and a large range are represented in the highlighted studies.

A number of the studies under review improve or supply STD treatment by doctors, nurses or other biomedically trained personnel as part of their intervention strategy. In itself, the provision of STD care does not encourage community participation and a number of researchers attempt to remedy this by including improved STD care in packages which embrace other more participatory approaches. This encourages the trend towards encouraging greater participation of grassroots community members in the implementation of sexual health promotion programmes. Thus, in the Cross

River State of Nigeria and in the truck stops of Tanzania the provision of STD care is combined with peer education and the distribution of condoms (Nyamuryekung'e *et al.*, 1997; Williams, Lamson, Weir & Lamptey, 1992), while sex workers in Shurugwi, Zimbabwe are encouraged to take part in a committee to decide on issues concerning HIV/STD transmission to clients (Chipfakacha, 1993). The use of participatory methods in combination with STD treatment is not, however, common to all interventions and there are those which use other non-participatory methods to enhance the provision of STD care. In these instances most intervention teams incorporate health education and condom promotion with STD clinic staff training, provision of a regular supply of drugs and supervisory visits to clinics (Grosskurth *et al.*, 1995; Jackson *et al.*, 1997; Laga *et al.*, 1994; Moses, Plummer, Ngugi, Nagelkerke, Anzala & Ndinya-Achola, 1991). STD care as a single intervention method was only reported in two studies. One involved the training of Nepalese pharmacists in syndromic management (Tuldhar, Mills, Acharya, Pradhan, Pollock & Dallabetta, 1998) and the other initiated the periodic presumptive treatment of a Ugandan community (Wawer *et al.*, 1998). The use of participatory methods was, however, more common among other interventions.

A perusal of the remaining studies reveals the extent to which HIV and STD interventions have moved towards participatory methods. The most commonly used methods include group education and discussion, peer education and the use of role plays. While traditional didactic intervention methods remain common, it is vital to recognise that in many cases videos, pamphlets, STD care and lectures are being used in conjunction with active community participation and as vehicles for peer education. Interventions aimed at school children often attempt to completely submerge their subjects in discussion and thought about HIV by adopting an HIV theme for all school activities during a certain period of time (Kuhn *et al.*, 1994). A methodology such as this will usually include both didactic and participatory methods.

While traditional intervention methods are well known to intervention teams, participatory methods are still in their infancy and therefore require innovative thought and formulation. For this reason no single participatory intervention method was found in all projects. Rather, a diverse range of methods are employed across the studies highlighted here. Among students, prisoners and sex workers attempts have been made to address HIV issues through drama, the creation and exhibition of educational posters, games and dances (Aplasca, *et al.*, 1995; Asthana & Oostvogels, 1996; Klepp *et al.*, 1994; Kuhn *et al.*, 1994; Schopper, Doussentousse, Ayiga, Ezatirale, Idro & Homsy, 1995; Vaz, Gloyd & Trindade, 1996; Visrutaratna, Lindan, Sirhorachai & Mandel, 1995; Williams *et al.*, 1992). Expansion of the audiences reached is also encouraged through the involvement of sex worker clients, brothel owners, communities and students' parents through meetings, committees and public events (Chipfakacha, 1993; Klepp *et al.*, 1994; Kuhn *et al.*, 1994; Schoepf, 1993; Schopper *et al.*, 1995). Participation of this sort encourages sustainable and self-supporting change at the community level rather than individual change in a hostile environment.

In recent work there has been recognition of the importance of the community, social and economic determinants of HIV. Asthana and Oostvogels (1996) highlight the role of community in discussing their attempts to introduce community participation

among the economically marginalised and stigmatised sex workers of Madras, India. Their experience indicates the difficulties, but also the rewards, inherent in interventions aiming to increase community participation where historically there has been no sense of 'community'. The eventual demise of the project, despite good condom distribution, highlights the importance of political, economic and community level co-operation.

