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AIDS EDUCATION FOR YOUTH THROUGH ACTIVE LEARNING: A SCHOOL-BASED APPROACH FROM MALAWI

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Abstract — Health education programmes need to address local understandings of HIV/AIDS within the broader context of sexual behaviour. We report on a locally derived and community orientated questionnaire survey of HIV/AIDS and sexually related behaviour among 756 pupils from two government secondary schools in Malawi. On average, pupils gave the correct answers to more than 70% of the items on the survey. Seventy-two pupils from one of the schools subsequently participated in playing an educational board game about AIDS, once a week, over four weeks. The percentage of correct responses given while playing the board game significantly increased each time the board game was played, and a one-month follow-up questionnaire showed that a significant improvement had been maintained in comparison with the initial questionnaire survey. Pupils who attended the school where the board game was trialed, but who did not participate in the board game, scored slightly, but significantly, higher than pupils from the other 'no-board game' control school. This result was tentatively interpreted as a 'trickle down' effect. The benefits of introducing active learning methods into schools, of focusing on local understandings of health problems, and of establishing an accurate knowledge base for health promotion are discussed. Copyright © 1997 Elsevier Science Ltd

It is now recognised that in Africa AIDS (Acquired Immune Deficiency Syndrome) constitutes a humanitarian crisis of immense proportions (Barnett and Blaikie, 1992; Cuddington, 1993; Forman and Bennett, 1992; Kerr, 1989; Potts, 1992). In 1994 Malawi was reported to have one of the highest rates of HIV (Human Immunodeficiency Virus) infection in the world, with an average of 25 people becoming HIV positive, six developing AIDS and five dying from AIDS, every hour (Liomba, 1994). By 1998 it is estimated that these figures will rise to 13 people developing AIDS and 12 dying from AIDS every hour. For 1994 it is estimated that 12% of the entire population is HIV positive, with more than 30% of mothers attending antenatal clinics and 90% of prostitutes testing HIV positive in urban areas (Liomba, 1994). Whatever the exact incidence and prevalence rates of HIV infection, it is clear that AIDS presents Malawi with an enormous challenge to the health of its citizens.

The transmission of HIV in Africa is predominantly through heterosexual intercourse

(Bledsoe, 1991). Sexual activity among Malawian youth appears to be common (Bandawe, 1992) with 55.3% of school pupils reporting having had sexual intercourse, of whom three-quarters claim that they first had sexual intercourse before the age of fifteen (McAuliffe and Ntata, 1994). Within Malawi, adolescent sexual behaviour is now recognised as a priority area for research (Helitzer-Allen *et al.*, 1993; Banda, 1994). As the incidence of AIDS increases and the general public becomes more aware of HIV transmission, a greater number of the young are put at risk of infection. Knowing that prostitutes are a high risk group, many African men are turning away from mature women for 'transactional sex' and towards young girls, with the idea that 'the younger you can get them, the less likely they are to have AIDS' (Malinga, 1993). The number of girls in Malawi who are HIV positive in the age range 15–19 years is now more than four times that for boys (Liomba, 1994).

Quite apart from this motivation to turn away from prostitutes in the search for HIV-free transactional sex, there exists, in Malawi and throughout much of Africa, a tradition of 'sugar daddies'. Sugar daddies are men who obtain sexual favours in exchange for money for school fees, clothes and other 'gifts'. With the high rate of HIV

■ This paper is dedicated to the joyful memory of Naomi Mpeмба.

infection in Malawi, more adult men are entering into such relationships with progressively younger girls (Malinga, 1993). Unfortunately, many of these 'sugar daddies' are already HIV positive, so the infection is passed on to progressively younger girls. At the same time as young girls are being endangered, so too are young boys. Rather than having their first sexual relationship with girls their own age, boys are increasingly turning to older women, because the boys' female peers are involved in exclusive sexual contracts with 'sugar daddies' (Liomba, 1994). These older women are often the very ones rejected by older men because of their fear of HIV infection. Thus a vicious circle is emerging where the youth are being put at increasing risk through fear and economic and sexual exploitation.

In Malawi AIDSCOM undertook a major effort to provide AIDS education in primary and secondary schools by developing a series of booklets intended to be appropriate to different levels of education. Teachers spent several weeks going through the booklets, in a fairly unstructured format, under standard classroom conditions. Although a quarter of a million booklets were printed and distributed, a preliminary evaluation reported discouraging results. Nyirenda and Jere (1991) found no increase in pupils' scores on a test of AIDS knowledge, given before and after several weeks of using the AIDS education materials. A number of factors could account for this. Teachers may have used the materials in different ways, and it was also reported that some teachers did not feel comfortable talking to school pupils about sex and HIV transmission. It is unclear whether the reported failure of the booklets is due to their content, the application of the materials in a classroom setting, or the methods of evaluation (Nyirenda and Jere, 1991).

