HIV/AIDS AND SCIENCE EDUCATION IN NAMIBIAN SECONDARY SCHOOLS

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT

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ABSTRACT

Previous studies alluded to the impacts of HIV/AIDS on education in Namibia. While such studies implied that secondary school science education was under the threat of Human Immuno-deficiency Virus/Acquired Immuno-Deficiency Syndrome (HIV/AIDS), there was a paucity of disaggregated and empirical data that spoke to the specific linkages between HIV/AIDS and secondary school science education. Therefore, the purpose of this study was to elucidate the HIV/AIDS impacts, risk factors, and knowledge gaps among secondary school science teachers and learners in Namibia. The study also analysed the pedagogical and ecological factors related to HIV/AIDS education in Namibian secondary schools.

A quantitative research approach was mainly utilised in this cross-sectional survey of science teachers and learners. Using a three-stage cluster sample design, eighteen secondary schools from six education regions were randomly selected. Life Science/Biology learners and teachers formed the tertiary sampling units. Separate questionnaires were completed by 829 learners and 61 teachers, respectively. Data were analysed using non-parametric and parametric statistics.

The results revealed low putative HIV/AIDS-related losses of science teachers and learners. Coping with HIV/AIDS was significantly associated with absenteeism, stress, lack of concentration, and poor performance in class. Learners' high risks to HIV infection were evidenced by their early age of coital debut, high sexual activity, multiple sexual partners, transactional and intergenerational sex, low condom use, and pregnancies. Demographic characteristics also placed science teachers at high risk of HIV infection. Both sets of respondents demonstrated remarkable gaps in

their knowledge of basic facts and new insights of HIV/AIDS. Similarly, the pedagogy of HIV/AIDS was fraught with constraints of inadequate resources, teacher training, and lack of examination of the HIV/AIDS content.

Statistical analysis showed learners from all the six regions were unanimous that HIV/AIDS education should be a separate subject taught by a specially trained teacher. This evidence persuaded a pedagogical paradigm shift from the current integrative approach whereby Life Science and Biology subjects were the vectors of HIV/AIDS education in secondary schools. Ecological factors that affected the delivery of HIV/AIDS education and prevention included the lack of teaching resources, extra-curricular activities, condoms, Voluntary Counselling and Testing services, and school-community interactions. In the wake of these findings, the study argued for the reform of secondary school curricula and educational policies pertinent to HIV/AIDS education and prevention.

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You see, God puts the genetic potential to obtain all we desire within us. It's finding the drive to express that potential that proves arduous for most. It requires hard work, sacrifice, modesty, and the ability to improve on one's strengths, and most of all, our failings. It takes a lot of humility to ask God and our fellow human beings for help. You'd be amazed how difficult it is to ask. Therefore, God, I thank you for all the people that agreed to assist me. I thank you for Prof. Choshi D. Kasanda, my main supervisor, for his encouragement and guidance during the study; Dr. D. Zealand and Dr. C.N. Shimwooshili-Shaimemanya for co-supervising the study.

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God you're amazing: you forgo me strong legs, but endow me with strong brains. I cannot fault you Lord, no. God I thank you for a painful childhood; it makes me appreciate the true meaning of pleasure. God I thank you for my weaknesses, they help me become stronger. I thank you for ignorance, it helped me to learn.

Finally, thank you God Almighty for this doctorate, so laborious, it is so sweet.

DEDICATION

Tumusakililenu

Nzambi diyi muwahi

Luwi lwindi lwaswezha

Luwi lwahayanyaka

(Praise be to God)

Nzambi wenka wemazhala

(God gives to those that seek)

This, my doctoral dissertation, is dedicated to my mother. Thank you for bringing me into this world, and for raising me up, under difficult times.

DECLARATIONS

I, Kazhila Croffat Chinsembu, declare hereby that this study is a true reflection of my own research, and that this work, or part thereof has not been submitted for a degree in any other institution of higher education.

I, Kazhila Croffat Chinsembu, grant The University of Namibia the right to reproduce this dissertation in whole or in part, in any manner or format, which The University of Namibia may deem fit, for any person or institution requiring it for study and research; providing that The University of Namibia shall waive this right if the whole dissertation has been or is being published in a manner satisfactory to the University.

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Kazhila Croffat Chinsembu 16th November, 2010.

