HHS Public Access

Author manuscript

J HIV AIDS. Author manuscript; available in PMC 2019 February 05.

Published in final edited form as:

J HIV AIDS. 2018 ; 4(1): . doi:10.16966/2380-5536.150.

The Development and Evaluation of a National School-based HIV Prevention Intervention for Primary School Children in Kenya

Gary W. Harper[*],
University of Michigan School of Public Health

Augusta Muthigani,
Commission for Education and Religious Education at the Kenya Conference of Catholic Bishops

Leah C. Neubauer,
Northwestern University's Feinberg School of Medicine

David Simiyu,
Commission for Education and Religious Education at the Kenya Conference of Catholic Bishops

Alexandra G. Murphy,
College of Communication at DePaul University

Julius Ruto,
Commission for Education and Religious Education at the Kenya Conference of Catholic Bishops

Katie Suleta, and
Colorado Access Hospital and Health Care.

Paul Muthiani
Commission for Education and Religious Education at the Kenya Conference of Catholic Bishops

Abstract

Primary schools in Kenya provide a promising venue for widespread delivery of HIV prevention interventions. This article describes the development and evaluation of Making Life's Responsible Choices (MLRC), a school-based HIV prevention intervention for primary school children developed through a collaborative global partnership involving multiple community stakeholders. Intervention development was informed by extensive reviews of youth-focused evidence-based HIV prevention interventions, and was rooted in both the Theory of Planned Behavior and Social Cognitive Theory. MLRC includes six modules: 1) self-awareness, 2) human sexuality, 3) healthy relationships, 4) drug/alcohol abuse, 5) HIV/AIDS and other sexually transmitted infections, and 6) behavior change. Class 5 pupils (N=1846; 52.1% girls, 47.9% boys; mean age = 12) attending 46 different Catholic-sponsored public and private primary schools throughout Kenya participated in the evaluation of the intervention program which was delivered in the classroom and occurred over the course of 40 weeks (one academic term). Changes in knowledge and behavioral intentions were assessed using a one-group pre-test post-test experimental design. Pupils completed module-specific assessment measures, and paired samples t-tests were used to compare changes in knowledge and behavioral intentions at the classroom level. Gender-specific analyses were also

[*]Corresponding author: Gary W Harper, PhD, MPH — gwharper@umich.edu.

conducted. All six modules displayed statistically significant positive changes in the mean percentage of knowledge items answered correctly for the full sample, with marginal gender differences revealed. Statistically significant health-promoting changes were seen in 11 of the 18 behavioral intention items (3 per module), with gender differences also revealed. Findings suggest that implementing interventions such as MLRC has the potential to thwart the spread of HIV among youth in Kenya, and equip youth with health-promoting skills. In addition, school-based programs have the potential to become institutionalized in school settings in order to maintain their long-term sustainability.

Keywords

HIV; Kenya; prevention; primary school; children; program evaluation

Introduction

Kenya is one of the countries in Sub-Saharan Africa that has been most impacted by the HIV/AIDS pandemic. Data from the 2013 Kenya AIDS Indicator Survey (KAIS) demonstrated that national HIV prevalence rates among adults (ages 15–64) decreased from 7.2% in the 2007 KAIS to 6.0% in the 2013 KAIS (NASCOP, 2014). The 2013 KAIS also documented continued regional variations in HIV infection rates, as well as higher prevalence rates among women than men (NASCOP, 2014). Although these declines in HIV prevalence rates are encouraging, the 6.0% national prevalence rate still equates to 1.6 million persons living with HIV in Kenya in 2013, representing a major public health concern (NASCOP, 2014).

One way of potentially reducing the HIV epidemic in Kenya is by designing prevention interventions that target youth before they become sexually active. Primary schools in Kenya provide a promising venue for the delivery of such HIV prevention interventions for youth since Kenya's Free Primary Education Policy, which was implemented in January 2003, created the opportunity for children from diverse socioeconomic backgrounds to attend school free of charge. Among children between the ages of 6 and 13 years, enrollment in primary school increased from 87% in 1998 to 94% in 2009, according to the Kenya Demographic and Health Surveys (Kenya National Bureau of Statistics and ICF Macro, 2010; National Council for Population and Development, Kenya Central Bureau of Statistics, and Macro International, 1999). Implementing an HIV prevention intervention in Kenyan primary schools would be one way to ensure that the prevention intervention is delivered in a safe and supportive learning environment for pupils from all regions of the country.

School-Based HIV Prevention Interventions

The delivery of HIV prevention interventions in schools has been found to be an effective strategy for reaching large numbers of youth with age-appropriate HIV prevention messages and skills building activities in sub-Saharan Africa (Gallant & Maticka-Tyndale, 2004; Kawai et al, 2008; Luginaah et al, 2007; Mantell, 2006; Maticka-Tyndale, Mungwete, & Jayeoba 2014; Maticka-Tyndale, 2010; Maticka-Tyndale, Wildish & Gichuru, 2010;

Mavedzenge, Doyle, & Ross 2011; Mkumbo, 2010; Page & Hall, 2009; Paul-Ebhohimhen, Poobalan & van Teijlingen, 2008). For example, in Tanzania Kawai et al (2008) found that communication with teachers about HIV and human sexuality was associated with delayed sexual initiation among pupils. Specifically, in Kenya Maticka-Tyndale, Wildish & Gichuru (2010) found that a school-based HIV prevention intervention had a long-term positive impact on the HIV-related knowledge, attitudes, and behavior of youth for up to three years following their participation in the program.

Paul-Ebhohimhen, Poobalan & van Teijlingen (2008) reviewed school-based sexual health interventions in sub-Saharan Africa and found that there is a great demand for more development of effective school-based sexual health interventions and further evaluation of those already being implemented. Another literature review of school-based HIV prevention programs targeting youth in sub-Saharan Africa was conducted by Gallant & Maticka-Tyndale (2004). They conclude that these school-based interventions should a) target younger children, b) implement the program throughout the entire school curriculum, c) use peer educators as well as teachers, d) utilize participatory activities, e) use a cascade approach to train teachers as widely as possible and f) sustain the program over a prolonged period of time in order to have an impact on HIV-related attitudes and behaviors. Thus, further research and practice is needed on the development, implementation, evaluation, and maintenance of HIV prevention interventions that are fully integrated into school systems in sub-Saharan Africa and other regions of the world most impacted by HIV.

“Making Life’s Responsible Choices” (MLRC)

The aforementioned literature on school-based HIV prevention interventions partially informed the development of the *Making Life’s Responsible Choices* (MLRC) school-based HIV prevention intervention for primary school pupils in Kenya. MLRC is implemented by school teachers who receive MLRC-specific training endorsed by the Teachers Service Commission-Kenya. The MLRC teaching and learning resources for teachers have been approved by the Kenya Institute of Curriculum Development (formerly Kenya Institute of Education), the national body that advises the Kenyan Government on matters pertaining to curriculum development, and evaluates, vets, and approves any local and foreign curricula and curriculum support materials to be utilized in Kenyan primary and secondary schools.

The MLRC program primarily targets pupils in Class 5 (ages 11–12) at Catholic-sponsored public and private schools throughout the country of Kenya. Booster lessons are held for pupils in classes 6, 7 and 8 to affirm the messages learned during the initial program in Class 5. The activities in the MLRC program are designed to be participatory (e.g. role plays, skits, poems, songs), and incorporate both positive traditional African/Kenyan cultural values along with Christian teachings. The participatory pedagogy and student-centered teaching approach was informed by best practices in sub-Saharan Africa (Brodie, Lelliott & Davis, 2002). A nationwide system of training teachers through a Training-of-Trainers (TOT) model ensures that a large number of teachers can be trained throughout the country. Last, the MLRC program is implemented throughout the academic school year, so the key educational and health-promoting messages are reinforced continuously over a prolonged

period of time by teachers. MLRC draws upon evidence-based best practices to ensure the most effective program possible is delivered to Kenyan youth.

The MLRC program focuses on skills building and the development and maintenance of health promoting behaviors that contribute to the prevention of HIV. The intervention is a culturally-derived, theory-informed intervention developed from extensive reviews of youth-focused, evidence-based HIV prevention interventions. The MLRC program was developed utilizing criteria that were found to be essential in successful evidence-based HIV prevention programs for youth. Kirby (2007) conducted an in-depth literature review of evidence-based abstinence, sex, and HIV education programs for youth and studied how various characteristics of these interventions influenced youths' sexual behavior, instances of pregnancy, and cases of sexually transmitted infections (STIs). He concluded by describing 17 key characteristics of effective curriculum-based sex and STD/HIV education programs, all of which were incorporated into the MLRC program.

