

ORIGINAL RESEARCH ARTICLE

Evaluation of School- and Community-Based HIV Prevention Interventions with Junior Secondary School Students in Edo State, Nigeria

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Abstract

This study examined the impact of two interventions delivered in rural communities and schools in Edo State, Nigeria designed to decrease youth vulnerability to HIV infection. The Ministry of Education approved Family Life and HIV Education (FLHE) programme delivered in Junior Secondary Schools and a community-based initiative to raise AIDS Competency of rural communities were evaluated using a clustered randomized control trial and mixed qualitative-quantitative methods. Ten schools were assigned to each of three research arms: FLHE programme only, FLHE and community programme, and control. Results demonstrated positive effects on rejection of myths, attitudes related to abstinence and use of condoms, and sexual activity. Confidence in these results is supported by both levels of statistical significance and consistency in patterns of results across different levels of schooling. Results support expansion of delivery of the FLHE programme and development of community-based initiatives as effective methods of reducing youth vulnerability to HIV infection (*Afr J Reprod Health 2012 (Special Edition); 16[2S]: 103-125*).

Résumé

Cette étude a examiné l'impact de deux interventions réalisées dans des communautés rurales et dans des écoles dans l'état d'Edo, Nigéria, qui étaient conçues pour réduire la vulnérabilité des jeunes à l'infection du VIH. Le ministère de l'éducation a approuvé le programme de la Vie Familiale et l'Education du VIH (VFEV) assuré dans les collèges et une initiative basée sur la communauté pour augmenter la compétence du SIDA dans les communautés rurales a été évaluée à l'aide d'un groupe d'essais contrôlé randomisé et des méthodes qualitative-quantitatives mixtes. Dix écoles ont été attachées à chacune des trois sections de recherche : le programme de la VFEV, la VFEV et le programme communautaire et le contrôle. Les résultats ont démontré les effets positifs sur le refus de mythes, des attitudes associées à l'abstinence et à l'utilisation des préservatifs ainsi que l'activité sexuelle. La confiance en ces résultats est soutenue par les deux niveaux de la signification statistique et la consistance dans les modèles des résultats à travers les différents niveaux d'études. Les résultats soutiennent l'expansion de l'assurance du programme de la VFEV et l'élaboration des initiatives basées sur la communauté comme des méthodes efficaces pour la réduction de la vulnérabilité de l'infection du VIH (*Afr J Reprod Health 2012 (Special Edition); 16[2]: 103-125*).

Keywords: HIV Intervention, School-Based Programme, Community-Based Programme, Nigeria, Youth

Introduction

The over-representation of youth in the global statistics of HIV infection^{1, 2} has led many

government and non-governmental organizations to focus attention on prevention programming for youth, especially in sub-Saharan Africa (SSA). The two dominant modes of reaching youth with

programming are through schools and local communities. School-based programmes for HIV prevention continue to be one of the most efficient ways of reaching large proportions of youth populations, even in countries where not all youth attend school^{3,4}. Countries with general population epidemics, and especially those hardest hit by HIV, are increasingly moving to develop and deliver such programmes through schools. In some cases these are stand-alone programmes that address HIV and AIDS in specific time blocks over a limited number of sessions⁵⁻⁹. In other cases HIV and AIDS are integrated and incorporated into the content of diverse school subjects, and delivered over the entire school year¹⁰⁻¹². Several studies have provided systematic reviews of school-based programming in SSA¹³⁻¹⁵.

Community-based programming has been taken up primarily by non-governmental organizations in their HIV prevention work in SSA. There is considerable diversity of form and content in these programmes. While some programmes rely on peer leaders to deliver prevention initiatives, others rely on community leaders, and others on trained personnel from outside the community¹⁶. The settings for programme delivery range across fixed locations such as youth or community centres, faith-based organizations or workplaces, and diverse, non-specific locations in the community. Their mode of delivery varies from one-to-one counseling, to group work to public and community-wide events. Maticka-Tyndale and Brouillard-Coyle¹⁶ provide an overview of the different types of community-based programmes and Maticka-Tyndale and Barnett¹⁷ of peer-led interventions in their systematic reviews. Meta-analyses and systematic reviews of both school- and community-based initiatives have produced best practice guidelines based on the characteristics of programmes that have been successful in shifting sexual behaviours away from those that carry a high risk of HIV transmission to those with lower risk^{14, 16, 17}. This leads to the conclusion that initiatives designed and delivered in alignment with these best practices can lower the vulnerability of school going youth to HIV infection. However, successes are limited in scope and size. Because of these limitations, several researchers have recommended

combining school and community-based programmes^{18, 19} to potentially increase their impact.

This paper reports evaluation results for school and school-plus-community HIV prevention programmes delivered in rural communities and Junior Secondary Schools (JSS) in Edo State, Nigeria. HIV Prevention for Rural Youth (HP4RY), a Canada-Nigeria action research project funded by the Global Health Research Initiative of Canada, delivered and evaluated these programmes. In schools, the project supported Ministry of Education training for the teacher- and peer-led Junior Secondary School programme Family Life and HIV Education (FLHE). FLHE, has been approved by the Federal Ministry of Education for delivery in Junior Secondary Schools across Nigeria. As funds become available, teachers, principals and peer educators are being trained to deliver this programme. However, until this study, it has not been subject to an impact evaluation. In communities HP4RY developed and delivered a community-based programme based on the AIDS Competent Community (ACC) model developed by Catherine Campbell and her colleagues^{20, 21}. FLHE²², the community-based programme²³, and the full research-programme-evaluation methodology²⁴ are more fully described elsewhere in this volume. The primary outcome goal of these programmes was to reduce youth's vulnerability to HIV infection through changes in knowledge, attitudes and sexual behaviours.

Methods

Sample

Analyses for this paper used survey and focus group data collected from students in JSS grades 1-3 (equivalent to North American grades 7-9) attending 30 public schools in Edo State, Nigeria. Three schools that met the sampling criteria were randomly selected from each of 10 Local Government Areas (LGA) spread across the North, Central and South Senatorial Districts in the state. Sampling criteria included: location in a rural community (population under 20,000); having at least one government credentialed and assigned

teacher responsible for teaching a class room subject identified as an FLHE carrier subject (English, social studies and integrated science); not having current or future planned HIV interventions in the school or its local community; accessibility to the community by road; and agreement from community and school leaders to participate in the project. For evaluation purposes, the three schools in each LGA were randomly assigned to each of two early or one delayed intervention arms. The first intervention arm included 10 schools whose teachers and principals were trained in the delivery of the Family Life and HIV Education (FLHE) programme in August, 2009 and peer educators in December 2009 and January 2010. The second arm included 10 schools where principals, teachers and peer educators were also trained on these dates, and youth serving in the National Youth Service Corps (Youth Corps) who were trained in working with youth and adults in their community using the AIDS Competent Community model were placed in the corresponding community²³. The 10 schools in the third arm had their teachers, principals and peer educators trained in July and August, 2011 after the final wave of data collection. These latter schools served as controls for schools that received the intervention earlier. The three research arms are referred to as FLHE, FLHE+C, and Delay respectively. In all cases, parents and community members were invited to information and sensitization sessions before any programmes were introduced into their schools or communities.

Data Collection

Data used in this evaluation were collected in October-November 2008 (wave 1) before principals, teachers, peer educators, and Youth Corps members were trained and deployed, and in February-March 2011 (wave 3), 18 months after programmes were initiated in schools and communities. An additional wave of data was collected in February-March 2010 (wave 2), during the first year of programme delivery. The wave 2 data are not used in this evaluation because the time period for programme delivery was short and results could only be considered preliminary.

Students who attended school on data collection days were invited to complete self-report questionnaires. Questionnaires were completed in sex segregated classrooms. Multilingual project staff read surveys aloud in English and Pidgin English, while students followed along on their own copies and marked their answers. Students were encouraged to ask for clarification from project staff on questions they did not understand the first time. The first wave of data collection had 4,424 students from 30 Junior Secondary Schools complete questionnaires, the third wave had 5,201. The increase in enrolment between the two waves may be due to educational reforms by the new governor of Edo State, including fee waivers, improvement in educational infrastructure and reposting of teachers to rural areas. Surveys were scanned using SNAP software²⁵ with trained project staff and one of the co-principal investigators checking for inconsistencies and potential errors.

