

Quantitative process evaluation of a community-based HIV/AIDS behavioural intervention in rural Uganda

J. Kinsman, A. Kamali, E. Kanyesigye¹, I. Kamulegeya, V. Basajja,
J. Nakiyingi, K. Schenk and J. Whitworth

Abstract

This paper describes the implementation of a large community-based HIV/AIDS behavioural intervention in rural Uganda and presents 4 years' worth of quantitative process data. The intervention involved 560 field-based workers (57% male, 76% subsistence farmers, mean age 35 years), supervised by six central staff. Intervention channels included drama and video shows, Community Educators (CEs), as well as leaflet and condom distribution. Activities focused on one or more of 16 key topics. In total, 392 000 attendances (51% female) were recorded—a mean of over 6 for each of the 64 000 target adults—at 81 000 activities, with CEs attracting 71% of the total attendance; 164 000 leaflets and 242 000 condoms were also distributed. The annual cost of the intervention per target individual was approximately US\$1.76. Our voluntary workforce experienced an annual attrition rate of 11%, with 'stable' workers more likely to be older, married or opinion leaders in their community than those who dropped out. We calculate that even a significant increase in the proportion of female field workers would have made little difference either to the sex ratio of attendees or to overall attendance. In spite of some initial resistance to the intervention, particularly in relation to condoms, we have demonstrated that people in

rural Africa can accept and actively participate in the dissemination of HIV/AIDS prevention messages throughout their own communities.

Introduction

A number of factors contribute to the heterosexual transmission of HIV in sub-Saharan Africa, including those that work at the level of the individual, those related to societal norms, those connected to health care infrastructures, and those that arise out of laws, policies and developmental issues (Lampert *et al.*, 1997). Clearly, no single preventive strategy can hope to tackle all these factors, but behavioural interventions—which seek specifically to reduce risk behaviours—offer one of the most promising approaches (Oakley *et al.*, 1995), with the potential to work on both individuals and society as a whole.

For reasons of feasibility and cost, HIV behavioural interventions in Africa tend to target specific groups. A wide array of populations have been targeted, including 'core transmitters' such as sex workers and their truck driver clients, as well as HIV discordant couples, university students, school pupils, commercial farm workers, religious communities, sexually transmitted disease (STD) patients, factory workers and prisoners (Moses *et al.*, 1991; Allen *et al.*, 1992; Wilson *et al.*, 1992a; Pickering *et al.*, 1993; Asamoah-Adu *et al.*, 1994; Klepp *et al.*, 1994; Laga *et al.*, 1994; Wynendaele *et al.*, 1995; Laver *et al.*, 1996; Ng'washemi *et al.*, 1996; Vaz *et al.*, 1996; Jackson *et al.*, 1997; Kagimu *et al.*, 1998; Katzenstein *et al.*, 1998; Harvey *et al.*, 2000; Laukamm-Josten *et al.*, 2000; Kinsman *et al.*, 2001).

MRC Programme on AIDS, c/o Uganda Virus Research Institute, PO Box 49, Entebbe and ¹Ministry of Health, PO Box 7272, Kampala, Uganda
Correspondence to: J. Kinsman

In spite of the extremely high infection rates that afflict the entire populations of many countries in the region (UNAIDS, 2000), just a few programmes to date have attempted to work at community level (Foster, 1990; Mouli, 1992; Wilson *et al.*, 1992b; Schopper *et al.*, 1995). Furthermore, although the primary target of most behavioural interventions is HIV infection itself, very few evaluations have actually measured HIV incidence (Laga *et al.*, 1994; Katzenstein *et al.*, 1998). Little information is therefore currently available regarding the potential impact on HIV infection of community-based behavioural interventions in Africa (Stephenson, 1999).

However, a randomized controlled trial to determine the extent to which such an intervention might reduce new HIV infections in rural Uganda has recently been concluded by the Medical Research Council (MRC) Programme on AIDS. The purpose of this paper is to describe the Information, Education and Communication (IEC) or behavioural component of the trial, and present the quantitative process data relating to it in order to provide a basis for understanding the intervention's impact. Details of its effect on HIV incidence, of various other components of the trial, its cost-effectiveness and acceptability to the target communities will be presented elsewhere (Mitchell *et al.*, 2001a,b; Kamali *et al.*, submitted).

