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Evaluation of HIV/AIDS secondary school peer education in rural Nigeria

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Abstract

In this study, we assessed whether peer education is an effective method of HIV/AIDS awareness, in terms of knowledge, misconception and behavior, among adolescents in the rural area of Nigeria. A comparative case series (n = 250), cross-sectional structured survey (n = 135) and focus group discussions (n = 80) were undertaken among adolescents. In both the case series and structured survey, a questionnaire was used which addresses the following issues: socio-demography, knowledge on transmission and prevention of HIV/AIDS, accessibility to different sources of HIV/AIDS information, stigmatization and sexual behavior. Binary logistic regression was applied to compare responses from the peer-educated and not peer-educated populations. The model was adjusted for confounders. We demonstrated increased knowledge and decreased misconception and sexual risk behavior in adolescents receiving peer education as compared to adolescents not receiving peer education. These differences are apparent both over time (2005–2007) and cross-sectional (2007). In conclusion, peer education in rural areas can be effective in HIV/AIDS prevention. Knowledge and behavior can be influenced positively.

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Introduction

In 2007, worldwide 33.2 million people were living with HIV/AIDS. Sub-Saharan Africa remains the most affected area with more than two-thirds (68%) of all people living with HIV [1]. It was estimated that 1.7 million people were newly infected with HIV in this region in 2007, bringing the total number of people living with the virus to 22.5 million. In west and Central Africa, Nigeria still has the largest numbers with some 300 000 people dead, 3 million infected and 1.5 million children orphaned by HIV/AIDS. It is estimated that ~60% of all new infections in sub-Saharan Africa are among young people. Since there is no cure to HIV, strategies addressing this epidemic should focus their messages on prevention for young people. Of all strategies, school-based HIV peer education has been viewed as a necessary step to protect the general population from further infection [2, 3].

As young people are more likely to adopt new behaviors, it remains important to focus preventive interventions on them.

Although education and behavior programs contribute to awareness and HIV/AIDS knowledge, they have weak to moderate effects on sexual risk behavior [4, 5]. This indicates that programs should be specifically developed to match culture and age and should address the underlying reasons for high-risk behavior [5]. Kirby *et al.* [6] evaluated HIV/AIDS school-based programs in developing countries. Based on this evaluation, they concluded that these interventions caused a delay of the onset of sex, reduction in the frequency of sex, decrease in the number of sexual partners and increase in the use of condoms. Most of the evaluated programs

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were curriculum based and adult led. Therefore, it was recommended to further evaluate the effectiveness of non-curriculum-based peer education HIV/AIDS programs. This evaluation in Nigeria contributes to this.

Peer education has been widely advocated as alternative to interventions presented as classical education programs and is becoming an increasingly popular method for promoting behavior change in HIV/AIDS prevention programs [7]. Peer education typically involves the use of members of a given group to effect change among other members of the same group. Peer education is often used to effect change at the individual level by attempting to modify a person's knowledge, attitudes, beliefs or behaviors [7]. In 2004, a community HIV/AIDS prevention program was initiated by the Nigerian Non-Governmental Organization CBR Effata in a rural community in Ebonyi State, southeast Nigeria. Part of this program is peer education in secondary schools. Ebonyi State is the most underdeveloped state in southeast Nigeria. It has very little development assistance from international agencies, compared with neighboring states. To our knowledge, no previous peer education program evaluation is reported for Nigeria. The only study containing Nigerian data, by Fawole *et al*. [8], was taking place in urban settings and did not include peer education.

The purpose of the study was to assess whether peer education is an effective method of HIV/AIDS awareness, in terms of knowledge, misconception and behavior, among adolescents in the rural area of Nigeria. We hypothesized that in cases of effective peer education, the HIV/AIDS knowledge would be better in the intervention group relative to the baseline group. Furthermore, we expected a reduction in misconception and sexual risk behavior in the intervention group relative to the baseline group.

Methods

Peer education program

AIDS Ministry Effata started in 2004 with HIV/AIDS awareness in villages, churches and schools in the Izzi community in Ebonyi State. To date, 25 primary and 25 secondary schools are included in the program (out of 150).

Peer educators were selected from all classes by the students and teachers of the schools and received continuous training and supervision for >2 years. Peer educators educated their fellow students about HIV and life skills at various times and in various ways (e.g. when teachers were absent, during moral instruction hours, one-to-one discussions). Methods varied from sketches, songs and quizzes to exhibitions, rallies and competitions.

The peer education program was not curriculum based. However, the AIDS Ministry staff developed a teaching plan to ensure coverage of all relevant topics.