MLRC is divided into six modules: a) self-awareness, b) human sexuality, c) healthy relationships, d) drug/alcohol abuse, e) HIV/AIDS and other sexually transmitted infections (STIs), f) behavior change (note: since this evaluation, an additional module on Child Safety and Protection has been added). The primary long-term impact goals of the MLRC program are to reduce HIV-related incidence and to reduce HIV/AIDS-related stigma. The secondary goals of the MLRC program are to reduce substance abuse, reduce teenage pregnancies, and to increase school completion and retention rates. The program aims to achieve these goals by increasing HIV/AIDS-related knowledge, improve attitudes around health promotion behaviors, impart healthy living skills and change behavior related to these goals. Specifically, the program aims to increase intentions to a) abstain from sex; b) abstain from drugs/alcohol; c) abstain from gender-based violence, d) increase love, care, and support toward people living with HIV/AIDS; and e) effectively communicate with parents and peers about HIV/AIDS, human sexuality, and drugs/alcohol.

The MLRC program has a focus on encouraging interpersonal communication skills and school/community dialogue about HIV/AIDS and related topics, which are often taboo and not discussed in Kenya (Maticka-Tyndale, Wildish & Gichuru, 2010). MLRC includes a parent component and parent-focused educational materials with the goals of sensitizing parents to the MLRC curriculum and offering training and support for parents/guardians of youth in the MLRC classes to encourage dialogue within families about these sensitive topics. In addition, key messages from the MLRC intervention are reinforced through radio programs that are transmitted on Catholic-sponsored radio stations throughout the country. Schools outside of the radio coverage are provided with compact discs (CDs) that contact audio files of the radio programs.

Theoretical Foundations and Evidence-Based Practice

The MLRC program is theoretically-informed by Social Cognitive Theory (Bandura, 1986) and the Theory of Planned Behavior (Ajzen, 1985; 1991)—two psychological behavior change theories that have been used in an array of HIV prevention interventions globally. Social Cognitive Theory views the adoption of behaviors as a dynamic social process influenced by personal and environmental factors. It posits that human behavior is learned

through experience, or through the modelling of another's behavior. Two primary components of this theory are: 1) modelling of behaviors we see other people perform, and 2) self-efficacy, a person's belief that s/he is capable of performing the new behavior in the proposed situation. This theory has been utilized in health behavior change interventions to help teach new skills, reinforce positive behavior, or discourage unhealthy behavior (e.g., the ability to reduce sexual behavior that places one at risk of HIV infection). The MLRC program focuses on identifying specific HIV-related risk behaviors (e.g., drug/alcohol use, sexual activity) and then promoting the self-efficacy of youth to maintain healthy behaviors or change their behavior in the future. It also involves a number of skills-building activities where youth have the opportunity to learn new HIV prevention skills, and to practice these new skills in an environment where they receive corrective feedback and social support. The skills-building activities focus specifically on areas such as strategies for refusing sexual activity, handling peer pressure, addressing gender inequality, and avoiding circumstances that may lead to engaging in sexual activity.

The Theory of Planned Behavior is premised upon the idea that before behavior change can occur a person must first develop an intention to change their behavior. The intention to behave or change one's behavior is influenced by two primary factors: attitudes about that behavior and perceived subjective norms about the behavior (Ajzen, 1985; 1991). When specifically examining the HIV-related risk behaviors of Kenyan youth it is important to identify the various referent norms that influence youths' attitudes and perceived subjective norms, most notably the attitudes and behaviors of their friends, teachers, parents, and/or other community members. For this reason, the program places a heavy emphasis on the role that peer pressure can play on youths' HIV-related risk and protective behaviors. The program also gives youth the skills necessary to navigate through these influences in order to promote healthy behaviors.

Abstinence-Based HIV Prevention Interventions for Youth

Given the young age of program participants (ages 11–12), the MLRC program promotes HIV prevention through encouraging abstinence from engaging in a range of behaviors that may put one at risk for HIV. Numerous studies in the United States have demonstrated that promoting abstinence in youth can be an effective method for delaying sexual initiation (Jemmott, Jemmott & Fong, 2010) and reducing the likelihood that youth will engage in sex (Masters et al, 2008). Abstinence promotion in HIV prevention programming has been found most effective when specifically targeting an increase in HIV-related knowledge, intentions to abstain from risk behaviors, and improving attitudes about abstaining from risk behaviors (Masters et al., 2008). For instance, Blinn-Pike (1999) found that the most frequent reasons that youth who were abstinent chose to remain abstinent were because of fears about early pregnancy or STIs (including HIV/AIDS). Also, Kniss & Akagi (2008) found that an abstinence-only program that promoted education about HIV knowledge and attitudes was more effective at reducing youth's HIV risk behavior when compared with youth who did not receive any sexuality education. In an earlier study, Botvin et al (1990) found that targeting youth before sexual debut is more effective than targeting older youth who may already have established behaviors.

Studies have not only found abstinence to be a potentially successful approach in the United States, but in countries around the world with relatively high HIV prevalence rates such as Burkina Faso and Cote d'Ivoire (Babalola, Ouedraogo & Vondrasek, 2006), Kenya (Chi & Mishra, 2009; Tenkorang & Maticka-Tyndale, 2008), Nepal (Iriyama et al, 2007), and Tanzania (Njau et al, 2009). Iriyama et al (2007) found that youth in Nepal who received an intervention that increased their perceived susceptibility to HIV infection successfully led to increased intentions to remain abstinent; however, this effect was stronger for youth under the age of 16.

Specifically, in Kenya data from the Kenya Demographic Health Surveys (1993, 1998, and 2003) demonstrate a statistically significantly relationship exists between youth knowing that abstinence can prevent HIV infection and practicing abstinence (Chi & Mishra, 2009). This association is stronger for youth who are in school, and for those who receive programming that is gender sensitive and culturally appropriate (Chi & Mishra, 2009). Additionally, Lillie, Pulerwitz & Curbow (2009) demonstrate a need for increased HIV-related education that promotes abstinence and being faithful in Kenyan primary and secondary schools. In surveying Kenyan pupils (ages 13–19) they found that less than half (48%) fully comprehended abstinence and only 20% fully comprehended being faithful as strategies for reducing HIV-related risk behavior.

While the studies above indicate that abstinence education can be an effective tool for reducing youth's HIV-related risk behaviors, it is important to note that not all abstinence-based approaches are effective (Kirby, 2007). For instance, Parsitau (2009) found that abstinence-only education in Kenya can be ineffective and problematic when it ignores complexities of human sexuality (such as only focusing on morality of sexual behavior, rather than sexual behavior's impact on one's health) or ignores social, economic and political situations that may increase youths' participation in HIV-related risk behavior (such as poverty, gender inequality, and/or political instability). Taken together, the studies discussed demonstrate that when implementers promote abstinence in HIV prevention they should deploy evidence-based practices in order for programs to be most effective. These approaches can include: targeting younger youth before they engage in risk behaviors (Botvin et al., 1990; De Rosa et al, 2010), increasing youths' knowledge that abstinence can prevent HIV transmission (Chi & Mishra, 2009; Lillie, Pulerwitz & Curbow, 2009; Tenkorang & Maticka-Tyndale, 2008), increasing youths' perceived susceptibility to HIV infection (Blinn-Pike, 1999; Iriyama et al, 2007), including activities that build life skills (Njau et al, 2009), and empowering youth to have confidence in their ability to abstain (Babalola, Ouedraogo & Vondrasek, 2006; Dancy, Crittenden & Ning, 2010; Njau et al, 2009; Tenkorang & Maticka-Tyndale, 2008).

The MLRC program incorporates all of these evidence-based approaches to abstinence-focused HIV prevention in schools. There is a strong focus on increasing knowledge about HIV transmission, increasing youths' perceived susceptibility to HIV/AIDS and other STIs, improving youths' attitudes towards abstinence as a way to avoid HIV infection, enhancing youths' ability to resist negative peer pressure, and increasing youths' intentions to engage in health-promoting behaviors. Additionally, the intervention addresses a range of other developmentally appropriate health-related areas that are associated with HIV transmission.

Thus, the six modules of the MLRC program cover a wide range of content, including self-awareness, human sexuality, healthy relationships, drug/alcohol abuse, HIV/AIDS and other sexually transmitted infections, and behavior change.

The purpose of this article is to evaluate the outcomes of *Making Life's Responsible Choices*, a school-based HIV prevention interventions grounded in Social Cognitive Theory and Theory of Planned Behavior, and based on evidence-based practices from prior HIV prevention interventions for youth. Given that the focus population for this intervention is pupils in Class 5 (ages 11–12) attending primary schools in Kenya, the program is abstinence-based and focuses on building knowledge and behavioral intentions that will protect them from acquiring HIV. The program also focuses on enhancing the relationship of the children with their parents/guardians.

