Factors Associated with School Teachers' Perceived Needs and Level of Adoption of HIV Prevention Education in Lusaka, Zambia

Henning, Margaret, M.A., Ph.D.[1] ; Chi, Chunheui, M.P.H., Sc.D.[2] ; Khanna, Sunil K., Ph.D. [3]

Author[1] is affiliated with Health Sciences, Keene State College, Author[2] is affiliated with the Department of Public Health, Oregon State University, Author[3] is affiliated with the Department of Anthropology, Oregon State University. **Contact author:** Margaret Henning, Health Sciences, Keene State College, Keene 03431 **Phone:** 541.740.8570; **Email:** mhenning@keene.edu

Submitted: January 4, 2011; Revised and Accepted January 7, 2011

Abstract

Objective: *The purpose of this study was to evaluate the socio-cultural variables that may influence teachers' adoption of classroom-based HIV/AIDS education within the school setting and among school types in Zambia's Lusaka Province.*

Method: *Mixed methods were used to collect original data. Using semi-structured interviews (n=11) and a survey (n=720), data were collected and analyzed using a socio-cultural constructionist approach and an abridged version of grounded theory.*

Results: *In 2008, a sample of 720 teachers completed surveys within 123 schools, 226 (31%) from 62 community, 270 (38%) from 36 government, and 223 (31%) from 25 private/church schools, equating to a 91% teacher response rate and a 100% response rate for schools sampled. Three main themes emerged from this research. First, insight was gained into the current activities used to teach HIV prevention within each school type. Second, we found that structural factors have a stronger association with HIV-education adoption than individual factors. Third, analysis indicated an association between HIV policy and hours teachers spent on HIV prevention in the classroom.*

Conclusion: *The survey and interviews provided insight into factors that are suggested to influence teachers' HIV-education dissemination as well as potential areas of program development.*

Keywords*: Health education, Acquired Immunodeficiency Syndrome (AIDS), Attitudes, Implementation*

Introduction

According to the UNAIDS 2006 report on the global AIDS epidemic, sub-Saharan Africa is home to over 70% of the world's HIV-positive population. Most notably, approximately 85% of all HIV-positive children live in the region.[1, 2] The continent itself remains the global epicenter of the human immunodeficiency virus (HIV), which leads to acquired immunodeficiency syndrome (AIDS).[1] The impact of HIV is further exacerbated by the region's ethnic conflict, poverty, political unrest, and unreliable infrastructure. Understanding the historical, social, and epidemiological complexity and severity of the HIV problem is essential for developing locally relevant solutions aimed at preventing the spread of HIV in the region.

In Zambia, approximately 920,000 people (18% of women and 13% of men) are living with HIV.[1] With such a high prevalence of HIV/AIDS, Zambians have an average life expectancy at birth of about 38 years (Demographic and Health Survey [DHS] 2007).

In the midst of the enormous health and socioeconomic burden HIV/AIDS has created in Zambia, children are commonly referred to as the "window of hope"; thus schools, with their growing accessibility, are ideal environments for an extensive and systematic response to HIV prevention.[3] HIV-prevention education can fall within the realm of primary health care,[1] a critical element in arresting the progression of HIV/AIDS in sub-Saharan Africa.[3, 4] The Millennium Development Goals (MDGs) mandate the coordination of global actions and efforts through a number of government and nongovernmental agencies. HIV/AIDS education is a priority if the goal of "education for all" is to be met. The Zambian Ministry of Education (MOE) has been supportive of the HIV/AIDS programming efforts adopted by the UN, USAID, and others, designed to directly reach primary- and high-school students.

Schoolteachers are uniquely positioned to promote HIV-prevention education for youth. In the words of one government-school teacher, "We are the parents while these children are in school, and for others, we are simply the only parent they have." While most school-based studies focus on HIV-prevention educational outcomes for students, there is a lack of research on how schoolteachers' knowledge, attitudes, and skills affect HIV-prevention education.[5, 6]

The purpose of this study was to identify socio-cultural variables that influence teachers' adoption of classroom-based HIV/AIDS education, in other words the perception of the need for HIV education (adoption). The study also assessed what teachers perceived they needed in order to produce effective HIV/AIDS education within their respective school settings in Lusaka, Zambia. This study also compared the current state of HIV efforts by school type in the Lusaka Province (including Chongwe, Kafue, Luangwa, and Lusaka). Specifically, it addressed two overlapping areas of research:

a. Factors associated with teachers' adoption of classroom-based AIDS education among the different school types

b. Factors influencing what teachers perceived they needed to effectively develop and teach HIV/AIDS curriculum in their school settings

Based on literature reviewed, it was anticipated that factors of influence would include teachers' educational statuses, functional knowledge,[2] perceptions of stigma, gender norms, school types, exposure to orphans and vulnerable children (OVC) in their schools, self-efficacy (specific to teaching HIV prevention), and social demographics (e.g., age, gender, number of years taught, religion, prior education/training, and prior HIV education). Questions were primarily selected from the *Centers*

[1] Primary health care, defined in 1978 at the Alma Ata Conference World Health Assembly of WHO, is a combination of curative, preventive, and promotive activities to improve overall community health. It includes multiple sectors—economic, political, and socio-cultural—and their effects on health and welfare.