Methods

Context

Masaka District lies on the north west banks of Lake Victoria, about 130 km south west of Uganda's capital city, Kampala. Sixty-seven percent of the district's population are from the Baganda ethnic group and 91% live in areas designated 'rural' (Population and Housing Census, Masaka District, 1991). A mean of approximately 190 people live in each square kilometre of the district (based on an estimated 2.5% annual population growth rate since the 1991 census). The population depends primarily on subsistence agriculture with income raised through coffee cultivation and fishing.

The Masaka Intervention Trial (MIT) was conducted by the MRC between 1994 and mid-2000 in order to establish the extent to which a behavioural intervention can reduce HIV transmission in a rural African community, both by itself and in combination with improved syndromic STD management. It was a three-armed trial with six parishes in each arm, giving a total of 18 participating parishes spread throughout Masaka District. (There are 119 parishes—small administrative units—in the district, most of which contain between seven and 15 villages.)

The intervention in Arm A consisted exclusively of IEC, while that in Arm B included the same standardized IEC package, but with additional information regarding STD-related treatment-seeking behaviour, and an improved syndromic STD management programme in government and private health clinics. Arm C acted as a control, with community development activities conducted by MRC staff. For ethical reasons, condom social marketing and voluntary HIV counselling and testing operated in all 18 study parishes. The overall study design has been described elsewhere (Kamali *et al.*, 2000)

The total adult population (defined as 13 years and above) in the 12 IEC parishes (Arms A and B) was approximately 64 000 in 1998, all of whom were targeted by our activities. The data presented in this paper describe the IEC activities in these 12 parishes, and they refer to the 4 years between 1996 and 1999. Due to the organization required to initiate activities in each parish, the process was staggered. Only six parishes had begun by January 1996 and only six remained fully active in December 1999, so these 4 years constituted the core period of the trial.

Theoretical background

The MIT's IEC package was based around the Behavioural Change for Interventions (BCI) model (King and Wright, unpublished). Unlike many theoretical models relating to HIV risk behaviour, which focus primarily on prediction and explanation and have little practical application (Leviton, 1989; Hochbaum *et al.*, 1992; Van Ryn and Heaney,

1992; McCamish *et al.*, 1993), the BCI model was developed specifically with the design of interventions in mind.

The model asserts that there are four key antecedents that must be cultivated before safe sexual behaviour is adopted, including knowledge acquisition, attitude development, motivational support and skills development. Collectively, these have the capacity to make safe sex both feasible and acceptable, by informing people at the individual level of the need to protect themselves and by giving them the skills they need to do so. Meanwhile, simultaneous changes in the wider social environment make the whole concept of safe sex more agreeable to the population as a whole. The four antecedents that, in theory, can bring about these changes were all incorporated into the MIT.

The implementers—selection, training and supervision

The central IEC staff included a coordinator, three health educators, a condom promoter and a part-time drama consultant. Their role collectively was to oversee all field activities, as well as to select, train and supervise the 45–50 people from each of the 12 participating parishes who were involved in the intervention. These community-based workers, some of whom played more than one role, included nine AIDS Prevention Committee (APC) members per parish, one Parish Coordinator (PC), 24 Community Educators (CEs) and 12–24 drama players.

The selection process for these community-based positions involved first identifying local opinion leaders (Parish Chiefs, elected Local Councillors and religious leaders) and informing them about the proposed intervention. Influential people from each parish were then invited to form an APC, which acted primarily in an advisory capacity, but also provided local political support for project activities when required. Such assistance was needed especially at the start of the trial, when, for example, we encountered opposition to our condom promotion activities from some quarters. APCs met every 3 months with central IEC staff, for which members each received an allowance of about US\$3.

With the APC's assistance, a full-time PC was then selected. The PC was the project's primary contact in each parish and he or she had to have completed at least 4 years of secondary education. PCs were required to mobilize their communities for all IEC activities, to ensure that CEs and drama players were working according to plan, and to attend monthly planning meetings at the central project office. Since they worked full time and had positions of central importance, PCs received a monthly salary of about US\$85—slightly more than that received by most Ugandan primary school teachers.

CEs were largely self-selected, based on their interest in the project. Their appointments were individually approved by APCs and PCs, who favoured the more approachable and widely respected applicants. Our CEs therefore shared many of the qualities that define a typical peer educator in other HIV prevention projects, although their task was to work throughout the entire community and not just with their 'peers'.

