Original Contribution

ABSTRACT

Background: The pervasive spread of HIV/AIDS in Africa necessitates development of social and behavioral interventions to impact sexual behaviors. The primary research objective was to determine if the Stay Alive program was effective in reducing sexual activity amongst the participants. The study’s secondary objective was to determine if students successfully learned target concepts taught by the Stay Alive program.

Methods: Pregnancy rates were compared among 14,916 students from 52 Kenyan schools using a randomized, wait-list controlled, pre-post experimental design. Additionally, 957 children were randomly selected for more in-depth, mixed-methods, pre-post testing and interviewing to determine if students successfully learned Stay Alive program concepts. Data was collected during a year-long study that began in Fall of 2014.

Results: The program was effective in reducing sexual activity as evidenced by a 67% reduction in pregnancy rates. The odds of a girl becoming pregnant after being taught the Stay Alive program was approximately one-third the odds of a girl becoming pregnant while on the waiting list (OR = 0.3549; 95%CI = 0.2712, 0.4644). After participating in the Stay Alive program, there was a 90% drop in the odds that a child believed he or she would die of HIV/AIDS, even though the level of belief that one would contract the disease did not change significantly. There was no significant shift in male students beliefs regarding the right of women to refuse male sexual advances (p = 0.066). Female students, on the other hand, significantly increased in their belief that their responses to advances would impact the future happiness of their families (OR = 2.08, p <0.001) and that, as a result, they had the right or need to reject those advances in order to protect their families (OR = 2.25, p <0.001).

Conclusions: Social and behavioral interventions can play an important role in battling HIV/AIDS in Africa.

Keywords:
- HIV/AIDS
- Prevention Program
- Outcome Evaluation
- Pregnancy Rates
- Stay Alive
- Kenya
- Africa

INTRODUCTION

Kenya has moved toward universal primary education and the provision of HIV prevention information to students in the later primary school grades. Previous studies have suggested that education prior to age 15 is necessary to prevent HIV due to early sexual activity and marriage (often occurring as young as age 12 in females) [1]. Therefore, appropriate HIV prevention information is necessary to assist youth before they become sexually active.

Gender Disparity in HIV/AIDS Infection Rates

The families and communities of sub-Saharan Africa continue to be decimated by the HIV/AIDS pandemic. For example, nine countries in the Eastern and Southern regions of sub-Saharan Africa - South Africa, Kenya, Mozambique, Tanzania, Zambia, Ethiopia, Malawi, Uganda and Swaziland - are the epicenter of the global epidemic, accounting for over half of the new HIV infections globally each year [2]. In seeking to determine the factors behind the high infection rates in sub-Saharan Africa, epidemiologists have found that young women and girls, ages 13 to 24 years, are particularly at higher risk for infection [3,4]. In Kenya, for example, young women are 5.5 times more likely to become infected with HIV than young men of the same age [5]. In addition, young women are experiencing a prevalence rate three to four times higher than young men, with 75% of all infections amongst young people, ages 15 to 24 years, occurring among young females [6]. This finding has led Elizabeth Pisani [7], an epidemiologist and consultant to the United Nations Program on AIDS (UNAIDS), to declare, “If we can stop the spread of HIV amongst women and girls in southern Africa, we can turn the epidemic around” (p. 27).

Need For Gender Specific Interventions

Because of the recognized disparity in impact of the HIV/AIDS pandemic between the two genders, particularly in Africa, both the United Nations (UN) and the World Health Organization (WHO) have long recognized the need to develop specific programs and interventions focused on the needs of young women and girls. As Kofi Annan [8], the then United Nations Secretary-General, stated in 2001:

“We must make sure that girls - who run a particular risk of infection - have all the skills, the services, and the self-confidence to protect themselves. Across all levels of society, we need to see a deep social revolution that transforms relationships between women and men, so that women will be able to take greater control of their lives - financially as well as physically. And we must encourage men to replace risk-taking behavior with taking responsibility.”