From other African studies of school pupils' knowledge about AIDS it is, however, apparent that false beliefs abound. It is, therefore, not enough to simply provide accurate information about AIDS, disinformation must first be detected and then challenged and dispelled. For instance, in Zimbabwe many secondary school pupils feared that mosquitoes transmit HIV (Wilson *et al.*, 1989), while in Uganda 30% of secondary school pupils believed that if a person has coitus only once with someone who is HIV positive, then there is no chance of infection (Kipp *et al.*, 1992). Also in Uganda, 46% of school pupils believed that condoms provide protection against HIV infection

for men, but not for women. The same percentage of pupils saw AIDS as 'a curse from God and impossible to avoid' (Kipp *et al.*, 1992).

Health beliefs vary in different communities and may reflect a variety of modern and traditional ideas which are resistant to behaviour change (MacLachlan, 1994 1996a, 1996b, in press; MacLachlan & Carr, 1994). It is becoming increasingly clear that effective health promotion needs to explore local community beliefs rather than simply adopting a 'broad brush' nationwide or, indeed, worldwide, approach (Ngugi and Plummer, 1988; Winett *et al.*, 1989). We, therefore, sought to evaluate school pupils' understanding of AIDS, not with instruments developed in other countries (often in very different contexts, for example, the AIDS Attitude Scale or the WHO Global Programme on AIDS survey of Knowledge, Attitudes, Beliefs and Practices Questionnaire), but instead to identify extant understandings of AIDS/HIV (and sexually-related behaviour) as found in our own community. We also wished to provide our community with an effective mechanism for actively engaging youth in AIDS education. As an initial step we, therefore, sought to *learn from our own community*, before we attempted to educate its members (MacLachlan, 1994, 1996a).

The Zomba community, a semi-urban community in southern Malawi, was chosen in the belief that a university should actively contribute to the wider community in which it is situated. Our project, which extended over three years involved (1) an initial qualitative search to identify existing ideas about AIDS/HIV, (2) a quantitative questionnaire survey of secondary school pupils to establish their understanding of AIDS, and (3) the development, trialing and evaluation of an educational board game intended to encourage pupils to become active participants in the process of AIDS education.

QUESTIONNAIRE STUDY

Subjects

Seven hundred and fifty-six secondary school pupils from two government co-educational schools in Zomba municipality (Masongola and Likangala Secondary Schools) completed the questionnaire described below. These pupils represented the entire population of pupils from Form I through Form IV, (Form IV being the highest form, in which pupils sit the Malawi School Certificate of Education examinations, the equivalent of the old British GCE 'O' Levels or

GCSE) attending each school on the day when the questionnaire was administered. The number of pupils in Forms I to IV who correctly completed the questionnaire was 188, 206, 168 and 131, respectively. There were 464 males and 227 females. A two-way analysis of variance (ANOVA) on pupils' age, with form and gender being the independent variables, produced significant main effects for form [$F(3, 671) = 89.30, p > 0.001$] and gender [$F(1, 671) = 91.14, p < 0.001$] but no significant interaction effect. Across the four forms, male pupils ($x = 17.70, S.D. = 2.11$) were on average a year older than female pupils ($x = 16.40, S.D. = 1.65$). The mean age of pupils increased across Form I to IV as follows: 15.87 (S.D. = 1.64), 16.92 (S.D. = 1.57), 18.17 (S.D. = 2.30) and 18.76 (S.D. = 1.39). There were no significant differences in the age or gender distributions of the two schools.

Materials

In order to identify the community's concerns about AIDS and to create a questionnaire sensitive to existing issues within the community, a number of separate but complementary sources of information were used to identify items for the questionnaire. These sources included school pupils, trainee teachers, qualified teachers, medical doctors and representatives of the Ministries of Education and Health.

Written sources. Although the first AIDS cases were reported in Malawi in 1985, it was not until early 1990 that the community began to be aware of AIDS, through the publication of short stories and plays. The first short story had as a theme, 'AIDS is a punishment from God' (Mwale, 1990). Other stories and plays concerned the connection between AIDS and tuberculosis (Sagonja, 1991), the dangers of using unsterilised equipment (Somanje, 1990), marital fidelity and infidelity (Gondwe, 1990; Lane, 1993), and AIDS and prostitution (Kamanga, 1993; Mlumbe, 1990). All of these sources provided information about the ways in which some people were thinking, or being encouraged to think, about AIDS.

Another source from which questionnaire items were derived was the numerous local press reports of international AIDS research, conferences and workshops. We emphasise the importance of *local* reporting, because this focus helps to bring a problem into the 'local domain' and to legitimise it as a topic for discussion. Local press reports also began in 1990, one of the first quoting Delay

(1990), who wrote: 'Unlike other major diseases (smallpox, malaria, plague, etc.) which mainly kill the weakest members of our society, the very young or very old. AIDS targets young and middle aged, productive adults . . .'. Other press reports outlined the government's 'multi-pronged strategy to get the message across' (WASI, 1990), highlighting the importance of education through mobilising media resources. Another reported on a survey of knowledge, attitudes, behaviours and practices which found that there was 'substantial knowledge on HIV and AIDS', but no significant change 'in people's moral and social behaviour' (Malawi News, 1991).