Trainers and peer educators made use of the UNPFA/UNAIDS Peer Education Toolkit [9] as well as the Family Health International peer-to-peer training guide [10]. To keep workshops and training sessions interesting and lively, the Alliance book '100 ways to energise groups' was used [11].

Where possible, videos were used in peer education. Two particular videos were used: 'Scenarios from the Sahel, young people against AIDS' and 'Scenarios from Africa' [12]. Both videos have been translated in the local language.

Data collection

The study consisted of a cross-sectional structured survey, a comparative case series and a qualitative study. It was performed among 465 adolescents in Izzi, a rural area, ~1940 km^2, located in the northeastern part of Ebonyi State. The cross-sectional structured survey was conducted among three secondary schools with 20 students each (n = 60) in February–March 2005 and was considered as baseline questionnaires. They were administered before any HIV/AIDS peer education took place in these schools. Two years later, in February–April 2007, the same survey was conducted among the same three schools with 25 students each (n = 75).

The comparative case series consisted of five secondary schools with 25 students each (n = 125) receiving HIV/AIDS peer education for at

least two consecutive years and five secondary schools with 25 students each (n = 125) which did not receive peer education at all. The 10 schools were studied between February and April 2007.

In both the survey and case series, a questionnaire was used, containing multiple-choice and open questions. The self-administered questionnaire consisted of 49 questions and addressed the following issues: socio-demography, knowledge on transmission and prevention of HIV/AIDS, accessibility to different sources of HIV/AIDS information, stigmatization and sexual behavior. The questions were constructed from previous questionnaires used in HIV/AIDS knowledge studies [13, 14].

The questionnaire used in 2007 had more questions than the questionnaire used in 2005. In 2005, it seemed quite impropriate to ask students their opinions about condom use, sexual behavior and stigmatization. However, after media campaigns on radio and television in 2006/2007, it seemed that these issues were more accepted in discussions. For this reason, questions about condom use, sexual behavior and stigma were included in 2007 questionnaires.

The questionnaire was pilot tested in two schools (n = 50) not included in this study. Changes were made based on feedback from teachers and students.

In the qualitative study, focus group discussions (FGDs) were used. The focus groups were conducted in series of eight students at five schools receiving peer education for the last 2 years (n = 40) and at five schools which did not receive peer education (n = 40). These same schools were chosen in the comparative case series and qualitative study, although the participants selection was different in both cases. The FGDs were conducted by a research assistant under the guidance of the researcher (F. van der M.) and took ~1 hour each. The discussions were recorded on tape. The researcher's observation and impressions were also recorded. The tapes were transcribed verbatim, translated into English and roughly categorized into seven main themes. Because this was the first study on HIV/AIDS peer education in the rural area of Nigeria, no sample size calculation could be conducted prior to study start. The sample sizes were chosen as large as possible. Schools were selected from different parts of the Izzi community. These subcommunities were Agbaja, Iseke and Inyimegu.

In all, school participants were selected from every third person in the classroom after unordered lining up all students. This means that some students could have been peer educators themselves, while most of them were not. The students were selected from the highest classes (class four and five) because of age and better standard of oral and written English. Students who changed schools during the last 2 years were excluded from the study. Before the students completed the questionnaire or took part in the FGD, the purpose of the study was explained and confidentiality was guaranteed. Participants sat at their own desks while they answered the questionnaire and were instructed to take the exercise as serious as if they were sitting for an examination. All schools were located in rural communities of Izzi and had given written or oral consent as was done by each student participating.

After completing the data collection, schools included in the control group got the opportunity to join the peer education program in the next semester.

Statistical analysis

Binary logistic regression was used to compare responses and calculate odds ratios (ORs) from the intervention and control groups (Statistical Package of Social Sciences version 15.0). The regression model was also used to adjust for the confounders' age, sex and residence. Values of $P < 0.05$ were considered statistically significant (reported P values are uncorrected for multiple comparisons).

Results

Demography

Table I shows the demographic data from the cross-sectional study, non-peer-educated (n = 60) and peer-educated (n = 75) participants and the demographic

Table I. *Characteristics of the 135 and 250 participants enrolled in the cross-sectional study and comparative case series, respectively*