In further clarifying the problem, the UN Secretary General's Task Force on Women, Girls and HIV/AIDS in Southern Africa [9] reported:

“... gender inequality fuels HIV infection because many women and girls cannot negotiate safer sex or turn down unwanted sex. The findings also demonstrate that HIV/AIDS deepens and exacerbates women’s poverty and inequality because it requires them to do more domestic labor as they care for the sick, the dying and the orphaned” (p. 5).

Beginning in 2004, the UN Secretary General's Task Force subsequently attempted to specify “key actions” that were needed to address the infection rate disparity affecting women. Despite these efforts, young women and girls have nevertheless continued to suffer disproportionately in sub-Saharan Africa. In an effort to better understand why young women and girls in southern Africa are so vulnerable to HIV infection, a technical meeting was subsequently convened in June 2008 under the sponsorship of the Joint UNAIDS and the Reproductive Health and HIV Research Unit of the University of Witwatersrand in South Africa. Several key conclusions and actions were identified to address the gender disparity in HIV/AIDS infections rates. Specifically, in order to effectively address the underlying factors leading to the exceptionally high infection rates amongst young women in sub-Saharan African, the meeting experts [3] concluded that, “an aggressive movement for social transformation is required” (p. S2). Additionally, the technical expert’s first recommendation was:
“... the mobilization of communities for HIV prevention, with strong male involvement, to design relevant strategies and messages about the cause, consequences of, and solutions to young women and girls’ vulnerability. These must focus on reduction of concurrency of sexual partners, delaying early sexual debut, and increasing condom use, while raising awareness about and understandings of risk associated with age-disparate, intergenerational, transactional sex and concurrent partnerships. This mobilization should encourage the rejection of cultural practices that are harmful to women and girls and strengthen advocacy for ‘zero tolerance’ for gender-based violence and exploitation in any form” (p. S2).

Need For Culturally-Targeted Behavioral Interventions

There is a general consensus amongst treatment providers and medical researchers that culture is the foundation upon which health behavior is determined [10-13]. In other words, although the goal of HIV/AIDS prevention programs is to reduce risk-taking behaviors amongst individuals, it must also be recognized that such behaviors are part of social interactions that occur within particular cultural contexts. In particular, within any given culture, there are numerous socializing influences that are fundamental to understanding how individual adolescents first develop values regarding sexuality; then decide how and when to become sexually active; and finally whether they will continue to choose to remain sexually active. In describing the influence that culture has upon the effectiveness of HIV/AIDS prevention programs in sub-Saharan Africa, the medical anthropologists Kinsman, Nyanzi, and Pool [14] have stated:

“Sexual activity is to a large extent socially constructed. Any attempt to reduce unwanted teenage pregnancy or STD/HIV infection must therefore have at its core a solid understanding of the social context in which young people’s values toward sex develop, as well as of the influences that contribute to their decisions to participate in or delay sexual activity” (p. 151).

As a result of the influence that culture has upon sexual health behaviors, in 2000, UNAIDS identified culture as one of the five key domains in HIV/AIDS prevention, care and support [15]. The other four contextual domains affecting HIV/AIDS prevention, care and support are: Government Policy, Socioeconomic Status (SES), Gender Relations, and Spirituality. Unfortunately, despite recognizing the impact that culture may have in explaining the disparity between the genders in HIV/AIDS infection rates in sub-Saharan Africa, the vast majority of interventions have been found to focus on addressing the economic, social, and political influences that affect the outcomes of intervention prevention programs [16,17]. This finding has led to the UNAIDS’s Regional Support Team for Eastern and Southern Africa [18] to assert:

“If national HIV prevention strategies are to succeed, countries must understand the character and drivers of their epidemic and focus on proven need through sustained and effective interventions. However, there is often a mismatch between HIV prevention efforts and the actual factors driving new infections. This can lead to significant resources being invested in programmes of limited effect which do not reach those most at risk.”