CEs provided their communities directly with information and advice about HIV/AIDS, and just over half of them were also actively engaged in condom promotion and skill provision. Their activities took place mainly through one-to-one and small group meetings, each of which they recorded on a simple monitoring form written in the vernacular, *Luganda*. For this reason, we required that CEs had at least some degree of literacy. CEs also assisted in mobilizing people for larger activities, such as drama and video shows. They attended a supervisory meeting once a month in their parish, for which they received about US\$4.50.

Once the selection of each parish's APC members, PC and CEs had been finalized, a 1-week training session was held. This involved clarification of the intervention and its objectives, defining the role of each group, explaining the 16 IEC topics that we had identified as being relevant to the people of rural Masaka (see Table I), and distributing simple resource booklets produced by the National AIDS Control Programme. Participants were also taught how to complete the mon-

Table 1. IEC topics, ranked by number of times covered during all IEC activities

Topic (in rank order)	Total number of times topic covered at all activities (% of activities at which topic covered)	
1 Condom use ^a	27 330	(34%)
2 HIV counselling and testing/sero-survey	26 606	(33%)
3 How HIV is spread ^a	16 594	(20%)
4 STD treatment seeking behaviour ^a	16 476	(20%)
5 Marital faithfulness ^a	15 102	(19%)
6 Preventing spread of HIV ^a	14 534	(18%)
7 Abstinence from sex ^a	14 338	(18%)
8 How HIV is not spread ^a	13 952	(17%)
9 Reducing sexual partners ^a	10 198	(13%)
10 Family planning	10 189	(13%)
11 Difference between HIV and AIDS	7974	(10%)
12 AIDS patient care	7810	(10%)
13 Positive living for PWHA	6621	(8%)
14 Vertical transmission of HIV	5674	(7%)
15 HIV and body immunity	5261	(6%)
16 Traditional practices and HIV	4231	(5%)
Total number of times topics taught	202 888	
Total number of activities	81 502	
Mean number of topics per activity	2.49	

^aKey topic.

itoring forms which provided us with much of the process data described in this paper. A further week's refresher training was offered 2 years later.

A drama troupe was also established in each parish. After an initial 2-day training session, these were visited once a month by our drama consultant who taught them plays, songs and drumming rhythms. He also assisted them in their attempts to become self-sustaining through additional dance performances, e.g. at weddings, and other income generating activities. Troupes would usually perform twice a month, receiving about US\$9 for each show. This money was used to buy props and costumes, to provide start-up capital for their income generating projects or to distribute among members.

The IEC intervention

The channels adopted to disseminate HIV prevention messages fell into two broad categories. The first included the drama and video shows, which were planned in advance at the monthly PC meetings in such a way as to ensure that each village

in each parish received the complete standardized package of plays and videos during the intervention period. The second category included those activities planned and conducted by PCs and CEs. Monitoring forms were completed after all activities.

In addition, five leaflets written in simple *Luganda* were produced specifically for use in the intervention. These provided general information about HIV/AIDS, STDs and condoms, discussed community concerns about condoms, and explained why mosquitoes do not spread HIV. With the exception of the STD leaflet, which was only distributed in Arm B parishes, they were given out wherever possible at all intervention activities.

Drama shows

Drama was adopted as an IEC channel because it would be immediately familiar and acceptable to our target population. In addition to telling a story to which the community would readily relate, plays sought to impart information, stimulate debate