Nine (wave 1) and eight (wave 3) of the 30 schools spread across the Senatorial Districts were selected for focus group research. In these schools, sex and grade segregated focus groups were held with JSS 1 and 3 students in wave 1 and JSS 2 and 3 in wave 3, for a total of 4 focus group discussions per school. Five students were randomly selected for each focus group from among those who completed surveys. Focus groups were led by facilitators of the same sex as the students. All focus group discussions were audio-recorded with recordings transcribed and analyzed using N6 software²⁶.

Questionnaire and Focus Group Guide Development

Student questionnaires and focus group guides were modeled on a combination of the WHO/UNESCO HIV Prevention Evaluation Kit²⁷ and surveys used with students of similar age in Kenya²⁸, Lagos²⁹, Tanzania³⁰, and in an earlier study in Edo State³¹. The research process and questionnaires were pre-tested in one local school. In addition, research procedures and data collection instruments were reviewed by the Research Ethics Boards of 3 universities in Canada, and at the University of Benin in Nigeria

as well as by the Ministry of Education in Edo State.

Survey Measures and Focus Group Guides

The effects of the school and community programmes were evaluated through a series of survey and focus group questions that examined students' understanding of core information, as well as behaviours and attitudes related to HIV prevention. These questions were asked at wave 1 and subsequently at wave 3 allowing us to examine if changes occurred as a result of environmental effects or the introduction of the interventions. Outcome variables comprised a combination of additive scales and categorical (dichotomous) variables. Five of the outcome variables (knowledge about HIV/AIDS; transmission myths; attitude towards condoms; presence of the programme in schools; and talking to teachers and peer educators about AIDS, sex or condoms) were additive scales created from conceptually relevant questions measuring these constructs (see Table A in the Appendix). Higher values on each scale indicated more desirable question responses. Missing values for questions used in these scales were imputed using PRELIS 2 (the data preprocessor for LISREL, version 8) with no more than a single question imputed on a scale for any given case. In PRELIS, a case with missing data on a given question was matched to others with the same responses on all other questions. If there was only one other matching case, its response to the question of interest was donated to the case with missing data. If there was more than one matching case, one was chosen at random as the donor, provided one condition was met. The condition was that, for potential donor cases, the variance of scores on the question of interest must be below the variance for the sample at large. We required that the variance for potential donors be less than 70% of that for the full sample. Imputation permitted us to maximize retention of students thereby minimizing the introduction of bias while having confidence that scale scores adequately reflected student knowledge, attitudes and experiences. Categorical dependent variables included whether respondents would have sex with someone they liked (coded

yes=0, no=1); whether they had ever engaged in sexual intercourse (coded yes=0 and no=1); whether students who had ever engaged in sex had done so in the past 3 months (coded yes=0 and no=1); whether those with sexual experience had ever used condoms, and whether they did so the last time they had sexual intercourse (both coded yes=1 and no=0). Independent variables included in the analyses were the waves at which data were collected (coded as wave 1=0 and wave 3=1); two dummy-coded variables representing the various intervention research arms (FLHE and FLHE+C) compared with the delay/control arm (DELAY); and two-way interactions between wave of data collection and research arm. Two variables were introduced as controls: self-reported age and the presence of teachers trained to deliver FLHE in a school (coded present=1, not present=0). Age was controlled to account for age-related changes in cognitive and sexual development. Including whether or not a school had teachers trained in FLHE controlled for the movement of teachers between the time they were trained in 2009 and data collection in 2011.

Focus group discussions addressed the same topics that were included in the statistical analysis but in an open-ended fashion, encouraging students to talk in greater depth about each topic.

Data Analysis

Survey Data. Consistent with the nature of the outcome variables (a mix of continuous and categorical variables), we employed both Ordinary Least Squares (OLS) and logit models. Analyses were preceded by diagnostic tests to establish whether variables met the assumptions of the planned regression models. Two models were estimated for each of ten outcomes. The first model included age, wave, research arm and their interactions. The second added the dichotomous variable representing whether trained teachers were present in the school at wave 3. The coefficients for variables of interest (wave, research arm and their interactions) were virtually the same in both models and there were no statistically significant effects related to the presence or absence of trained teachers. This suggests that the movement of teachers among

schools did not produced different programme responses or outcomes across schools. Consequently, only results for the first models are presented. Age was controlled in all analyses, but since it was never statistically significant as a predictor it is not reported in the tables.

For each outcome, results are reported separately for males and females for each of the three levels of schooling (JSS 1 through JSS 3). Effects attributable to the programmes are estimated by the two interaction terms. The interaction between wave and FLHE provides an estimate of how much students in the FLHE sites changed between waves, compared to students in the delay sites. The interaction between wave and FLHE+C estimates how much students in sites with both FLHE and the community programme changed, again compared to those in delay sites. It is the interaction terms that are of primary interest, since they answer the question of how much the FLHE and the FLHE+C programmes achieved. Given that there are 12 tests of programme effects for each outcome (2 programme effects for each of males and females in each of three grades), if results were strictly random, one or more effects significant at .05 would be expected through random fluctuation 46% of the time. Taking this into consideration, we pay attention not only to statistically significant results, but give greater weight to results significant at .05 or lower at one school level that are found together with results in the same direction at other levels of schooling. While the probability of getting one or more significant results at three different school levels is .143, the probability of getting one or more significant results along with two others in the same direction is only .0375, raising confidence that results were not due to random fluctuation. This strategy has been used elsewhere in evaluation studies involving multiple outcomes to guard against reporting results which have a high probability of being produced by random fluctuation^{33,34}.

When all students were used in regression models, sample sizes ranged from 1138 to 1879 in each sex by school grade analysis and from 333 to 901 when only those with sexual experience were used. Because of the reduced sample size in analyses with sexually experienced students,

models were tested both for each school grade and also for students in all school grades combined with grade entered as a control. The latter regressions had sample sizes ranging from 999 to 2407.

Regression models were tested using the SURVEY module of STATA 12 to accommodate the stratified and clustered nature of the sample. Schools had been selected within strata (LGAs) and students were clustered in schools. Given this identification of strata and clusters, the SURVEY module estimated standard errors by its default method (linearization)³⁵.

Focus Group Discussions. Transcripts for focus group discussions were coded for themes that paralleled the outcomes tested in the statistical models. Summaries of student discussions and commentaries were organized by research arm, grade level and sex for each theme to produce an overview of how students spoke about these topics.

Results

The results are presented in nine tables and one figure. The first two tables provide sample characteristics. The third deals with whether students were increasingly aware of programming in their schools. The fourth addresses frequency of discussions with teachers and peer educators about AIDS and sexuality. Table 5 addresses changes in factual knowledge about AIDS and in rejection of myths about it. Table 6 examines responses to 'I would have sex if I liked someone'. Table 7 looks at changes in acceptance or endorsement of condom use. The eighth table deals with changing reports of having had sexual intercourse. The ninth and final table addresses whether students used condoms.