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LIST OF ABBREVIATIONS/ACRONYMS

AIDS- Acquired Immuno-Deficiency Syndrome
ANOVA- Analysis of Variance
ARVs- Antiretrovirals
CD4- Complementarity Determinant type 4 cell
EMIS- Educational Management Information Systems
FHI- Family Health International
GRN- Government of the Republic of Namibia
GTZ- Deutsche Gesellschaft fur Technische Zusammenarbeit
(Germany Overseas Technical Cooperation)
HIV- Human Immuno-deficiency Virus
HBM- Health Belief Model
KNAPS- Knowledge, Norms, Attitudes, Practices, and Skills
NIED- National Institute for Educational Development
TPB- Theory of Planned Behaviour
UNAIDS- United Nations Programme for AIDS
UNDP- United Nations Development Programme
UNECA- United Nations Economic Commission for Africa
UNESCO- United Nations Educational, Scientific and Cultural Organization
UNICEF- United Nations Children's Emergency Fund
USAID- United States of America International Development
WHO- World Health Organization

CHAPTER 1: INTRODUCTION

The current dissertation focussed on the HIV/AIDS impacts, risk factors, and knowledge gaps among Namibian secondary school science teachers and learners. It also elucidated the constraints of integrating HIV/AIDS education into the syllabi for secondary school Life Science and Biology subjects in Namibia. In addition, the study explored the professional and organizational dimensions through which HIV/AIDS education was being delivered in Namibian secondary schools. This chapter presents the background, statement of the problem, goals, research questions, significance, limitations, and delimitations of the study.

1.1 Background of the study

Namibia is a semi-arid country with a population of 2.1 million people spread over an area of 823,145 square kilometres (Ministry of Health and Social Services & Macro International Inc., 2008). Situated in south-western Africa, Namibia is divided into thirteen administrative regions: Caprivi, Erongo, Hardap, Kavango, Karas, Khomas, Kunene, Ohangwena, Omaheke, Omusati, Oshana, Oshikoto, and Otjozondupa.

The Namibian population consists of various ethnic groups: Ovambo (50.0%), Damara-Nama (12.0%), Kavango (9.0%), Herero (7.0%), Lozi (4.0%), San (3.0%), Baster (2.0%), and Tswana (0.5%) (Ministry of Health and Social Services & Macro International Inc., 2008). Ethnic identity is stronger than national identity, with 75.7% of Namibians feeling much stronger ties to people from their own ethnic groups than to fellow nationals of other ethnic groups (Shaw-Taylor, 2008).

People in different regions and ethnic groups have various cultures. For instance, the Ovambo people have pre-initiation sexual customs such as *ewilo* (whereby girls and boys sleep together without being expected to engage into penetrative sex) and sexual initiation ceremonies known as *efundula* and *ohango* (Mufune, 2003). Young Ovambo boys also perform a dance known as *etenda* (Fairweather, 2006) while young girls do *oudano*, a moonlight dance with praise songs for boys (Mufune, 2003). Tuupainen (1970) described the details of these practices but to-date, there are contradictory views as to whether these ceremonies delay or encourage coital behaviour among young people.

Mufune (2003) reported that multiple sexual partnerships were discouraged through sexual taboos such as *oshaatu*, *oshiwatu*, and *oshili*. The author stated that these Ovambo taboos prescribed that married women that were unfaithful would die of cramps during child labour. He also documented a taboo called *oshithitikila* which deemed that married men that were unfaithful caused death to their babies or wives. However, in the Herero culture, a practice called *tjiramue* allows males to have sex with their female cousins regardless of whether they are married or not (Desert Soul, 2008). The Desert Soul reported that during sex with *tjiramues*, there was no negotiation about condom use. Among the Lozi people of the Caprivi region, a female sexual initiation ceremony called *mulaleka* is also known to mediate the transmission of HIV/AIDS (Chinsembu, 2010a).

In most Namibian ethnic cultures, the payment of *lobola* (bride-wealth) has also been misinterpreted to mean that married women cannot refuse sex or negotiate condom use with unfaithful husbands (Thomas, 2007). Young men that cannot afford *lobola* resort to casual sexual partners. Some of these cultural practices influence sexual dynamics that underlie the heterosexual transmission of HIV/AIDS.