A third written source which contributed to questionnaire items was the materials prepared by the Ministry of Health together with the then Ministry of Education and Culture for use in secondary and tertiary institutions in the country. This included health promotion materials such as posters.

Student and pupil sources. A further source of community information was lessons on AIDS education, given by trainee teachers in local schools. The content of these lessons included passages on modes of transmission of HIV, read out to the pupils for a listening comprehension exercise, short stories on a variety of aspects of AIDS and related issues (e.g. Mbeza, 1991; Whayo, 1991), as text comprehension exercises, with role plays and other activities arising out of these short stories. These lessons were observed and note was made of the pupils' responses.

Thus over a period of two and a half years and drawing from a variety of qualitative community resources and sources, a series of salient AIDS and sex-related issues were identified and catalogued. This was the origin of the items used in the questionnaire survey.

Item validation. Initially fifty questions were identified. Ten adults, working in or around Zomba, with a professional knowledge of AIDS (including lecturers, medical doctors and counselors working with AIDS sufferers), independently categorised these statements as true or false, or opinions. Where the response to an item was rated as an opinion, by any one of our panel of experts, this item was dropped (e.g. 'AIDS is a punishment from God'). The final forty items used in the questionnaire were those which received unanimous true or false responses from our ten judges. These questions covered the following

areas: presentation of disease, cause of disease, folklore, prevention, protection, sex education, statistics, transmission routes and treatment. However, it is important to emphasise that we were not attempting to produce a comprehensive range of questions *per se*, but rather to incorporate items which addressed extant and salient ideas about AIDS and sex-related issues in the Zomba community.

The questions were also checked for readability using the SMOG formula, which assesses the average number of polysyllabic words per sentence (McLaughlin, 1969). Any question which contained non-technical polysyllabic words, which could be replaced by simpler words without changing the meaning, were rephrased (e.g. 'develop' was changed to 'get'), and the abbreviation for tuberculosis (TB) was used in preference to the full word, in this way bringing the readability level down from the equivalent of U.S.A. Grade 10/11 to Grade 9/10. The lower grade level was felt to be more appropriate for second-language speakers of English, even though the Form III and IV pupils were already in their 11th and 12th year of schooling, respectively.

Procedure

The forty questions were given to pupils in the form of a questionnaire with 'True' and 'False' response options. Pupils were asked to indicate their name, school, form, age and sex before starting to answer the questions. No time limit was given, but on average pupils took 15–20 minutes to answer all the questions. Two months later pupils from both schools again completed the same questionnaire, under the same conditions.

QUESTIONNAIRE RESULTS

Table 1 lists the forty items in the questionnaire in order of decreasing percentage of pupils who gave the correct response to each item. There were no items to which all pupils knew the correct answer. Three items, 1, 5 and 9 shared the highest rating of 97%. Pupils knew that at present there is no cure for AIDS, that not everybody who gets TB has AIDS, and that AIDS is not a disease of whites alone, but also of Africans. In all, twenty of the items were answered correctly by 81% or more of the pupils. On the other hand, up to the 50% of the pupils responded incorrectly to seven of the items. Half of the pupils did not know that a woman can get pregnant before her first period (item 30). Only 47% of pupils knew that AIDS

has not always existed (item 13), 45% that AIDS victims can benefit from counselling (item 20) and 43% that some traditional healers try to treat AIDS (item 8). Forty-three percent also realised that the results of HIV tests are not necessarily accurate (item 24). Only 39% appreciated that once a person contracts HIV they may live for more than two years before showing signs of AIDS (item 3). Finally, the highest level of ignorance was found in pupils' knowledge about babies born of HIV-positive mothers (item 28). A mere 3% knew that children born to HIV-positive mothers are not necessarily HIV-positive themselves.

The mean percentage of correct responses for the whole sample was 71.46 (S.D. = 3.63). An analysis of covariance (ANCOVA) was conducted on pupils' total number of correct responses. The two independent variables were form and gender, with age the covariate. There were effects for both form [$F(3, 668) = 20.58, p < 0.001$] and gender [$F(1, 668) = 14.71, p < 0.001$], but no interaction effect [$F(3, 668) = 0.11, ns$]. The covariate, age, was not significant [$F(1, 668) = 1.21, ns$]. Thus pupils' total score on the questionnaire was influenced by their gender and the number of years of education they had received (form), but not directly by their age.

The mean percentage correct scores for Forms I through IV were 67.58 (S.D. = 8.80), 71.35 (S.D. = 9.4), 74.25 (S.D. = 8.23) and 75.10 (S.D. = 7.75); while for males and females they were 72.48 (S.D. = 8.68) and 69.83 (S.D. = 9.65), respectively. Males scored higher than females by an average of 2.5%. There was no significant difference in the mean percentage correct answers given by pupils from the two schools in the sample ($t = 1.32, ns$).