	Non-peer educated		Peer educated		Controls		Cases	
	n	%	*n*	%	*n*	%	*n*	%
Age								
10–15 years	12	20.00	6	10.00	27	21.60	13	10.40
16–20 years	34	56.70	50	83.30	78	62.40	84	67.20
21–30 years	14	23.30	19	31.70	20	16.00	28	22.40
Sex								
Male	38	63.30	47	78.30	78	62.40	79	63.20
Female	22	36.60	28	46.70	47	37.60	46	36.80
Residence								
Grammar	20	33.30	25	33.30	0	0.00	25	20.00
John Calvin	20	33.30	25	33.30	0	0.00	25	20.00
Onuenyim Iseke	20	33.30	25	33.30	0	0.00	25	20.00
Ete	0	0.00	0	0.00	25	20.00	0	0.00
Igweledoha	0	0.00	0	0.00	25	20.00	0	0.00
Okweledoha	0	0.00	0	0.00	25	20.00	0	0.00
Nduokeda	0	0.00	0	0.00	25	20.00	0	0.00
Evangel Nwezenyi	0	0.00	0	0.00	25	20.00	0	0.00
Nwofe	0	0.00	0	0.00	0	0.00	25	20.00
Iziogo	0	0.00	0	0.00	0	0.00	25	20.00

data for the comparative case series, controls (n = 125) and cases (n = 125).

HIV transmission

The assumed modes of HIV transmission are presented in Table II. In both studies, significant differences were found for all questions. It was, however, not possible to calculate OR for the questions 'Is it possible to get HIV through sexual intercourse?' and 'Is it possible to get HIV through coughing?' using the binary logistic regression for the non-peer-educated versus peer-educated group. Chi-square testing resulted in P values of 0.002 and <0.001, respectively.

HIV prevention, treatment and symptoms

Comparing the assumed modes of HIV prevention also resulted in significant differences. Non-peer-educated participants, in the cross-sectional study and in the comparative case series, had a greater risk in believing the wrong prevention modes (Table III). Questions to HIV/AIDS treatment were found significant in both the cross-sectional study and comparative case series, with the exception of 'There is a HIV vaccine'.

The statement 'Women are more vulnerable to HIV infection' was only included into the comparative case series questionnaire and found significant.

Accessibility to different sources of HIV/AIDS information

Table IV contains the results of the accessibility to different sources of HIV/AIDS information for the cross-sectional study. In every category, except village meetings (assembly of male community members at a central location in the village), significant differences are found between the non-peer-educated and peer-educated group.

Peer-educated respondents' main source of information was the radio. The religious organizations did also show a high difference between the two groups, followed by parents and friends.

The results of the range of sources of HIV/AIDS education for the comparative case series are shown in Table IV too. The accessibility to HIV/AIDS information through peer education showed the

Table II. *The association of non-peer educated and controls versus peer educated and cases in believe of mode of HIV transmission*

	Number correct answers (%) non-peer educated	Number correct answers (%) peer educated	Adjusted OR (95% CI), *P* value	Number correct answers (%) controls	Number correct answers (%) cases	Adjusted OR (95% CI), *P* value
Through mosquito bites	36 (60.0)	70 (93.3)	9.9 (3.4–28.8), <0.001	71 (56.8)	110 (88.0)	5.4 (2.8–10.3), <0.001
Through kissing	41 (68.3)	62 (82.7)	2.3 (1.0–5.4), 0.045	70 (56.0)	97 (77.6)	2.6 (1.5–4.6), 0.001
Through sexual intercourse	53 (88.3)	75 (100.0)	—	115 (92.0)	124 (99.2)	9.8 (1.2–78.3), 0.032
Through sharing spoons	42 (71.2)	72 (96.0)	9.6 (2.6–34.76), 0.001	96 (76.8	117 (93.6)	4.7 (2.0–11.0), <0.001
Through touching	45 (75.0)	74 (98.7)	24.8 (3.2–195.0), 0.002	113 (90.4)	123 (98.4)	7.0 (1.5–32.3), 0.013
Through injections	34 (56.7)	73 (97.3)	28.4 (6.3–127.4), <0.001	91 (72.8)	119 (95.2)	6.8 (2.7–17.1), <0.001
Through razorblades	38 (63.3)	74 (98.7)	42.2 (5.5–326.4), <0.001	105 (84.0)	121 (96.8)	5.3 (1.7–16.0), 0.003
Through pregnancy (mother–child)	25 (43.9)	69 (92.0)	15.3 (5.6–41.7), <0.001	98 (78.4)	115 (92.0)	3.1 (1.4–6.7), 0.005
Through coughing	45 (76.3)	75 (100.0)	—	91 (72.8)	121 (96.8)	10.6 (3.6–31.1), <0.001

highest difference between control and cases. The information source of village meetings and school lectures is not found significant.

Stigma and sexual behavior

The data on stigma (Table V) and sexual behavior (Table VI) indicate that non-peer-educated adolescents were more likely to stigmatize HIV-positive people, had significantly more sexual partners and had a higher frequency of sexual intercourse. Controls had significantly higher HIV testing as >61% did this test in comparison with 10% in non-peer-educated adolescents. No difference in condom use was found.

FGDs

In the translated FGDs, the following themes were identified: basic knowledge about HIV/AIDS, misconceptions, personal behavior, stigma, accessibility to different sources of HIV/AIDS information, sexual behavior and peer group recommendations.