Besides ethnic and cultural traits, the sexual transmission of HIV/AIDS is also linked to poverty. Poverty is known to lower self-esteem and increase the vulnerability to HIV/AIDS infection (Ajzen & Manstead, 2007). Under poor socio-economic conditions, people may engage in transactional sex with HIV-infected persons. Tersbol (2006) also stated that HIV/AIDS is traceable to the vortex of poverty, deprivation, and inequality that characterises certain regions of Namibia. For example, Caprivi and Ohangwena regions, the two regions hardest hit by HIV/AIDS (GRN, 2008a), are the poorest in Namibia (UNDP, 2000). However, this argument is contestable because in Southern Africa, it is not the poorest countries that are worst hit by the epidemic (witness Botswana, Swaziland and South Africa).

Be that as it may, HIV prevalence in Namibia is among the highest in the world (De la Torre, Khan, Eckert, Luna, & Koppenhaver, 2009). The average national prevalence of HIV was 18.8% in 2009 (Katuta, 2011). According to GRN (2008a), the prevalence rate for HIV rose from 4.2% in 1992, to 22.0% in 2002, and 17.8 % in 2008 (Figure 1).

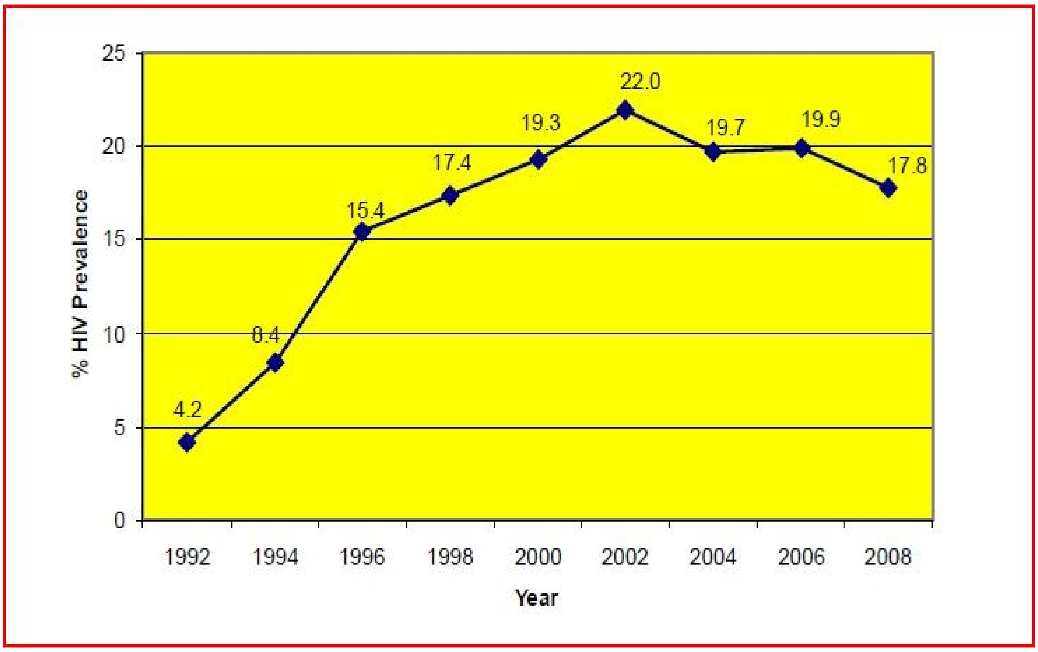

Figure 1: HIV prevalence rate in pregnant women, biannual survey 1992-2008, Namibia (Source: GRN, 2008a, p.11)

The first four cases of HIV/AIDS were reported in Namibia in 1986 (GRN, 2004a). By 2001, it was estimated that there were about 230,000 adults and children living with HIV/AIDS (GRN, 2004a). That was a staggering figure considering Namibia's small population. In 2008, the number of people living with HIV/AIDS was estimated at 204,000, with 14,000 new infections during that year alone, at a rate of 39 new infections per day, and 77.0% of the new infections were in females (GRN, 2008a). At the end of August 2009, there were approximately 70,000 Namibians on antiretroviral treatment (Chinsembu, 2009a).

Thus, Ahmad (2001, p.371) stated that "according to UNAIDS, Namibia had the most HIV cases in the world, with at least 20.0% of sexually active adults infected. As a result, AIDS remains the number one killer among Namibians". De la Torre et al. (2009, p.1) also stated that "HIV prevalence in Namibia is among the highest in the world". In 2006, the USAID (2006a) revealed that Namibia was one of the top five AIDS-affected countries in the world. Goveia (2000, p.32) also wrote that "800,000 Namibians would die of AIDS by 2010". Whether such projections were accurate is still unknown. However, due to HIV/AIDS, life expectancy decreased from 62 years in 1996 to 44 years in 2006 (Family Health International, 2007).