BOARD GAME STUDY

Subjects

Of the two schools in which the questionnaire was administered, Masongola Secondary School, was chosen as the site for evaluation of the AIDS educational game. Seventy-two pupils from each of the four forms that constitute secondary schooling were chosen to take part in the study. Eighteen pupils were chosen from each form. The first eighteen pupils in the alphabet who fell within the age range and gender (1:1 ratio) specifications, were chosen to take part in the game. Pupils aged 13 and 14 years were chosen in Form I, 15 and 16 years in Form II, 17 and 18 years in Forms III, and 19 and 20 in Form IV

Table 1. Questionnaire items listed in order of decreasing percentage of correct responses

	Item	Answer	Correct (%)
1.	At present there is no cure for AIDS	True	97
5.	Everyone who gets TB has AIDS	False	97
9.	AIDS is a disease for whites, not Africans	False	97
11.	You can get AIDS from an injection given by an unsterilised needle	True	96
17.	Ministers of religion cannot get AIDS	False	96
38.	Gonorrhoea is a sexually transmitted disease	True	94
6.	Everyone who loses a lot of weight in a short time has AIDS	False	91
16.	People of some blood groups can't get AIDS	False	91
31.	A woman cannot get HIV/AIDS if she has sex only once with an infected man	False	91
36.	AIDS is a sexually transmitted disease (STD)	True	91
39.	Syphilis is a sexually transmitted disease (STD)	True	91
12.	You can get AIDS from sharing a cup with an AIDS victim	False	90
25.	TB is a sexually transmitted disease (STD)	False	90
32.	The use of condoms reduces the likelihood of one partner getting HIV/AIDS from the other	True	88
40.	If you get a sexually transmitted disease (STD) and are not treated, you can become	True	88
10.	You can get AIDS from hugging	False	87
4.	You usually get a sexually transmitted disease (STD) by having sex with someone who has a STD	True	86
26.	You can get AIDS from a mosquito if it bites you just after biting an AIDS victim	False	85
21.	It is a great help for AIDS patient to be accepted by their family	True	82
33.	One way to greatly reduce the risk of getting HIV/AIDS is to have sex only with a mutually faithful partner	True	81
27.	You cannot get AIDS if you have sex standing up	False	79
23.	AIDS was not recognised before the 1980s	True	76
35.	One way to greatly reduce the risk of getting HIV/AIDS is to abstain totally from sex	True	72
7.	AIDS does not exist	False	68
34.	The age-group at greatest risk from getting AIDS in Africa is 15–49	True	66
2.	Anorexia is a sexually transmitted disease (STD)	False	65
14.	You can live up to ten years after getting HIV	True	65
18.	It is impossible for people to change their sexual behaviour to avoid getting AIDS	False	64
19.	All AIDS victims develop serious mental problems	False	63
22.	Some people who get AIDS become mentally disturbed	True	56
15.	Some Western-trained doctors attempt to treat AIDS	True	55
29.	To abstain totally from sex will cause physical harm	False	55
37.	You are more likely to get HIV/AIDS if you already have a sexually transmitted disease (STD)	True	53
30.	A woman cannot get pregnant before her first period	False	50
13.	AIDS has always existed	False	47
20.	AIDS victims can benefit from counselling	True	45
8.	Some traditional medicine men attempt to treat AIDS	True	43
24.	The results of all HIV tests are 100% accurate	False	43
3.	Once you have got HIV, you will definitely get AIDS within two years	False	39
28.	All babies of mothers infected with HIV are born with HIV	False	3

Materials

The board game was played on a modified 'snakes and ladders' board with a pack of forty cards. The squares on the boards were numbered from 1 to 100. Each card had one of the questions from the questionnaire pupils had previously completed. Statements identical to those in the questionnaire were used. A number from 1 to 6 was randomly assigned to the back of each card. Prepared coding sheets, on which questions and answers for each turn of the game were recorded, were used by enumerators (university students).

Prior to supervising the playing of the board game enumerators were trained in providing the correct answers to all of the questions. This was so that they could explain the rationale for the appropriate answers. Pupils playing the board game were not only required to give the correct answer, but *also* to explain the rationale behind the answer. If the wrong answer was given then enumerators explained the correct answer. The instructions for the game were printed on a sheet of paper and read out by enumerators. The instructions were as follows:

Aims. To learn the difference between 'True' and 'False' statements about AIDS and related issues.

Materials. The game is played on a Snakes and Ladders board with 100 squares. It may be played by 2–6 people. In addition to the board each player needs a counter (e.g. a pebble, paper-clip or bottle top). There is also a pack of forty cards with sentences written on one side of them. The pack of cards is placed at one side of the board with the sentences face up.

Method. The player to start is chosen by discussion. The game moves clockwise so that the second to play is to the left of the one who starts, etc. The first player picks up the top card. He or she reads the sentence aloud for the other players to hear, and then states whether the sentence is 'True' or 'False'. Once the player has answered aloud for the other players to hear, he or she turns over the card and reads out the correct answer. If the player answered correctly he or she moves Forward the number of squares indicated on the back of the card. If he or she is wrong then he or she moves Backwards the same number of squares. In either case, if a player lands at the top of a snake, they slide down to the bottom, and if they land at the bottom of a ladder he or she climbs up it to the top. The first to reach square 100 is the winner. If the cards are finished before the game is over, they may be reshuffled and used again.