This study constitutes the findings of the independent research team that examined the effectiveness of the Stay Alive program of behavioral interventions [19]. It should be noted that none of the authors of this study participated in any manner in the development or implementation of the Stay Alive program. The purpose of the evaluation was based upon Bolton and Singers’ recommendation that after interventions are developed and deployed, there needs to be an “experimental evaluation of the effectiveness of culturally specific AIDS prevention programs [20].”

The Stay Alive HIV/AIDS Prevention Program

A number of non-governmental agencies (NGO’s), as well as various Kenyan government programs, currently provide, throughout the country, a variety of HIV/AIDS prevention
education programs to which all citizens are exposed. However, according to Kenyan officials, prior to the development of the Stay Alive program, none of these interventions were targeted specifically for 8- to 14-year-olds, who are yet to become sexually active. The goal of the Stay Alive program was to develop an intervention (grounded in the ancient core belief that a woman’s prime duty was to stay alive) to curtail the exploding HIV epidemic. The goal of changing the cultural scripts that lead to high risk or self-destructive sexual behaviors as the youth matured, would help curb HIV transmission. This goal is consistent with the philosophy of UNAIDS [21], which states, “The future of the HIV epidemic lies in the hands of young people. The behaviors they adopt now and those they maintain throughout their sexual lives will determine the course of the epidemic for decades to come” (p. 9).

A brief description of the program is given to assist in understanding the outcome evaluation. The Stay Alive Program teaches eight lessons focused on assisting youth to develop consequential thinking skills, embrace hope, and build a sense of power over their lives in addition to basic HIV prevention health and hygiene information. The program is described as a holistic, developmental approach to HIV/AIDS prevention education, providing training in the biological, psychological and sociological factors contributing to HIV/AIDS infection. Training in biological factors includes facilitating the understanding of: medical facts related to opportunistic viruses and infections, as well as, age appropriate abstinence, self-empowerment-focused prevention, and health maintenance promotion practices. The curriculum deals with psychological issues such as helping students develop their learning and reasoning capabilities, primarily through the development of cognitive-behavioral skill sets. Sociological factors, within the cultural context, are discussed and include the reinforcement of major culturally and age-appropriate developmental social milestones, such as strengthening hope, reinforcing the value of life, solidifying a sense of individual worth within the family and community, and discovering personal empowerment to advance personal and general welfare [20]. The Stay Alive program’s goals and objectives are consistent with the USAIDS’ ABC Approach Guidelines [2], in that the program teaches Abstinence, promotes Being faithful, and does not conflict with correct and consistent Condom use efforts (although condom use is not a direct focus of the Stay Alive program due to the age range of the target recipients).

During the development of the Stay Alive program (over a two-year period), participant observation of activities, ethnographic focus groups, and guided discussion processes led to the identification and program targeting of several cultural scripts that lead to self-destructive sexual activity amongst Kenyan youth. The primary cultural scripts were found to be similar to those identified by Suzanne Leclerc-Madlala [17] in sub-Saharan Africa, as well as the cultural script for woman to stay alive for her family, also described above. However, three additional cultural scripts were also identified and targeted for intervention development.

The first cultural script uniquely targeted for change by the Stay Alive program was “fatalism” and the belief that an individual has little ability to determine the course of one’s own life. In regard to HIV/AIDS infection, it was found that many Kenyan youth viewed the contraction of the disease as an event outside of their personal control, typically expressed by the phrase, “God willing, I’ll be healthy.” In brief, this cultural script is reflective of an external locus of control. Therefore, one of the main objectives of the Stay Alive HIV/AIDS prevention program is “to empower” youth to remain free from HIV/AIDS by developing their belief that they are capable of making safe choices regarding their sexual behaviors that will impact their health.

The second cultural script targeted for change was “hopelessness” experienced by youth and belief that their life will be short. Due to the widespread and pernicious nature of HIV/AIDS in sub-Saharan Africa, children typically express the belief that they will most likely die at a young age from AIDS. The second objective of the Stay Alive Program is to instill hope, and the belief that they can “live a long, loving life.”