[2] According to the Division of Adolescent and School Health National Center for Chronic Diseases Prevention and Health Promotion Centers for Disease Control, practical information about HIV, such as the methods of transmission and the personal consequences of HIV infection, is referred to as "functional knowledge". General HIV knowledge is information about the global AIDS pandemic (how HIV affects the immune system or the history of AIDS epidemics). Functional HIV knowledge is the essential knowledge that students must acquire to reduce risk and vulnerability to HIV.

for Disease Control Assessment Associates Handbook.[7]

For the first area of our research—factors associated with HIV-education adoption among the different school types in Lusaka, Zambia—questions were asked about teachers' experiences in conducting HIV/AIDS education at their schools (which topics were covered during a school year or six-month period, the extent of HIV-prevention activities adopted, and time spent on these activities). For exploring the second area of research—factors influencing schoolteachers' perceptions of their need for support for HIV/AIDS-prevention education—the survey included questions assessing needs and information about content that might be incorporated into an HIV-education/prevention staff-development program.

Teachers were asked if they believed it was important to provide students with information on where to be tested for HIV infection, and if HIV/AIDS education was considered in their schools' policies or mission statements. Other questions range from asking about how a person may become infected with HIV/AIDS to how they may protect themselves. For example, "Someone with AIDS can spread HIV by coughing and spitting". Educators are to choose one of the following responses: "True," "False," "Not Sure," or "Do Not Understand." The AIDS knowledge test was scored for the number of correct responses. Each correct answer received one point, and each incorrect or "not sure" response received no points. Total scores can range from 0 points (no items correct) to 11 points (all items correct).

Research Methods

Epistemology, or study of the nature of knowledge and its rationalization is the fundamental concept guiding the design of this work.[8] Based on socio-cultural constructionism as the foundational methodology, we developed research methods that take into consideration the important role local cultures play by examining behaviors as well as by developing a context-specific knowledge necessary to interpret the behaviors.[9] Further, this methodology calls for researchers to recognize the dynamic ways in which individuals or groups participate in the creation of their perceived social realities, and examines how a social phenomena (e.g., education) is constructed and institutionalized relative to social contexts.[10-12] While constructionism provides an explanation of the roots and development of individual and collective perceptions, it should be noted that these perceptions are mutable, but can change and evolve over time—the common understandings and framework allow for people to start in a place of agreed-upon truth.[10]

To achieve this process of inquiry, we used multiple approaches of information and data collection that allow us to have an open and inclusive understanding of those context-specific phenomenon and knowledge. These methods included both qualitative and quantitative investigations that collected data and information on individual and group responses and interpreted within the socio-cultural and institutional context.

Qualitative data collected in the study provided insight into the nuances of relationships and their contexts, for perceptions and beliefs cannot be meaningfully reduced to numbers or adequately understood without reference to the local context.[13, 14]

First, information about the schools was obtained from an Education Management Information Systems (EMIS) of Zambian Ministry of Education special data request (2006).

Data collection was done using a numbers and narrative approach. According to our source there are 402 schools within the Lusaka district in Zambia. These schools are divided into three main types – Community (n = 162), Private (n = 116), and Government (n = 124). Estimates from the Ministry of Education special data request (2006) indicate community schools have 997 teachers; government schools have 4,992 teachers, and private schools have 2,272 teachers. The total population size for the basic schools is 8,219. Based on power analyses to estimate the sample size, survey data were collected from 720 individuals (n=720), while additional semi-structured in-depth interviews were conducted among 11 teachers. This research used two-stage sampling and sampling without replacement, with schools as the chosen stratum by using a randomized list. The sampling method was selected to increase the sample's generalizability to the larger population of schoolteachers in Lusaka, Zambia.

Once a school was randomly selected, all teachers in that school that met the age criterion became our sample teachers. Due to the smaller percentage of teachers employed at community schools (12%) as compared to government schools (60%) and private schools (28%), community school teachers were over-sampled to create groups that were

proportionate to the largest group (i.e., government schools). This strategy increased the power for inferences made regarding the stratum. In our first stage sampling, 123 schools were randomly selected. All sample schools agreed to participate in this survey, resulted in 100% response rate at the stratum (school) level. Surveys were completed by 720 teachers from these 123 sample schools in three types (community, government, and private) – resulted in 91 percent response rate (CI=95), which were randomly selected from 36 government, 62 community, and 25 private schools. Of the 720 teachers, 226 were from community, 270 were from government, and 223 were from private schools; and 1 teacher did not indicate his or her school type. For the actual survey dessemmiation, one of the researchers met with schools deputies or administrators to seek their approval and cooperation.