Procedure

One week after the questionnaire survey, the selected group started playing the 'AIDS Challenge' board game. The pupils were split into groups according to forms. While in their forms, they were further divided into smaller mixed, male and female, groups of six pupils.

The game was played three more times with a period of 1 week between each playing session. During each session, the enumerator assigned to

each group had to record, on prepared coding sheets, the responses to each turn of the game as the pupils played. The number of the card a player picked was written on the coding sheet and whether the answer given was correct or not was recorded.

On the first day of the game, an hour was spent teaching the pupils to play the game. After they had understood the game, they went straight into play and played for another hour. One hour was assigned to playing the game during each of the sessions that followed (but due to lateness and absenteeism, sometimes less than an hour was spent on playing the game). One month after the fourth and last playing session, pupils from both schools again completed the forty-item questionnaire described in the first study.

BOARD GAME RESULTS

Prior to playing the game the 72 'board game playing' pupils had a mean score of 73.5% (S.D. = 8.70) correct on the pretest questionnaire. Each time they played the board game their mean scores increased (see Fig. 1 and Table 2). In each case the increase in number of correct answers represented a statistically significant gain up to the fourth and final playing of the board game. While there was a reduction in the percentage of correct answers between the final playing of the board game and the post-test completion of the questionnaire, it is important to emphasise that post-test scores were still significantly higher than pre-test scores.

Due to the differing number of pupils who participated in playing the board game each time, repeated measures ANOVA was not used to assess the significance of change scores across time, as this would not have made use of all the available data. Instead, as shown in Table 2, *t*-tests compared scores for each time the board game was played with previous scores. To examine the relationship between age, form and percentage of correct responses, partial correlations were used.

Table 2. Means and standard deviations for the percentage of correct responses given by pupils, with *t*-test comparisons of successive scores

	Pre-test	First week	Second week	Third week	Fourth week	Post-test
No. of pupils	71	68	64	49	58	38
Mean	73.5	83.3	87.3	91.9	94.3	88.2
S.D.	8.7	13.1	10.8	6.8	6.6	9.5
<i>t</i> -statistic		5.56	2.29	3.36	3.07	4.71
Probability		<i>p</i> <0.001	<i>p</i> <0.05	<i>p</i> <0.01	<i>p</i> <0.01	<i>p</i> <0.001

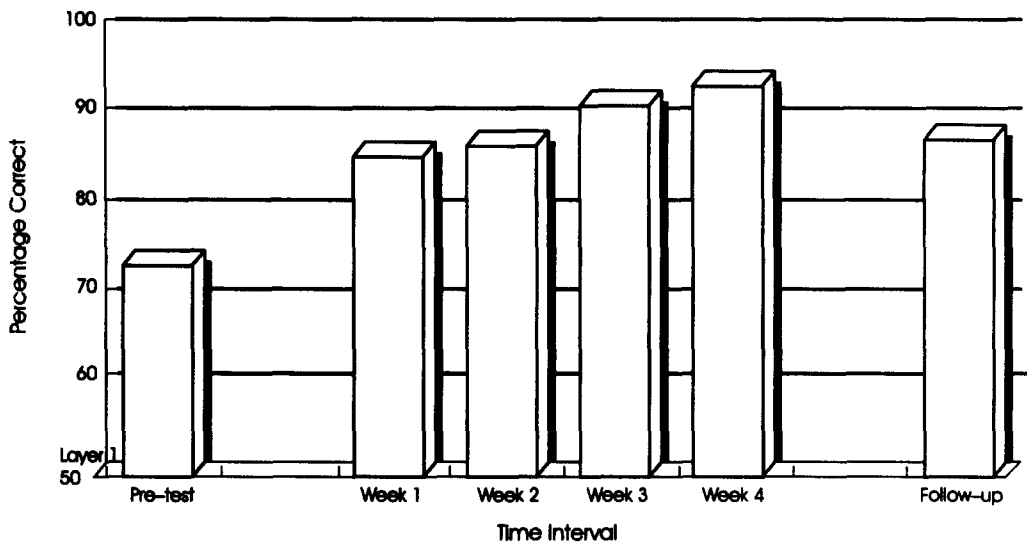


Fig. 1. Questionnaire and board game scores across time. Pre/Post-tests: Questionnaire. Weeks 1–4: Board game.

Neither age nor form were significantly related to learning at any stage of assessment.

Finally, we compared the post-test questionnaire scores of pupils from the two schools reported in the first study. This comparison was between pupils in each of the schools who had *not* participated in playing the board game (their pre-test questionnaire scores did not differ).