Methods

Participants and Schools

The MLRC program targeted Class 5 pupils (N=1846; 52.1% girls, 47.9% boys) in Catholic-sponsored public and private primary throughout Kenya. The Commission for Education and Religious Education within the Kenya Conference of Catholic Bishops (KCCB) administers approximately 30% of all educational institutions in Kenya. For specific age and gender demographic information on each module by assessment period (pre-test vs. post-test) see Table 1. The number of pre-test and post-test measures that were completed by participants varied across both module and assessment period. This was primarily due to fluctuations in enrollment and attendance at the 46 different schools involved in the evaluation, although additional barriers to participation included competing family demands, safety concerns, environmental concerns, and health issues. In addition, since the measures were completed anonymously, there was no way to follow up with youth who missed an assessment. Of the 26 Catholic Dioceses (geographic districts under the supervision of a Bishop) that cover the country of Kenya, MLRC was implemented in schools located within 24 different Dioceses. All pupils in Class 5 of participating KCCB schools are offered the opportunity to participate in MLRC regardless of their faith affiliation.

A representative sample of the schools for the current study was constructed using a multistage sampling method. The primary stage units for sampling consisted of 7 of the 8 administrative provinces in Kenya, excluding the North Eastern Province region which does not implement the MLRC intervention due to safety concerns (note: since this evaluation was conducted the province structure has been replaced with a county governance system). The provinces form an all-inclusive demographic population of the Kenyan people that include a cross-section of individuals representing various ethnic groups, geographic regions (urban and rural), and occupations (pastoralists, farmers, fishermen). The second stage units were the Catholic Dioceses which were selected using simple random sampling procedure in each of the seven administrative provinces. Finally, schools were randomly selected from a sampling frame provided by each Diocese based on those schools that were implementing MLRC at the time of the study. The number of schools from each Diocese was proportionately allocated to ensure adequate representation from the various regions of the country. Due to resource limitations, a total of 46 schools were selected for the final sample,

which was 3% of all schools who were implementing MLRC at the time of the study (total number of schools implementing MLRC = 1541).

Intervention Development and Delivery

The MLRC program was created by members of a collaborative partnership formed between the Commission for Education and Religious Education within the Kenya Conference of Catholic Bishops (KCCB) and faculty/staff members from the largest Catholic university in the United States. An Expert Advisory Board (EAB) was created at the beginning of the intervention development process in order to have an external Kenya-based group to provide expert guidance and direction. The EAB was composed of individuals who represented the following groups: current and retired primary school teachers; head teachers; content experts in education, child development, curriculum design, theology, cultural studies and HIV; and representatives from education-focused governmental agencies such as the Kenya Institute of Curriculum Development (formerly Kenya Institute of Education).

Development of the MLRC HIV prevention intervention was grounded in Social Cognitive Theory (Bandura, 1986) and the Theory of Planned Behavior (Ajzen, 1985; 1991), and was informed by extensive reviews of youth-focused, evidence-based HIV prevention interventions. The intervention was developed utilizing Kirby's (2007) 17 key characteristics of effective curriculum-based human sexuality and STI/HIV education programs for youth. Given the young age of our focus population of youth in Class 5 primary school, development of the MLRC program also incorporated key elements from evidence-based approaches to abstinence-focused HIV prevention. In addition to these theoretical and technical considerations, we assured that the content of the curriculum was both developmentally and culturally appropriate for pupils in Class 5 across all regions of Kenya. Developmental considerations were addressed through assuring that concepts and activities were not too cognitively advanced for 11 to12 year-old children. Cultural and religious considerations were addressed through the incorporation of both traditional African/Kenyan cultural values and Christian teachings. This included the incorporation of culturally-relevant concepts and values into the intervention content and activities, as well as the inclusion of culturally-specific songs, skits, and role-plays. Christian teachings were primarily addressed through the inclusion of relevant Bible verses which served to reinforce key HIV prevention messages.

After the initial curriculum was developed, the MLRC program was pilot tested in Catholic-sponsored primary schools throughout various regions of Kenya that represented both rural and urban settings. These schools included private and public schools, as well as boarding schools, day schools, and mixed boarding/day schools. During this pilot phase, members of the collaborative partnership and members of the EAB made site visits to implementing schools to conduct observations and to meet with head teachers, teachers, and parents to discuss implementation practices, successes and challenges. Various forms of qualitative and quantitative process evaluation data (e.g., surveys, classroom observation logs, field notes, interviews, focus groups) were collected during this formative stage in 15 of the 25 KCCB Dioceses, and these data helped to improve both the content of the MLRC intervention as well as the implementation procedures that were used to deliver the intervention in diverse

school-based settings. Following the refinement of the intervention based on these initial pilot trials, MLRC was later expanded to 24 of the 25 KCCB dioceses.

The MLRC program is implemented across an entire academic school year (40 weeks), with one or more of the 51 sessions delivered once per week. Each session is typically 40 minutes long, and is delivered in a classroom setting with a maximum teacher to pupil ratio of 25 students per 1 teacher. In settings where the pupil to teacher ratio exceeds 25:1, the class is broken into two or more sections for the purposes of MLRC delivery or additional teachers join for program delivery. The MLRC Teacher's Guide gives the stated duration and plan for each session in each of the six modules. Delivery of the MLRC curriculum must be done in accordance with the "MLRC Core Elements" which outline for teachers how the curriculum should be implemented across the academic school year (see Appendix A). The scheduling of sessions can vary from one classroom to another, including before/after school, over the lunch hour, or in some cases as part of the school timetable.

Teachers are given specific instructions on how to engage learners and actively encourage their participation in the MLRC curriculum activities. Specific activities include active and interactive methods such as didactic lectures, small group discussion, large group discussion, role plays, case studies, booklets, songs, radio programs, dances, "take home" assignments, and others. MLRC also utilizes classroom demonstrations whereby MLRC teachers and/or participating pupils demonstrate some of the life skills according to the sessions. These are done through role plays, skits, or reading and discussing stories. Teachers prepare schemes of work and lesson plans before delivering the lesson, and they also keep a register of attendance for pupils.

All of the necessary materials for the MLRC program are distributed to schools through the Arch/Dioceses Education offices. All teachers receive a copy of the MLRC Teacher's Guide, MLRC Teaching Posters, and the Training of the Facilitator Manual. Pupils receive at least an MLRC Pupil's Booklet, but schools are also given a number of more extensive Pupil's Books which are sometimes shared in the classroom depending on the size of the school. Parents/guardians of pupils in Class 5 are sensitized on the objectives of the intervention as well as taken through the content of the program before teaching commences. After parents/guardians participate in a sensitization meeting, they and/or the pupil may opt out of the MLRC program. All parents/guardians of pupils receive MLRC Parent's Booklets and MLRC Parent's Memos whenever a new module is taught.

Intervention Monitoring and Fidelity

The MLRC program has a robust monitoring plan in place to track implementation and also improve quality. A monthly monitoring form is completed by each MLRC teacher and endorsed by the head teacher of implementing schools and sent to the KCCB national office where data are aggregated and compiled into quarterly reports to funding agencies. These monitoring forms also provide teachers an opportunity to document successes and challenges with the program, and to solicit feedback to be shared with the KCCB national office. In addition, the KCCB national team and local KCCB Diocesan teams conduct monthly site visits to participating schools (on a rotating schedule) to monitor teacher fidelity to the curriculum. During site visits, team members observe MLRC being delivered

in the classroom setting, and complete an intervention fidelity checklist. Site visit reports are generated based on classroom observations and other data collected during the visit, and these reports are submitted to funders and to the schools for continuous improvement and quality assurance.

Evaluation Design

The goal of the current evaluation was to evaluate changes in knowledge and behavioral intentions as a result of participating in the MLRC. A one-group pre-test post-test experimental design was utilized, as the evaluation was conducted as part of the developmental process to create a new educational program designed to be delivered in all Catholic-sponsored primary schools in Kenya. Thus, the addition of an attention placebo control or comparison condition across an additional 46 schools (the number of schools where the intervention was delivered) during this early stage of development was beyond the resources and scope of the current evaluation. Changes in knowledge and behavioral intentions were evaluated at the classroom level as opposed to the individual level, since confidentiality concerns prohibited collection of individually identifying information. Modules were evaluated separately to determine if any particular module would need to be potentially revised or eliminated.

Ethical approval for the targeted evaluation described in this article was obtained from the Kenya Ministry of Education, the Commission for Education and Religious Education within the Kenya Conference of Catholic Bishops, as well as the U.S. collaborating partner's University Institutional Review Board. Since this was an evaluation of an educational program being implemented in Catholic-sponsored primary schools throughout the country of Kenya and students completed pre-and post-test measures that did not include any identifying information for the purpose of program evaluation and improvement, waivers of active parental consent were granted from all ethical review boards. Prior to the introduction of MLRC into any school, parents/guardians of pupils in Class 5 were sensitized on the objectives of the intervention as well as taken through the content of the program. After parents/guardians participated in a sensitization meeting, they and/or the pupil may opt out of the MLRC program. All parents/guardians of pupils received MLRC Parent's Booklets and MLRC Parent's Memos whenever a new module was taught.