Basic knowledge about HIV/AIDS

The FGDs clearly showed that the non-peer-educated students had less knowledge about the basic facts of HIV/AIDS. The discussions with the controls went on and on, with only a few students knowing the right answers. However, sexual intercourse and blood contact were mentioned in all discussions. Facts about mother-to-child transmission, HIV test or antiretroviral drugs were unknown to the majority of them.

Most controls knew that HIV can be spread through sharp objects like needles and razorblades. One student asked: ‘Is it true that you can get HIV from your girlfriend when you use two condoms?’. Another said: ‘I don’t believe that you can get it from your mother, nobody has ever told me. Even in the clinic they asked my mother last month to donate blood for my small sister’.

The knowledge of the peer educated was clearly much better and students moved quickly on to a deeper level, discussing things like stigma, discrimination, positive living, advantages of testing,

Table III. *The association of non-peer educated and controls versus peer educated and cases in believe of mode of HIV prevention, treatment and symptoms*

	Number correct answers (%) non-peer educated	Number correct answers (%) peer educated	Adjusted OR (95% CI), *P* value	Number correct answers (%) controls	Number correct answers (%) cases	Adjusted OR (95% CI), *P* value
Avoid dirty places	38 (63.3)	66 (88.0)	4.4 (1.9–10.6), 0.001	69 (55.6)	104 (83.2)	4.1 (2.3–7.5), <0.001
Test blood for HIV before transfusion	40 (66.7)	74 (98.7)	36.0 (4.6–279.4), <0.001	108 (86.4)	119 (95.2)	2.8 (1.0–7.3), 0.043
Use clean needles	31 (51.7)	72 (96.0)	23.3 (6.5–83.4), <0.001	93 (74.4)	117 (93.6)	4.8 (2.1–10.9), <0.001
Not sharing spoons	43 (71.7)	67 (89.3)	3.2 (1.2–8.0), 0.009	86 (68.8)	113 (90.4)	4.2 (2.0–8.5), <0.001
Use condoms	33 (55.0)	50 (66.7)	1.5 (0.7–3.1), 0.166	90 (72.0)	84 (67.2)	0.7 (0.4–1.3), 0.291
Practice abstinence	37 (61.7)	72 (96.0)	14.8 (4.1–52.9), <0.001	88 (70.4)	117 (93.6)	6.0 (2.6–13.6), <0.001
Eat good food	50 (83.3)	62 (82.7)	1.0 (0.4–2.4), 0.918	84 (67.7)	104 (83.2)	2.3 (1.3–4.2), 0.007
There is no treatment to cure AIDS	43 (71.7)	73 (97.3)	14.5 (3.2–66.8), 0.001	97 (77.6)	117 (93.6)	4.0 (1.7–9.3), 0.001
A person with HIV may look healthy	13 (21.7)	54 (72.0)	9.4 (4.2–21.0), <0.001	42 (33.6)	87 (69.6)	4.3 (2.5–7.4), <0.001
There is a HIV vaccine	34 (56.7)	46 (61.3)	1.3 (0.7–2.7), 0.430	64 (51.2)	76 (60.8)	1.5 (0.9–2.5), 0.104
There is a test to see if you have HIV	38 (63.3)	74 (98.7)	42.0 (5.4–324.0), <0.001	112 (89.6)	124 (99.2)	15.2 (1.9–119.9), 0.010
Women are more vulnerable to get HIV	—	—	—	106 (84.8)	84 (67.2)	0.4 (0.2–0.7), 0.004

etc. Students reacted sometimes even irritated when they were asked if somebody can get HIV through kissing, touching, etc., as if the questions were too simple for them. The modes of transmission were very clear to them too.

Misconceptions

A lot of misconceptions came up when discussing HIV transmission modes. Most controls could not accept that HIV does not spread through mosquitoes. In one school, most of the controls thought that HIV can be transmitted through a dog bite, similar to rabies. In another school, most of the controls said that it takes only 3 months to develop AIDS after being infected with HIV. It was clear to everybody that there is no cure to AIDS. Much confusion came up about the fact whether a vaccine can or cannot prevent HIV infection.

In most discussions with controls, the fact that kissing cannot easily spread the HIV was not easily accepted. One student said: 'Many people say that you should not touch a person with AIDS. I really believe you can get it through his skin'.

The knowledge of the cases was much more correct. A few students still thought that kissing may be dangerous, but they were quickly corrected by others.

Coughing and touching were not seen as infection modes. 'People in the village still think that you can get AIDS from eating with a positive person, but that is not true. After all, how do you know who is positive since you cannot see it from outside?'.