The third cultural script addressed by the program was the belief that young women do not have the right to refuse sexual advances of men, particularly those of older men with authority and
social prominence. In response, the third major goal of the Stay Alive program is the “empowerment” of all young people, including girls. The purpose of empowerment is to help girls refuse unwanted sexual advances and improve all areas of girls’ lives including attainment of education, self-confidence, a sense of self-worth, social and political involvement, economic independence, protection from violence, and improved interpersonal relationships. Additionally, the program works with young males in accordance with their script (to provide and protect women and children) by training them to protect their sisters and friends and accept and support the choices they make regarding abstaining from risky sexual behaviors.

Outcome Evaluation

The primary objective of this study was to conduct a preliminary investigation to determine whether the Stay Alive HIV/AIDS prevention program is effective in reducing sexual activity amongst 8- to 14-year-old Kenyan students over a 1-year-period, as measured by standardized pregnancy rates. Secondary objectives included determining if students successfully learned program concepts, resulting in changes to cultural scripts (e.g., increase in consequential thinking; instillation of hope that they will live long- HIV/AIDS-free lives; and empowerment of female students to refuse sexual advances).

MATERIALS AND METHODS

Study Design and Setting

There were unique challenges associated with this study that impacted the choice of research design to determine whether the Stay Alive HIV/AIDS prevention program was effective in reducing sexual activity. The program had already been designed, funded, and approved for introduction into 52 Kenyan primary schools, chosen by local government and school officials. These schools were chosen from all seven provinces to reflect diversity in economic status (high, middle, low, or extremely low) and setting (urban or rural) of the schools, using classifications provided by the Ministry of Education. In other words, the ministry assigned the economic status of the schools (based upon median family incomes), as well as setting (according to location) information to the researchers. Consequently, the choice of schools for introduction of the program was not truly random and was influenced by unknown bureaucratic processes. As a result, it is unknown how representative these schools were of Kenyan schools, in general. Nevertheless, since the evaluation was being conducted independently, the evaluators were expected to design the evaluation to work within the framework of the program. The Stay Alive program consisted of training local teachers a new curriculum, which they introduced into their own classrooms shortly after learning the basic concepts.

In conducting the evaluation, this study used a randomized, wait-list controlled pre-post experimental design. Specifically, the Ministry of Education provided a list of schools that were stratified by location and economic status, from which half the schools were chosen for introduction of the program, and half were chosen to be wait-listed. Given the backing of the ministry, no school declined to participate. School head masters/mistresses were asked to report on pregnancies amongst female students every six months throughout the project. It should be noted that information on pregnancy rates were standardly tracked at the school level across all Kenyan schools, and is not unique to the schools in this study. Specifically, the Ministry of Education shared this information, and the researchers did not directly collect this information. Consequently, the researchers can only assume the validity of this information since it came from official sources. This information was used, by comparing pregnancy rates between the treatment and control groups, to determine if the Stay Alive HIV/AIDS program was effective in reducing sexual activity among 8- to 14-year-old Kenyan students over a 1-year-period, which was the study’s primary objective.

The goal of analyzing this data was to determine if behavioral changes possibly occurred as a result of the Stay Alive program.

The study’s secondary objective was to determine if students successfully learned program concepts, resulting in changes to their cultural scripts. In order to test for these conditions, 957 children from the 52 schools
were randomly selected at the classroom level from school rolls for more in-depth testing and interviewing using qualitative methods. In other words, specific classes were randomly chosen and all classroom members were interviewed. All treatment group schools were pre-tested 4 weeks prior to the introduction of the Stay Alive program regarding learning objectives and knowledge content. Post-testing on the same information was conducted 8 weeks after the introduction of the Stay Alive program, as well as 1-year after the introduction of the program. Schools on the waiting list were given the pre-test and the first post-test 12 weeks apart, and the second post-test one year later. In-depth interviews were also conducted on the same week that students were tested. Of the children selected for participation, 378 completed all phases of testing and interviews. The high rate of attrition was attributed to sickness, family crisis, moving, a typically high drop-out rate in the school, as well as the opening of a large number of new schools to which students transferred during the period of study.