Within Zaire similar work has been conducted at the community level by making use of experiential training (Schoepf, 1993). This method '...concentrates on self-empowerment, [but] it can also be used to initiate and sustain other, broader types of socially transformative change' (Schoepf, 1993, p. 1404). Activities initiated through role plays, picture 'codes' and ethnographic exercises encourage women to share their experiences and to develop solutions to problems communally. This method was particularly effective in allowing commercial sex workers to gain personal experience of condom use. The sex workers' knowledge and competence with condoms led to an increase in their previously low social standing. In advocating participatory methods as above, Schoepf (1993) stresses the fact that these activities cannot take place among individuals without taking into account society's discourses, such as racism, moralism, denial and male chauvinism in Zaire, which impact on, and contribute to the spread of HIV.

In short, the majority of interventions used have sought in one way or another to encourage participation by target audience members. Participatory methods take various forms ranging from those in which target audience members simply participate in limited programme activities (as in Asamoah-Adu, Weir, Pappoe, Kanlisi, Nequaye & Lamptey, 1994) to more radical forms of participation, where target audience members are actively involved in programme planning or implementation and drive the programme forward in the way best suited to their community (as in Schoepf, 1993). Given the increasing confidence that programme designers and funders are giving to the process of participation, there is an urgent need for better understanding of what constitutes health-enhancing participation. Not only would this allow for improved intervention implementation, but would encourage more rigorous participatory evaluation.

Methods of Evaluation

As illustrated above, the progress that has been made in the design of community-based interventions, and in particular the trend towards greater participation by and representation of grassroots target audience members in programme planning and implementation, has not been matched in the development of appropriate community-level indicators. Such indicators are needed for evaluating the psychosocial and environmental processes which community-level HIV prevention programmes seek to encourage so as to promote health-enabling environments, i.e. environments which reduce the likelihood of people engaging in unsafe sexual behaviour.

Here we seek to highlight three crucial limitations of existing evaluation methods:

1) *Over-reliance on quantitative methodologies*

Existing evaluation strategies give too much importance to quantitative analysis: Of the 42 different interventions conducted in the studies under review, quantitative evaluations were conducted in 34 cases. There were 5 attempts to conduct both qualitative and quantitative evaluation within the same study and only 2 studies made use of qualitative methods as their main evaluation measurement.

A strong reliance on KAPB questionnaires is present in most interventions with the evaluation being statistically measured by administering questionnaires before and after the intervention. From the results of these surveys researchers are able to calculate the percentage increase in condom use (Ford, Wirawan, Fajans, Meliawan, MacDonald & Thorpe, 1996; Fox, Bailey, Clarke-Martinez, Coello, Ordonez & Barahona, 1993; Konde-Lule, Tumwesigye & Lubanga, 1997; Ngugi *et al.*, 1996; Visrutaratna *et al.*, 1995; Williams *et al.*, 1992); increase in knowledge about HIV transmission; behaviour change (Aplasca *et al.*, 1995; Archibald, Chan, Wong, Goh & Goh, 1994; Asmoah-Adu, *et al.*, 1994; Jackson *et al.*, 1997; Klepp *et al.*, 1994; Munodawafa, Marty & Gwede, 1995; Schopper *et al.*, 1995; Vaz *et al.*, 1996; Wilson *et al.*, 1992; Wynendaele, Bomba, Manga, Bhart & Fransen, 1995;); and changes in perceptions of personal risk (Pauw, Ferrie, Villegas, Martínez, Gorter & Egger, 1996). Quantitative methodology is also used through pre-and post-intervention STD tests with project success being measured by significant declines in STD prevalence or incidence (Allen *et al.*, 1992; Archibald *et al.*, 1994; Bhave *et al.*, 1995; Chipfakacha, 1993; Jackson *et al.*, 1997; Laga *et al.*, 1994; Nymauryekung'e *et al.*, 1997). Evaluation through the comparison of pre- and post-intervention HIV incidence or prevalence is also employed (Allen *et al.*, 1992; Grosskurth *et al.*, 1995; Nymauryekung'e *et al.*, 1997). Modeling and estimations allow researchers to estimate the number of potential HIV infections interventions have prevented (Moses *et al.*, 1991; Ngugi *et al.*, 1996). While quantitative measures are important in providing 'proof' that an intervention has had the desired impact, they furnish limited or no understanding of dynamics operating within the project. In addition, the use of quantitative evaluation methods reinforce our third limitation, still to be discussed, by focusing evaluation on the individual rather than developing tools to evaluate the changes at the community or social level.