Personal behavior

Only a few controls were aware of the existence of an HIV test. The level of discussions with the controls remained very general and it never became personal, even when the group was small. It appears that the students have not been encouraged to discuss sensitive issues together. Most of them did not know that the HIV test could be taken free of charge. 'I do not believe that HIV is a problem for me. It has only to do with people who engage themselves in prostitution.'

The discussions with the cases were more open and personal. Students freely answered questions

Table IV. *The association of non-peer educated and controls versus peer educated and cases in accessibility to different sources of HIV/AIDS information*

	Number correct answers (%) non-peer educated	Number correct answers (%) peer educated	Adjusted OR (95% CI), *P* value	Number correct answers (%) controls	Number correct answers (%) cases	Adjusted OR (95% CI), *P* value
Television	18 (30.5)	52 (69.3)	5.2 (2.4–11.1), <0.001	68 (54.4)	96 (76.8)	2.8 (1.6–4.8), <0.001
Radio	39 (65.0)	74 (98.7)	43.1 (5.5–337.1), <0.001	115 (92.0)	122 (97.6)	3.3 (0.9–12.5), 0.077
Posters or billboards	18 (30.0)	42 (56.0)	2.9 (1.4–6.0), 0.004	34 (27.2)	66 (52.8)	3.0 (1.8–5.2), <0.001
School lectures	28 (46.7)	49 (65.3)	2.1 (1.0–4.1), 0.045	73 (58.4)	83 (66.4)	1.3 (0.8–2.3), 0.261
Parents	19 (31.7)	53 (70.7)	5.4 (2.6–11.5), <0.001	66 (52.8)	85 (68.0)	1.9 (1.1–3.1), 0.019
Friends	21 (35.0)	55 (73.3)	5.3 (2.5–11.2), <0.001	59 (47.2)	93 (74.4)	3.2 (1.8–5.4), <0.001
Hospital or clinic	26 (43.3)	58 (77.3)	4.4 (2.1–9.4), <0.001	78 (62.4)	99 (79.2)	2.4 (1.4–4.2), 0.003
Church or mosque	16 (26.7)	55 (73.3)	7.7 (3.5–16.7), <0.001	67 (53.6)	89 (71.2)	2.0 (1.2–3.5), 0.008
Village meetings	12 (20.0)	22 (29.3)	1.6 (0.7–3.6), 0.263	44 (35.2)	48 (38.4)	1.2 (0.7–2.0), 0.488
Peer education	—	—	—	58 (46.4)	101 (80.8)	5.2 (2.9–9.4), <0.001
Others	—	—	—	60 (48.0)	104 (83.2)	5.8 (3.2–10.6), <0.001

about HIV testing and stigma. It almost appeared that some students felt ashamed to say that they have never been tested, as so many others had. It looked as if it referred to their personal responsibility to take charge of their life, in contrast with the controls where it appeared that a person who did the HIV test must have been a very careless person taking a lot of risks. Students discussed abstinence and saw the importance of it. However, they mentioned that it is not easy and some doubted whether it cannot cause infertility later, since 'Everything will get blocked if you do not use it'. One student remarked: 'I am happy that you come to our school with this HIV-teaching, because we did not know anything before. Now we know how to prevent ourselves from getting it'.

Stigma

Students were provoked to discuss topics concerning stigma and discrimination. The question if a person with HIV must have committed adultery/fornication was answered positively in most of the discussions with controls. Such a person has got the disease because of his bad behavior. Most students answered that they do not know any HIV-positive person, but when they would know somebody they would not like to associate with that person out of fear of infection. The majority of the controls was of the opinion that an HIV-positive person should not have a job, but should be isolated from the society. As one said: 'I like it if all positive people will be put together in one place. Let them die there and stop infecting us'. 'It is not good if somebody with AIDS is teaching or working as a barber in the market. He may get a wound and give us the virus, I don't like it.'

Cases dealt differently with stigma and discrimination. Although most of them admitted to be afraid to touch somebody with AIDS, they were very much aware of the fact that an HIV-positive person may look the same as an HIV-negative person. Therefore, people should not judge anybody before they have done their own HIV test. And even if somebody is HIV positive: 'That is not the end of his life'. 'I learned that you do not have to be afraid for somebody with HIV. You can visit him and go

Table V. *The association of cases versus controls in stigmatization*

	Number correct answers (%) controls	Number correct answers (%) cases	Adjusted OR (95% CI), *P* value
HIV-positive person needs our care and support	83 (66.4)	120 (96.0)	13.5 (5.0–36.5), <0.001
HIV-positive person has committed adultery	50 (40.0)	82 (65.6)	2.8 (1.7–4.7), <0.001
HIV-positive person should not be employed as a teacher	49 (39.2)	90 (72.0)	4.0 (2.3–6.8), <0.001
It is dangerous to attend the funeral of an AIDS patient	50 (40.0)	94 (75.2)	4.4 (2.5–7.7), <0.001