Table II. Names and messages of video and drama shows

Name (<i>Luganda</i> /English)	Video (V) or drama (D)	Message
<i>Akanaafa</i> /Death is a riddle	V	A boy elopes with his girlfriend and contracts HIV. Meanwhile, his brother succeeds well in his studies. Young people are therefore advised to avoid sex while still at school.
<i>Gunsinze</i> /I'm sorry	V	An AIDS widow is lured into sex by a man who insists on believing that her husband was a victim of witchcraft, not disease. The man's wife finds out, and laments for her life and her children's future.
<i>Kyazze</i> /Irreversible	V	Describes how some men working away from home engage in extra-marital sex, contract HIV and pass it on to their spouses. The CE in the play encourages people to go for counselling.
<i>Ndiwulira</i> /Forewarned	V	Returning from studies abroad, a man becomes HIV infected at a party. His whole family ultimately suffers as a result. Discusses condom use, abstinence, 'zero grazing' and positive living for PWHA.
<i>Embulire</i> /Guidance (Arm B only)	V	Promotes STD treatment-seeking behaviour, describes signs and symptoms, and also explains the danger of HIV infection if STDs are not treated properly.
<i>Nkangaali</i> /The trap	V, D	Discusses the problem of sugar daddies. An older male family friend sends gifts to a girl, her mother finds the gifts and she is forced to explain where they came from, embarrassing the man in front of her parents.
<i>Omusika</i> /The heir	V, D	Addresses the cultural importance of having a male heir, how some men engage in extra-marital sex in order to achieve this, and thereby contract HIV.
<i>Byampuna</i> /A wasted life	V, D	Describes the problems that peer pressure can bring for young people. A school girl has just completed her studies and passed well. She falls in with a dubious crowd, gets pregnant and contracts HIV.
<i>Kirimuttu</i> /Secrecy	V, D	A wife finds a condom that her husband had hidden in anticipation of introducing it to her. A friend resolves their argument, explaining to her the benefits of condoms as well as how to use and store them.
<i>Kamwakabi</i> /Foul language	D	Addresses various misconceptions associated with the condom and humorously tackles the problem of community resistance to condom promotion.
<i>Tweyambe</i> /Self help (Arm B only)	D	Encourages people with STDs to go for treatment and explains the importance of partner notification.

within the community and enhance the general acceptability of safer sexual practices within the social environment.

Five specially written plays were performed in each village of the Arm A parishes, with six in Arm B, the additional one relating to STDs (see Table II). The two plays that tackled condoms were performed during the latter stages of the intervention period, by when the initial resistance to the topic that we had faced had waned substantially, thanks in large part to the work of the PCs and CEs (see below). Shows generally lasted between 30 and 60 min, and were held in two different

villages in each parish each month. They were conducted entirely in *Luganda*, and would normally attract between 50 and 150 people. After the play, the facilitator—either the PC or someone from central staff—would answer questions from the community, concerned either with issues that had arisen directly out of the play or other related topics.

Video shows

The use of video shows guaranteed interest from our study communities. Most of the 12 parishes remain without any electricity supply—and therefore television—which means that great novelty

value is attached to this particular technology. The mere presence of a small generator and a video player would invariably attract an interested crowd, generally of similar size to those drawn by the drama shows.

The six plays mentioned above (see 'Drama shows') and a further four specially written plays were performed by the parish drama troupes and recorded on video (see Table II). We also screened a popular film produced by a professional drama troupe. A central IEC staff member would conduct the shows and would also answer any questions that arose subsequently.

Activities conducted by PCs and CEs

PCs and CEs were charged with the task of providing information, advice and skills relating to HIV/AIDS directly to their communities, as well as promoting the project's voluntary HIV counselling and testing (VCT) services. Discussions and meetings would take place either on their own initiative, e.g. by visiting private houses and meeting places in the village, or in the event that an individual or group came to them with a particular concern. PCs had no quota to fulfil with these activities, as they had a number of other tasks in addition. However, CEs were expected to conduct 10 activities a month, even though in fact they rarely met this target.

In addition to their other IEC activities, a number of PCs and CEs were also engaged in condom promotion and distribution. Since a significant minority of the population believed—especially during the early stages of the intervention—that condoms promote promiscuity and that they can actually encourage the spread of HIV/AIDS, we had to be very sensitive in any discussion of them during the larger public meetings. These PCs and CEs therefore sold condoms and privately supplied more detailed information than would have been appropriate at drama or video shows, thereby providing clients with the opportunity to develop the skills they would require in order to use them. Their work also contributed significantly to the gradual reduction of resistance to condoms from those who had initially opposed them.

Results

The implementers—demographic details

Demographic details were collected in November 1999 concerning all the individuals who had worked in the different field-based groups. These data—as well as those below describing the intervention itself—were coded, entered onto computer, validated and cleaned. Analysis was conducted using EPI INFO 5 (Epidemiology Program Office, Centers for Disease Control and Prevention, Atlanta, GA) and STATA 5 (Stata Corporation, College Station, TX).