Sample Characteristics

Table 1 shows that at each wave, and for each research arm, more males than females were involved and the percentage of students in JSS 1 tended to be a few points lower than that in JSS 2, which in turn tended to be a bit below JSS 3. In each research arm and wave, students ranged in

Table 1: Sample characteristics by wave and research arm

		Delay		FLHE		FLHE+ C	
		wave 1	wave 2	wave 1	wave 2	wave 1	wave 2
	Total N=	1188	1550	1499	1782	1401	1869
Sex:	Males	58.4%	58.0%	54.2%	52.5%	59.3%	56.9%
	Females	41.6%	42.0%	45.8%	47.5%	40.7%	43.1%
Grade:	JSS 1	29.8%	32.5%	29.3%	31.9%	26.0%	30.0%
	JSS 2	32.5%	31.1%	36.2%	33.6%	34.9%	33.7%
	JSS 3	37.7%	36.4%	34.4%	34.5%	39.1%	36.2%
Sen. Dis.	North	34.3%	35.9%	43.3%	40.3%	46.0%	33.9%
	Central	25.2%	28.5%	31.6%	34.8%	30.0%	27.7%
	South	40.5%	35.7%	25.2%	24.9%	24.1%	38.4%

Table 2: Percentages of males and females with various sexual and condom use experiences by wave and research arm

	Delay		FLHE		FLHE+C	
	wave 1	wave 3	wave 1	wave 3	wave 1	wave 3
Males						
Total N=	694	899	815	941	828	1057
never engaged in sex	56.2%	66.4%	49.3%	69.4%	60.1%	67.3%
N (who ever engaged in sex)=	304	302	413	288	330	346
did not engage in sex in past 3 months	51.0%	67.5%	34.4%	72.2%	56.7%	69.7%
ever used a condom	28.3%	25.2%	24.7%	24.3%	25.5%	31.5%
used a condom last time you had sex	23.7%	16.2%	25.4%	19.8%	25.5%	21.7%
Females						
Total N=	494	651	684	850	573	803
never engaged in sex	74.1%	77.7%	62.1%	81.8%	62.7%	82.4%
N (who ever engaged in sex)=	128	145	259	155	214	141
did not engage in sex in past 3 months	59.4%	60.7%	54.4%	65.2%	53.3%	69.5%
ever used a condom	16.4%	24.1%	14.3%	29.0%	25.7%	27.7%
used a condom last time you had sex	11.7%	13.1%	12.0%	25.2%	19.2%	16.3%

age from under 11 years to over 17 years, with a median age of 15 years. Three ethnic groups dominated in this sample: Esan, Bini, and Akoko Edo. In view of the greater population in the Northern Senatorial District, 12 of the 30 research sites were selected from there. Consequently, the percentage of cases from the North was usually greater than that from either the Central or the Southern District. Table 2 gives a sense of the sexual behaviour of the youth in the study. For males, across waves and research arms, a median 63.3% reported never having engaged in sexual intercourse. For females, the corresponding figure was 75.9%. For the males with sexual experience, the median percentage reporting having used a condom at least once was 25.4%; for females, it was 24.9%. The median percentage reporting condom use on the last occasion was 22.7% for males and 20.3% for females.

Evaluation Results

Tables 3 and 4 examine evidence that students were aware of and engaging in the FLHE programme. Table 3 shows one statistically significant programme effect: males in JSS 3 in FLHE+C sites were more aware of the presence of the programme in their schools with coefficients for other school levels in FLHE+C sites pointing in the same direction. Interestingly, coefficients for FLHE sites, without community programmes, were not significant, and sometimes showed negative signs. Although they do not bear so directly on assessment of the program, it is of interest that three of the coefficients for wave, which indicate changes from pre-programme to 18 months into programme delivery, are significant. Two are negative (both among females) indicating a decrease in programming, and one positive. It is

Table 3: OLS Regression for measures of presence of programme in schools

	Males						Females					
	JSS 1		JSS 2		JSS 3		JSS 1		JSS 2		JSS 3	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
wave ^a	-.511	0.534	0.893*	0.411	0.456	0.371	-0.544 **	0.191	-0.801 *	0.310	-0.029	0.537
FLHE only ^b	-0.065	0.682	0.409	0.368	-0.184	0.471	0.556	0.403	-0.059	0.569	0.182	0.559
FIHE + C ^c	0.100	0.668	1.106 *	0.449	0.072	0.236	0.807	0.578	1.213	0.882	0.476	0.498
wave by FLHE ^d	-0.002	0.880	-0.107	0.531	0.678	0.608	-0.275	0.527	0.874	0.488	0.635	0.708
wave by FLHE+C ^d	1.020	1.040	0.065	0.673	1.619**	0.495	1.080	0.807	0.807	0.954	1.381	0.713
Constant	2.574	0.358	1.961	0.327	2.529	0.260	2.627	0.308	2.500	0.401	2.775	0.590
R ²	0.040		0.079		0.133		0.106		0.095		0.080	

Footnotes: a. wave 1=0, wave 3=1; b. Delay & FLHE+C=0, FLHE=1; c. Delay & FLHE=0, FLHE+C=1; d. Interactions

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 4: OLS Regression for measures for talking to teachers & PEs about HIV/AIDS and sexuality

	Males						Females					
	JSS 1		JSS 2		JSS 3		JSS 1		JSS 2		JSS 3	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
wave ^a	s-0.416	0.240	-0.097	0.344	-0.266	0.251	-0.187	0.192	-0.077	0.192	-0.614	0.366
FLHE only ^b	-0.348	0.181	0.058	0.316	-0.063	0.273	0.276	0.212	0.169	0.191	-0.506	0.314
FIHE + C ^c	-0.242	0.203	-0.232	0.351	-0.296	0.242	0.282	0.325	0.375	0.312	-0.544	0.438
wave by FLHE ^d	0.104	0.306	0.410	0.417	0.111	0.333	0.005	0.306	0.138	0.298	0.825	0.468
wave by FLHE+C ^d	0.274	0.351	0.826 *	0.366	0.901*	0.331	-0.232	0.443	-0.007	0.404	0.766	0.497
Constant	1.147	0.186	0.969	0.278	1.330	0.281	0.697	0.169	0.745	0.258	1.732	0.357
R ²	0.022		0.031		0.022		0.022		0.013		0.014	

Footnotes: a. wave 1=0, wave 3=1; b. Delay & FLHE+C=0, FLHE=1; c. Delay & FLHE=0, FLHE+C=1; d. Interactions

* $p < .05$; ** $p < .01$; *** $p < .001$

unclear whether this difference in awareness of the programme reflects activities at these sites.

In focus group discussions, both male and female students at all intervention sites spoke of teaching related to HIV and AIDS. Teaching took place predominantly in classroom subjects and only included the recommended co-curricular activities such as the anonymous question box or formation of FLHE or AIDS clubs in the FLHE+C sites. In focus groups with peer educators it was Youth Corpers who were mentioned as working with them, continuing their training. A frequent comment is illustrated in one male, JSS 3 focus group with peer educators: "Corpers help us. The Corper taught us about it and help us to carry out our activities." The focus group results were consistent with responses to survey questions asked in wave 3 about the presence and roles of Youth Corpers in schools. In all 10 FLHE+C sites students reported that Youth Corpers were teaching about HIV and AIDS. In 8 sites Youth Corpers were identified as the ones handling the question boxes, with a question box present in only one FLHE school.

In Table 4, two significant results suggest that males, in JSS2 and JSS3, were talking more to teachers and peer educators about HIV/AIDS and sexuality at wave 3 in FLHE+C sites. Results were in the same direction for JSS 1 males. In focus groups, both male and female students spoke primarily about talking with peer educators rather than teachers. Teachers were reported as 'talking to' students, but not as 'talking with' or engaging in conversation or discussion with students. We wonder whether there is an effect only in FLHE+C sites because Youth Corpers were viewed as teachers in these sites. Since survey questions only gave the choice of 'teacher,' students may have identified talking with a teacher when it was a Youth Corper performing the role of a teacher. This is consistent with schools filling teaching vacancies with Youth Corps members, which will be discussed later in this paper.

One might readily expect that a programme delivered through schools, where the emphasis is on gaining knowledge, would result in a rise in scores on a test of knowledge. We see in Table 5 that the coefficient for wave is significant for males in JSS 1 with the coefficient at JSS 2 in the same direction, but reversing for JSS 3. For females, wave is significant at all school levels. This implies that for females, and potentially for

males, there was an improvement in knowledge at the control as well as the intervention sites. The absence of any significant interaction terms implies the gains in knowledge were consistent across sites.

Effects of the programmes do show up on a related test that focused on rejection of cultural myths. For males in JSS 2, the FLHE+C sites showed significant improvement between waves, and males in the same sites at other school levels had results with the same sign. For females in JSS 3, there was significant improvement at both the FLHE and the FLHE+C sites with all of the other interaction terms in the same direction.

Students demonstrated both knowledge and myth rejection in all but one focus group discussion. When they were asked how to prevent HIV infection, they correctly responded with 'abstaining from sex,' 'not sharing sharps,' and 'using condoms' in 7 of the 8 sites and with 'reducing partners' in one site. In some focus groups, students offered myths which they had heard (e.g. condoms damage the womb or cause HIV, you will get infected if you eat with someone who has it). In all but one case, other students in the group were able to identify this as a myth and replace it with correct information. One focus group was an exception to this pattern with students endorsing myths about transmission (e.g. being in the home of someone who is infected, eating with an infected person) and about condoms (multiple fallacious reasons why they cannot protect). Reasons for the exceptionality of this single site are unclear.