Table VI. *The association of cases versus controls in sexual behavior*

	Number correct answers (%) controls	Number correct answers (%) cases	Adjusted OR (95% CI), *P* value
Two or more times sex during last 4 weeks	23 (18.4)	2 (1.6)	13.3 (3.0–57.9), 0.001
Two or more sexual partners	23 (18.4)	7 (5.6)	3.5 (1.4–8.5), 0.007
Used condom during last sexual intercourse	36 (28.8)	27 (21.6)	1.4 (0.7–2.9), 0.310
Ever done an HIV test	13 (10.4)	77 (61.6)	13.4 (6.8–26.6), <0.001

together to church. But if I would know somebody with AIDS I think it will still be difficult for me.' 'I know somebody who died from AIDS, but it was not in my village. He really suffered, but his parents have never denied him.'

Accessibility to different sources of HIV/AIDS information

Both controls and cases mentioned that they received most information about HIV/AIDS from the radio. Next important sources of information were friends and parents. When asked with whom they liked to discuss sensitive matters, like sexuality, they mostly answered their friends. It appears that there were not many differences between the control and cases in accessibility to different sources of HIV/AIDS information, except the activities of the peer groups in the schools. Discussions with church leaders seemed to be less likely in the FGDs. 'After all, this type of things you do not like to discuss with your parents or pastor. I only like to ask my fellow students how they see these things. And of course I always listen to the radio.'

Peer education in schools was only mentioned in the intervention group and seemed to be the most valued way of receiving information. The peer educators were known by all cases in the discussion groups. Their work was seen as important in awareness and prevention. All cases liked the activities of the peer educators. Some peer educators seemed to be more active than others, but all the students reported that it was largely through them that they had gotten the knowledge they needed. 'I am very happy about the peer group because they always tell us what we need to know and they have even explained to us where to do the test.' 'At first I felt that the peer educators are disturbing us with their talking, but now I understand that AIDS is really a problem and that many people will die if we do not change our behavior.'

Since a few of the participants in the FGDs were peer educators, it was also discussed how they felt accepted and respected as peer educators. Most of them said that it has been especially difficult in the beginning. It appeared that the willingness of management of the schools has a direct link with the activities of the peer educators. Some schools reported active peer education groups, while other schools reported less activity. Most schools have waiting lists for new members of the peer groups. It seemed that many peer educators have other responsibilities in the schools as well (e.g. prefect, chaplain). 'I like it so much to be one of the peer educators. I am really glad to do the work although

it is not always easy and people are all watching me if my own behavior is bad. I did the test twice and I ask others to do the test also.'

Sexual behavior

In the FGDs, it was not possible to ask questions about frequency of sexual intercourse, number of sexual partners and condom use, because of confidentiality. Instead, students were asked where they liked to discuss questions about sexuality. Many of the controls appeared not to feel at ease. It was clear that generally these issues were not discussed in the classroom, but mostly with peers. Cases seemed to be more ready to discuss sensitive issues with friends and parents. Factors contributing to unsafe sex practices (e.g. use of alcohol, bad friends) were difficult to discuss with the controls, while the discussion with the cases was much more mature. Discussions about the use of condom were sensitive in both groups. Only a few technical questions about expiry date, reliability, etc. were discussed. During a discussion with cases, a student remarked: 'We should discuss everything together so that nobody will fall into temptation. When you find it difficult to stay away from sex, you should mind the friends you have'.

Peer group recommendations

Participants in the FGDs were asked to give suggestions for improvement of the peer education. Most controls requested to be included in the peer educators training program. Students were aware of their lack of HIV/AIDS knowledge. 'We will be happy if you can come back again, because we have never discussed about AIDS in the school. And we like to know more. Please discuss with the principal if we can come for training to your side.'

Cases indicated that they would like to join the peer group but because of the waiting list this is not easy. Some indicated the need of a supportive school management and suggested that teachers should receive more information about HIV/AIDS to understand the work of the peer educators better. Some suggested that HIV/AIDS education should get a place in the curriculum as presently only the peer education program is addressing HIV/AIDS. Students also indicated the need for networking with other schools to exchange ideas like songs, games and drama.

Most students discussed about capacity building of the peer educators and suggested that more workshops should be organized. None of the students suggested that peer education should be conducted in single-sex sessions, Some peer educators requested for more teaching materials and incentives like leaflets, posters, stickers, caps, T-shirts and banners. One peer educator complained: 'Our principal is not too bad, but he never allows us to teach during school hours. Only on Thursdays when we have ''moral instruction'' he allows us for half an hour. That is not enough, and we also like to discuss with smaller groups, not just in the big hall'.