There were 563 people working at the time of the survey (Table III), of whom 57% were male, 76% were subsistence farmers and for whom the mean age was 35.5 years. Men predominated in all except the drama groups.

Drama players tended to be younger than members of the other groups and less likely to be either opinion leaders (as defined above) or married, while APC members were the oldest group and were also the most likely to be married.

For a variety of reasons, we lost a total of 244 field workers over the 4 years (Table III). Overall attrition rates for the different groups were calculated by taking the number who had dropped out as a percentage of the number we had started with. Annual attrition rates were then calculated by dividing the overall rates by 3.78, which was the mean number of years for the 12 parishes between initial training and November 1999. It should be noted that although the denominators for APCs, PCs and CEs are accurate, complete records of the composition of our drama groups were not available for the start of the intervention. While overall numbers remained quite stable, therefore, the denominator for this group (205, the number of 'current' workers) should be seen only as a close approximation.

The overall attrition rate for our field-based workforce was 43% (11% annually). However, 40% of all these who dropped out did so within 12 months of their initial training and a further 34% did so during the second year; 74% of all the

Table III. Demographic details of the field-based workforce: current (working in November 1999) and dropouts

	N (M:F ratio)	Mean age (range) ^a	Married (%) ^a	Mean years (SD) of education	'Opinion leaders' (%) ^a	Subsistence farmers (%) ^a	Overall (annual) attrition rates (%)
APC							
current	109 (64:36)	42.5 (23–68)	86	7.1 (2.4)	52	80	–
dropouts	18 (67:33)	39.1 (27–52)	72	9.0 (2.7)	39	67	17 (4)
PCs							
current	12 (83:17)	37.5 (28–48)	75	11.5 (0.8)	67	33	–
dropouts	2 (50:50)	37 (34–40)	50	11.0 (0.0)	0	50	17 (4)
CEs							
current	288 (59:41)	36.4 (17–68)	74	8.0 (2.2)	43	81	–
dropouts	97 (62:38)	33.1 (18–70)	58	8.0 (2.8)	17	63	34 (9)
Drama							
current	205 (49:51)	30.2 (8–68)	49	6.8 (2.7)	21	72	–
dropouts	133 (54:46)	29.5 (16–70)	53	6.7 (2.5)	7	73	65 (17)
All males							
current	322	36.2 (8–68)	84	7.8 (2.6)	39	76	–
dropouts	140	33.8 (18–70)	71	7.5 (2.8)	16	71	43 (12)
All females							
current	241	34.6 (12–65)	47	7.1 (2.5)	34	76	–
dropouts	104	28.4 (16–50)	37	7.3 (2.5)	9	66	43 (11)
Grand total							
current	563 (57:43)	35.5 (8–68)	68	7.5 (2.5)	37	76	–
dropouts	244 (57:43)	31.5 (16–70)	57	7.4 (2.7)	13	69	43 (11)

'All males', 'All females' and 'Grand total' include a number of individuals with more than one role—hence totals are less than the sum of the four field-worker categories.

^aSignificant difference between current workers and dropouts for this characteristic ($P \leq 0.01$).

dropouts therefore left the programme within 53% (2 of the 3.78 years) of the follow-up period, which shows that attrition slowed significantly with time. Attrition rates varied greatly between the different groups, from drama players (17% annually) to PCs and APC members (both 4% annually). In all cases, we sought to replace dropouts and train their successors as fast as possible so as to maintain continuity.

Most of the people who dropped out did so for unavoidable reasons, such as 'moved from the area' (31%), 'too busy' (14%) and 'stopped from working by husband' (28% of female dropouts, 12% of the total). Twelve percent 'lost interest', 11% died, 7% had to be dropped because of inappropriate behaviour and 13% left for various other reasons.

Dropouts were less likely than current workers

to be subsistence farmers (69 as compared to 76%; $P = 0.01$), more likely to be younger (31.5 as compared to 35.5 years; $P < 0.001$) and more likely to be single (43 as compared to 32%; $P = 0.003$). Level of education was not associated with dropping out (7.5 as compared to 7.4 years for dropouts; $P = 0.7$), and neither was sex (43% both for men and women, $P = 0.96$). Current workers were more likely than dropouts to be opinion leaders (37 as compared to 13%, $P < 0.001$).