Notwithstanding this emphasis on quantitative methods in the of HIV intervention programmes, a small number of qualitative evaluation strategies appear in the literature. Unlike more quantitative methods there is great variety in their formulation and execution. Those studies that do report qualitative findings are hampered by their failure to provide a systematic account of the methods by which their data were collected and analysed. Too often, the reporting of qualitative data takes the form of anecdotal observations, or informal thumbnail sketches of authors' personal impressions of psycho-social or community level factors which they believe had an impact on the intervention. There is a considerable social scientific literature on qualitative research methodology, and this needs to be drawn on more rigorously by intervention evaluators, thereby encouraging the scientific community to take their findings seriously.

As Asthana and Oostvogels (1996) comment, there is still a widely held view within the scientific community that qualitative evaluations lack the rigor of their quantitative counterparts. Our views on this criticism of qualitative researchers depend on what criteria one is using for 'rigor'. If one interprets rigor as the use of systematic methods of data collection and analysis, we would agree with this criticism but insist that qualitative research can, and should be done rigorously. However, the biomedical community who dominate the field of HIV-prevention, often imply that the only kind of research that is rigorous is research using quantifiable indicators, analysed by statistical, preferably parametric, methods. It is our belief that it is premature and possibly inappropriate to use this criterion of 'scientific rigor' as the gold standard for judging evaluation strategies in the field of HIV prevention. A great deal more theoretical and empirical research remains to be done before our understanding of the determinants of sexual behaviour and sexual behaviour change can be operationalised in terms of a few quantitatively measurable, discrete survey variables of the type which would be amenable to 'rigorous' analysis under this definition (MacPhail, 1998).

As we argue above, a great deal more qualitative research remains to be done in the interests of developing quantifiable indicators of intervention success which move beyond the theoretically limited variables that are measured in KAPB surveys, for example. We believe such criteria of rigor might also be inappropriate because sexuality and sexual behaviour change are such complex, multi-level (individual, group, community, social) and context-dependent phenomena that it seems unlikely that they will ever be adequately accounted for in discrete, generalisable variables of the kind traditionally privileged by biomedical scientists.

Returning to the literature review, qualitative evaluation is rarely used alone but rather as a means of enhancing and interpreting information collected through KAPB questionnaires. The five studies using this approach generated richer evaluative information than those that focused on quantitative methods alone. Among young adults in São Paulo, Brazil KAPB questionnaires established that there was almost no change in high risk behaviour post-intervention. Workshops held after the intervention ascertained that societal uncertainties such as unemployment, housing problems and harsh economic environments were far more pressing concerns for this group than STDs and HIV. In addition, the group indicated their inability to afford condoms and the inaccessibility of condom supplies (Antunes *et al.*, 1997). Similar information was forthcoming from focus groups held in Ugandan Muslim communities. While informants acknowledged the need to adopt condoms within sexual relationships, discussion centered on the fact that low condom use could be blamed on the suspicion that requesting condom use induced in marriage partners (Kagimu, Marum, Wabire-Mangen & Hogle, 1998). Comparable problems articulated in workshops with Zairian married women were solved through participatory workshops and role plays that allowed women to develop effective strategies to broach this topic in a manner acceptable to their husbands (Schoepf, 1993). Among school children qualitative evaluation, in the form of focus groups and workshops, was used as a means of establishing the acceptability of methods used, thus leading to the development of more refined interventions (Cáceres, Rosasco, Mandel & Hearst, 1994; Kuhn *et al.*, 1994).