Another student remarked about teacher–student sex (girls sleep with their teachers to pass exams): 'On the radio we hear about AIDS almost every day, but in the school we have no time to discuss it. Maybe the teachers are afraid that the girls will not be willing to follow them anymore'.

Discussion

In this study, we assessed the effectiveness of HIV/AIDS peer education in terms of knowledge, behavior and misconception among youth in the rural area of Nigeria.

We demonstrated increased knowledge and decreased misconception and sexual risk behavior in adolescents receiving peer education as compared with youth not receiving peer education.

Furthermore, these differences were not only apparent when peer-educated schools were compared over time (2005–2007), but also between peer-educated and non-peer-educated schools in the same period of 2007.

According to results from previous peer education research among secondary school adolescents in (West) Africa [15, 16] and Asia [17], we found that non-peer-educated adolescents are prone to more misconceptions. In the results about HIV transmission mode, prevention, treatment and AIDS-related symptoms, the peer-educated youth performed significantly better. Since HIV in Africa

is believed to spread mainly through sexual contact, it was encouraging to see that students in schools with peer education were more likely to think that HIV can spread through sexual contact.

Talking about condoms during the FGDs was difficult as students were not willing to open up. It was still a controversial topic as not all schools accepted to talk about condoms.

It also seemed that students were confused in their understanding about condoms. They associated condom use with effective HIV prevention, but also with unaccepted sexual behavior. Another reason could be that most peer educators and students belonged to the Roman Catholic Church, which made it difficult for them to talk about condoms as this would put them in the group of 'sinners'.

When students were asked in the FGDs what they understood about vaccines, most students indicated that they heard about medicines for AIDS. They confused vaccine with antiretrovirals. This explained why the question: 'There is a HIV vaccine' was not significant in both the cross-sectional structured survey and the comparative case series.

Both peer and non-peer-educated students indicated that HIV/AIDS information was received mostly from radio and friends. These findings showed that students preferred to get information from their age mates. Peer education seemed to be a valued source. A similar result was found by Briegel *et al.* [15], where friends were most often mentioned to discuss sensitive topics with.

The preference of getting the information from age mates was also stated by Merakou and Kourea-Kremastinou when evaluating peer education in schools: 'young people appeared to enjoy their participation in the program and found it easier to learn from peers than from teachers. The peers are empowered to discuss the issue of sexual matters and AIDS with their schoolmates openly using their own teenage language' [18].

Peer-educated adolescents tended to stigmatize HIV-positive people less often. During the FGD, it became clear that it is still difficult to discuss matters around HIV/AIDS openly. The discussions in the intervention group were more open. In the control group, it seemed that students are not so comfortable to discuss issues around stigmatization. They found it difficult to talk about HIV-positive persons and labeled all of them as 'persons worse than us'.

Only the students in the intervention group were generally aware that you need a test to know the HIV status of a person, while the majority of the control group thought that it takes only a few months after infection to get signs and symptoms. The fact that some of them maybe HIV positive without knowing it, caused confusion and reason to think. It also caused them to re-think some of the previous made statements about discrimination and isolation of HIV-positive persons. This shows that HIV programs should not only address the basic facts of HIV and AIDS but also issues concerning stigmatization and discrimination.

Peer-educated students did understand that abstinence is an effective method to prevent HIV infection more often than non-peer-educated youth did. Furthermore, peer-educated students had less sexual partners but were not more consistent in using condoms. Several other peer education studies report non-significant changes in condom use [8, 16, 17, 19–22].

During the FGDs, most peer-educated students understood the advantage of knowing their HIV status, the meaning of positive living, treating opportunistic infections, etc. All of them knew that the HIV test is for free. Some of them had done the test twice to cover the window period. In contrast, students in the control group had many misconceptions about the HIV test, for example, the amount of blood needed for testing, the price and the place where it could be done. Very few of them knew their HIV status.

Although we tried to get more insight into our quantitative data using the qualitative FGDs, as well as comparing schools cross-sectional and retrospectively, two limitations of our study setup should be mentioned. A potential confounder of the results is the selection procedure which was not fully at random. Furthermore, it was not guaranteed that peer educators were excluded from the intervention group. This could have created an artificial difference between controls and peer-

educated students, although we think that the effect is minimal as participants were selected from multiple schools in all groups and the number of peer educators in the intervention groups was low as compared with the total amount of students (~1%).

The limitation of our sexual behavior results should also be acknowledged, as they are only based on answers. No HIV testing results or sexual transmitted disease (STD) screening is taken into account. These would probably help interpreting the results better, as all participants, but in particular the peer-educated adolescents, could be biased as they know what the 'favorable' answers are. In our future peer education evaluation research, HIV test results and STD screening will be included to get a better insight in the sexual behavior of the secondary school population receiving peer education.