Table 6 presents the first of two attitudinal outcomes. Positive signs represent disagreement with the statement 'I would have sex if I liked someone.' For males in JSS 2 the coefficient is significant and positive, suggesting that the odds on rejecting the idea are multiplied by more than 4 for those in the FLHE+C schools at wave 3. The other coefficients for males are positive in these sites, lending confidence that males in FLHE+C schools were more likely to reject the idea of having sex with someone if they liked them once the programmes were in place. However, results for FLHE sites were mixed and they were never significant for females. A second attitudinal outcome, acceptance or endorsement of condom use, is presented in Table 7. Three significant coefficients for wave together with non-significant coefficients in the same direction tell us that views

Table 5: OLS Regression for factual knowledge and myth rejection

Males												
	Factual Knowledge						Myth Rejection					
	JSS 1		JSS 2		JSS 3		JSS 1		JSS 2		JSS 3	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
wave ^a	0.412 **	0.141	0.238	0.147	-0.062	0.172	0.575**	0.194	0.502	0.294	0.298	0.219
FLHE only ^b	0.431	0.365	0.187	0.257	0.072	0.176	0.112	0.218	-0.078	0.257	0.364	0.247
FIHE + C ^c	0.202	0.371	-0.248	0.277	-0.205	0.192	-0.121	0.197	-0.638**	0.204	-0.215	0.284
wave by FLHE ^d	-0.241	0.335	0.006	0.306	0.090	0.260	0.108	0.308	0.239	0.394	-0.036	0.330
wave by FLHE+C ^d	-0.006	0.280	0.414	0.305	0.295	0.284	0.520	0.281	1.100**	0.383	0.714	0.416
constant	2.301	0.305	2.717	0.159	3.075	0.180	1.028	0.151	1.839	0.193	2.080	0.290
R ²	0.019		0.027		0.006		0.094		0.129		0.051	

Females												
	Factual Knowledge						Myth Rejection					
	JSS 1		JSS 2		JSS 3		JSS 1		JSS 2		JSS 3	
	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
wave ^a	1.235***	0.303	1.070**	0.304	1.021**	0.294	0.917***	0.186	1.040***	0.276	0.940**	0.285
FLHE only ^b	0.047	0.438	-0.309	0.554	-0.300	0.553	0.092	0.194	-0.191	0.263	0.071	0.311
FIHE + C ^c	0.502	0.318	0.332	0.446	-0.174	0.426	0.502**	0.149	-0.217	0.230	-0.125	0.273
wave by FLHE ^d	0.029	0.482	0.311	0.557	0.508	0.565	0.283	0.229	0.666	0.357	0.844*	0.392
wave by FLHE+C ^d	-0.052	0.504	-0.432	0.387	0.307	0.394	0.076	0.226	0.510	0.421	1.041	0.372
constant	1.622	0.295	1.819	0.362	1.969	0.285	0.455	0.154	1.079	0.231	0.963	0.317
R ²	0.148		0.114		0.165		0.165		0.222		0.261	

Footnotes: a. wave 1=0, wave 3=1; b. Delay & FLHE+C=0, FLHE=1; c. Delay & FLHE=0, FLHE+C=1; d. Interactions

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 6: Logistic regression results for disagreement with "I would have sex with someone if I liked them"

	Males									Females								
	JSS 1			JSS 2			JSS 3			JSS 1			JSS 2			JSS 3		
	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.
wave ^a	0.621	1.86	0.427	0.086	1.09	0.415	1.023***	2.77	0.258	2.072***	7.920	0.532	1.336**	3.780	0.397	1.207*	3.350	0.429
FLHE only ^b	-0.433	0.65	0.320	-0.261	0.77	0.429	0.309	1.36	0.290	0.191	1.210	0.451	0.085	1.090	0.463	-0.016	0.980	0.469
FIHE + C ^c	-0.330	0.72	0.348	-0.920*	0.40	0.358	0.210	1.23	0.331	0.442	1.550	0.489	0.214	1.230	0.473	0.274	1.310	0.467
wave by FLHE ^d	0.815	2.27	0.520	0.607	1.84	0.563	-0.268	0.76	0.398	-0.708	0.490	0.698	-0.332	0.720	0.581	0.261	1.300	0.569
wave by FLHE+C ^d	0.936	2.56	0.580	1.438 *	4.18	0.577	0.210	1.23	0.404	-0.235	0.790	0.717	-0.632	0.530	0.514	-0.246	0.780	0.571
constant	-0.389		0.312	-0.144		0.419	-0.680		0.301	-1.255		0.370	-0.564		0.380	-0.527		0.319

Footnotes: a. wave 1=0, wave 3=1; b. Delay & FLHE+C=0, FLHE=1; c. Delay & FLHE=0, FLHE+C=1; d. Interactions

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 7: OLS regression for attitudes accepting/endorsing condom use

	Males						Females					
	JSS 1		JSS 2		JSS 3		JSS 1		JSS 2		JSS 3	
	Coeff	s.e.	Coeff	s.e.	Coeff	s.e.	Coeff	s.e.	Coeff	s.e.	Coeff	s.e.
wave ^a	-0.111	0.270	-0.160	0.210	-.655*	0.270	0.912***	0.217	0.783***	0.200	0.278	0.241
FLHE only ^b	-0.024	0.372	0.039	0.250	-0.267	0.340	0.093	0.221	0.096	0.320	-0.201	0.387
FIHE + C ^c	-0.237	0.350	-0.117	0.360	-0.371	0.303	0.405	0.285	0.552	0.330	-0.096	0.346
wave by FLHE ^d	0.022	0.355	0.035	0.240	0.201	0.365	-0.064	0.273	0.131	0.320	0.537	0.430
wave by FLHE+C ^d	0.516	0.373	0.560	0.350	0.819*	0.350	-0.180	0.466	-0.053	0.350	0.624*	0.291
constant	1.552	0.324	1.521	0.280	2.401	0.279	0.737	0.176	0.614	0.328	1.303	0.354
R ²	0.013		0.017		0.022		0.070		0.080		0.050	

Footnotes: a. wave 1=0, wave 3=1; b. Delay & FLHE+C=0, FLHE=1; c. Delay & FLHE=0, FLHE+C=1; d. Interactions

* $p < .05$; ** $p < .01$; *** $p < .001$

at all sites were shifting, negatively for males and positively for females. However, the positive coefficient for JSS 3 males in FLHE+C schools, together with parallel signs for coefficients at other grade levels suggests that the negative trend for males is counteracted in FLHE+C schools. Thus, male students in FLHE+C schools develop more positive attitudes toward condom use. For female students in JSS 3 there is also a statistically significant positive coefficient in FLHE+C schools. However, this is not supported by results at other school levels, so we have less confidence that female students in FLHE+C schools have improved their attitudes toward condom use. As already presented, in focus group discussions students generally appeared to know that condoms could prevent HIV transmission and in all but one case were also able to debunk several common myths about the ineffectiveness or dangers of condom use. However, both males and females also expressed dislike of condoms or difficulty using them. We could summarize the attitudes related to condom use offered in focus groups as: we don't like condoms and find them difficult to use, but we know they are the only protection we have when we are sexually active.

Table 8 deals with two questions, whether students reported having had sex, and for those who did, whether they had done so in the past 3 months. In this table a positive sign indicates increased odds on abstinence. For males in JSS 1 in the FLHE +C site there is a significant negative result, which, when combined with results for wave suggests that the odds on abstention in these programme schools increased less than they did in the control or delay schools. The signs of other interaction terms for males are mixed, reducing our confidence in this result. For females, on the other hand, all coefficients are positive, implying greater abstention, and three are significant: those for JSS2 and JSS 3 in the FLHE sites, and that for JSS 3, also in the FLHE+C sites. In addition, the non-significant coefficients are also positive. This gives us considerable confidence that both programmes produced increases in abstinence among female students. These results have been graphed in Figure 1.