Assessment Measures and Analytic Strategy

Pupils completed a brief module-specific pre-test assessment measure at the beginning of each module, as well as a module-specific post-test assessment (with the same items as the pre-test) at the end of each module. Each module-specific pre-test and post-test measure was developed by members of the collaborative partnership, and was constructed to include items that represented the core areas of learning included in each module. Following construction of each measure, they were reviewed by the partnership's EAB, and modified based on this feedback. The measures were then pilot-tested with youth from representative classrooms.

Each module's pre-test/post-test assessment measure included a brief demographic section (gender, teacher, age, class level, name of school, name of Dioceses), followed by ten items

—seven items focused on knowledge, and three items focused on behavioral intentions. Knowledge items included four multiple choice response options, with only one response being the correct response based on the information provided in the module. All items in the behavioral intentions sections were measured on a scale from “Never” (1) to “Always” (4) with “Most of the time” (3) and “Sometimes” (2) in the middle. For statistical analyses, each knowledge item was scored for its correctness, and then a total score was calculated for each participant based on the percentage (%) of the items that were answered correctly. Each attitude, intention and behavior item was evaluated separately using the item-specific 1–4 scale previously described. For most items, a higher score represented a more favorable and health-promoting behavioral intention.

Each of the 6 MLRC modules was evaluated separately. Statistically significant improvements in HIV prevention-related knowledge and behavioral intentions were determined by comparing pupils’ scores on module-specific pre-test assessment measures prior to participating in each MLRC module with their scores on the post-test assessment measure following completion of each module. Paired samples t-tests were used to compare these changes at the classroom level separately for each module. Gender-specific paired samples t-tests were also conducted to see if there were any differential effects of the intervention by gender. Overall sample means for the proportion of items answered correctly on the knowledge items by module were calculated, as well as gender-specific means for the proportion of knowledge items answered correctly. Overall sample means for the attitude, intention, and behavior items were calculated separately, as well as gender-specific means for these items.

Results

For each module, the percentage of the seven content knowledge items that were answered correctly during the pre-test was compared to the percentage of the knowledge items that were answered correctly during the post-test. These comparisons were statistically significant for all six modules in the positive direction (see Table 2 and Figure 1), indicating that students who participated in the intervention demonstrated statistically significant gains in knowledge regarding HIV/AIDS and other related issues.

The percentage of content knowledge items answered correctly on the pre- and post-test assessments within each module were analyzed by gender (see Table 3). Girls demonstrated significant post-test gains in all six modules. Boys demonstrated significant post-test gains in all modules except for Module 3 (Healthy Relationships).

Statistically significant health promoting changes in behavioral intentions were seen in 11 of the 18 items included in the pre-test and post-test assessments (see Table 4). All of the behavioral intention items in Modules 1 (Self Awareness) and 5 (HIV/AIDS and other STIs) demonstrated statistically significant health promoting improvement, with varying numbers of items reaching significance in all other modules except for Module 6 (Behavior Change). The significant findings represent increased intentions to treat others with respect, practice Christian values, participate in family activities, share information regarding risky sexual behavior with friends, relate well with friends, introduce friends to parents, educate friends

on dangers of drugs and alcohol, abstain from drug use, abstain from premarital sex, talk to friends about HIV/AIDS, and be kind to people living with HIV/AIDS.

For the gender-specific analyses of behavioral intentions focused on only the girls, two items in Module 1 (Self Awareness), two items in Module 3 (Healthy Relationships) and one item in Module 5 (HIV/AIDS and Other STIs) reached statistical significance (see Table 5). These significant findings for girls represent increased intentions to treat others with respect, practice Christian values, relate well with friends, introduce friends to parents, and be kind to people living with HIV/AIDS. For boys, only one item in Module 2 (Human Sexuality) and all three items in Module 5 (HIV/AIDS and other STIs) demonstrated statistically significant difference with regard to behavioral intentions. These significant findings for boys represent increased intentions to share information regarding risky sexual behavior with friends, abstain from premarital sex, talk to friends about HIV/AIDS, and be kind to people living with HIV/AIDS.

Discussion

Given that Kenya is one of the countries in Sub-Saharan Africa that has been most impacted by the HIV/AIDS pandemic, it is important to develop HIV prevention interventions to thwart the spread of HIV. The development and delivery of behavioral interventions that target youth before they become sexually active and develop patterns of HIV-related risk behavior s is a promising strategy for slowing the spread of HIV. Primary schools in Kenya provide an ideal venue for the delivery of HIV prevention interventions for youth since Kenya's Free Primary Education Policy created the opportunity for children from diverse socioeconomic backgrounds to attend school free of charge. Delivering such interventions in Kenyan primary schools is one way to ensure that programs are delivered in a safe and supportive learning environment for pupils from all regions of the country.

Making Life's Responsible Choices (MLRC) is a theory-informed school-based HIV prevention intervention for primary school pupils in Kenya implemented by local school teachers. A nationwide system of training teachers through a Train-the-Trainer model ensures that a large number of teachers can be trained throughout the country, creating a sustainable supply of educators to deliver the intervention. Since the MLRC program is implemented throughout the academic school year, the key educational messages are reinforced continuously over a long period of time. The MLRC intervention has become institutionalized in Catholic-sponsored primary schools throughout Kenya, thus assuring long-term sustainability.

Overview of Findings

For the overall sample, all six modules demonstrated statistically significant increases in module-specific knowledge from the pre-test to the post-test assessment. This demonstrates that the pupils participating in the MLRC intervention improved their understanding of the key messages delivered through the intervention for all of the modules. The largest increase in knowledge occurred in Module 2, which was focused on Human Sexuality. The overall sample mean for correct knowledge items was 47.23% at the pre-test assessment, and this increased to 64.8% at the post-test assessment ($p<.001$). Even for the two modules where

participants demonstrated a relatively high level of accurate knowledge (i.e., Healthy Relationships: 74.86% correct; Drug/Alcohol Abuse: 70.40%), the youth still demonstrated statistically significant increases in knowledge (i.e., Healthy Relationships: 79.92% correct; Drug/Alcohol Abuse: 76.97%).

Gender-specific analyses indicated that girls demonstrated statistically significant increases in knowledge on all six modules. Boys, on the other hand, demonstrated statistically significant increases in knowledge on all of the modules except the Healthy Relationships module. Examination of the mean % correct figures for boys illustrates that they started with a higher baseline understanding of content from this module than the girls (77.62% vs. 73.97%), and at the post-test assessment had only slightly higher scores on the knowledge items for this module than the girls (79.92% vs. 79.48%). Even though the boys did demonstrate an overall increase in knowledge related to Healthy Relationship, the change was not strong enough to reach statistical significance.

Examination of the gender-specific means for the percentage of items correct across all modules, demonstrates a consistent pattern of correct responses from both the boys and girls. This indicates that even if differences occurred in the baseline levels of knowledge, both genders increased their level of understanding of the information provided in the intervention. This suggests that even if girls and boys enter the MLRC intervention with different levels of understanding of HIV-related issues due to cultural, community, family, or peer-related factors, the intervention is able to improve that level of knowledge toward a healthier understanding of HIV-related issues.

The results of the behavioral intentions items are more challenging to interpret given that they do not necessarily have a discrete “correct” vs. “incorrect” response. These items were created by the collaborative team and developed to reflect health-promoting behavioral intentions that were reflective of the content in each module. Since they were not developed based on any standardized measures of behavioral intentions, it is difficult to know if they were effectively assessing the desired intentions. There also may have been a ceiling effect for most of these items, some of which may have been driven by social desirability or the age of the participants. Each item was responded to on a 1–4 scale, with 4 being indicative of a greater level of health-related behavioral intentions. The mean scores for the items ranged from 3.11 to 3.80 for the full sample, and between 2.96 and 3.90 for boys and between 3.24 and 4.00 for the girls in the gender-specific samples. The label for a “3” on the scale was “most of the time” and for a “4” was always, but these scores indicate that the youth reported intending to engage in health-promoting behaviors a vast majority of the time.

In Module 1, which was focused on Self Awareness, all three behavioral intention items were significant for the overall sample. In the gender specific analyses, none were significant for the boys, but 2 of the 3 were significant for the girls (only one related to personally participating in positive family activities was not). In Module 2, which was focused on Human Sexuality, the item focused on sharing information about risky sexual behavior with friends was significant for the combined sample and for the boys. None of these items were significant for the girls, although all but the one related to abstaining from

sexual behavior showed an increase. This item was high at baseline (3.80) and decreased slightly (3.69) for girls. Module 3, which was focused on Healthy Relationships, demonstrated significant differences for the overall sample on items related to relating well with friends and introducing friends to parents, and these items were also specific for girls in the gender-specific analyses. One item in this section related to choosing friends wisely was not significant for any of the analyses, but the baseline levels of this items were high for both boys (3.75) and girls (3.85).