All teachers in randomly selected schools were invited to participate in the study. Surveys were printed in English, and were administered to government, community, and private-school. Teachers were included in the study if they were at least 18 years of age, and the study population was not restricted to gender. Teachers who verbally indicated willingness to participate were given an informed consent document approved by the Oregon State University Institutional Review Board (IRB) and the Ministry of Education in Zambia. For the interviews some teachers preferred to meet with the researcher at their schools, others preferred meeting elsewhere. One teacher indicated she felt she could "talk freely" (government school teacher, 2008) outside of the school setting where she would not be worried about her coworkers overhearing the interview. For the interviews a notes-only method was used and coded the underlying categories.[15] Data was categorized into thematic or common categories aimed at generating results and information.

Qualitative and quantitative data were triangulated to compare findings and identify links that might provide a more comprehensive understanding of HIV education, barriers experienced by teachers, and facilitating factors in the adoption of HIV/AIDS-prevention education within the classroom setting.[13, 14] Research questions were posed to predict the effects of an explanatory variable on the dependent variables without suggesting causal relationships or conclusive results.[16]

Survey Methods

Prior to data collection, several steps were taken to assess reliability and validity of the questionnaire. An advisory board was established with the Ministry of Education in Zambia to serve as an expert panel to optimize the cultural proficiency and validity of the materials, as well as to maximize responsiveness of the survey. The advisory board also evaluated the face-validity of the survey. Survey questions although not exhaustive of all possible variables of influence, were aimed at identifying factors associated with teachers' perceptions of HIV education within the school setting in Lusaka, Zambia. Questions used were primarily selected from the *Centers for Disease Control Assessment Associates Handbook* (Centers for Disease Control [CDC] and its contractor, IOX Assessment Associates 2005).[7]

Two teachers from each school type (Community, Private, and Government) were also invited to review the questionnaire and provide feedback. Internal consistency (Cronbach's alpha) was used to determine how well a set of items (individual teacher variables) measures a single construct.[17, 18] The raw scores for each item within a factor were summed to yield a composite score.

In-depth semi-structured interviews

The second method of data collection used was from 11 in-depth semi-structured individual interviews with teachers from all three school types, using a notes-only method and coding the underlying categories. Interviews allowed the researchers a naturalistic approach to understanding the HIV education phenomena in a context-specific setting. The quantitative data were categorized into measurable or common categories aimed at generating results and information that can be applied to a wider setting knowledge. When working within a naturalistic approach, validity and reliability are positioned as to provide an understanding for the notion that there are multiple predictors for a single reality.[19] A mixed method approach to research acknowledges that knowledge is socially constructed and may change depending on the circumstances. This research was aimed to honor the qualitative constructs of research while also being attentive to the reliability and validity that is relevant to qualitative and quantitative methods and the environment, and in turn, acknowledging that there are multiple ways to reflect truth.

The qualitative data were generated using concept saturation, which involves reaching the point in which gathering more data about a theme yields no further insight about the emerging theory.[16] Interviews included questions like, "Do you currently teach HIV/AIDS prevention in your classroom?" "What might your typical lesson look like?" and "Are there challenges to teaching HIV education within your school?" Questions were followed with, "If yes, could you tell me more about these challenges?" and "Could you expand on that?" Teachers met with the researcher at their schools or outside of school, depending on their preferences.

While conducting the interviews, the lead researcher lived in the teachers' environment, which presented an opportunity to observe and describe interactions within a social context and to analyze behaviors from the research participants' realities. The lead researcher spent 12 months in the field to collect data and develop an understanding of the local and regional cultural and sociopolitical contexts. An inductive fieldwork-based approach adopted for this study further enhanced its validity and generalizability.

Results

The survey included 89 questions on a range of topics, including teacher's socio-demographic characteristics (age, sex, school type, education and religion), perceptions of HIV/AIDS education need in school, HIV/AIDS knowledge, attitudes toward HIV/AIDS, gender attitudes, and adoption of HIV/AIDS-prevention programs. These questions were selected, based on review of literature and experience with Zambian schools and social context. Questions also focused on if participants would be potential candidates for answering second research question on factors influencing what teachers perceived they needed to effectively develop and teach HIV/AIDS curriculum in their schools setting. To respond to this question we specified a statistical model to estimate the explanatory variables' association with teachers' adoption of HIV/AIDS prevention program and their perceived needs for HIV/AIDS prevention in their schools.