Pupils in Masongola Secondary School did, however, subsequently have the opportunity to come into contact with board game players (from who they might have learnt the answers to some of the questions). The pupils from Likangala Secondary School did not have this possibility, at least not during school hours. The Masongola pupils who *had* participated in playing the board game were *not* included in this comparison. The remaining Masongola pupils who completed the post-test questionnaire ($N = 147$) got a mean of 72.59% (S.D. = 9.37) of the questions correct, while Likangala pupils ($N = 288$) scored a mean of 70.61% (S.D. = 9.10) correct. This difference, although very small in real terms, is still statistically significant ($t = 2.21$, d.f. = 433, $p < 0.05$). The post-test sample is regrettably smaller than the pre-test sample because not all the pupils who had turned up to complete the questionnaire the first time, did so the second time.

DISCUSSION

Questionnaire study

Over 70% of the questions were correctly answered in the first survey and this suggests that there is a substantial amount of accurate information about AIDS available to Malawian secondary school pupils. Almost all the pupils knew that there is currently no cure for AIDS, and generally were aware of the transmission routes. On the other hand, less than half believed that counselling can help AIDS victims. Counselling of AIDS victims only really began in Malawi in 1992, and it is possible that pupils are not yet aware of its importance in the treatment and care of AIDS victims. Roughly half of the pupils correctly believed that HIV tests are not always accurate. This belief may have implications for perception of the value of HIV testing and for the general uncertainty surrounding AIDS, and continuing denial of it as a problem in the community (Panos Institute, 1988). Only two-fifths of pupils were aware that a person may live for more than two years after contracting HIV and before showing signs of AIDS. This, like the belief about accuracy of HIV tests, may have implications for the general mood of denial, for the spread of HIV and for the clinical management of HIV-reactive individuals.

The highest level of ignorance was revealed by

the question on the transmission of HIV from the mother to the unborn child. This may be because in Malawi the rate of HIV infection in newborns is higher than that reported elsewhere, but there is also the possibility that the response reflects the fears of the pupils about contracting AIDS from younger siblings, for whom they are traditionally responsible almost from birth.

Composite analysis of the questionnaire revealed that accurate knowledge about AIDS increased with years of education. The fact that there is a significant relationship between the number of years of education and AIDS knowledge, a relationship that was not accounted for simply by age, suggests that AIDS knowledge increases with education, even without a specific AIDS education programme being implemented in the schools (note that the questionnaire was administered before the Ministry of Education and Culture introduced the recently prepared AIDS education materials into the schools nationwide). One can only surmise that this AIDS knowledge is being acquired through other, possibly, 'informal', channels. These channels are deserving of further research in themselves because they represent a potentially useful medium for health promotion information. Extant community communication networks should be identified so that they can be enhanced and augmented by more formal school-based initiatives. It may be that formal education enhances one's ability to assimilate accurate information about AIDS/HIV.

The absence of a relationship between age and AIDS knowledge can be explained by the fact that, unlike in Western schools, Malawian pupils may be delayed entering school (for financial reasons, since education was not free until 1992 and is still not compulsory, even at primary school level), and/or pupils may have repeated a grade several times in the course of their education. Thus within any one form a far wider age range is found than would be the case in Western schools. In the case of Form III in this study, for example, the mean age was 18.17 years, with a standard deviation 2.3, and an actual age range of 15 to 21 years.

Board game study

That the board game facilitated learning is indicated by the significant improvement in scores each time the game was played. Although this improvement fell off on the post-test questionnaire (follow-up), scores were still significantly bet-

ter than before the board game was played. This incremental increase in the percentage of correct scores on the board game indicates that statistically significant improvements in learning occurred even between the third and fourth playing of the game. It is possible that further trials could have produced further learning, or reinforced material already learnt, so that the 'drop-off' effect at one-month follow-up was reduced.

It is important to note that the board game facilitated learning even when pupils accurately answered over 70% of the items on the pre-test questionnaire. One might have thought that 'ceiling effects' could prohibit further learning at this level. However, the 94% correct answer rate achieved on the fourth playing of the game reflects an impressive improvement and supports the efficacy of the board game as an education tool. Anecdotally, our observations of the game players suggest that almost without exception they greatly enjoyed the board game and surprisingly this enjoyment did not appear to be diminished by successive games. It seems quite likely that enjoyment is an important contributor to pupils' inclination to learn.

In comparing our results to those reported by Nyirenda and Jere (1991) a number of different factors could account for our relatively greater success in increasing pupils' knowledge about AIDS/HIV and sexual behaviour. These may include the role (and perhaps embarrassment) of a teacher discussing the traditionally taboo subject of sexual behaviour; a teacher adopting a didactic approach; the similarity of such teaching to 'normal' lessons; the restricted opportunity for discussion (either because of time or social pressures); and the effects of being actively involved in a social group of peers. These are all elements which may be significant. However, in addition, we believe that it is important to acknowledge the lack of resources and individual attention which typify many of Malawi's overworked teachers in overcrowded schools. In many cases a class of more than one hundred pupils will sit listening to a teacher reading from a book.