Interview Questions for the Qualitative Part of the Evaluation

The interviews were conducted in the primary language of the child (English, Swahili, Luo, or Kikuyu). The outcome interview consisted of 22 open-ended questions eliciting the child’s response regarding the concepts taught in the Stay Alive program. The questions were developed by reviewing the Stay Alive program materials as provided to the teachers. All questions were unique to this study in that they focused on the specific learning objectives of the different lessons established in the Stay Alive program. Each child was then interviewed regarding these concepts and asked to provide concrete examples of the program concepts in order to determine their level of understanding. Guided discussion techniques were also used to assist in correctly identifying the degree to which the child understood the concept being examined. All responses were transcribed verbatim. The responses were then rated and scored using a predetermined, anchored scoring matrix on a three-point scale that indicated the degree to which the child understood the concept – no understanding, partial understanding, complete understanding. The goal of asking these questions was to determine if the child gained increase in target knowledge and understanding as a result of the Stay Alive program.

Questionnaire Administration and Interviews

To assist in the qualitative assessment of child learning, research assistants (RAs) fluent in the language of English and the tribal languages of Swahili, Luo, and/or Kikuyu were recruited. As stated previously, the researchers developed an initial set of 22 open-end questions to directly measure the learning objectives of the Stay Alive curriculum and the anchored scoring matrix in English. The RAs then worked within language groups to reach a consensus regarding the appropriate translations of the evaluation materials. After training the RAs in interviewing techniques, test classes were chosen for each language group in which to pre-test the questions for clarity and understanding. After the initial pre-test, the language groups then modified the questions, once again by consensus. Additionally, the responses from the pretest were then transcribed and reviewed by the language groups. Issues regarding the appropriate scoring using the three-point scale (no understanding, partial understanding, complete understanding) were addressed by having the RAs score responses first rate the response as individuals, and then within the group until a consensus was achieved. This process with scoring responses was continued until an inter-rater reliability greater than 0.90 was achieved. Prior to the post-testing evaluations, this scoring reliability process was repeated to ensure appropriate recalibration of the RAs to an appropriate consensus.

Ethical Considerations

As stated previously, aggregated data regarding pregnancy rates at the school level was provided by the Ministry of Education, and was not collected by the researchers. Consequently, parental release was not deemed for the primary research objective. In regards to the secondary research objective, because researchers were measuring student learning and understanding of the Stay Alive curriculum that was being introduced by the Ministry of Education at the classroom level, no parental permission was deemed necessary. Consequently, because the
project involved only aggregated government data and educational outcomes, the Institutional Review Boards (IRBs) of both the Ministry of Education and the University of Utah granted “Exempt” status to the project. The individual schools were not compensated for participating in this study.

**Statistical Analyses**

All quantitative analyses were conducted using SPSS version 20 (IBM, NY, USA). Data was collected during a year-long study that began in Fall of 2014. Pregnancy rates within each school (as reported by the headmaster or headmistress) before and after initiation of the program were the primary endpoint. Since the qualitative analyses were conducted on transcripts written in tribal languages, with the relatively simple goal of scoring the level of knowledge, no specialized software was used.

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**RESULTS**

**Characteristics of the Participants**

A total of 14,916 young students were taught the *Stay Alive* program concepts. Of these, 7,292 were young women whose rates of pregnancy were tracked in aggregate. In particular, due to the sensitive nature of becoming pregnant during adolescence, the gathering of identifying demographic information from individual girls (e.g., age, social economic status, language group, etc.) was not considered appropriate and was not collected. Consequently, all analyses regarding pregnancy rates were conducted on data collected at the school level. The schools were selected from all seven Kenyan provinces and reflected diversity in economic status (high, middle, low, and extremely low) and setting (urban or rural).