In Module 4, which focused on Drug/Alcohol Abuse, there were two items that were significant for the full sample (one related to making friends aware of the dangers of drugs and alcohol and the other related to using drugs because of peer pressure), and neither of these was significant in the gender specific analyses. The item related to abstaining from using illegal drugs and alcohol was not significant for either the full sample or the gender specific samples, but the means were all 3.61 or higher and did not fluctuate much. For Module 5, which was focused on HIV/AIDS and Other STIs, all three items (i.e., abstaining from premarital sex, talking to friends about HIV/AIDS, and being kind to people living with HIV) were significant with the overall sample. These items were all significant for the boys too, and the only one significant for girls was being kind to people living with HIV. For the girls, the other two items did demonstrate a non-statistically significant increase, but they started at 3.7 (talking to friends) and 3.70 (abstaining). In Module 6, which was focused on Behavior Change, none of these items produced statistically significant changes for the overall sample or for the gender-specific analyses. The baseline levels were high for the gender specific analyses (boys= 3.70–3.84; girls=3.75–4.00) so this may have played a role.

Examination of the pattern of statistically significant pre-/post-test differences for the gender-specific analyses of the behavioral intention items demonstrated more variability than that seen with the knowledge items. Although this variability may be related to socio-cultural factors, it also may be related to the fact that behavioral intention analyses were conducted on single items as opposed to the 7-item knowledge scores.

Girls and boys both demonstrated statistical significance on only one item related to being kind to people living with HIV and AIDS. Girls demonstrated significant increases in behavioral intentions related to self-awareness and healthy relationships, with their specific intention items primarily focused on kind and respectful relationships with other people. Conversely, boys demonstrated significant increases in behavioral intentions related to human sexuality and HIV/AIDS and other STIs, with specific intention items focused on sharing HIV-related information with others, and abstaining from premarital sex. These gender differences may be related to differences in gender role socialization, as qualitative research in secondary schools in Kenya has demonstrated that girls are more likely to be socialized to care for and build relationships with others, whereas boys are socialized to restrict emotion and focus on completing tasks (Kangethe & Lyria, 2014).

Implications of Findings

These findings suggest that the MLRC school-based HIV prevention intervention is able to increase HIV-related risk reduction knowledge and to shift behavioral intentions to be more in line with a health-promoting focus among primary school children throughout various

geographic regions of Kenya. In addition to teaching pupils traditional information regarding modes of HIV and other STI transmission and risk reduction strategies, the intervention addressed a range of content areas related to helping primary school aged children make healthy decisions that will hopefully decrease their risk of HIV infection, including self-awareness, human sexuality, healthy relationships with peers, drug and alcohol abuse, and behavior change strategies.

Students entered the intervention having the least amount of information and facts about general human sexuality and this is the area where we saw the greatest gains in knowledge acquisition. It is important for young people to have accurate information about human sexuality in upper primary school, so they can better understand their bodies and emerging sexuality as they enter and progress through puberty. In addition, since this program is delivered prior to the sexual debut of most youth in the program, pupils can be more prepared to deal with unwelcome advances from those who may use the young person's lack of knowledge about their body and/or human sexuality in general to engage in coercive sexual behavior. This is important information for both boys and girls (both of whom demonstrated significant increases in knowledge) during this time period, especially since gender differences in timing of puberty occur and thus may impact bodily changes and sexually-related feelings. By having more accurate information and a safe place to explore issues of human sexuality in the classroom setting through engaging activities and an informed teacher, young people who complete the MLRC program will be able to make healthier choices about their own sexuality.

Several of the behavioral intention items that demonstrated significant positive increases were related to interactions with friends, and the sharing of health-promoting information with friends. For example, pupils were more likely to endorse stronger support for sharing information with friends about unacceptable sexual behavior, making friends aware of the dangers of drugs and alcohol, and talking to friends about HIV/AIDS following participation in the intervention as opposed to prior to the intervention. In addition, participants reported being able to resist peer pressure related to substance use better after the intervention, as they reported being less likely to use drugs because of peer pressure. In addition, there were also increases in pupils' desire to relate better with their friends and to introduce their friends to their parents following the intervention. Better relationships with peers during this important developmental stage can help to provide health promoting support for youth, and increased knowledge of youths' friends can improve parents' ability to better monitor their child—a factor that has been linked with improved health outcomes for youth (Rai, Stanton, Wu, Li, Galbraith Cottrell et al., 2003; VanRyzin, Johnson, Leve, & Kim, 2011; Wang, Deveaux, Marshall, Chen, & Stanton, 2014; Yang, Stanton, Li, Cottrel, Galbraith, & Kaljee, 2007).

All of the behavioral intention items in the HIV/AIDS and Other STIs modules demonstrated health-promoting increases for the overall sample. Following participation in the intervention youth reported that they will commit to abstaining from premarital sex, talk to friends about HIV/AIDS, and be kind to people living with HIV. This suggests that the intervention was able to encourage pupils to not only strive to engage in health-promoting health behaviors at the individual level, but also to share their newfound HIV and STI

knowledge with others and to show kindness and compassion to people in their community who are living with HIV. This desire to disseminate knowledge to their peers is critical to bringing about school and community-level changes in HIV-related knowledge and behavioral intentions, and the commitment to supporting those who are living with HIV also helps to create more accepting school and community environments where those who are impacted by HIV can feel comfortable receiving the services and support they need. Changing knowledge and behavioral intentions at this early age is important so that these young people can grow up with more accurate, accepting and health promoting perspectives on HIV, thus increasing the likelihood that cultural shifts can occur over time.

Gender differences did emerge in some areas of the evaluation, primarily in the behavioral intention items. Given that boys and girls in primary school will reach puberty at different ages, and are subject to different types of cultural socialization regarding both gender roles and sexuality, it will be important that future interventions address gender-specific needs regarding HIV prevention. This gender-specific attention in HIV prevention efforts is particularly warranted given differences in gender role and sexual socialization in Kenya, as well as gender differences in HIV-related stigma and HIV infection rates (Kangethe & Lyria, 2014; Mugoya, & Ernst, 2014; NASCOP, 2014).

The findings from this evaluation are an indication that a multi-faceted approach to HIV prevention in school-based settings can create a platform for behavior change among youth in Kenya, and thus have promise for schools in other countries most impacted by the HIV pandemic. The MLRC program involved two of the most powerful adult influences on the lives of children—teachers and parents—in promoting health-promoting knowledge and behavioral intentions. Since pupils in Kenya spend approximately eight hours a day in school, teachers have a great opportunity to influence the pupils' health-related behaviors. They also were able to have an influence on pupils' views of people impacted by HIV, thus teachers played a role in promoting acceptance and de-stigmatization. The involvement of parents ensures that healthy messages given in schools are affirmed at home and children are encouraged by parents/guardians to sustain healthy behaviors.

Collectively, these findings highlight the unique and broad-serving role that multi-pronged educational policy can play in advancing HIV prevention efforts and combatting social and structural determinants impacting Kenyan youth. Poverty, gender-based violence and political instability are system-level factors that can be further analyzed and addressed in future studies. KCCB educational programming includes national and organizational policy working in a complementary fashion to create an infrastructure of free primary education with a country-wide mandate to facilitate MLRC in schools. This policy environment creates an arena for schools and teachers to utilize existing resources and expertise to deliver developmentally and culturally appropriate interventions the promote behavior change associated with increased health and well-being.

Strengths and Limitations

A strength of the MLRC program is that it was created by members of a collaborative partnership between the Commission for Education and Religious Education within the Kenya Conference of Catholic Bishops and faculty/staff members from the largest Catholic

university in the United States, with input from an external Kenyan Expert Advisory Board composed of individuals (primarily primary school teachers/administrators) with expertise in education and child development. Development of the MLRC HIV prevention intervention was grounded in psychological theories of behavior changes—Social Cognitive Theory (Bandura, 1986) and the Theory of Planned Behavior (Ajzen, 1985; 1991)—and was informed by extensive reviews of youth-focused, evidence-based HIV prevention interventions. The development of the program adhered to Kirby's (2007) 17 key characteristics of effective curriculum-based sex and STI/HIV education programs for youth, and was both developmentally and culturally appropriate for pupils in Class 5 across all regions of Kenya. Thus the program was "home grown" in the sense that it was developed from the knowledge and experiences of those working with primary school children in Kenya, while still utilizing the latest theoretical and empirical information regarding HIV prevention strategies for this age group.