The intervention—activity levels and attendance

The data presented below should be seen only as a close estimate of what took place and not in all cases as a precise account. People attending drama and video shows came and went, for example, and numbers recorded on a monitoring form would

Table IV. Number of IEC activities and attendance, by year

	1996	1997	1998	1999	Totals (% of overall attendance)
Video shows					
no. of activities	83	82	116	111	392
total attendance	9111	9644	10757	9814	39326 (10%)
Drama shows					
no. of activities	116	204	236	224	780
total attendance	7887	22680	23232	20506	74305 (19%)
Activities conducted by PCs and CEs					
no. of activities	6789	17658	24677	31206	80330
total attendance	37336	64831	83795	92402	278364 (71%)
Grand totals					
no. of activities	6988	17944	25029	31541	81502
overall attendance	54334	97155	117784	122722	391995 (100%)

include only individuals counted at one point during the proceedings. Categorizing people according to age group also inevitably involves a degree of subjective judgement.

A total of 391 995 attendances were recorded at 81 502 IEC activities between 1996 and 1999 (see Table IV). This represents a mean of 6.1 attendances for each of the 64 000 target adults. Twenty-one percent of all reported attendees fell into the 13–17 year age group, 37% were aged between 18 and 24, while the remaining 42% were over 24 years old (children under 13 years were not counted). The overall male:female attendance ratio was 49:51.

A steady rise in the number of activities resulted in an increase of over 220% for total annual attendance, from 54 334 in 1996 to 122 722 in 1999. PCs and CEs (hereafter referred to collectively as CEs) conducted by far the majority (98.6%) of all activities and contributed 71% of the total attendance. Their overall male:female attendance ratio was 50:50, although both sexes tended slightly to favour their own: 54% of the male CEs' attendees were male and 57% of the female CEs's attendees were female. Fifty-two percent of CEs' activities involved only one client, with these meetings comprising just 15% of all their attendances. An average of 928 attendances was recorded by each CE, 825 by the females and 1004 by the males.

Although video and drama shows accounted for

just 1.4% of all activities, they contributed 10 and 19% of all attendances, respectively. This was on account of their high mean attendance, 100 and 95. The male:female attendance ratios at these meetings were 50:50 and 46:54, respectively.

The frequency with which the 16 IEC topics were covered is shown in Table I. Overall, condom use was the most frequently discussed subject, at 34% of all activities. Discussion of VCT and participation in the survey (which measured serologically the impact of the intervention) came a close second, at 33% of all activities. The other topics we considered to be of key importance—how HIV is and is not spread; abstinence, faithfulness and reduction of sexual partners; and for Arm B, STD treatment seeking behaviour—were all ranked in the top 9 of this league.

A total of 164 063 leaflets were distributed (Figure 1), which represents a mean of 2.6 leaflets per target individual, although many leaflets would have been read by more than one person, thereby enhancing their potential impact. 17% of the leaflets described the importance of early STD treatment (distributed only in Arm B), 22% explained why mosquitoes do not transmit HIV, 24% discussed condoms and the remaining 36% covered broader IEC messages.

Technical problems with the office photocopier caused leaflet distribution to fall between 1996 and 1997. Once we had employed the services of a

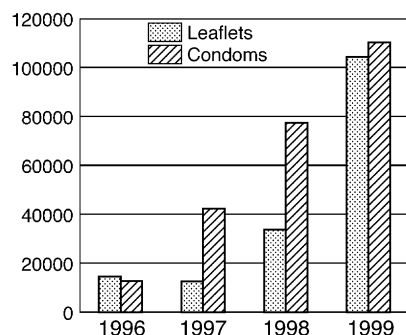


Fig. 1. Condom sales by CEs and total leaflet distribution, 1996–1999.

reliable commercial printer, annual distribution rates increased, by 275% between 1997 and 1998, and by a further 310% between 1998 and 1999.

A condom social marketing programme was conducted throughout the 18 study parishes, involving 345 small retail shops, 162 CEs (only from the 12 IEC parishes), and 97 clinics and drug shops. Two brands of subsidized condoms were distributed, selling for the equivalent of 8 US cents for three—50–70% cheaper than those sold commercially—providing a 100% profit margin for the seller. All the outlets together sold a total of 1 495 570 condoms over the 4 years, of which CEs sold 241 750, or 16%. This represents a mean of 1492 sold by each CE, or 3.8 per target adult/7.6 per couple between 1996 and 1999—see Figure 1. Just 17% of the CEs' condoms were sold to women.