The characteristics of the 957 children who participated in the pre-test assessment and interview, along with the characteristics of the 378 who completed all phases of testing and interviews, are both presented in Table 1. Due to the high rate of attrition, statistical comparisons were made to determine if the post-testing was biased towards a particular sub-population of the children.

**Effectiveness of the Program**

A comparison of pregnancy rates between the two groups (controls versus those who had received the *Stay Alive* program) is presented in Table 2. The results indicate that there was a statistically significant difference in the rate of pregnancy between young women who were on the waiting list (control group), and those who were taught the *Stay Alive* program ($\chi^2 = 56.990, p < 0.001$). The effect size was large, in that the odds of a girl becoming pregnant after being taught the *Stay Alive* program was approximately one-third the odds of a girl becoming pregnant while on the waiting list (Odds Ratio = 0.3549; 95%CI = 0.2712 to 0.4644). Binary logistic regression was used to determine if setting (rural versus urban) had an effect modification or confounding effect on the impact of the *Stay Alive* program. The results indicated that setting was not a confounding variable, in that there was no change in the odds ratio with its inclusion in the model. Additionally, setting was not found to be an effect modifier, in that there was no significant interaction with the treatment condition.

**Increase in Consequential Thinking**

Table 3 presents the changes in three specific cultural scripts following implementation of the program. The *Stay Alive* HIV/AIDS prevention program first focused on empowering youth to remain free from HIV/AIDS by developing their belief that they are capable of making safe choices regarding their sexual behaviors that will impact their health. Controlling for gender, age, language, and economic status using logistic regression, the findings indicate that *Stay Alive* program participation significantly altered the student’s ability to give correct definitions to the concepts of decision-making ($OR = 2.51, p < 0.001$) and consequences ($OR = 1.90, p < 0.001$). In other words, while controlling for differences in gender, age, primary language, and economic status, students who participated in the *Stay Alive* program had 2.51 times greater odds of giving a correct definition of the concept of decision-making, and 1.9 times greater odds of giving the correct definition of consequence. More meaningfully, again controlling for the
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pre-Test (n = 957)</th>
<th>1-year Post-Test (n = 378)</th>
<th>( \chi^2 )</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>459 (48.0%)</td>
<td>194 (51.3%)</td>
<td>1.225</td>
<td>0.268</td>
</tr>
<tr>
<td>Female</td>
<td>498 (52.0%)</td>
<td>184 (48.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age (at beginning of study) (Years)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>21 (2.2%)</td>
<td>10 (2.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>145 (15.2%)</td>
<td>23 (6.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>314 (32.8%)</td>
<td>74 (19.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>203 (21.2%)</td>
<td>92 (24.3%)</td>
<td><strong>71.9</strong></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>12</td>
<td>153 (16.0%)</td>
<td>121 (32.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>81 (8.5%)</td>
<td>43 (11.4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>38 (4.0%)</td>
<td>14 (3.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>276 (28.8%)</td>
<td>130 (34.4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swahili</td>
<td>648 (67.7%)</td>
<td>225 (59.5%)</td>
<td><strong>5.92</strong></td>
<td>0.116</td>
</tr>
<tr>
<td>Luo</td>
<td>19 (2.0%)</td>
<td>8 (2.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kikuyu</td>
<td>1 (0.1%)</td>
<td>1 (0.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Economic status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>147 (15.4%)</td>
<td>58 (15.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>663 (69.3%)</td>
<td>271 (71.7%)</td>
<td><strong>1.20</strong></td>
<td>0.549</td>
</tr>
<tr>
<td>Extremely low</td>
<td>146 (15.3%)</td>
<td>49 (13.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Setting</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Urban</td>
<td>809 (84.5%)</td>
<td>320 (84.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>147 (15.4%)</td>
<td>58 (15.3%)</td>
<td><strong>0.01</strong></td>
<td>0.988</td>
</tr>
</tbody>
</table>

characteristics listed above, the anchored rating of responses to the request to give specific examples of each of these concepts also showed significant and substantial increases in scores (\( OR = 1.95, p <0.001 \)). This finding indicates that controlling for the previously mentioned demographic variables, a student had almost double the odds of being able to give a concrete and correct example of a consequence to making a choice if they had been taught the *Stay Alive* program.