Exploratory data analysis was carried out using the Statistical Package for the Social Sciences (SPSS) version 13.0 for Windows. Assumptions for the linear regression model were met, including normality, linearity, and homoscedasticity, as well as the absence of multicollinearity. Internal consistency (Cronbach's alpha) was used to determine how well a set of items (i.e., individual teacher variables) measured a single construct.[17, 18] Lastly, besides review of theory and relevant literature, we also examined and selected variables included in regression analysis by using a correlation- covariance matrix to avoid multicolinearity.

As shown in Table 1, the summary statistics indicated the teachers' average age is 35, and that they had completed an average of 12 years of formal education. Teachers in government schools generally had more years of formal education. Community-school teachers tended to be younger and to have fewer years of education (10.5). This seems intuitive, given that community schools are community-based, that their teachers are usually paid on donation bases, and that the role requires less educational training than in government or private schools. Males accounted for 54.6% of the sample. However, there were more female than male teachers in the school system. Therefore, male teachers were overrepresented in the sample. In general, HIV knowledge levels (e.g., about body fluids that carry the virus) reflected high scores for both male and female teachers.

The most common HIV/AIDS prevention activity in community schools was drama groups (59%), and in government ones, class lecture (35%). In private schools, "no activities" (32%) was most common (Table 2). The most common topics addressed by all three school types were HIV/AIDS acquisition and HIV testing. It should be noted that 63% of teachers within all school types indicated that their school committed less than four hours to HIV/AIDS education or prevention in a six-month time period. Teachers in all three school types expressed that it was "inappropriate" to discuss where to buy a condom and or debunk common myths.

While it was indicated that myths should not be addressed, many teachers expressed concern about how to handle child molestation stemming from the myth that "being with [i.e., having intercourse with] a child will cure HIV/AIDS," as one government-school teacher described it. Most teachers indicated that this practice was not common—though many had worked with or knew of students who had been molested for this purpose.

Schools for which surveys indicated "HIV/AIDS education [was] in the school's policy or mission statement" reported a higher rate of implementation

over a six-month period; the chi-square test suggested that when school policy promoted HIV education, teachers reported spending more time on HIV prevention. This was specific only to the amount of time spent, and did not indicate the quality of the time spent.

Logistic regression was used to examine variables of influence for the adoption of HIV education (Table 3). Reliability for adoption is shown to be low, using all items with an alpha level of 0.150 and 0.517 for the assessment of needs. The adoption variable (HIVadd) was transformed into a dichotomous variable (i.e., yes/no). The results for logistic regression indicated that teachers' school types and self-efficacy (confidence) scores influenced the extent of their classroom-based HIV/AIDS education adoption. Teachers with a high level of confidence in their ability to teach the subject were 11% more likely to adopt HIV education within the classroom setting. Our model estimation indicated that community schools and government schools were more likely (5.3 and 2.8 times, respectively) to adopt HIV education than private schools, after controlling for other relevant variables. Results also showed community schools with a high rate of adoption indicated lower rates of perceived need for HIV education than government schools. Private schools' overall lack of HIV education was reflected by a low adoption rate and low perceived-need score.

This study also used a linear regression model to investigate variables that are suggested to influence teachers' perceptions of the need for classroom-based HIV/AIDS education and what they felt they needed in terms of support (Table 4). Community-school teachers' scores for the perceived need for HIV education were an average of 3.00 lower than government schools', while private-school teachers scored an average of 1.84 lower than government school ones, after controlling for other relevant variables. This suggests that, although community schools were more engaged in prevention efforts, teachers in schools with lower scores for prevention efforts also perceived a greater need for support. Community school teachers may also have felt they did not have further HIV-prevention education needs because they already indicated having adopted such programs. Again, self-efficacy was also positively associated with perceived needs for the adoption of programs.

A key theme that evolved out of the interviews was teachers wondering "how to involve parents in HIV education programs"; 98% of the 720 teachers surveyed in all school types indicated parental involvement to be an area of needed support. As one teacher said, "You know, we are the parents away from home, and we don't always have the language to teach this. We know the facts; we all know the facts…but how to teach this is different."

Teachers also indicated the need for "ARV [antiretroviral drug] and first-aid training to better support students that are HIV positive." Another teacher said, "You know these are children, they run, they play, they get hurt; we must know how to protect them."

Interestingly, one area that teachers from all school types indicated as less important in teaching HIV protection was condom use. This was also reported in the survey results; the most common topics addressed by all three school types were HIV/AIDS acquisition and HIV testing. As one teacher put it, "We do not need to be telling students about the condom, for they will want to try using these and have sex." Only 1.8% of community-school teachers saw condom use as a topic that needed to be covered; just 1.9% from government schools and 0.3% from private schools did. This suggests that HIV-prevention education is limited in scope, and that topics being taught are also limited.