In spite of our strenuous efforts to avoid upsetting the more traditional members of the community, offence in relation to our condom promotion activities was occasionally taken, and we were obliged to seek support from our APCs and other field-based workers. Further details of the challenges and accomplishments of the MIT's condom promotion strategy have been presented elsewhere (Bassaja *et al.*, 2000).

We have estimated that the entire cost of the IEC intervention between 1996 and 1999 was US\$451 056. Salaries were calculated based on 100% of those of the six central IEC staff, and 20% of those of the MIT's Project leader, station

manager and secretary. This came to US\$220 704. Total field-worker allowances were calculated using the figures given in the 'Implementers' section of Methods and these amounted to US\$116 263. Administrative costs were based on 20% of all those incurred at the Masaka office, and transport costs were based on 100% of two vehicles. Together, these came to US\$114 089. (Our calculations did not take into account any central MRC Programme administrative or scientific support costs). Based on our target population of 64 000 individuals, therefore, the total amount constitutes an annual cost of approximately US\$1.76 per target individual.

Discussion

This paper has described a community-based HIV/AIDS behavioural intervention conducted throughout 12 parishes of rural Uganda between 1996 and 1999. Over 560 people from the community contributed to the intervention in a variety of fashions, with training, supervision and support from six centrally based staff. Nearly 400 000 attendances were recorded at 80 000 activities during the 4 years, which means that each of the 64 000 target adults in our study area would on average have attended over six activities. This intervention has demonstrated that it is feasible to reach deep into a rural African community with HIV prevention messages.

Developing and maintaining a motivated field-based workforce was one of the main challenges. The intervention required considerable manpower, but given that labour is quite plentiful in rural Uganda, this in itself was not actually a major hurdle. More problematic was the fact that the intervention had to be replicable, so that if it was found to have an impact on HIV incidence, it could then be repeated elsewhere, and at relatively low cost. The potential for some degree of self-sustainability was therefore crucial, which is why we avoided creating dependency by paying salaries—except to one key individual in each parish, the PC—and why we supported the drama groups in their own income-generating activities. The ideal

we strove towards was of dedicated volunteers, who would work primarily for the benefit of their communities, and who would be supported and given only a nominal monthly allowance. The effectiveness and sustainability of this strategy has been demonstrated previously in northern Uganda, during a community-based onchocerciasis control programme (Mutabazi and Duke, 1998). Key determinants of success on this project included (1) high community attendance levels at health education sessions, (2) community involvement in the selection of field workers and (3) minimal cash incentives (Katarwa *et al.*, 2000). All these were also incorporated into our own intervention.

To a large extent, our goal of sustainability was achieved, as demonstrated by the relatively low annual attrition rate of 11%. Self-selection of most field workers, combined with vetting by community leaders, ensured that we started out with people who were in general both enthusiastic and respected. In addition, the continual supervision, support and retraining provided by central staff played a major role in stabilizing the workforce. However, even with such support, some attrition is inevitable with this type of work—over half of those who dropped out did so for unavoidable reasons such as moving from the village, death or being forced to stop by jealous husbands. Nevertheless, the fact that three-quarters of all those who dropped out did so within half of the follow-up period suggests that attrition reduces with time and therefore that once properly established, a voluntary workforce of this nature can be quite easily maintained. We also found that ‘stable’ field-workers tended to be slightly older than those who dropped out, as well as more likely to be married or opinion leaders—perhaps because these characteristics are associated with reduced geographical mobility. Similar projects in the future may therefore wish actively to recruit such people in order to reduce attrition to a minimum. Since we also found absolutely no difference in the dropout rates for women and men—even though some wives were prevented from working by their spouses—there is no reason to avoid recruiting

and training female workers in this sort of work out of a misplaced fear of losing them.

Establishing this intervention and reaching the point where annual attendance began to level off took several years. Launching IEC activities and training all the field workers in each parish was time consuming and required considerable planning, which meant that the process had to be staggered (the last parish was launched 29 months after the first). This, combined with increasingly efficient programme delivery—CEs reported an average of just over 3 activities per month in 1996 as compared to nine in 1999—resulted in substantial annual increases both for the number of activities conducted and for overall attendance.