Namibia has a generalized HIV/AIDS epidemic (GRN, 2008a). HIV prevalence rates vary across different age groups: 5.1% (15-19 year olds), 14.0% (20-24 year olds), 23.8% (25-29 year olds), 27.2% (30-34 year olds), 26% (35-39 year olds), 17.7% (40-44 year olds), and 13.8% (45-49 year olds) (GRN, 2008a). Given these statistics, HIV prevalence rates for secondary school learners and teachers in this study were expected to range from 5.0% to 24.0% and 14.0% to 28.0%, respectively.

Figure 2 shows that the geographical distribution of HIV in Namibia is higher in the north-eastern part of the country (more than 30.0% in the Caprivi region) than in the south (less than 10.0% in the Omaheke region (De la Torre et al., 2009). There are also variations in HIV prevalence rates according to HIV testing sites: 4.7% (Windhoek Central Hospital), 11.6% (Eenhana), 18.8% (Rundu), 19.6% (Outapi), 21.7% (Katutura State Hospital, Windhoek), 25.9% (Tsandi), and 31.7% (Katima Mulilo) (GRN, 2008a). Among 15-24 year olds, HIV prevalence rates were: 6.1% in Eenhana, 9.1% in Outapi, 12.4% in Rundu, 12.5% in Katutura, 23.7% in Tsandi, and 24.0% in Katima Mulilo, (GRN, 2008a).

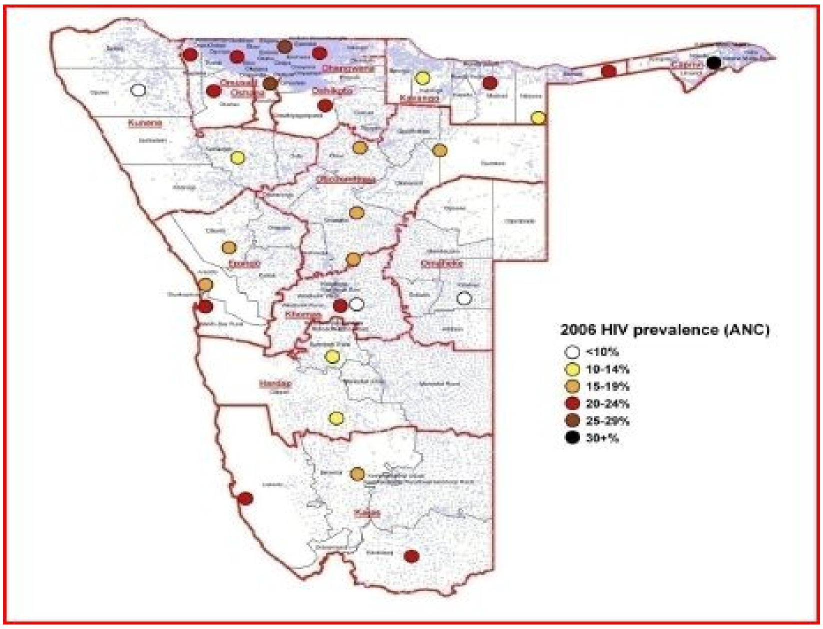

Figure 2: Namibia's HIV prevalence rates in 2006 (Source: De la Torre et al., 2009, p.5)