In these graphs, the logits predicted under our models have been converted to predicted

percentages, controlling for age by setting it to its mean value for each of the school levels. For each level, the percentage reporting virginity rose at about the same rate for the two intervention arms. At JSS 1, by wave 3 the intervention schools had risen to about the level of the control schools. At JSS 2, the rising lines representing the intervention sites both cross the line for the control sites. At JSS 3, the programme sites both clearly rise while the control sites decline.

For more recent sex, there are two significant coefficients. Males in JSS 1 at the FLHE sites are less likely to report sex in the past 3 months with coefficients for the other grade levels in these sites showing the same sign. For females, the coefficient for JSS 3 also shows these students less likely to report recent sex, but coefficients for other grades are in the opposite direction, decreasing confidence in this result.

The results for both ever engaging in sex and recent sex are consistent with what students articulated in focus groups. Jessica Barnett fully explored the scripting of sexuality based on the wave 1 focus group responses³⁸. For both male and female students the focus was on virginity, but for different reasons. Male students spoke of maintaining virginity as undesirable since sexual experience was equated with masculinity and maturity. For males, engaging in sex is necessary. However, sexual activity did not need to be frequent to establish these qualities. As 'men' they controlled whether and how often they continued to engage in sex. Female students spoke of the importance of remaining a virgin. Once virginity was 'lost' they had less control over sexual events. There was no evidence of change in these maturation scripts in the wave 3 focus groups. Table 9 deals with condom use. The questions are applicable only to those who report having sex. For the question 'have you ever used a condom while having sex' there were no statistically significant results associated with a programme effect. For the question 'was a condom used the last time you had sex,' there is only one, which suggests that JSS 1 males at FLHE sites were less likely to have used a condom at last intercourse compared to those in comparison sites. However, the signs for other grade levels are mixed, decreasing confidence in this result. In focus

Table 8: Logistic regression for indicators of sexual behaviour

	Males																	
	Never Engaged in Sexual Intercourse (All Students)									Sexually Experienced Students Did Not Participate in Sex in Past 3 Months								
	JSS 1			JSS 2			JSS 3			JSS 1			JSS 2			JSS 3		
	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.
wave ^a	1.374***	3.94	0.181	0.311	1.36	0.181	0.258	1.30	0.300	0.978	2.66	0.488	0.762*	2.14	0.290	0.315	1.36	0.473
FLHE only ^b	-0.168	0.84	0.360	-0.150	0.86	0.228	-0.462	0.63	0.278	-0.895*	0.41	0.418	-0.560	0.57	0.402	-0.766	0.47	0.382
FIHE + C ^c	0.684**	1.97	0.240	0.230	1.26	0.294	-0.142	0.87	0.270	0.491	1.63	0.394	0.337	1.40	0.357	-0.282	0.76	0.434
wave by FLHE ^d	0.244	1.27	0.418	0.554	1.73	0.306	0.537	1.72	0.430	1.734*	5.64	0.680	0.780	2.18	0.596	0.647	1.92	0.571
wave by FLHE+C ^d	-0.700*	0.50	0.265	0.258	1.30	0.265	-0.054	0.95	0.365	-0.055	0.95	0.586	-0.351	0.70	0.410	0.314	1.36	0.730
constant	0.486		0.296	1.446		0.289	2.750		0.313	-0.305		0.394	0.592		0.306	1.000		0.508

	Females																	
	Never Engaged in Sexual Intercourse (All Students)									Sexually Experienced Students Did Not Participate in Sex in Past 3 Months								
	JSS 1			JSS 2			JSS 3			JSS 1			JSS 2			JSS 3		
	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.
wave ^a	0.966	2.64	0.474	0.339	1.40	0.384	-0.178	0.84	0.246	0.311	1.36	0.672	1.245*	3.49	0.446	-0.499	0.61	0.551
FLHE only ^b	-0.661*	0.52	0.308	-0.675	0.51	0.355	-0.540	0.58	0.325	-0.004	1.00	0.567	0.206	1.23	0.420	-0.644	0.53	0.607
FIHE + C ^c	-0.575	0.57	0.436	-0.422	0.66	0.377	-0.723	0.49	0.402	-0.251	0.78	0.463	-0.223	0.80	0.391	-0.086	0.91	0.670
wave by FLHE ^d	0.613	1.84	0.554	0.973*	2.64	0.379	1.250**	3.49	0.414	-0.588	0.55	0.740	-0.789	0.45	0.794	1.794*	5.99	0.771
wave by FLHE+C ^d	0.796	2.20	0.810	0.863	2.36	0.506	1.100*	3.00	0.421	0.803	2.23	0.730	-0.338	0.71	0.604	0.838	2.32	0.781
constant	1.848		0.360	2.812		0.358	3.821		0.400	0.766		0.515	0.442		0.533	0.946		0.673

Footnotes: a. wave 1=0, wave 3=1; b. Delay & FLHE+C=0, FLHE=1; c. Delay & FLHE=0, FLHE+C=1; d. Interactions
 * $p < .05$; ** $p < .01$; *** $p < .001$

Table 9: Logistic regression for indicators of condom use

Males																		
	Have you ever used a condom when having sex?									The Last Time You Had Sex Was A Condom Used?								
	JSS 1			JSS 2			JSS 3			JSS 1			JSS 2			JSS 3		
	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.
wave ^a	-1.494***	0.23	0.395	-0.370	0.69	0.530	0.233	1.26	0.218	-1.153**	0.32	0.372	-0.636*	0.53	0.305	-0.717**	0.49	0.233
FLHE only ^b	-0.374	0.69	0.330	0.050	1.05	0.371	0.003	1.00	0.304	0.334	1.39	0.452	0.377	1.46	0.199	-0.228	0.79	0.303
FIHE + C ^c	-0.542	0.58	0.363	0.405	1.49	0.469	0.021	1.02	0.251	0.110	1.12	0.300	0.594*	1.80	0.253	-0.069	0.93	0.168
wave by FLHE ^d	0.317	1.38	0.577	-0.043	0.96	0.613	-0.301	0.74	0.380	-1.22*	0.30	0.519	-0.144	0.87	0.349	0.661	1.93	0.354
wave by FLHE+C ^d	0.635	1.88	0.507	0.004	1.00	0.640	0.064	1.06	0.392	-0.698	0.50	0.521	-0.560	0.57	0.403	0.527	1.70	0.351
constant	-1.429		0.330	-2.462		0.323	-1.920		0.475	-0.902		0.347	-2.087		0.411	-1.178		0.484

Females																		
	Have you ever used a condom when having sex?									The Last Time You Had Sex Was A Condom Used?								
	JSS 1			JSS 2			JSS 3			JSS 1			JSS 2			JSS 3		
	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.	Coeff	Adj. OR	s.e.
wave ^a	-1.222	0.30	0.736	-0.358	0.70	0.678	0.058	1.06	0.392	-1.903*	0.15	0.831	-0.235	0.79	1.098	-0.523	0.59	0.358
FLHE only ^b	0.364	1.43	0.567	0.246	1.28	0.627	-0.125	0.89	0.346	0.687	1.99	0.511	-0.004	1.00	0.807	-0.100	0.90	0.496
FIHE + C ^c	0.262	1.30	0.750	0.231	1.26	0.496	0.422	1.52	0.464	1.250	3.49	0.793	0.950	2.59	1.025	-0.062	0.94	0.427
wave by FLHE ^d	0.800	2.23	0.677	-0.561	0.57	0.854	0.191	1.21	0.466	0.768	2.16	0.944	0.063	1.06	0.970	1.137	3.13	0.611
wave by FLHE+C ^d	0.137	1.15	0.871	-0.153	0.86	0.699	-0.545	0.58	0.563	0.399	1.49	1.140	-1.421	0.24	1.271	0.379	1.46	0.443
constant	-2.755		0.805	-2.814		0.525	-2.991		0.600	-2.901		0.741	-2.875		0.825	-1.492		0.600

Footnotes: a. wave 1=0, wave 3=1; b. Delay & FLHE+C=0, FLHE=1; c. Delay & FLHE=0, FLHE+C=1; d. Interactions