The great majority of the work was conducted by the CEs, who collectively led over 98% of all the activities and reached 71% of all attendees. This is particularly encouraging, especially given the doubts expressed by a number of community members at the start of the intervention, who did not believe that their neighbours would be able to teach them anything they did not already know. On average, each of the CEs had 928 contacts at 268 activities over the 4 years. Fifty-two percent of their meetings were with only one client, where more individual attention could be provided than was possible at larger group activities and which may therefore have had a greater impact. It is clear that CEs constituted the cornerstone of the intervention, with the drama and video shows providing an important but supplementary contribution.

Since sexual activity in rural Masaka is largely under male control, we were satisfied that we accomplished a 59:41 male:female ratio among our CEs. By having a relatively large number of male ‘agents of change’ working on the project, we hoped that a social environment would develop in which coercive or otherwise illegitimate sex would become less and less acceptable within male peer groups. We also expected that this predominantly male CE work force would bring about a correspondingly greater proportion of male attendees at their activities, so we were surprised that the sex ratio at CE activities was in fact 50:50.

An analysis of the sex of CEs in relation to attendees explained this finding, which showed that although overall attendance at female CE activities was about 20% lower than that at the men's, the women had proportionately slightly more female clients than male CEs had male clients. This made us wonder what effect a reversal of the CEs' male:female ratio (to 41:59) might have on attendance. Assuming similar attendance rates for male and female CEs, we calculated that the attendee sex ratio would change only marginally under such circumstances, to 48:52, and overall attendance would fall, but only by 4%. These small changes in hypothetical output—in spite of significant differences in the field team's gender constitution—demonstrate that the relative proportions of women and men working on such an intervention actually make very little overall difference to clients. Within quite a broad range, therefore, the sex ratio of field workers in an IEC intervention probably does not need to be a major issue during planning and recruitment.

Our condom promotion activities proved occasionally to be contentious [the same has been reported elsewhere in Uganda (Kagimu *et al.*, 1998)] and, especially at the start, great care had to be taken with this key area so as to avoid alienating certain sections of the community. Partly as a result of the controversy they provoked, condoms were discussed and debated at 34% of all activities, more frequently than any other topic. In spite of the negative feelings towards them that we faced from some quarters, however, the 162 CEs who were engaged in condom distribution each managed to sell a mean of 1492 over the 4 years. In other words, they both created and met demand. They also played a crucial role in the process of facilitating community-wide acceptance of this occasionally contentious product, as demonstrated by the clear differences in attitude displayed by our study communities as compared with those in the neighbouring parishes. Nevertheless, since CEs managed to sell just 16% of all the condoms distributed, future condom social marketing projects would be well advised to adopt a multi-

channel approach such as ours and not to rely exclusively on CEs or their equivalent.

At first glance, the US\$1.76 that we spent each year per target individual to deliver this preventive intervention may seem quite high, especially in the context of a government health care system that spends an average of \$4 per citizen per year on curative services. However, this figure does include some evaluation and research costs—it would have been very difficult accurately to disentangle them from the rest—so the actual cost of programmatic implementation was in fact less. Costs in any attempt to replicate the programme would also be reduced by incorporating the intervention into an existing structure, either through local government or a NGO. Irrespective of how it was to be run, however, there is no way around the fact that some degree of donor support would be required.

Substantial but surmountable problems were faced during the establishment and implementation of this large-scale behavioural intervention. Difficulties ranged from the practical—how to recruit, train, supervise and motivate more than 550 field workers from 12 different communities—to the political. Many of the older and more influential people in rural Masaka hold traditional views about sex and relationships, and we occasionally faced serious objections to what we were doing, especially at the start of the trial. However, with sensitivity, tenacity and the support of key local leaders, we were ultimately able to defuse, or at least ameliorate, these situations. What we have demonstrated, therefore, is that providing rural African communities with HIV/AIDS prevention messages and skills is practicable, and that members of the target communities can themselves play a central role in the process.

Acknowledgements

The authors thank Joseph Ssembatya, Elisam Mulali and Kiyimba Musisi for their work on the implementation of this intervention, as well as all the field workers and the study communities themselves. We also thank Robert Pool, Sabina

Bergstén, Kirsti Mitchell and the three anonymous referees for their helpful comments on an earlier draft of this paper.

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Received on February 7, 2001; accepted on May 26, 2001