Qualitative evaluation through participatory observation allowed Lyttleton (1994) to formulate ideas about the behavioural and psychological responses of a rural Thai village to a government AIDS media campaign. While levels of knowledge (indicated through KAPB survey) were high, translation into behaviour change was minimal. Lyttleton's observational evaluation highlights arguments for location specific interventions by indicating factors such as villagers inability to view 'local injection doctors' as doctors who should sterilize needles between uses. Perhaps the most successful qualitative evaluation, and one which uses qualitative evaluation alone, was undertaken in Zaire among sex workers. Schoepf (1993) conducted user-focused evaluations in which project staff observed sex workers teaching methods and material to new groups of subjects. This allowed the intervention team not only to evaluate uptake of information but also to establish that participatory methods were firmly entrenched within the functioning of the project.

The studies highlighted above indicate the continued focus of intervention evaluations on quantitative methods despite the rich data that could be unearthed through qualitative methodologies. While quantitative research methods are important within the unavoidable reality of a funding culture where programmes are expected to 'prove' to funders that they have achieved quantifiable short-term results, we argue that they have less value in relation to the broader task of understanding the processes by which programmes have these quantifiable effects (enabling us to learn something about sexuality and behaviour change in general, rather than simply about the results of one particular programme), and the extent to which programme results are likely to be sustainable over time. It is only through in-depth qualitative studies that we are likely to develop our understandings of such processes. Qualitative approaches are usually an essential component of process evaluation strategies, the topic of the next section.

2) *Relative neglect of 'process evaluation' strategies*

In developing their account of what should be the appropriate focus of process analyses, Aggleton *et al.* (1992) indicate that communication between the project staff and target communities should be the major form of assessment of the processes underlying why a project did or did not succeed. Campbell and Williams (1998), however, disagree arguing that this definition is too narrow and requires further expansion. Such expansion might include attention to, for example, the extent to which target audiences identify with the project; the organisational context of the project; the relationships between the project and other organisations; the national policy context in which the project operates; the extent to which the project engenders the transformation of sexual norms and identities on a societal level; and the extent to which adequate resources are available for meeting project goals within their definition of process evaluation.

The interventions described in our literature of interest show a clear bias in favour of outcome evaluation strategies. The use of pre- and post-test methodologies enable researchers to quantify the uptake of knowledge and changes in STD prevalence through comparisons between test scores at the start of programmes and the final scores once programmes have been completed. From this type of

evaluation one is able to deduce that changes in target communities have been achieved; explanations for the reasons behind these changes are seldom given. Exceptions here include the efforts that have been made to obtain a clearer understanding of the processes leading to the observed outcomes in studies of interventions involving school children (Cáceres *et al.*, 1994; Kuhn *et al.*, 1994; Munodawafa *et al.*, 1995). In these evaluations students engaged in the intervention as well as teachers or facilitators were asked to evaluate the actual intervention. Comments received in this way were then utilised in planning further interventions and refining techniques. The same approach has also been adopted among sex workers in Ghana (Asamoah-Adu *et al.*, 1994).

While the four studies mentioned above have attempted to incorporate some form of process evaluation in their design, the most sophisticated forms of process evaluation can be seen in the work of Schoepf (1993) and Asthana and Oostvogels (1996). The work of Schoepf among the women of Zaire has been mentioned previously as an example of an intervention making use of both participatory intervention methods and qualitative evaluation. In terms of process evaluation, Schoepf offers important explanations for the reasons behind changes in the use of condoms. During much of the study there was a reported increase in the number of protected sex acts. Schoepf begins to explore some of the psycho-social issues highlighted by Campbell and Williams (1998) when she attributes this to two major factors. In the first instance the project enabled married women to learn means of encouraging their husbands to use condoms as contraceptives rather than prophylaxis through discussion about the high costs of education and the need to limit family size. In the second case, increased condom use could not be fully attributed to the programme but rather to the deaths from AIDS of two sex workers within the network. Sex workers within the project were appreciative that they had learned the value of condoms before the sudden increase in condom use that followed these deaths. At eight months post-intervention sex workers engaged in the project reported a decline in the number of protected sex acts. An interview with Jonathan Kolodney in *Paris-Match* had been erroneously interpreted by students in Kinshasa as indicating the uselessness of condoms for combating HIV infection. Viewed as an educated elite and valued client-base the students were one of the few sources of AIDS information the sex workers had. Differences in social standing and economic dependence therefore encouraged the sex workers to believe what the students had told them.