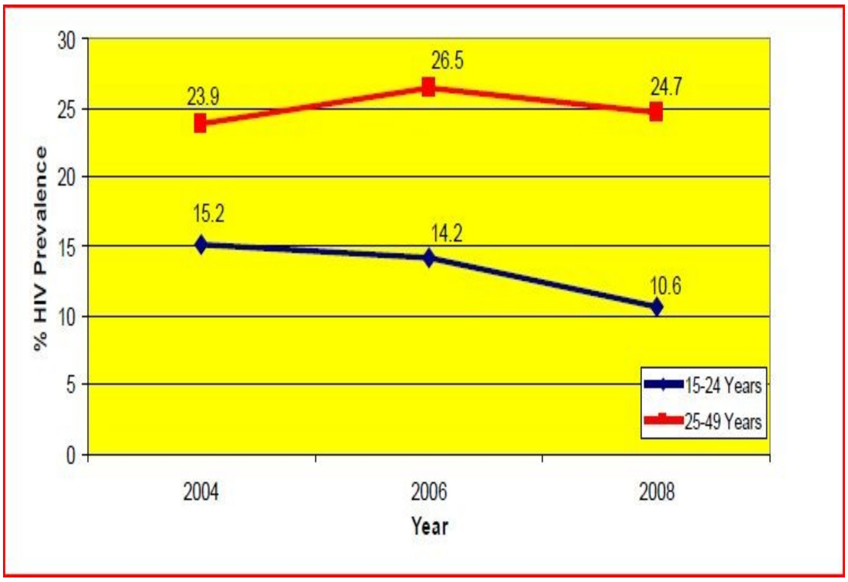

Figure 3: HIV prevalence rates in youth and adult age groups, 2004-2008 (Source: GRN, 2008a, p.18)

Figure 3 shows that on national level, HIV prevalence rates among 15-24 year olds reduced from 15.2% in 2004 to 10.6% in 2008 (GRN, 2008a). Among youths aged 15-19 years, HIV prevalence declined from 12.0% in 1998 to 10.0% in 2004 (UNICEF, 2006a). HIV prevalence rates differ according to rural-urban locations. In urban areas, HIV prevalence was 4.4% among 15-19 year olds, and 14.5% among 20-24 year olds (GRN, 2008a). In rural areas, HIV prevalence was 5.8% among 15-19 year olds, and 13.5% among 20-24 year olds (GRN, 2008a).

Women in Namibia are infected quite young, with approximately 10.0% of pregnant adolescents aged 15 to 19 years already infected. By age 34, almost one third of pregnant women are HIV positive (De la Torre et al., 2009). “Among women, the odds of testing positive were highest for those between the ages of 30 and 39, whereas for men the odds were highest at slightly older ages (35 to 45)”, stated De la Torre et al. (2009, p.13).

The HIV epidemic in Namibia is predominantly due to heterosexual and mother-to-child transmission (GRN, 2004a), although Lorway (2006) observed same-sex relationships in Katutura and dismissed the notion of ‘heterosexual African AIDS’ in Namibia. Baral, Trapence, Motimedi, Umar, Iipinge, Dausab, and Beyer (2009) found an average of 12.4% HIV prevalence rate among men who have sex with men in Namibia. Rogers, Ucello, and Sommerfelt (2010) reported that 9.0% and 5.0% of male and female Namibian teachers, respectively, had same sex partners.

Notkola, Timæus and Siiskonen (2004) observed that in northern Namibia, post-neonatal mortality increased more than six-fold while mortality for children aged 1-4 years increased more than threefold between 1991 and 2000. Further, Namibia had an HIV-attributable under-5 mortality of above 30 per 1000 (Walker, Schwartlander, & Bryce, 2002). By the year 2000, adult mortality for women was 3.5 times, and for men 2.5 times its 1993 level; and the increase in adult mortality was concentrated at ages 30-54 years for men and 25-49 years for women (Notkola et al., 2004). Increase in maternal mortality was attributed to HIV/AIDS (Van Dillen, Stekelenburg, Schutte, Walraven, & Van Roosmalen, 2007). According to official estimates (GRN, 2008b, p.20):

> Approximately 5,400 persons died of AIDS related causes in 2007/08 in Namibia (plausibility bounds 3,700 to 7,300). This reduced from an estimated 9,200 deaths per year in 2003/04 – before the roll out of ARVs [antiretrovirals]. Even with the continued rapid roll out of ARVs, the number of deaths per year due to AIDS will likely increase slightly over the next 5 years to 7,500 in 2012/13. This increase is due to the increasing size of the population starting on treatment. Some of those individuals will die because their body's systems do not respond to treatment, they avoid starting treatment because of the stigma, they stop taking medicines because of the side effects, or they default on their medication. In addition this increase is due to the larger population on treatment reaching older ages. The number of HIV positive people over age 50 will increase by 70.0% between 2006/07 and 2012/13.

The statistics presented above strengthen the case that HIV/AIDS is a serious threat to development in Namibia. In fact, Gonzales (2000, p.120) noted that "the infection of a large percentage of the population with HIV could significantly hinder national development" in Namibia. The UNDP projected that HIV/AIDS would make Namibia lose a quarter to a third of its workforce by 2020 (UNDP, 2000).