* $p < .05$; ** $p < .01$; *** $p < .001$

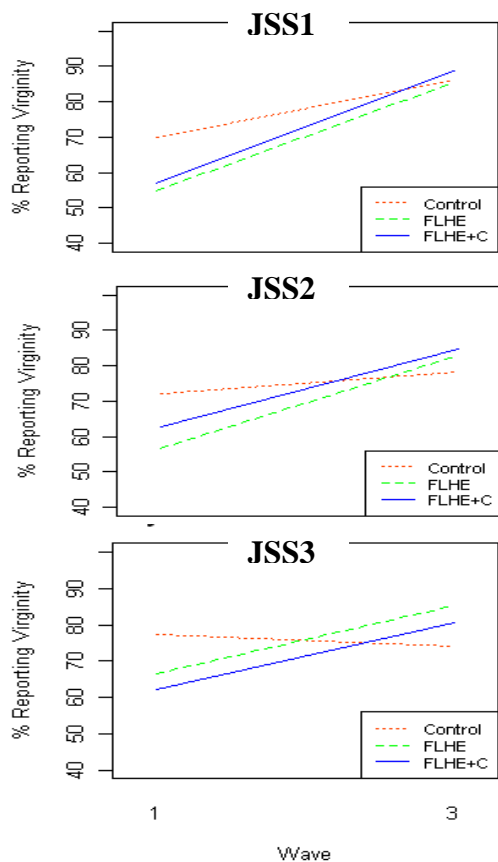


Figure 1: Percentage of girls reporting virginity at three grade levels by wave and research arm

groups, condom use was only mentioned among JSS 3 students – both peer educators and students. In focus group discussions there was evidence of students endorsing myths about condoms, such as “condoms cause HIV,” in only one focus group. In the remained, their view of condoms is reflected in what one young woman said: “condoms keep people safe from HIV, STIs and pregnancy; if one cannot hold themselves, use a condom.” In all schools, students were able to identify at least one teacher who advised them that condoms provide protection against pregnancy and/or disease. Considering both the survey and focus group data it appears that something other than knowledge and attitudes is interfering with condom use among these youth. We considered that the paucity of statistically significant results for three questions -- recent sex, having ever used a condom, and having used a condom at last sex – may have been influenced by the reduced sample

size. As a result, we ran additional regressions for these three questions by gender, with school level included as a variable in the analyses. None of the coefficients for programme effect were significant, suggesting that sample size was not precluding our ability to find a significant relationship, but rather that the programme was not having an impact on these behaviours. Finally, we look at the number of significant results by grade level. Since 40 tests were done at each school level (10 outcomes, each tested for males and females and for two interventions), the 3 significant results at JSS 1 were no more than would have been expected through random fluctuation, but the number of significant results rose with school level, to 4 at JSS 2 and 9 at JSS 3. A test for trend in proportions yields $p = .018$ [$X^2(1df) = 5.60$]. This suggests that length of exposure to the programmes, maturation, or the method or content of programme delivery at different levels of schooling may be an important factor in their influence.

Discussion

Results support the conclusion that the school and community-based programming had positive effects on rejection of myths about HIV transmission (among male students in FLHE+C schools and among females in both FLHE and FLHE+C), improvement in attitudes related to abstinence (among male students in FLHE+C schools) and use of condoms (among male students in FLHE+C schools and potentially among JSS 3 females in the same schools), and in decreasing sexual activity (by decreasing sexual initiation among females in FLHE and FLHE+C schools and by decreasing recent sexual activity among males in FLHE schools). Confidence in these results is supported by both levels of statistical significance and consistency in patterns of results across different levels of schooling. Differences in outcomes both across school levels and for males and females, as well as several unexpected results, and the limitations and strengths of this study require further consideration.

The differences in size and significance of effects over the three school levels, with more significant effects and most often the strongest

effects found for JSS 3 and the weakest for JSS 1 students, has three potential explanations. First is a differential in programme content or delivery across school levels with the programme as delivered in lower levels not sufficient to effect change. Second is that differences in maturation, cognitive or sexual development, or in the circumstances of students at different school levels resulted in different responses to the programme. On average, the age of students increased across the three years of junior secondary school. These differences may very well have influenced responses to the programme. Third is that there is some element of a dose response to the programme. Students in JSS 1 had only been exposed to the programme for 4 months prior to data collection; whereas, students in JSS 2 and 3 were exposed for the same 4 months plus the entire previous school year. Teacher responses to survey questions^{22,36} indicate they felt JSS 1 was the appropriate grade to begin this programme and that these students were 'old enough' for the programme. However, an examination of the schemes of work provided by the Ministry of Education show different content and time allocated to teaching across the three school levels, with the least in JSS 1 and most in JSS 3. Also, analysis of focus group discussions shows a grade-level increase in the independent synthesis of information and formulation of personal responses to questions. At lower grades, talk about HIV, sexuality, and prevention methods, was general and nearly identical in wording across schools and focus groups, as if participants were repeating what they had been told. When asked for examples, the original phrases (e.g. use condoms, abstain from sex) were either repeated or only minimally changed in wording. In higher grade levels the same responses were worded differently by different participants and in different groups and specific examples that could well have reflected personal experience were provided. Several examples for focus groups with JSS 3 students in different schools:

- *Some of my friends who have boyfriends and multiple sex partners have dropped their partners.*

- *My friend who used to sleep in her boyfriend's house has stopped visiting him.*
- *[One of my sisters] was dating a boy and got pregnant. She went ahead to abort the pregnancy. When I told her about abortion and HIV she decided to stay away from the boy and she left the relationship. Since then I have not seen her with boys.*

This suggests potential differences in cognitive or sexual maturation and response to the programme, or potentially a dose response with longer exposure required for students to move to formulation of a personal understanding, response and articulation. It appears that all three explanations – maturity of students, curriculum for each level, and dose response – may have contributed to differences in results over the three school levels.

There were also differences in results for male and female students. For males, there were significant changes supported by consistent patterns across grade levels in six targeted HIV/AIDS related outcomes as well as in two indicators of programme presence in the schools. For females there were only two. Of the six changes among male students, five were for those in the FLHE+C intervention arm, suggesting that the school programme may not have been enough, on its own, to have an impact. For female students, however, both of the outcomes were found for students in FLHE and FLHE+C arms. This suggests that among female students, the school programme had an impact on its own. Besides the difference in the number of outcomes, with the exception of rejecting myths, there were impacts on different outcomes for males and females. Among males in FLHE+C schools there were shifts toward rejecting the idea that they would have sex with someone if they liked them and towards more positive attitudes toward condom use. Among females, there was no shift in attitudes toward having sex with someone if you liked them. In addition, only JSS 3 females in FLHE+C schools showed improved attitudes toward condom use with females in other grades showing a non-significant tendency toward poorer attitudes toward condom use in wave 3 than in wave 1. The

single significant effect on the behaviour of male students was a decrease in their reports of recent (i.e., within the past 3 months) sexual activity in FLHE schools. Although females in JSS 3 showed a similar change, confidence in this result is weak since it is not supported by a similar change in other grades. The single behavioural change for females was in reports of ever engaging in sex among females in both FLHE and FLHE+C schools.

The sex differences in programme awareness and talking to teachers and peer educators appears curious. Why would such results only appear for male students? The explanation may reside in the dynamics of gender for adolescents. Of note is that these results were only evidenced in FLHE+C schools. From the monthly reports produced by the Youth Corps conducting the community programming and student responses to survey questions about the presence and roles played by Youth Corps in their schools, it is apparent that in FLHE+C schools, the Youth Corps trained in HIV/AIDS programme delivery worked not only in communities, but also in schools. This was often at the invitation of school principals. Based on student survey responses and observations of data collection teams, 25 of the 30 schools in this study had Corps teaching in them. In a setting where teachers are in short supply, Youth Corps members are often assigned to schools to teach regular subjects. However, for nine of the ten schools in the FLHE+C arm students identified the Youth Corps members as teaching lessons on HIV and AIDS; whereas no Youth Corps were identified as doing so in FLHE or Delay schools. The other activities that Youth Corps performed in the FLHE+C schools varied but included overseeing the anonymous question box (8 schools), and supervising an AIDS or FLHE club (9 schools). According to students and Youth Corps members, they used participatory techniques such as drama and music (5 schools), and debates (8 schools) as well as discussions in answering questions in the anonymous question boxes (8 schools). These were techniques that teachers rarely reported using^{22, 36}. Clearly, the programming that was taking place in schools in the FLHE+C arm was different from that in the FLHE arm. This may account for the larger

number of changes in outcomes in the FLHE+C compared to the FLHE schools. However, it does not account for the differences between males and females. Nothing in our data helps to explain these. More research is needed to understand how male and female students relate to school programming delivered by teachers or by Youth Corps members.