We anticipated that the activity of an unknown board game, and the selection (albeit unbiased) of particular pupils to play the game, would arouse some curiosity. Consequently, it seemed reasonable to expect that there might be some discussion among pupils of what the board game was about, and possibly also some 'boasting' about what was learnt in playing the game. The statistically significant, but very modest, difference

between post-test scores in the two schools give tentative support to a 'trickle-down' effect, such that pupils at Masongola Secondary School had learnt something from their colleagues who had played the board game. The small degree of difference between the two schools, only about 2% is, however, compatible with the probability that not everybody's interest might be aroused by the game playing, and that not everybody would seek to find out what the questions were about or the correct answers to them. The very small difference, in real terms, between the two schools, while encouraging, cautions against making too much of this 'trickle-down' effect.

Limitations of the research

We attempted to investigate youths understandings about AIDS/HIV and sexually-related behaviour within the context of their own community. In doing so we did not take advantage of the considerable literature and psychometric measures available from elsewhere. Our assessment of what pupils know about AIDS/HIV and sexually-related behaviour has been intentionally circumscribed. For example, because intravenous drug abuse is not a significant problem in Malawi we did not include any questions about this, or its associated dangers for HIV transmission. However, having identified a promising mechanism for AIDS/HIV education, additional items can be incorporated into the board game as felt appropriate.

An important limitation of this research is that thus far we have measured only 'understanding' and not behaviour. It is clear that behaviour should be a more crucial focus for intervention than knowledge, attitudes, beliefs or reported practices (Bandawe, 1992). We are attempting to follow up the pupils from these two schools over the next few years by assessing indirect indices of sexual behaviour such as pregnancies, STDs, condom uptake and so on. However, we are also committed to the belief that sustainable behaviour change will require a change in pupils' understanding of AIDS/HIV and sexually-related behaviours. We see an accurate understanding of HIV/AIDS as, therefore, necessary but not sufficient in itself.

A theoretically interesting issue is whether it was the effect of playing the board game itself, or the simply the repetition of information, which produced learning. We would argue that the board game format not only repeats exposure to information, but does so in a format which is conducive to learning. We, therefore, doubt whether simply

presenting a list of questions and answers would sustain the attention of pupils. We believe that it is the social context of learning that stimulates attention and retention.

Finally, our assessments and board game could be criticised for being nothing more than rote learning. That is, we are teaching facts which can be easily remembered but not necessarily understood. While our form of assessment does, indeed, measure knowledge that could be rote learned, pupils' discussion during the playing of the game reflected a desire to know *why* certain answers are right or wrong rather than just *which* answers are right or wrong. Indeed, the competitive and social aspect of the board game seemed to encourage pupils to ask enumerators, and each other, to explain why a certain answer was true or false. We would, however, argue that rote learned information can also have its place. For instance, the British 'Green Cross Code' is rote learned by most school children: 'Look right, look left, look right again and then cross the road'. Interestingly, this example, which could be argued to be a mnemonic device or involve aspects of self-statement, relates directly to changing behaviour. However, sometimes it is not *why* people behave in a certain way, but that *they do* behave in that way (e.g. look right, look left, etc.) which is important (see Ager *et al.*, in press).

Summary

We have focused on local understandings of AIDS/HIV and sexually-related behaviour in our community. Having collated these from various sources we surveyed the accuracy of school pupils' knowledge concerning such understandings. We found that school pupils had a relatively high level of correct knowledge (over 70%). Pupils who had advanced further in their education and male pupils had the highest level of accurate knowledge. Pupils' age was not related to their level of accurate knowledge. A board game played over four successive weeks significantly improved the accuracy of pupils' understanding of AIDS. Pupils who did not take part in playing the board game, but who were in the same school where the board game was being played, scored slightly, but significantly, higher than those in another school where the board game was not played at all. The present results suggest a promising mechanism for increasing learning about AIDS/HIV and sexually-related behaviour among Malawian youth.

Postscript

With assistance from UNICEF, Malawi, the board game has been developed into 'The AIDS Challenge' (Chimombo and MacLachlan, 1995) and distributed to schools, AIDS Clubs and other youth groups throughout Malawi. An additional sixty questions have been added and twenty additional cards left blank so that genuinely local ideas about AIDS can be included in the game. We hope that this will retain the community sensitivity of the game while conveying a broad range of useful information.