Teachers expressed the need for emotional support for students that were affected or infected by HIV/AIDS. As one community-school teacher noted, "We have anti-AIDS clubs, but the students already know of AIDS, plus these clubs are voluntary; the student with troubles at home will not have time to come to such a club." Often, teachers expressed the need to incorporate anti-AIDS clubs into the regular school programs and include "other topics" that are coupled with the HIV/AIDS pandemic, such as losing family, friends, and teachers; nutrition for the HIV positive; and the impact HIV had on the students' communities. A community-school teacher said, "Students are not feeling 'strong,' you know," referring to the students' self-confidence. As a teacher from a government school commented,

> "I think we are missing an opportunity at the girls' initiation period [at around age 14 or 15]. All the women in a girl's life take her and tell her how to be women; you know what she must do to care for a family and her husband are her responsibilities. This is when we should be talking to the

> girls, to be telling them how to protect themselves, how to be tested, how to talk with their husband about past [in] discretions. We must be telling them more than just how to prepare a meal or respect one's mother-in-law. You know, many want to go wild at this stage—they need to have safety measures—they need to be told. We need to work within the systems that exist."

Understanding the current level of HIV-education adoption and teachers' perceived needs can lead to the development of efficacious, comprehensive, and targeted models for HIV-prevention education.[23, 27]

Discussion and Conclusion

Both logistic and linear regression models were used to address the research questions. Variables included in the regression analysis were selected based primarily on literature review of factors that influence schoolteachers' attitudes toward HIV prevention education. These variables are derived from the Social Cognitive Theory, and Theory of Reasoned Action.[21, 22] In a similar study, Mathews[23] examined factors associated with teachers' HIV/AIDS education in Cape Town, South Africa (N = 579 teachers, within 125 schools, 56% response rate) and found that teacher-related characteristics that most closely associated with teaching HIV/AIDS were previous training, teacher's self-efficacy, student-centeredness, beliefs about controllability and the outcome of HIV/AIDS education, and responsibility. Additionally, at the school level, the existence of a school HIV/AIDS policy, a climate of equity and fairness, and good school-community relations were positively associated with teaching HIV/AIDS. This empirical research also provided a foundation for us to select relevant variables in our model estimation for teachers' HIV/AIDS prevention program adoption and for teachers' perceived needs for HIV/AIDS prevention. Further, this research considered not only the school environment that influence teachers but also the broader contextual factors that take a role in influencing a teacher's HIV educational pedagogy in the classroom.

Our results indicated that community schools and government schools were more likely to adopt HIV education than private schools. This suggests that community schools were already more actively involved in HIV-prevention efforts, and had better odds of adopting HIV/AIDS-prevention education in their curricula. It makes sense that more confidence would increase teachers' adoption of HIV education, and it seems that training to boost confidence might support the adoption of more widespread school-based HIV education. The fact that private schools gave less attention to HIV education could stem from the reason that they indicated being "removed" from the HIV epidemic in Zambia. Based on the interviews and data, the researchers surmised that private schools were part of a culture that considers itself to be insulated from HIV/AIDS by its relatively higher socioeconomic position and better access to education.

Dawson[24] reported that health teachers possessed a strong understanding of HIV/AIDS, while teachers in other disciplines had significantly less knowledge. Female teachers held more positive attitudes toward HIV/AIDS than did male administrators. For our study HIV knowledge levels (e.g., about body fluids that carry the virus) reflected high scores for both male and female teachers. This finding was consistent with the 2007 Zambian Demographic and Health Survey's (DSH's) data, which indicated that 97% of the population, both males and females, is equipped with accurate knowledge. In a review of 109 studies on HIV and social stigma from 1995-2003, few studies focused on populations in low-income countries. This gap in knowledge points to an urgent need for understanding the community or social contexts to examine the complex relationship between stigma and HIV in low-income countries.[25] As stigma continues to be cited as a barrier to HIV education there is a need to understand HIV/AIDS stigma within the educational sector.

A number of common themes emerged in this study. First, it brought attention to the range of topics that teachers deemed inappropriate; the majority of HIV-prevention education was focused on testing, and it left out topics such as where to obtain condoms. Research has shown that comprehensive sex education (CSE) is necessary for behavior to change.[28, 29] Mounting evidence demonstrates the effectiveness of CSE, which teaches abstinence as the best prevention strategy, but also provides students with medically accurate information about contraceptives and condoms. This work also suggested that, in an effort to support teachers, parents should be encouraged to express their opinions on sexuality education,[20, 21] creating a collaboration between teachers and parents so that teachers are not solely responsible for determining what information is appropriate for students.