The delivery format of the MLRC program was a strength as well since it was delivered once a week in the school setting by trained and certified teachers who worked in the school where the program was delivered. The training for teachers included instruction not only on the intervention content, but also on active and interactive learning strategies and methods. This type of teaching approach is not standard practice in many primary schools in Kenya, as the educational system is still heavily influenced by a liberal philosophy-oriented and traditional style of teaching which does not promote active engagement of learners. Since the teachers who deliver the MLRC program participate in a national training endorsed by the Teachers Service Commission-Kenya (TSC), they receive certification that serves as a form of professional development and capacity building for the teachers since they often become more marketable to schools who are looking for teachers with advanced training and education.

The Commission for Education and Religious Education within KCCB provides multiple levels of support to local schools, which is another strength that supports the success and future sustainability of the program. In addition to providing national trainings, they provide guidance and support to the Education Secretaries in each Diocese who have primary responsibility for the coordination of program delivery at each school in their geographic district. The Commission office also provides program materials and technical assistance to assure that each Diocese has the resources needed to implement the program. In addition, the MLRC monitoring system which was previously described provides schools and teachers with an opportunity to document successes and challenges with the program, and to solicit feedback to be shared with the KCCB national office. The site visits assist with monitoring and maintaining fidelity to the curriculum and support continuous improvement and quality assurance.

A strength of our evaluation design was the use of a multistage sampling method that allowed for participation of schools and pupils from all regions of the country where MLRC program is currently being delivered. This allowed for an inclusive demographic population of Kenyan youth who came from families representing various ethnic groups, geographic regions, and occupations. This increases the ability to generalize the findings from this evaluation to the general Kenya population of primary school aged children. In addition, the

use of measures that were developed specifically for this evaluation and pilot-tested with youth from the population of focus is another strength. The brevity of the assessment measures also allowed for them to be administered in the school setting without causing disruption to the traditional school day.

Despite the strengths of the program and evaluation, there were some limitations to the current evaluation. Due to limited resources, only 46 schools were selected for this initial evaluation, which was 3% of all schools who were implementing MLRC at the time of the study (total number of schools implementing MLRC = 1541). Our use of a one-group pre-test post-test experimental design did not allow us to include a comparison or attention-placebo control group, thus we cannot control for any history effects or intervention effects that may have occurred due to the attention and time spent with the youth during the course of the intervention regardless the content of the intervention. Another limitation to the evaluation design was that due to confidentiality issues, individually identifying information could not be included on any of the assessment measures thus changes were evaluated at the classroom level as opposed to the individual level. Another potential limitation is that since this was the first evaluation of the MLRC program, the current evaluation only includes modular specific data and does not include data related to overall pre-/post-intervention changes.

Acknowledgments:

The partnership that completed this work was made possible through the generous support of the American people with funding from the US President's Emergency Plan for AIDS Relief (PEPFAR) and CDC/Kenya. Activities are carried out through a partnership between the Kenya Conference of Catholic Bishops and DePaul University, managed by the American International Health Alliance's HIV/AIDS Twinning Center, which is funded by the US Department of Health and Human Services, Health Resources and Services Administration (HRSA). We wish to acknowledge our Expert Advisory Board for their support and guidance during the development, delivery and evaluation of the intervention. In addition we wish to acknowledge the support of the Commission for Education and Religious Education at the Kenya Conference for Catholic Bishops, as well as the many volunteer hours provided by the Education Secretaries, Head Teachers, Trainers-of-Teachers (TOTs), and MLRC Teachers who were critical in delivering this program in schools throughout Kenya. Finally we acknowledge the children who participated in the program, and their families who supported its implementation.

Appendix A.: Core Elements for the Making Life's Responsible Choices (MLRC) Program

While administrators and teachers are encouraged to localize the MLRC Program to meet the unique needs and cultures of each school and community, the following "Core Elements" are the essential components required for the Program to be implemented effectively. Therefore, the "Core Elements" cannot be changed or altered.

1. The MLRC Program must target children in Class 5 in the school implementing MLRC with a focus on ages 11-14 years old.
2. The MLRC Program must be delivered by a Diocesan trained MLRC volunteer teacher (or other trained volunteers).
3. All teachers/other volunteers delivering the MLRC Program must have the following teaching and learning resources:

   a. MLRC Teacher's Guide
   b. MLRC Pupil's Book / MLRC Pupil's Booklet
   c. MLRC Posters

4. Parents, School Management Committees (SMCs), and school administrators must be sensitized to the MLRC Program prior to implementation.
   a. MLRC Parent Booklets are given to parents/guardians during sensitization.
   b. MLRC Parent Memos/Circulars are distributed to parents/guardians at the beginning of each Module.
5. Implementers must deliver all components of the 6 Modules in Class 5 within one academic year. The MLRC Program must also be taught once a week (for at least 40 minutes) for Class 5.
6. The MLRC Program must be implemented in a classroom with a teacher-to-pupil ratio of not more than 1:25 for all "Skills-Building" activities (these are Sessions #2D, #3F, #4E, #4G, #5D, #5K, #5L, #6A, #6D, and #6F).
7. All pupils participating in the MLRC Program must receive an "MLRC Pupil's Booklet."
8. All pupils participating in the MLRC Program must receive an "MLRC Pupil's Booklet."All teacher-pupil discussions shall remain confidential (however, if a child discloses anything that must be legally-reported then teachers must do so while respecting the child's confidentiality to the fullest extent possible).
9. All pupils participating in the MLRC Program must receive an "MLRC Pupil's Booklet."The instructional approach is "child-centred" and "participatory." The instructional approach will also utilize the "Life Approach."
10. All pupils participating in the MLRC Program must receive an "MLRC Pupil's Booklet."Teachers must adhere to the approach of the Catholic Church when delivering the Program.

References

Ajzen I (1985) From intentions to actions: A theory of planned behavior In Kuhi J & Bechmann J (Eds), Action-Control: From cognition to behavior. (pp. 11–39). Heidelberg: Springer.

Ajzen I (1991) The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50, 179–211.

Babalola S, Ouedraogo D, & Vondrasek C (2006) Motivation for Late Sexual Debut in Côte d'Ivoire and Burkina Faso: A Positive Deviance Inquiry. Journal of HIV/AIDS Prevention in Children & Youth, 7(2), 66–87.

Bandura A (1986) Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, NJ: Prentice-Hall.

Blinn-Pike L (1999) Why Abstinent Adolescents Report They Have Not Had Sex: Understandng Sexually Resilient Youth. Family Relations, 48(3), 295.

Botvin GJ, Baker E, Dusenbury L, Tortu S & Botvin EM (1990) Preventing adolescent drug abuse through a multimodal cognitive-behavior al approach: Results of a 3-year study. Journal of Consulting and Clinical Psychology, 58(1), 437–446. [PubMed: 2212181]

Brodie K, Lelliott A and Davis H, 2002 Form and substance in learner-centred teaching: Teachers' uptake from an in-service programme in South Africa. Teaching and Teacher Education, Vol. 18, pp. 541–559.

Chi C, & Mishra V (2009) Trends in primary and secondary abstinence among Kenyan youth. AIDS Care, 21(7), 881–892. [PubMed: 20024745]

Dancy BL, Crittenden KS, & Ning H (2010) African-American Adolescent Girls' Initiation of Sexual Activity: Survival Analysis. Women's Health Issues, 20(2), 146–155. [PubMed: 20144551]

De Rosa CJ, Ethier KA, Kim DH, Cumberland WG, Afifi AA, Kotlerman J, & … Kerndt PR (2010) Sexual Intercourse and Oral Sex Among Public Middle School Students: Prevalence and Correlates. Perspectives on Sexual & Reproductive Health, 42(3), 197–205. [PubMed: 20887288]

Gallant M & Maticka-Tyndale E (2004) School-based HIV prevention programs for African youth. Social Science & Medicine, 58, 1337–1351. [PubMed: 14759680]

Iriyama S, Nakahara S, Jimba M, Ichikawa M, & Wakai S (2007) AIDS health beliefs and intention for sexual abstinence among male adolescent students in Kathmandu, Nepal: A test of perceived severity and susceptibility. Public Health, 121(1), 64–72. [PubMed: 17166535]

Jemmott JB, Jemmott LS & Fong GT (2010) Efficacy of a theory-based abstinence-only intervention over 24 months: A randomized controlled trial with young adolescents. Archives of Pediatric and Adolescent Medicine, 164(2),152–159.

Kabiru CW & Ezeh A (2007) Factors associated with sexual abstinence among adolescents in four sub-Saharan African countries. African Journal of Reproductive Health, 11(3), 111–132. [PubMed: 19122794]

Kangethe NS, & Lyria KS (2014). The gender socialization question in education: Influence on boys' and girls' academic achievement. European Scientific Journal, 10 (19), 279–294.