The intervention aimed at empowering sex workers in Madras provides one of the richest sources of process evaluation despite the authors themselves stating that evaluation fell by the wayside in favour of intervention (Asthana & Oostvogels, 1996). The eventual demise of the intervention was due to a number of seemingly minor issues which combined to overwhelm the efforts of the project staff and sex worker community. The initial part of the intervention had been planned and implemented through an external WHO consultant; once control was handed to a local NGO, their lack of political leverage and practical experience in running interventions caused many of the project objectives to flounder. Continued harassment from police in Madras finally culminated in a crackdown forcing all brothels in the intervention area to either close or relocate. Significant relationships on which much of the intervention was based were consequently

lost. However, the nature and organisation of sex work within the various communities had the most consequential impact on the intervention. Initial enthusiasm among the sex worker peer educators could not be maintained once the initial 'scare' factor of AIDS had worn off. Many found it increasingly hard to maintain their enthusiasm for peer education when they lost clients (and money) due to the time the intervention took and the fact that the message they spread was a threat to the perceived self-interests of their clients. Power structures within Madras society were also perceived to have a negative impact on the project in a number of ways. Firstly, educated clients were often not prepared to listen to brokers' safe sex messages as they felt themselves to be socially superior. Secondly, the development of community organization was difficult among sex workers who lived in isolated communities and maintained their subservient relationships with their brothel-owners and brokers in the face of vulnerability to police and clients.

In keeping with their commitment to explaining some of the processes underlying the outcomes of interventions, Asthana and Oostvogels (1996) make a number of useful comments about the organisational context of the Madras project thus highlighting issues raised by Gillies (1998) and Campbell and Williams (1998) referred to in the introductory section;

- *National policy as a favourable context in which to conduct local health work:* The authors evaluate their intervention in the light of the changing attitudes to HIV/AIDS being felt within the Indian government. The National AIDS Prevention and Control Programme (NAPCP) has moved from a focus on surveillance of 'high-risk groups' towards educational and support-based AIDS messages. A part of this changed attitude has been the encouragement of alliances with non-governmental organisations (NGO) and grassroots mobilisation. The NAPCP realisation that too little was known about sex workers in India led to the development of relationships with the World Health Organisation.
- *Communication between programme and target audience:* The intervention team was aware of the problems facing them in attempting to create a sense of community in a diverse and disparate group of sex workers. To this end an open office policy with interaction between project staff and sex workers was promoted. Through communication and the provision of a meeting place the project fostered some sense of community among the different groups.
- *Relationships between the project and other organisations:* This aspect of process evaluation has already been touched on in examining the role that the local Madras police played in the intervention. Despite changes in the official government attitude towards HIV risk groups such as sex workers, police continue to penalize sex workers under the Suppression of Immoral Traffic Act. The strained relationship between sex workers and police was evaluated as one of the factors involved in the loss of important alliances.
- *Organisational context of project:* Evaluation of the changing role of the project highlights the change in organisation which took place during 1993 when responsibility was handed over to a local NGO without the necessary experience and political affiliations to adequately promote the project.

From the examples provided above by Schoepf (1993) and Asthana and Oostvogels (1996) the benefits of process evaluation become clear. Through outcome evaluation the intervention in India would have been termed a failure and the data would have suggested that few of the intervention objectives had been met. Process evaluation, however, highlights the particular circumstances of the intervention and makes it possible to develop an understanding of the factors acting for and against the intervention objectives. This is done in a way that can be generalised to an understanding of other programmes in other contexts. It is only through a detailed account of obstacles facing the interventions of this sort that lessons can be learned for future projects.