This finding may assist the health education policy making of the Zambian Ministry of Education (MOE), which is the largest government sector in the country. Currently under the MOE, educational provision is guided by the education policy document, *Educating Our Future* (1996), the policies of which focus on equitable access to quality education at all levels. Since 2003, the actual implementation of the policy has been based on the *Education Sector Strategic Plan, 2003–2007.* The MOE is organized according to the following levels: headquarters, 9 Provincial Education Offices (PEOs), and 72 District Education Boards (DEBs). In order to decentralize education and facilitate the deconcentration and devolution process, the MOE has created Provincial Education Management Committees (PEMCs), and District Education Management Committees (DEMCs) at provincial and district levels respectively. The Zambian Ministry of Education guides education delivery at all levels. This work suggests that there is often a gap between a stated policy and the accountability and implementation systems. When assessing the practice of health education, one can never take a government policy at face value. Further, context matters. School teachers are highly influenced by their society, culture and norms. Without a conducive environment and supportive society, especially students' family, effects of implementing these policies may be limited**.** Finally, there is a strong need to support the efficacy of CSE/HIV prevention education implemented in the schools and to create specific advocacy or policy changes. These changes would ensure that all school teachers in Zambia have the capacity and supportive organizational systems for HIV education.

Second, teachers indicated several ways that their effectiveness as HIV/AIDS educators could be increased. They indicated a willingness to teach HIV prevention; this willingness, combined with their thorough understanding of HIV/AIDS indicated by surveys and interviews, suggested a need for increased teacher training that goes beyond basic prevention education. For example, counseling skills and antiretroviral therapy (ARV) and first-aid training need to be addressed. In schools, situations arise where students may be exposed to bodily fluids (e.g., blood). Since students may not know they are infected, it is important to have policies in place for managing accidents and injuries. It should be noted that such procedures are important not only for HIV but for all blood-borne infections. As teachers also indicated child abuse was an area of concern, counseling skills would be appropriate—teachers need training to identify victims, and the skills and support to determine appropriate courses of action.

Third, policy development for HIV-prevention education within the schools must be taken into account. While we may want to respect and accommodate some level of autonomy and community differences at different schools, we also want to maintain consistency in quality. Fourth, there is a need for a better understanding of the topics that teachers deemed inappropriate, and how these might be appropriately included into the educational system. Although our results do not suggest that intercourse with a child by an adult to cure HIV/AIDS was a common practice, most teachers indicated they knew of students who had been molested for this purpose. It was also reported by teachers that myths should not be addressed. The results suggest teachers' contradictory attitudes. Based on the researchers' interactions with teachers and with an understanding for the social norms within the communities participating in the research, the researchers have explained and asserted that the discrepancy reflects a teacher's fear of losing his/her job by openly addressing the culturally taboo issue of molestation. Teachers may also fear an adverse reaction from community leaders if they discussed this sensitive issue as part of HIV education in school. These findings also need to be explored in relation to similar studies, to determine if there are indeed common socio-cultural variables influencing teachers' engagement in HIV-prevention education within Zambia and other parts of Africa.

There were several limitations within this study. As the study population for teachers was limited to Lusaka, Zambia, the results may have limited generalizability to all teachers in Zambia. It is critical to consider that the survey results were based on self-report, and thus depended on the participants' accuracy and honesty, and that responses were limited to those of voluntary participants. There could also be unknown variables that were not analyzed in this model, and the absence of published studies using the same survey limits comparison with other teacher populations.

We know that teachers are central to addressing HIV/AIDS prevention. However, additional international studies are needed to further explore the factors that influence HIV education within various school-based settings.[23] There is also a need to go beyond discovering what influences school teachers to also explore the efficacy (quantity and quality) of

the current HIV-prevention programs within the classroom setting. Gaining a better understanding of the influences on schoolteachers in relation to HIV-prevention education is just one aspect of critically understanding and improving the quantity and quality of delivering school-based HIV education. Ultimately, the quality of the delivery must be evaluated further to understand the effects of attempting to prevent HIV transmission among students, for one cannot assume that knowledge will always lead to action.

Acknowledgments

The authors wish to acknowledge the support of the Ruth E. Warnke Tuition Research Award and The Thayer Raymound Fellowship for research award. Thank you to the University of Zambia and the MOE for their support, and to the many teachers who share their trust and stories. Thank you to the journal reviewers for helping to improve the manuscript.