The second area of sex difference is in attitudinal change. A number of questions were asked to tap into attitudes related to abstaining or engaging in sexual activity. These included questions about perceived readiness for sex, whether one was able to say 'no' to sex, and whether one would have sex with someone if they liked them. Although these questions did not cluster together adequately to be used in a single scalar measure, there was little variation in results. In most cases, no changes occurred that could be related to either school or community programming. The only exception was for responses to the question on having sex with someone if you liked them (Table 6). Agreement with this statement decreased among male students in FLHE+C schools. Given the absence of change in all but one question on abstinence attitudes, it appears that neither the school nor the community programme could be relied on to influence these attitudes. This is supported by discussions in focus groups which did not demonstrate changes in attitudes between waves 1 and 3. In both waves, both male and female students spoke of abstinence as preferred for them and as the officially endorsed norm (e.g. by parents, teachers, religious leaders). However, peer norms and perceived possibilities did not endorse abstinence. In her analysis of sexual scripts articulated by students in wave 1 focus groups, Barnett identified multiple attitudes, norms and interpersonal and social forces influencing youth to become sexually active³⁸. There was no evidence of changes or shifts in these in the wave 3 focus groups. Focus groups did, however, provide some insight into a potential explanation for the change that was found. Males were more likely to describe a script of having sex with someone because you like them or are attracted to them than were females. For females, reasons for engaging in sex were more often related to wanting to keep a boyfriend (not

necessarily because you like him but because a boyfriend provides status, gifts, and some security), or wanting to acquire things from sexual interaction^{37,38}. Female students were also more likely than males to report forced or coerced sex. This suggests that the attitude of having sex because you like someone was not as common among females as among males. These results suggest that attention needs to be paid to differences in how males and females express and experience their sexuality and the implications of these differences for HIV vulnerability.

Results for sexual behaviours were also different for males and females. Fewer females reported initiation of sexual activity following both school and school and community programming. Sexual initiation did not change for males, but fewer reported recent sexual activity following the school programme. These results may relate to sexual roles and the gendered dynamics of sexual activity and also to sample size. In focus group discussions, males described strongly held norms and beliefs that sexual activity was required to prove masculinity and maturity³⁸. Among female students, this was not the case. Virginity was more highly valued by females than males. In addition, maturation and proof of femininity were associated with pregnancy and not with sex per se. However, female students also spoke of the importance of postponing pregnancy to insure school completion. This was accompanied by talk about the fear of becoming pregnant associated with being sexually active. They also spoke positively of peers who were virgins, who did not need to have sex because their school grades were good or their parents provided for their needs. Thus, for male students, initiation of sex is necessary to be seen as 'mature' and 'masculine.' In addition, sexual activity and even a potential resulting pregnancy, does not necessarily pose any threat to their schooling. For female students, there are more reasons to postpone sexual activity. Considering these differences, it may be easier to shift sexual initiation among female than male students.

Contrary to results for sexual initiation, those for recent sexual activity changed for male students, with a decrease in the number of males reporting recent sex. For female students such a

change occurred only for those in JSS 3 (a result in which we have only limited confidence). There are at least two potential explanations for this difference. First, the difference may be related to differences in the scripting of sexuality for males and females. For males, engaging in sex, may mean they have established their maturity and masculinity. If they are concerned with possible infection they may be able to refrain from or decrease sexual activity without threatening their status as mature and masculine. Considering the decrease in the proportion of male students endorsing the attitude of having sex because you like someone, males may even be able to maintain a relationship with a girlfriend and not engage in sexual activity. The absence of change in recent sexual activity among female students other than those in JSS 3 may reflect a lower ability or desire among those in lower grades who are already sexually experienced to reduce sexual activity. There is support for this possibility in focus group data where males and females both speak of male control of the sexual activity that occurs. The ability to counter this control may be weaker for females in lower grades.

Differences between males and females both in responses to HIV prevention programming and in sexual scripts have been found in research elsewhere in sub-Saharan Africa. Evaluations of school and community-based programmes typically report different results by sex^{13, 14, 16}. In addition, multivariate analyses examining factors influencing sexual activity also report different results by sex³⁹⁻⁴⁴. These results suggest that programmes may be more effective if they shift from a generic programme delivered in mixed sex classrooms to include components that address sex- and gender-specific content perhaps delivered in sex-segregated groups.

There were several anomalous or unexpected results that warrant discussion. Among these were the apparent lack of programme impact on factual knowledge related to HIV prevention (i.e., that abstinence, reduction in number of partners, condom use and avoidance of sharing sharps can reduce the risk of HIV transmission). Insight is gained into the absence of effect in an examination of the actual levels of knowledge in different research arms across waves 1 and 3 and in

comparison to rejection of myths (where significant gains were made). There were parallel patterns of scores for knowledge and myths. Both were lowest among students in JSS 1 and rose to highest in JSS3. Both were lower among female than male students. Both improved in all research arms between wave 1 and 3. Neither was significantly different across research arms in wave 1; however, only rejection of myths was different across research arms in wave 3. These results support the conclusion that knowledge-based learning is taking place regardless of whether or not teachers are trained to deliver FLHE in the school or the community programme is present. This is not necessarily surprising. The State Ministry of Education held meetings with parents and teachers across the state to announce the acceptance of FLHE as a regular programme in Junior Secondary Schools and began distributing schemes of work for inclusion of FLHE in the carrier subjects (English, integrated science and social studies) to all schools. At wave 1, before FLHE training, teachers in all schools demonstrated very high levels of knowledge and rejection of myths (mean scores over 90% correct responses). There was also evidence in wave 1 data that some HIV/AIDS related teaching was occurring in all schools. As reported in the paper by Dlamini et al.²² in this volume, in wave 3 teachers trained in FLHE delivery reported significantly more teaching about HIV and AIDS and significantly greater increases in teaching between waves 1 and 3 than those without training. However, the teaching that was taking place in all schools may have been sufficient to produce gains in factual knowledge across research arms. This does not, however, appear to be the case for rejection of myths where gains were significantly greater in schools where teachers were trained in FLHE delivery. This may reflect the nature of myths and of teaching. Myths are common beliefs, espoused and articulated among the general public. They are heard and reinforced in communities and arise out of local beliefs and experiences. Factual knowledge is learned in schools or through external sources such as the media. The role of schools is to impart factual knowledge about an array of topics. It may be that, even without training, teachers

incorporated facts about HIV and AIDS into their teaching, especially once they had been apprised of the Ministry's move to include HIV and AIDS in the school curriculum. Incorporating effective responses to myths may have required training. This explanation has some support from the interviews with teachers^{22, 36, 45} where they spoke of the training as increasing their comfort in teaching about sexuality and HIV/AIDS, in developing their skills in addressing a wider array of topics, and also in addressing their own beliefs and uncertainties. These may very well include their ability to recognize myths, the need to address them, and the skills to do so.

Systematic reviews of interventions¹³⁻¹⁵ have found that while school programming does not always produce improvements in knowledge, this is the most likely change associated with the presence of school-based programmes. Most studies, however, do not separate fact from myth, but include both in a single measure of knowledge. Data collected in this study produced two distinct measures in factor and reliability analysis: one for factual knowledge and another for endorsement or rejection of local myths. This is similar to analysis of data from studies in Kenya^{42, 46} and South Africa^{43, 44}. In both studies endorsement or rejection of myths had a significant influence on risk-related sexual behaviours, and levels of knowledge did not. If the ultimate goal of HIV prevention programming is to change risk-related behaviours, it appears that reducing myth endorsement may be more important than increasing factual knowledge.