Specifically, the Human Development Report warned that gains emanating from increased investment into science and technology would be eroded by the HIV/AIDS epidemic (UNDP, 2000). Against this background, it is apparent that HIV/AIDS is a bona fide threat to secondary school science education in Namibia.

Other reports also estimated that about 20.0% of teachers would be lost between 2002 and 2010 due to HIV/AIDS (Abt Associates, 2002); and “over one quarter of the nation’s [Namibia] investment in education could be lost through premature AIDS illness and deaths among today’s learners” (Abt Associates, 2002, p.127). However, both UNDP and Abt Associates’ survival models were computed at a time when there was a paucity of free antiretroviral therapy (ART) for HIV/AIDS patients. Notwithstanding the authenticity of these HIV/AIDS impact estimates given the current roll-out of ART, the argument that HIV/AIDS is a bona fide threat to the Namibian government’s renewed focus on secondary school science education is still compelling. Three case scenarios support the broad contention that HIV/AIDS is a subtractive factor to secondary school science education in Namibia.

First, it is estimated that with decreased worker productivity because of HIV/AIDS, there may be a reduction in Namibia’s annual economic growth rate (UNDP, 2000). The assumption is that reduced economic growth could stunt government revenue, hence less and less government subventions may trickle into education in general and science education in particular.

Second, from 2000 to 2004, the Namibian health and social services sector obtained 14.0-15.0% of the total budget while the total health budget accounted for about 5.0% of total Gross Domestic Product (Phororo, 2003). In 1996, AIDS cost almost

8.0% of Namibia's Gross National Product (ONAP, 1999). The estimated direct and indirect costs of HIV/AIDS to Namibia for the years 1996-2001 added up to N$8.6 billion, more than the 1999 budget of N$7.6 billion (Rabbow, 2001; UNDP, 1998).

In the longer term, HIV/AIDS is expected to increase the health burden and budget, forcing government to rationalize, meaning resources may be diverted from projects such as secondary school science education. Already, Marope (2005) stated that HIV/AIDS would divert investment from activities such as education, training, and knowledge creation.

Third, with an overall HIV prevalence rate of 18.8% of the adult population, coupled with observations that 50.0% of deaths among persons aged 15-19 years of age were attributable to AIDS (Family Health International, 2008), the reading is that Namibia may lose the human resource base required to launch and sustain the scientific and technological renaissance project.

Undoubtedly, the vicious impacts of AIDS on science education are undeniable when viewed against the backcloth of HIV prevalence rates among Namibian teachers and learners in general. Rogers et al. (2010) stated that 14.4% of Namibian teachers (15.0% females and 12.0% males) self-reported being HIV-positive. That meant 2,880 teachers out of the country's approximately 20,000 teacher population were infected with HIV. Other "projections suggest that around one in seven teachers are HIV-infected", stated the Abt Associates' report (2002, p.vi).

The proportions of HIV-positive teachers varied across age groups: from 3.0% in those aged 25 years and younger to 19.0% in those aged 40-49 years. Further, the percentages of HIV-positive teachers in the regions of Caprivi, Kavango, Khomas, Ohangwena, Omusati, and Oshikoto varied between 6.0% and 24.0% (Rogers et al., 2010). Teacher death rates per annum averaged 1.5% between 2000 and 2002, with higher rates of 2.0% in northern regions of Namibia (Abt Associates, 2002). This death rate translates into the mortality of 400 teachers per year.

In terms of learners, “Radio Namibia reported that 10.0% of the school-age children in the north-western region of the country were already HIV-positive” (Gonzales, 2000, p.120). By 2006, infant mortality ranged from 27 deaths per 1,000 live births in the Kunene region to 78 deaths per 1,000 live births in the Caprivi region (Ministry of Health and Social Services & Macro International Inc., 2008). In 2009, 50.0% of all deaths among Namibian children under the age of five were attributable to HIV-related conditions (Kaiser Daily HIV/AIDS Report, 2009).

The above figures contend that without effective interventions, Namibian education in general and secondary school science education in particular may crumble under the heavy burden of HIV/AIDS among teachers and learners. Already, HIV/AIDS has compounded the problems of teacher absenteeism, attrition, and turnover (GRN, 2008c). Teacher absenteeism is mostly due to chronic sick leave (46.3% of all leave) and funeral attendance (31.0% of all leave) (GRN, 2008c). There is “evidence…that demand for relief teachers is increasing due to a combination of factors including HIV and AIDS impact” (GRN, 2008c, p.8).