References

1. UNAIDS (2006). *Report on the global AIDS epidemic 2006* (Report). UNAIDS, Geneva, Switzerland.

2. UNESCO (2005). Towards an AIDS-Free generation: The global initiatives on HIV/AIDS and education. International Institute for Educational Planning, Eugrne Delacroix, Paris

3. Kelly, M.J. (2000). Planning for Education in the Context of HIV/AIDS (Paris, UNESCO IIEP).

4. Kelly, M.J. (1999). *The Impact of HIV/AIDS on Schooling in Zambia*. Paper presented at the 11th International Conference on AIDS and STDs in Africa (ICASA) Roundtable on the Social Impact of HIV/AIDS

5. Tijuana, J. T. A., Finger, W., Daileader Ruland, C., & Savariaud, S. (2004). Teacher Training: Essential for School-Based Reproductive Health and HIV/AIDS Education Focus on Sub-Saharan Africa. *Family Health International, YouthNet Program.*

6.Paulussen T, Kok G, Schaalma H, Parcel GS,.*Diffusion of AIDS curricula among Dutch secondary school teachers*. Health Education Quarterly 1995; 22: 227–43.

7. Popham, W.J, Hall, E, A. Booklet 3: Appraising an HIV Curriculum (1992). Division of adolescent and School health National Center for Chronic Diseases Prevention and Health Promotion Centers for Disease Control. Retrieved May, 2005 from http://www.cdc.gov/HealthyYouth/publications/hiv_handbook/pdfs/hivintro.pdf

8. Schwandt, T. A. (Ed.) (2001) Dictionary of qualitative inquiry (2nd ed.). Thousand Oaks, CA: SAGE.

9. Spradley, M., & McCurdy, D. (1987). *Readings in cultural anthropology: Conformity and conflict* (6th ed.). Boston, MA: Little, Brown, and Company.

10. Lupton, D. (Ed.). (2000). *The handbook of social studies in health and medicine.* London: Sage Publications Ltd.

11. Glasersfeld, E. V. (1995). Radical Constructivism: A Way of Knowing and Learning. *Annual Review of Psychology, 49,* 345-375.

12. Armstrong, D. (1984). The Patient's View. *Social Science and Medicine 18,* 737-744.

13. Dudwick, N., Kuehnast, K., Nyhan, J., and Woolcock, M. (2006). Analyzing Social Capital In Context: A Guide to Using Qualitative Methods and Data (pp. 1-52). Washington, D.C.: World Bank Institute.

14. Watkins, S., & Gray, J. (2006). Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome: A Survey of the Knowledge, Attitudes, and Beliefs of Texas Registered Nurses in the 21st Century. *Journal for Nurses in Staff Development, 22*(5), 232.

15. Barnard, H., R. (Ed.). (2006). *Research Methods In Anthropology Qualitative and Quantitative Approaches* (Fourth ed.). Lanham, MD: Altamira Press, A division of Rowman & Little Publishers, Inc.

16.King, G. (1997). *A Solution to the Ecological Inference Problem: Reconstructing Individual Behavior from Aggregate Data* Princeton, NJ: Princeton University Press.

17. Portney, L., & Watkins, M. (Eds.). (2000). *Foundations of clinical research: Applications to practice* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

18. Tabachnick, G. B. and Fidell, L. (Ed.). (2001). *Using Multivariate Statistics: A Pearson*

Education Company. Needham Heights, MA: Allyn & Bacon.

19. Golafshani, N.(2003).*Understanding Reliability and Validity in Qualitative Research.* The Qualitative Report 8(4), 597-607.

20. Guest, G., Bunce, A., and Johnson, L. (2006). How Many Interviews Are Enough? An Experiment with Data Saturation and Variability. *Field Methods, 18*(1), 59-82.

21. Bandura, A. (1977). Social Learning Theory. New York, NY: General Learning Press.

22. Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research.* Reading, Mass: Addison-Wesley.

23. Mathews, C., Boon A., Flisher J., Schaalma. H.P. (2006). Factors associated with teachers' implementation of HIV/AIDS education in secondary schools in Cape Town, South Africa. *AIDS Care, 18*(4), 388-397.

24. Dawson, L., Chunis, M., Smith, M., Danielle, & Carboni, A. A. (2000). The Role of Academic Discipline and Gender in High School Teachers' AIDS-Related Knowledge and Attitudes. *Journal of School Health, 71*(1), 3-8.

25.Nyblade, L.C. (2006). Measuring HIV stigma Existing knowledge and gaps. Psychology Health and Medicine. 11(3),225-345.

26. White, D. M., & Ballard, D. J. (1993). The status of AIDS/HIV Education in the Professional Preparation of Perseveres Elementary Teachers. *Journal of Health Education, 24*(2), 68-72.

27. Eisenberg, M., Bernat, D., Bearinger, L., and Resnick, M. D. (2008). Support for Comprehensive Sexuality Education: Perspectives from Parents of School-Age Youth. *Journal of Adolescent Health, 42*, 352-359.