3) *Over-reliance on the individual level of analysis*

The conceptual tools that are used are often ones that favour the individual level of analysis. HIV/STD interventions have adopted methods which seek to impact not only on the individual but also on the community which acts on and influences the individual. From the analysis of the evaluation content of these interventions it is clear that researchers have yet to find a way which effectively evaluates the contribution of interventions to community and social processes. Evaluations are all concentrated at the individual level of analysis and while they do provide indications of the extent to which interventions have succeeded in achieving their stated aims, they fail to explain the deeper processes promoted within the intervention community.

In most studies (34 studies) evaluation is achieved by exploring knowledge, beliefs, attitudes and practices through administering individual questionnaires to selected groups. Other evaluative methods include individual STD and HIV tests and recording of numbers of unprotected sex acts (25 studies). As we have already stated, in the few studies that do try and incorporate attention to broader social factors beyond the biomedical and behavioural levels of analysis, such qualitative material is often presented in the form of anecdotes or of fairly unsystematic personal observations by authors of papers, rather than in a rigorous way, using well-defined concepts and indicators. Indeed, Antunes *et al.* (1997) bemoan the fact that there are no evaluative measures of the community processes promoted by intervention programmes. In their Brazilian intervention they indicate that the sexual decision-making of adolescents cannot be separated from their reproductive choices and socially determined sexual roles they engage with. Changes in these aspects have been felt but their measurement or evaluation remain problematic.

Conclusion

In this paper we have reviewed the published literature which deals with the evaluation of HIV-prevention programmes in developing countries. Our review suggests that such programmes often seek to encourage community-level processes such as participation, representation and empowerment. However, this "paradigm drift" (Becker *et al.*, 1998) away from purely biomedical and behavioural approaches towards attempts to create health-enabling community contexts, is often not reflected in evaluation methodologies.

In the literature we reviewed evaluation methodologies were mostly quantitative, outcomes orientated and concerned with the individual level of analysis. Few of the studies examined here made rigorous use of qualitative evaluation, indicating the problems facing researchers in their efforts to firstly, collect such information and secondly, to present it in an acceptable way to the scientific community. Evaluation concentrated primarily on the individual level of analysis through the use of largely biomedical outcomes measures such as HIV or STD rates and the changes observed in KAPB questionnaires. While some of the interventions attempted to encourage change at the community and social level, the representation of these changes through evaluation remains problematic.

One reason for this very narrow approach to evaluation is a funding culture which pressurises programme organisers to provide evidence of 'quick fix' changes, measured in discrete quantifiable terms that will appeal to the biomedical fraternity who often dominate the field of HIV-prevention. Another reason for this is that we currently lack adequate conceptual understandings of the mechanisms or pathways whereby community development processes (such as participation, representation or 'community partnerships for health') serve to mediate between intervention activities and health outcomes (Campbell & Mzaidume, 1999).

In the introductory section we highlighted three areas of research in which hypotheses regarding psycho-social and community-level factors which might serve to promote programme success have been sought. Campbell and Williams (1998) argue that programmes are likely to succeed to the extent that they promote psycho-social changes, including increased self-efficacy amongst target audience members, as well as providing opportunities for the collective re-negotiation of social and sexual identities. Kreuter (1998) states that the intervention-community interface is an important determinant of programme success, suggesting that a key determinant of success is the extent to which communities have a range of formal and informal networks and resources that are broadly supportive of what the programme is trying to achieve. They also emphasise that community members should trust and identify with the programme. Gillies (1998) highlights the importance of the intervention being linked into a network of similar interventions, as well as the importance of alliances between grassroots interventions and representatives of broader provincial and national programmes and policies in the public, private and voluntary spheres. None of these hypotheses are currently adequately operationalisable in concrete quantifiable indicators, which could be used to evaluate programme success or failure, in a way that moves beyond the narrow biomedical and behavioural outcome measures which currently dominate programme evaluation.

We argue that rigorously conducted and systematically documented qualitative process evaluations of concrete interventions could make a key contribution to our understanding of these psycho-social, organisational and community-level processes - and as such could make a key contribution to not only the development of the science/art of programme evaluation, but also to the development of more successful HIV-prevention interventions.

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