Kawai K, Kaaya SF, Kajula L, Mbwambo J, Kilonzo GP, & Fawzi WW (2008) Parents' and teachers' communication about HIV and sex in relation to the timing of sexual initiation among young adolescents in Tanzania. Scandinavian Journal of Public Health, 36(8), 879–888. [PubMed: 19004907]

Kenya National Bureau of Statistics and ICF Macro (2010). Kenya Demographic and Health Survey 2008–09. Calverton, MD: ICF Macro.

Kingree JB & Betz H (2003) Risky sexual behavior in relation to marijuana and alcohol use among African-American, male adolescent detainees and their female partners. Drug and Alcohol Dependence, 72(2), 197–203. [PubMed: 14636975]

Kirby D (2007) Abstinence, Sex, and STD/HIV Education Programs for Teens: Their Impact on Sexual Behavior, Pregnancy, and Sexually Transmitted Disease. Annual Review of Sex Research, 18, 143–177.

Kniss D, & Akagi CG (2008) Sexuality Education and HIV Knowledge, Attitudes, and Behavior s of Young Adults. American Journal of Sexuality Education, 3(4), 355–373.

Lillie T, Pulerwitz J, & Curbow B (2009) Kenyan in-School Youths' Level of Understanding of Abstinence, Being Faithful, and Consistent Condom Use Terms: Implications for HIV-Prevention Programs. Journal of Health Communication, 14(3), 276–292. [PubMed: 19440910]

Luginaah I, Maticka-Tyndale E, Kairi W, Wildish J, & Brouillard-Coyle C (2007) Extending HIV/AIDS-prevention efforts in Kenya: primary schools as community-based organizations. Environment & Planning C: Government & Policy, 25(3), 439–456.

Mahat G, & Scoloveno M (2010) HIV Peer Education: Relationships Between Adolescents' HIV/AIDS Knowledge and Self-Efficacy. Journal of HIV/AIDS & Social Services, 9(4), 371–384.

Mantell J, Harrison A, Hoffman S, Smit J, Stein Z, & Exner T (2006) The Mpondombili Project: Preventing HIV/AIDS and Unintended Pregnancy among Rural South African School-Going Adolescents. Reproductive Health Matters, 14(28), 113–122. [PubMed: 17101429]

Masters N, Beadnell BA, Morrison DM, Hoppe MJ, & Gillmore M (2008) The Opposite of Sex? Adolescents' Thoughts About Abstinence and Sex, and Their Sexual Behavior. Perspectives on Sexual & Reproductive Health, 40(2), 87–93. [PubMed: 18577141]

Maticka-Tyndale E, Mungwete R, & Jayeoba O (2014). Replicating impact of a primary school HIV prevention program: primary school action for better health, Kenya. Health Education Research, 29, 611–623. [PubMed: 23962492]

Maticka-Tyndale E (2010) Sustainability of gains made in a primary school HIV prevention program in Kenya into the secondary school years. Journal of Adolescence, 33(4), 563–573. [PubMed: 19329176]

Maticka-Tyndale E, Wildish J, Gichuru M. (2010) Thirty-month quasi-experimental evaluation follow-up of a national primary school HIV intervention in Kenya. Sex Education: Sexuality, Society and Learning, 10, 113–130.

Mavedzenge SMN, Doyle AM, & Ross DA (2011). HIV prevention in young people in sub-Saharan Africa: a systematic review. Journal of Adolescent Health, 49(6), 568–586. [PubMed: 22098767]

Mkumbo KAK (2010) What Tanzanian young people want to know about sexual health; implications for school-based sex and relationship education. Sex Education, 4, 405–412.

Mugoya GCT, & Ernst K (2014). Gender differences in HIV-related stigma in Kenya. AIDS Care, 26(2), 206–213. [PubMed: 23795954]

National AIDS and STI Control Program [NASCOP] (2014). Kenya AIDS Indicator Survey 2013: Preliminary Report, June 2014. Nairobi, NASCOP, Ministry of Health, Kenya.

National Council for Population and Development, Kenya Central Bureau of Statistics, and Macro International (1999). Kenya Demographic and Health Survey, 1998. Calverton, MD: Macro International.

Njau B, Mtweve S, Manongi R, & Jalipa H (2009) Gender differences in intention to remain a virgin until marriage among school pupils in rural northern Tanzania. African Journal of AIDS Research, 8(2), 157–166. [PubMed: 25875567]

Page RM & Hall CP (2009) Psychosocial distress and alcohol use as factors in adolescent sexual behavior among sub-Saharan African adolescents. Journal of School Health, 79, 369–379. [PubMed: 19630871]

Parsitau D (2009) “Keep Holy Distance and Abstain till He Comes”: Interrogating a Pentecostal Church’s Engagements with HIV/AIDS and the Youth in Kenya. Africa Today, 56(1), 45–64.

Paul-Ebhohimhen VA, Poobalan A, & van Teijlingen ER (2008) A systematic review of school-based sexual health interventions to prevent STI/HIV in sub-Saharan Africa. BMC Public Health, 8, 4 [PubMed: 18179703]

Rai AA, Stanton B, Wu Y, Li X, Galbraith J, Cottrell L, Pack R, Harris C, D’Alessandri D, & Burns J (2003). Relative influences of perceived parental monitoring and perceived peer involvement on adolescent risk behaviors: An analysis of six cross-sectional data sets. Journal of Adolescent Health 33(2), 108–118. [PubMed: 12890602]

Raj A, Decker MR, Murray JE, & Silverman JG (2007) Gender differences in associations between exposure to school HIV education and protective sexual behavior s and sexually transmitted disease/HIV diagnosis among high school students. Sex Education, 7(2), 191–199.

Tenkorang E, & Maticka-Tyndale E (2008) Factors Influencing the Timing of First Sexual Intercourse Among Young People in Nyanza, Kenya. International Family Planning Perspectives, 34(4), 177–188. [PubMed: 19201678]

VanRyzin MJ, Johson AB, Leve LD, & Kim HK (2011). The number of sexual partners and health-risking sexual behavior: prediction from high school entry to high school exit. Archives of Sexual Behavior, 40(5), 939–949. [PubMed: 20703789]

Walcott CM, Meyers AB, & Landau S (2008) Adolescent sexual risk behavior s and school-based sexually transmitted infection/HIV prevention. Psychology in the Schools, 45(1), 39–51.

Wang B, Deveaux L, Li X, Marshall S, Chen X, & Stanton B (2014). The impact of youth, family, peer and neighborhood risk factors on developmental trajectories of risk involvement from early through middle adolescence. Social Science and Medicine, 106, 43–52. [PubMed: 24530616]

Wingood GM & DiClemente RJ (1998) The influence of psychosocial factors, alcohol, drug use on African-American women’s high-risk sexual behavior. American Journal of Preventive Medicine. 15(1), 54–59. [PubMed: 9651639]

Yang H, Stanton B, Li X, Cottrel L, Galbraith J & Kaljee L (2007). Dynamic association between parental monitoring and communication and adolescent risk involvement among African-

American adolescents. Journal of the National Medical Association, 99(5), 517–524. [PubMed: 17534009]