Results for condoms as a method to prevent HIV transmission were disappointing. While attitudes toward condoms shifted from wave 1 to 3 for males in FLHE+C schools and potentially for JSS 3 females in the same schools, there were no increases in condom use itself. Of note is that the topic of condoms as a prevention mechanism is not officially included in the FLHE curriculum and teaching about condoms is not endorsed by the Ministry of Education for Junior Secondary Schools. The topic was covered in teacher training to insure that teachers had the necessary knowledge to answer questions asked by students and to dispel the numerous local myths espoused by teachers as well as other community members

supporting the ineffectiveness and dangerousness of condoms. In addition, anonymous question boxes where students could place any question about HIV and AIDS and have these answered in class or in school assemblies, were expected to elicit questions about condoms from students. A similar strategy was used in the programme delivered and evaluated in Kenya. Evaluation of the Kenya programme showed that the use of question boxes was the intervention strategy that had the strongest effect on attitudes and behaviours related to condom use¹¹. Considering these factors, what appears to be the case in this Nigerian study is that in FLHE+C schools Youth Corps members were likely to be present in the schools and using anonymous question boxes, and where male students reported both awareness of programming components in their schools and an increase in talking about sexuality, HIV/AIDS and condoms, there is a positive gain in attitudes toward condoms. However, such gains did not take place without the presence of Youth Corps members, and it only took place for female students in JSS 3. Considered together, these results suggest that the participatory methods used by Youth Corps members are worth considering as potentially important influences on attitudes toward condoms.

Results for condom use were disappointing, but not altogether surprising. Condoms continue to be a difficult topic for school-based programming, with several programmes reviewed by Gallant and Maticka-Tyndale either prohibited from including any content about condoms, or reporting poor implementation of the components of programmes that included condom content¹³. A review of research on condom use in sub-Saharan Africa documented numerous barriers to increasing use and identified few programmes that were able to effect a change⁴⁷. Although condoms were included as a topic in teacher training, the curriculum itself does not include anything about condoms.

There were two statistically significant results that were contrary to the desired direction. Reports of ever engaging in sexual intercourse increased among male JSS 1 students in FLHE+C schools and reports of condom use at last sexual intercourse decreased among the same group of

students in FLHE schools. Neither of these results, however, were supported by a consistent pattern of effects in the higher school grades, decreasing our confidence in them. We can think of no explanation for these results, but note that they are both among JSS 1 males who represent the youngest students, in a school grade with the most limited sexuality content in the curriculum, and students who were exposed to the school programme for only 4 months. Clearly, further research is required to explain these results.

Limitations and Strengths

There are several limitations that must be considered when interpreting the results and drawing conclusions. First, the data used here are all self-report. Research in Tanzania has raised questions about the validity of self-reports of sexual behaviour, especially when these follow an intervention that endorses behaviour change and provides participants with information about behavioural risks⁴⁸. While the validity of self-reported behavioural changes must be viewed with caution, at a minimum they reflect changes in awareness of desired behaviours, something that was not common before the programme and is at least a step towards behaviour change.

A second, fully addressed in the methodology article²⁴ in this volume, is the challenge of participant comprehension of survey questions. Despite data collection procedures designed to increase comprehension, there is uncertainty about how well students understood the questions. We did find considerable inconsistency in responses of students who reported their age as 11 years. Their responses often appeared as outliers or contradicted responses and response patterns of other age groups. We took this as an indication that these students did not adequately comprehend the questions and dropped them from the analyses. As Weiber & Sana⁴⁹ point out, when comprehension is weak and when point-of-administration translation is provided rather than standardized translation, coefficients are most likely to be attenuated, potentially falling short of statistical significance and masking changes that did occur. As a result, we recommend treating the results reported here as a somewhat conservative

indicator of programme effects. The effects may be broader, i.e. present for more outcomes, and/or stronger than we have reported. They are unlikely to be fewer in number or weaker.

A third limitation is posed by our use of a cross-sectional sample. A cross-sectional sample is appropriate for testing programme effects on successive cohorts of students, but not for testing the durability of programme effects on students as they mature. The durability of effects is of particular concern since we do not know for how long the results obtained here will be sustained. This is particularly important with respect to the depressed rate of sexual initiation among female students and the decrease in recent sexual activity among males. Ultimately it is sustained low risk behaviours which are necessary to protect individuals and to lower the incidence of HIV infection. We did collect longitudinal data in this study and anticipated being able to use the longitudinal sample of students who were in JSS 1 at wave 1 and JSS 3 at wave 3 for analysis. However, the total longitudinal sample consisted of a mere 400 students, too small to support the required analyses.

The fourth limitation is the possibility of bias introduced by the absence of blinding. Blinding of schools and of data collection staff was not feasible. Informing all schools of the nature, purpose and procedures of the evaluation was necessary to gaining compliance, especially from control schools. Once schools were aware of their status in the evaluation, it was impossible to fully blind data collection staff.

Finally, it is important to recognize that this evaluation was conducted only in rural communities in one state. The specific conditions of delivery of both the FLHE and the community programming are documented in two reports^{50, 51} to facilitate comparison to programme delivery in other settings. However, we cannot conclude with confidence that deviations from the method of delivery in Edo State, or different contextual situations would produce the same results as reported here.

While considering limitations, it is also important to consider the particular strengths of this study. In reviewing evaluations of school-, community-based and peer led programming^{13, 16,}

¹⁷ Maticka-Tyndale has noted that evaluation research is concentrated in urban areas and easy to reach rural areas. This is the case for the earlier pre-post design evaluation of FLHE which was conducted in Lagos²⁹. This leaves us with little knowledge of how programmes fare in rural regions where the majority of people in SSA live. This evaluation specifically targeted such rural areas for the purpose of evaluating how FLHE, a programme designated for delivery across Nigeria, fared in the types of schools attended by the majority of Nigerian youth. We were able to complete data collection despite difficult field circumstances²⁴. Diagnostic tests of data quality lead to the conclusion that the quality is on par with data collected in larger-scale endeavors such as the Demographic and Health Surveys. The use of multiple forms of data, including transcripts of focus group discussions with youth, in-depth interviews and questionnaires with teachers, field notes of Youth Corps members, and observations of project staff, contributed to interpretation of survey results and provided a rich source of information for triangulation of results, raising our confidence in the results reported here.

Conclusions

As this is the only evaluation to date of the Family Life and HIV Education programme approved for delivery in all Junior Secondary Schools in Nigeria using an experimental design. It combines evaluation of this school-based programme with evaluation of the programme combined with a community-based programme designed to enhance the AIDS Competence of communities and support the changes promoted in the school programme. Programme effects were strongest for youth where there was programming in both their school and their community. In fact, fewer changes reached statistical significance when there were only school programmes. These results are consistent with other research that found that while effecting change with only a school programme is possible, it is difficult. Change appears more likely when work is also done in communities. Because the Youth Corps members delivering community programmes also enhanced the programming being delivered in the schools, the

results also suggest that school programming is likely to benefit from the participatory methods used by the Youth Corps members and/or by the presence of youthful programme leaders. Results also support the conclusion that programmes are likely to have different effects on students at different levels of schooling and for male as compared to female students. Overall, the results of this evaluation lead to the conclusion that the FLHE programme, as delivered in Edo State, produces beneficial outcomes related to student sexual health, but these outcomes are stronger when Youth Corps members are also working to enhance AIDS Competence in the community and school. It leads to two recommendations related to reducing youth vulnerability to HIV. First, the FLHE programme should be supported for delivery in all schools. However, it is advisable to undertake further research and programme development to identify programme content and delivery methods most appropriate for students at different grade levels and for female as compared to male students to increase the impact of this programme. Second, the community-based programme was designed specifically to use local resources, to increase the feasibility of delivery on a wide scale. These are described in greater detail in the article by Omorodion and her colleagues. The most important resource is Nigeria's National Youth Service Corps. The Youth Corps members assigned to HP4RY proved to be highly resourceful, enthusiastic, and dedicated to working with youth and communities on HIV prevention. The training they were provided with could readily be incorporated into the regular NYSC training programme. Schools and local government areas would then have a resource available to enhance delivery of FLHE and to work with communities to enhance AIDS competence.

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