28. Santelli, J., Ott, M., Lyon, M., Rogers, J., Summers, D., and Schleifer, R. (2006). Explaining Recent Declines in Adolescent Pregnancy in the United States: The Contribution of Abstinence and Improved Contraceptive Use. *American Journal of Public Health, 97*(1), 150-156.

29. Skelton, C. (1989). And so the wheel turns... Gender and initial teacher education'. In C. E. Skelton (Ed.), *Whatever Happens to Little Women?* (53-67). Open University Press, Milton Keynes.

Table 1 Summary statistics per school type†

	Public	Private	Community	Total
Age (Mean; SD)	36.0 (7.1)***	34.8 (8.7)	32.4 (9.1)***	34.5 (8.4)
Sex (%)				
Female	41.9	52.5**	42	45.4
Male	57.8	46.6**	58	54.6
Years of education (Mean; SD)	13.6 (4.5)***	13.0 (4.6)**	10.5 (4.1) ***	12.4 (4.6)
Religion (%)				
Catholic	18.9**	21.5	32.7***	24
Evangelical	74.1***	65.5	58.8***	66.5
Others‡	7.0	13.0**	7.5	9.5

* $p<0.1$; $p<0.05$; $p<0.01$

† Chi-square test was run on categorical variables; t-test was run on continuous variables (age; years of education).

‡ Others include: atheist; Muslim; Baptist, etc.

Table 2. Summary statistics for education activities within each school type (community, government, and private)

Variables	Community School	Public/Government School (GRZ)	Private/Church Schools
Total number of Teachers	226 (31%)	270 (37%)	223(31%)
Techniques			
Event #1- drama group	134 (59.3%)	41 (8.4%)	41 (18.4%)
Event #2- class lecture	122 (54%)	96 (35%)	61 (27.4%)
Event #3- outside guest lecturer	57 (25.2%)	59 (21%)	44 (19.7%)
Event # 4 - other	20 (8.8%)	27 (10%)	32 (14.3%)
Event # 5 – no activities	15 (6.6%)	36 (13.3%)	73 (32.7%)
Topics addressed			
How someone can acquire HIV/AIDS	88 (8.9%)	95 (35.2%)	72 (32.2%)
Common myths	11 (4.9%)	7 (2.6%)	8 (3.6%)
Where to buy or obtain a condom	4 (1.8%)	5 (1.9%)	3 (1.3%)
HIV, STD, or pregnancy prevention	4 (1.8%)	1 (0.4%)	0 (0%)
HIV testing	38 (16.8%)	44 (16.3%)	27 (12.1%)
Relationships	74 (32%)	91 (33.7%)	47 (21%)
Have not discussed any of the above topics	7 (3.1%)	27 (10%)	66 (29.6%)

Table 3 Estimated coefficients of logistic regression model for HIV education adoption (HIVadd)

Logistic regression for HIV-education adoption

Variables	**β**	**Std. Error**	**O.R**
Constant	0.21	1.62	1.24
Public School†	0.98***	0.27	2.67
Community School†	1.68***	0.34	5.39
Age	-0.01	0.01	0.99
Female	0.28	0.21	1.33
Years of education	-0.05*	0.02	0.94
Need score	0.04	0.04	1.04
Knowledge score	-0.02	0.07	0.98
Efficacy score	0.10***	0.02	1.11
Attitude score	0.01	0.03	1.00
Gender norms score	-0.01	0.01	0.98
Stigma score	-0.06	0.09	0.94
Catholic†	-0.09	0.44	0.91
Evangelical†	0.20	0.40	1.23

Dependent Variable: HIV adoption (N=654)

* p<0.10; ** p<0.05; *** p<0.01

† Reference categories: Private school; Other religion.

‡ Nagelkerke R2= 0.196

Table 4 Estimated coefficients of linear regression model for teachers' perceived needs

Variables	Estimated Coefficients	Std. Error	p-value
(Constant)	6.01	1.41	0.00
Community School †	-2.98	0.26	0.00
Private/Church School†	-1.84	0.26	0.00
Age	0.01	0.01	0.93
Sex	0.15	0.13	0.25
Years of education completed	0.05	0.02	0.02
Catholic**	-0.54	0.39	0.16
Evangelical**	-0.34	0.35	0.33
Adoption score	0.30	0.13	0.02
Knowledge score	-0.02	0.06	0.66
Gender norms score	0.03	0.01	0.04
Attitude score	0.03	0.02	0.24
Self-efficacy	0.09	0.02	0.00

Dependent Variable: perceived needs(N=654)

† Reference category: Private school

**Reference category:

other religion

R= 0.26