**Instillation of Hope for Living Long, HIV/AIDS-Free Lives**

The *Stay Alive* program was also focused on instilling hope in the students and the belief that they can “live a long, loving life.” Despite this major focus of the program, results indicate that
Table 2. Effectiveness of the Stay Alive Program - Comparison of Pregnancy Rates Between Wait List (Controls) and Girls Taught Stay Alive Program*

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Stay Alive Program</th>
<th>Wait List (Control)</th>
<th>Odds Ratio</th>
<th>95% Confidence Intervals</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy</td>
<td>216</td>
<td>57</td>
<td>159</td>
<td>0.3459</td>
<td>0.2712, 0.4644</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No pregnancy</td>
<td>13,846</td>
<td>7,235</td>
<td>6,611</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>14,062</td>
<td>7,292</td>
<td>6,770</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Adjusted for setting (rural versus urban)

Table 3. Summary of Changes in Three Cultural Scripts Post-implementation of Program*

<table>
<thead>
<tr>
<th>Cultural Scripts</th>
<th>Odds Ratio</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONSEQUENTIAL THINKING:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did Stay Alive Program participants significantly changed in their ability to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Give correct definitions to the concept of decision-making?</td>
<td>2.51</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Give correct definitions to the concept of consequences?</td>
<td>1.90</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Give more specific and correct examples of these concepts (based on an anchored rating of responses)?</td>
<td>1.95</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>INSTILLATION OF HOPE:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did Stay Alive Program participants significantly changed in their belief that:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>That they would contract HIV/AIDS?</td>
<td>0.191</td>
<td></td>
</tr>
<tr>
<td>That they would die of HIV/AIDS?</td>
<td>0.093</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>REFUSING SEXUAL ADVANCES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did Stay Alive Program participants significantly changed in their belief that:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My response to sexual advances will affect the future happiness of my family?</td>
<td>2.08</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Women have the right to refuse sexual advances?</td>
<td>2.25</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>0.066</td>
<td></td>
</tr>
</tbody>
</table>

* Adjusted for Gender, Age, Language, and Economic Status

in controlling for gender, age, primary language, and social economic class, there was no significant difference to the degree that students believed that they would contract HIV/AIDS (Wald’s $X^2 = 1.710, p = 0.191$). In a surprising disconnect of logic, however, there was a significant and large shift in the degree to which the students believed that they would die of HIV/AIDS (Wald’s $X^2 = 18.360, OR = 0.093, p <0.001$). In other words, after participating in the
Stay Alive program, there was a 90% drop in the odds that a child believed he or she would die of HIV/AIDS, even though the level of belief that one would contract the disease did not change significantly. Qualitative interview results indicated that the students concretely focussed on the concept that they could choose to “live a long, loving life,” but they did not understand the concept that they could avoid contracting the disease.

Empowerment of Female Students to Refuse Sexual Advances

In focusing on male students, there was no significant shift in their beliefs regarding the right of women to refuse male sexual advances (Wald's $X^2 = 3.381$, $p = 0.066$). Nevertheless, the fact that findings neared significance suggests this script is amenable to intervention and that further development and modification is needed for males on this intervention methodology. Female students, on the other hand, showed a strong and significant shift in their belief in this area. Specifically, female students significantly increased in their belief that their responses to advances would impact the future happiness of their families (Wald’s $X^2 = 25.990$, $OR = 2.08$, $p <0.001$) and that, as a result, they had the right or need to reject those advances in order to protect their families (Wald’s $X^2 = 37.831$, $OR = 2.25$, $p <0.001$). In other words, after participating in the Stay Alive program, young women were twice as likely to believe that they had the need or right to reject sexual advances, even from men in authority, in order to protect their future families.