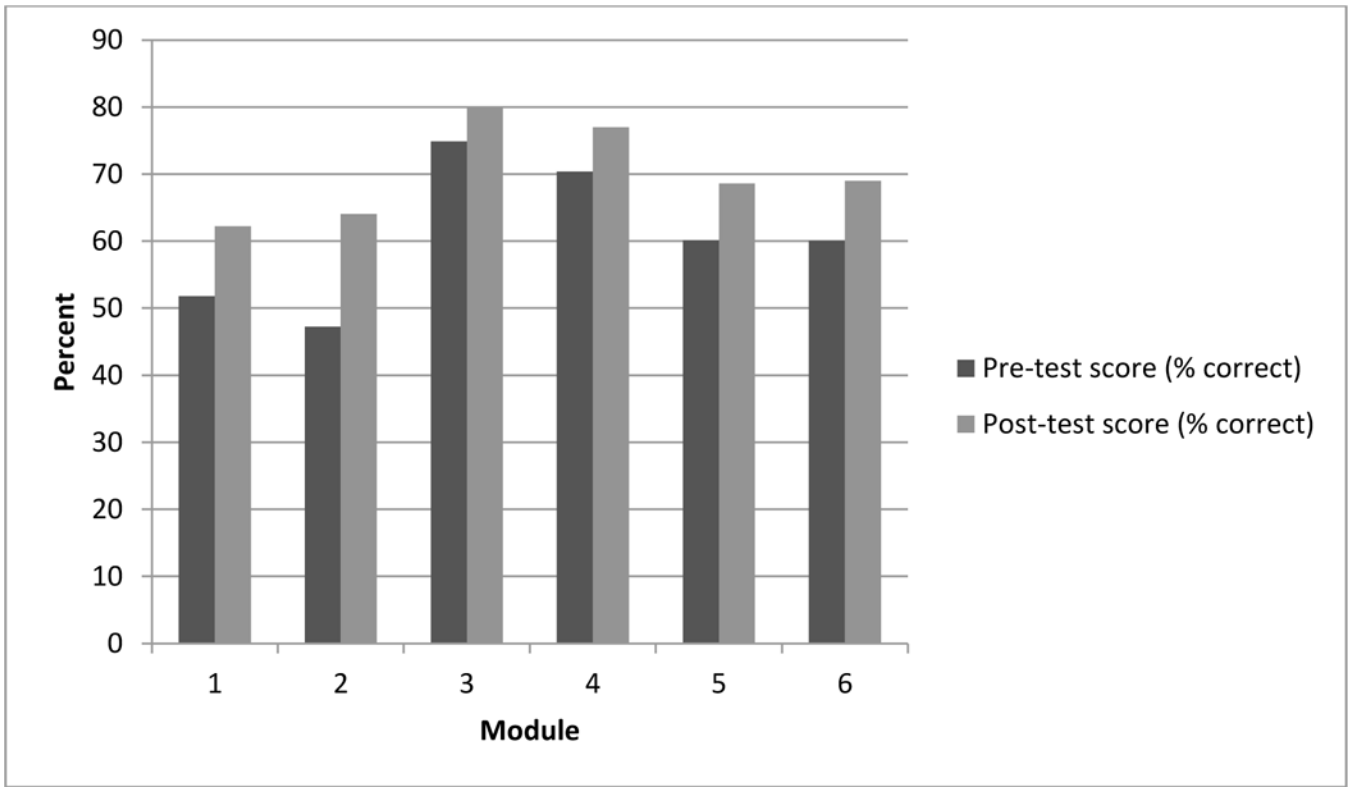

Figure 1.
Overall Sample Means for % of Knowledge Items Answered Correctly on Pre-/Post-Tests by Module

Table 1.

Demographics for Participants by Module and Assessment Period

Module	Pre-test n (% of total N)	Post-Test n (% of total N)	Gender				Mean Age (SD)	
			Pre-test		Post-test		Pre-test	Post-test
			Boys (%)	Girls (%)	Boys (%)	Girls (%)		
1	1312 (71.1%)	1270 (68.8%)	523 (39.9%)	789 (60.1%)	507 (39.9%)	763 (60.1%)	11.94 (.64)	12.01 (.77)
2	1846 (100%)	1774 (96.1%)	884 (47.9%)	962 (52.1%)	847 (47.7%)	927 (52.3%)	12.01 (.72)	11.98 (.70)
3	1615 (87.5%)	1643 (89.0%)	725 (44.9%)	890 (55.1%)	709 (43.2%)	934 (56.8%)	12.52 (.71)	12.50 (.65)
4	1782 (96.5%)	1654 (89.6%)	812 (45.6%)	970 (54.4%)	779 (47.2%)	873 (52.8%)	12.61 (.98)	12.53 (.84)
5	1472 (79.7%)	1484 (80.4%)	697 (47.4%)	775 (52.6%)	674 (45.4%)	809 (54.6%)	12.58 (.67)	12.63 (.79)
6	1609 (87.2%)	1341 (72.6%)	772 (48%)	836 (52%)	570 (42.5%)	771 (57.5%)	12.61 (.81)	12.74 (.77)

Table 2.

Overall Sample Means for % of Knowledge Items Answered Correctly on Pre-/Post-Tests by Module

Module	Pre-test mean % correct	Post-test mean % correct
1. Self-Awareness	51.78	62.24**
2. Human Sexuality	47.23	64.08**
3.Healthy Relationships	74.86	79.92**
4. Drug/alcohol Abuse	70.40	76.97**
5. HIV/AIDS and other STIs	60.11	68.59**
6. Behavior Change	60.04	68.99**

** All changes were statistically significant at the $p<.001$ level.

Table 3.

Gender-Specific Sample Means for % of Knowledge Items Answered Correctly on Pre-/Post-Tests by Module

	Boys		Girls	
Module	**Pre-test Mean % correct**	**Post-test Mean % correct**	**Pre-test Mean % correct**	**Post-test Mean % correct**
1. Self-awareness	49.84	58.45**	54.29	64.23**
2. Human sexuality	49.43	63.22**	48.57	64.61**
3. Healthy relationships	77.62	79.92	73.97	79.48**
4. Drug/alcohol abuse	75.01	79.16**	69.12	73.43**
5. HIV/AIDS & other STIs	61.38	69.53**	60.67	68.02**
6. Behaviour change	61.92	72.77**	59.67	66.37**

** Indicates statistically significant change at the p<.001 level

* Indicates statistically significant change at the p<.01 level

Table 4.

Changes in Health-Promoting Behavioral Intention Items by Module

Item	Pre-test Mean	Post-test mean
1. I will treat others the way that I would like them to treat me. (M1)	3.34	3.52***
2. I will practice Christian values in my daily life. (M1)	3.56	3.70***
3. I will personally participate in positive family activities. (M1)	3.11	3.33***
4. I will respect members of the opposite sex. (M2)	3.46	3.35
5. I will abstain from sexual behavior. (M2)	3.66	3.66
6. I will share with my friends what I know about unacceptable sexual behaviour. (M2)	3.35	3.52**
7. I will relate well with my friends. (M3)	3.72	3.79***
8. I will introduce my friends to my parents. (M3)	3.47	3.58***
9. I will choose my friends wisely. (M3)	3.78	3.77
10. I will abstain from using illegal drugs and alcohol. (M4)	3.66	3.65
11. I will make my friends aware of the dangers of drugs and alcohol. (M4)	3.61	3.73***
12. +I will use drugs because my peers pressure me to do so. (M4)	3.62	3.72***
13. I will abstain from pre-marital sex. (M5)	3.71	3.82***
14. I will talk to my friends about how to prevent HIV and AIDS. (M5)	3.71	3.80***
15. I will be kind to people living with HIV and AIDS. (M5)	3.72	3.79*
16. I will abstain from all kinds of risky behaviour. (M6)	3.90	3.89
17. I will talk to my friends about the importance of abstinence. (M6)	3.82	3.80
18. I will talk about my problems with a responsible adult. (M6)	3.70	3.69

Note. M# indicates the module being assessed with the item.

+Indicates reverse coded with 1=Always and 4=Never

***Indicates statistical significance at the p<.001 level

**Indicate statistical significance at the p<.01 level

*Indicates statistical significance at the p<.05 level

Table 5.

Changes in Health-Promoting Behavioral Intention Items by Gender and Module

	Boys		Girls	
Item	**Pre-test mean**	**Post-test mean**	**Pre-test mean**	**Post-test mean**
I will treat others the way that I would like them to treat me. (M1)	3.36	3.44	3.40	3.57**
I will practice Christian values in my daily life. (M1)	3.51	3.60	3.56	3.74***
I will personally participate in positive family activities. (M1)	2.96	3.14	3.28	3.36
I will respect members of the opposite sex. (M2)	3.42	3.49	3.24	3.46
I will abstain from sexual behaviour. (M2)	3.52	3.62	3.80	3.69
I will share with my friends what I know about unacceptable sexual behavior. (M2)	3.30	3.48**	3.53	3.58
I will relate well with my friends. (M3)	3.68	3.71	3.70	3.82*
I will introduce my friends to my parents. (M3)	3.41	3.45	3.41	3.65***
I will choose my friends wisely. (M3)	3.75	3.65	3.85	3.69
I will abstain from using illegal drugs and alcohol. (M4)	3.67	3.61	3.65	3.69
I will make my friends aware of the dangers of drugs and alcohol. (M4)	3.67	3.74	3.67	3.69
+I will use drugs because my friends pressure me to do so. (M4)	3.73	3.78	3.60	3.59
I will abstain from pre-marital sex. (M5)	3.73	3.92***	3.70	3.79
I will talk to my friends about how to prevent HIV and AIDS. (M5)	3.64	3.88***	3.74	3.80
I will be kind to people with HIV and AIDS. (M5)	3.76	3.90**	3.64	3.82***
I will abstain from all kinds of risky behaviour. (M6)	3.81	3.85	4.00	3.84
I will talk to my friends about the importance of abstinence. (M6)	3.84	3.80	3.88	3.69
I will talk about my problems with a responsible adult. (M6)	3.70	3.65	3.75	3.69

Note: M# indicates the module being assessed with the item

+Indicates reverse coded with 1=Always and 4=Never

***Indicates statistical significance at the p<.001 level

**Indicate statistical significance at the p<.01 level

*Indicates statistical significance at the p<.05 level