Conclusion

Our study has contributed in finding that peer education in secondary schools can be effective in HIV/AIDS prevention. Knowledge and behavior can be influenced positively. Peer education programs should be encouraged and supported as much as possible to decrease the negative impact of HIV/AID in the study area and beyond.

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Conflict of Interest Statement

None declared.

References

1. Joint United Nations Programme on HIV/AIDS (UNAIDS). *AIDS Epidemic Update*. Geneva: UNAIDS, 2007.
2. Barnett E *et al*. *Health & HIV/AIDS Education in Primary & Secondary Schools in Africa & Asia. Policies, Practice & Potential: Case Studies from Pakistan, India, Uganda, Ghana*. Sevenoaks, UK: DFID Education Research Paper 14, 1995.
3. UNESCO. *HIV/AIDS and Education, A Strategic Approach*. Paris, 2003.
4. Holtgrave DR, Qualls NL, Curran JW *et al*. An overview of the effectiveness and efficiency of HIV prevention programs. *Public Health Rep* 1995; **110**: 134–46.
5. Kirby D, Short L, Collins J *et al*. School-based programs to reduce sexual risk behaviors: a review of effectiveness. *Public Health Rep* 1994; **109**: 339–60.
6. Kirby D, Obasi A, Laris BA. The effectiveness of sex education and HIV education interventions in schools in developing countries. *World Health Organ Tech Rep Ser* 2006; **938**: 103–50.
7. Joint United Nations Programme on HIV/AIDS (UNAIDS). *Peer Education and HIV/AIDS: Concepts, Uses and Challenges*. Geneva: UNAIDS, 1999.
8. Fawole IO, Asuzu MC, Oduntan SO *et al*. A school-based AIDS education programme for secondary school students in Nigeria: a review of effectiveness. *Health Educ Res* 1999; **14**: 675–83.
9. Zielony R, Kimzeke G, Stakic S *et al*. *Training of Trainers Manual; Youth Peer Education Toolkit*. New York: United Nations Population Fund, 2003.
10. Oke O. *Peer-to-Peer: HIV & AIDS peer educators trainers' guide for IMPACT implementing agencies in Nigeria*. Arlington VA: Family Health International, 2003, 6–104.
11. Alliance T. *100 ways to energise groups: games to use in workshops, meetings and the community*. Hove UK: International HIV/AIDS Alliance, 2002, 3–23.
12. Ouagadougou. *Scenarios from Africa. Global Dialogues*. 2003. http://www.globaldialogues.org. Accessed: 2 April 2008.
13. Groce NE, Yousafzai AK, van der Maas F. HIV/AIDS and disability: differences in HIV/AIDS knowledge between deaf and hearing people in Nigeria. *Disabil Rehabil* 2007; **29**: 367–71.
14. Yousafzai AK, Dlamini PJ, Groce N *et al*. Knowledge, personal risk and experiences of HIV/AIDS among people with disabilities in Swaziland. *Int J Rehabil Res* 2004; **27**: 247–51.
15. Brieger WR, Delano GE, Lane CG *et al*. West African Youth Initiative: outcome of a reproductive health education program. *J Adolesc Health* 2001; **29**: 436–46.
16. Gallant M, Maticka-Tyndale E. School-based HIV prevention programmes for African youth. *Soc Sci Med* 2004; **58**: 1337–51.
17. Cartagena RG, Veugelers PJ, Kipp W *et al*. Effectiveness of an HIV Prevention Program for Secondary School Students in Mongolia. *J Adolesc Health* 2006; **39**: 925.e9–925.e16.
18. Merakou K, Kourea-Kremastinou J. Peer education in HIV prevention: an evaluation in schools. *Eur J Public Health* 2006; **16**: 128–132.
19. Fitzgerald AM, Stanton BF, Terreri N *et al*. Use of western-based HIV risk-reduction interventions targeting adolescents in an African setting. *J Adolesc Health* 1999; **25**: 52–61.
20. Kinsman J, Nakiyingi J, Kamali A *et al*. *Evaluation of a Comprehensive School-based AIDS Education Programme in Rural Masaka*. Uganda: Oxford University Press, 2001,85–100.
21. Visser M. Evaluation of the First AIDS Kit, the AIDS and lifestyle education programme for teenagers. *S Afr J Psychol* 1996; **26**: 103–13.
22. Visser MJ. HIV/AIDS prevention through peer education and support in secondary schools in South Africa. *Journal of Social Aspects of HIV/AIDS* 2007; **4**: 678.

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