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REFERENCES

- Ager, A., Carr, S. C., MacLachlan, M. and Kaneka-Chilongo, B. (in press) Perceptions of tropical health risks in Mponda, Malawi: Attributions of cause, suggested means of risk reduction and preferred treatment. *Psychology and Health*.
- Banda, D. M. (1994) Sexual knowledge, sources of information and sexual activities of school-going adolescents in Malawi. Masters thesis, University of Brandon, Brandon, Canada.
- Bandawe, C. R. (1992) AIDS – Related beliefs, attitudes and intensions in Malawi. Research report, Department of Community Health, College of Medicine, University of Malawi, Blantyre.
- Barnett, T. and Blaikie, P. (1992) *AIDS in Africa: Its Present and Future Impact*. Belhaven Press, London.
- Bledsoe, C. (1991) The politics of AIDS and condoms for state homosexual relationships in Africa: Recent evidence from the local print media. *Disasters*, 15 (1), 1–11.
- Chimombo, M. and MacLachlan, M. (1995) *The AIDS Challenge*. UNICEF (Malawi), Lilongwe.
- Cuddington, J. T. (1993) Further results on the macroeconomic effects of AIDS: The dualistic labour-supply economy. *The World Bank Economic Review*, 7 (3), 403–417.
- Delay, P. (1990) AIDS in Malawi. *Malawi Medical Journal*, 6, 2–4.
- Forman, M. and Bennet, O. (1992) *The Hidden Costs of AIDS: The Challenge of HIV to Development*. Panos Institute, London.
- Gondwe, T. (1990) I'm on the phone. *WASI Writer*, 2, 23–26.
- Helitzer-Allen, D., Chilowa, W., Dallabetta, G., Flynn, C., Graham, N., Makhambera, M. and Wangle, A. M. (1993) An investigation of community-based communication networks of adolescent girls in rural Malawi for HIV/STD/AIDS prevention messages. John Hopkins University School of Hygiene and Public Health, Maryland, Baltimore, U.S.A.
- Kamanga, V. (1993) Evil force. In *Relationships* (edited by M. Chimombo), CLAIM Publishers, Blantyre, Malawi.
- Kerr, D. L. (1989) HIV infection and AIDS in Africa and the Third World. *Journal of School Health*, 59 (8), 369–370.
- Kipp, W., Kwered, E. M. and Mpungu, H. (1992) AIDS awareness among students and teachers in primary and secondary schools, Kabarole District, Uganda. *Tropical Doctor*, 22 26–27.
- Lane, S. (1993) The whole of it. In *Relationships* (edited by M. Chimombo), CLAIM Publishers, Blantyre, Malawi.
- Liomba, G. (1994) *AIDS Statistics*. AIDS Secretariat, Ministry of Health, Government of Malawi, Lilongwe.
- MacLachlan, M. (1994) Tropical health promotion: On learning from the community. Paper presented at World Congress of Applied Psychology, July, Madrid.
- MacLachlan, M. (1996a) From sustainable change to incremental improvement: The psychology of community rehabilitation. In *Psychology and the Developing World* (edited by S. C. Carr and J. F. Schumaker), pp. 26–37. Greenwood, Westport, C T.
- MacLachlan, M. (1996b) Identifying problems in community health promotion: An illustration of the nominal group technique in AIDS education. *Journal of the Royal Society of Health*, 116 (3), 143–148.
- MacLachlan, M. (In press) *Culture and Community Health*. John Wiley, Chichester.
- MacLachlan, M. And Carr, S. C. (1994) Managing the AIDS crises in Africa: In support of pluralism. *Journal of Management in Medicine*, 8, 45–52.
- McAuliffe, E. And Ntata, P. (1994) HIV/AIDS prevention through information and education for youth in Malawi. Centre for Social Research/UNICEF (Malawi), Zomba.
- McLaughlin, G. (1969) SMOG grading — A new readability formula. *Journal of Reading*, 22, 639–646.
- Malawi News (1990) Staff reporter. *Malawi News*, p. 3 (8 December).
- Malinga, W. (1993) (Zomba District AIDS Co-ordinator) Personal communication.
- Mbeza, R. (1991) The houseboy. *Malawi News*, pp. 6–7 (9 June).
- Mlumbe, S. (1990) The holocaust. *Malawi News*, pp. 6–7 (19 May).
- Mwale, M. (1990) The syndrome. *Malawi News*, pp. 6–7 (27 January).
- Ngugi, E. N. and Plummer, F. A. (1988) Health outreach and control of HIV infection in Kenya. *Journal of Acquired Immune Deficiency Syndromes*, 1, 566–570.
- Nyirenda, D. and Jere, D. R. (1991) An evaluation report for AIDS education materials. Malawi Institute of Education, Domasi.
- Panos Institute (1988) *AIDS and the Third World*. Panos Publications, Panos Institute, London.
- Potts, M. (1992) AIDS in Africa. *The Lancet*, 339, 238.
- Sagonja, R. (1991) Namaluzi's emotional judgement. *Malawi News*, pp. 6–7 (26 January).
- Somanje, R. (1990) The syringe of death. *Malawi News*, pp. 6–7 (6 October).
- WASI (1990) AIDS and the writer (editorial). *WASI Writer*, 2, 5–7.
- Whayo, M. (1991) Daughter in 'battery cage'. *Malawi News*, pp. 6–7 (13 April).
- Wilson, D., Greenspan, R. and Wilson, C. (1989) Knowledge about AIDS and self-reported behaviour among Zimbabwean secondary school pupils. *Social Science and Medicine*, 28, 957–961.
- Winett, R. A., King, A. C. and Altman, D. G. (1989) *Health Psychology and Public Health: An Integrative Approach*. Pergamon Press, New York.