DISCUSSION AND CONCLUSIONS

The pervasive spread of HIV/AIDS in Africa requires social and behavioral interventions as a part of any prevention efforts. The effectiveness of social and behavioral interventions is dependent upon developing culturally appropriate programs that are capable of changing attitudes and norms. Additionally, interventions should be age appropriate. The Stay Alive program is an example of a prevention program that teaches behavioral interventions such as consequential thinking and empowerment, especially for children in the 8-14 age groups. More importantly, the Stay Alive program is an expansion of prevention efforts seeks to identify and address dysfunctional cultural scripts that promoted the transmission of HIV/AIDS within a particular cultural subgroup. Whereas other programs have often sought to change the behaviors of sexually active youth, this intervention targeted attitudes that affected sexual behavior before the youth became sexually active.

The program was effective in reducing sexual activity as evidenced by the 67 percent reduction in pregnancy rates. Longer-term research is needed to identify the stability of the findings over time as well as to identify needs in the 14 and older age group, after completing the Stay Alive program. The Participatory Approach Model is based upon a reiterative process in which outcome evaluation data is a source of information needed for further development. Therefore, additional independent evaluations will be needed as the program undergoes further refinement. Due to the focus on cultural scripts, the appropriateness of the interventions and the validity of the findings can only be generalized to Kenya. As the Stay Alive program is considered for introduction to other countries in Africa, a reiteration of the development and validation process will be needed.

The development and evaluation of this program represents a growing sophistication to addressing public health challenges in Africa. Furthermore, the success of this program demonstrates that community participation in the development of culturally appropriate interventions is desirable, and should be considered to be a critical component in the development of effective prevention programs. Moving forward, the process that was followed within Kenyan schools should be followed by other developing nations to recognize and address their own cultural scripts. Consequently, social work and public health workers can play an important and necessary role in schools to evaluate cultural and gender sensitive as well as effective interventions in the battle against this disease.

During the qualitative interviews, the evaluation team discovered that the word “consequence” did not exist in the majority of the 46 languages spoken in Kenya. In other words,
the concept that one’s choices and behaviors determine one’s future experience literally is not in the primary vocabulary of many of the participants that were examined. Once taught the concept by the *Stay Alive* program, however, the participants did not have difficulty in understanding and accepting the principle. Results suggest that the *Stay Alive* program greatly enhanced the belief and understanding of the typical participant that each individual can determine the course of his or her own life through personal choices.

Qualitative interview results also indicate that the students concretely focused on the concept that they could choose to “live a long, loving life,” but they did not understand the concept that they could avoid contracting the disease. In other words, HIV/AIDS was so extremely prevalent in their world experience, the possibility that they could avoid the disease was not considered. Clearly, the intervention attempting to change this cultural script must be examined and further developed. Despite the important shift in behavior, during qualitative interviewing the young women identified an important gap in the *Stay Alive* intervention that needed to be addressed in order to effect the desired behavioral change of rejecting the sexual advances of males. Although the desire of the young women to abstain from sexual relations significantly increased, the young women consistently reported that they “did not know how” to turn down solicitations. Based on this finding, the evaluation team made the recommendation that a set of role-play exercises be developed to give the young women the concrete skills and practice needed to negotiate a difficult and uncomfortable social interaction.

The greatest limitation of this study was the reliance upon data that collected and provided by the Ministry of Education. Although the stated purpose of this evaluation was to provide an independent evaluation of a HIV/AIDS prevention program, the researchers are unable to validate the accuracy of the data that they were provided.

**AUTHORS’ CONTRIBUTIONS**

AP conceived of the study, carried out the literature review, and drafted the manuscript. PTP collected the data and conducted the statistical analyses, and participated in the drafting of the manuscript. SC participated in analyzing the data. All authors have read and approved the final manuscript.

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**CONFLICT OF INTEREST**

Authors have declared that no competing interests exist.

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