Financial costs of teacher absenteeism, including payments for relief teachers, were extrapolated to reach at least N$60 million in 2005 (GRN, 2008c). Further, “the implied loss of contact time in the classroom had its own profound cost in respect of reduced learning and teaching, quality and output. EMIS data on pass rates bear testimony to the extent of this problem, and it is reasonable to suppose this is related to both official and unofficial absenteeism" (GRN, 2008c, p.21). Taken together, HIV/AIDS-related absenteeism has increased the cost of education but reduced teacher supply, performance, and learner pass rates in Namibia.

Furthermore, the argument that secondary school science education and its spill-over benefits are constrained by HIV/AIDS is congruent with the views of Guinness, Walker, Ndubani, Jama, and Kelly (2003) who contend that the HIV/AIDS epidemic represents an obstacle to productive employment and economic development. Guinness et al. (2003) stated that employers would experience severe staff shortages, reduced productivity, and increased costs because of protracted ill-health and death among their workforce. Earlier, Ojo and Delaney (1997) also lamented that the AIDS epidemic in Namibia would aggravate poverty and increase levels of social inequality. The view that HIV/AIDS would downplay secondary school science education was also in conformity with the African Development Forum's warning that many countries in Southern Africa would not attain their development goals due to the negative impacts of HIV/AIDS (UNECA, 2000).

In response to the eminent threats of HIV/AIDS on Namibian education, the then Ministries of Basic Education, Sport and Culture, and Higher Education, Training and Employment Creation set up the HIV/AIDS Management Unit (HAMU) in 2003 (UNESCO, 2008a). In partnership with other stakeholders, HAMU spearheaded a new curriculum for HIV/AIDS education in schools. The *Window of Hope*, an after-school life skills HIV/AIDS education programme, was implemented in all primary, combined, and secondary schools starting in 2004 (UNICEF, 2004; 2005). This behaviour change AIDS prevention and care programme was divided into 'junior windows' (aimed at children that had not yet attained puberty) and 'senior windows' (intended for children that had already reached puberty). Another extra-curricular life skills programme called *My Future is My Choice* was introduced by the Ministry of Education (UNICEF, 2006b). This programme was aimed at preventing HIV infection, unwanted pregnancies, and alcohol abuse among young people in secondary and combined schools.

Currently, HIV/AIDS education in secondary schools is delivered through science subjects such as Life Science (for learners in Grades 8-10) and Biology (for learners in Grades 11-12). In Grade 9 Life Science, HIV/AIDS is taught during the topic on health education. Here, the HIV/AIDS content is restricted to: types of HIV tests, knowing one's HIV status, symptoms of HIV, and statistics of the global epidemiology of HIV/AIDS in 2001 (s & Lourens, 2008). In the Grades 11-12 Ordinary level Biology syllabus, the role of a balanced diet for HIV-positive persons is taught under the topic on nutrition in humans (NIED, 2010). The topic on human reproductive system contains further content on HIV/AIDS, namely: methods of transmission and prevention, increased vulnerability of Namibians to other illnesses due to the increased prevalence of HIV, and the socio-economic consequences of AIDS (NIED, 2010).

Moreover, HAMU created a decentralised Education Management Information System (EMIS) for capturing, analysing and monitoring HIV/AIDS impacts and interventions (UNESCO, 2008a). Despite the presence of EMIS, Notkola, Timaeus and Siiskonen (2004) bemoaned that few data are available on the impacts related to HIV/AIDS mortality and morbidity in Namibia. Guinness et al. (2003) also stated that the scale of the HIV/AIDS impacts has not been fully estimated, and the roadmap through which HIV-related impacts can be ameliorated by control measures, including effective treatment of opportunistic infections, is not well known. Given this background, the current study is a modest effort towards a better understanding of the backward and forward linkages between secondary school science education and HIV/AIDS in Namibia.

1.2 Statement of the problem

Abt Associates (2002) cautioned that routine EMIS data do not often provide adequate information to guide planning and allow interpretation of trends in a period of growing changes and uncertainties due to HIV/AIDS. More non-routine data would be required to inform planning and monitoring of HIV/AIDS in schools. Other workers also advised against a holistic and aggregated study of the educational system. Boler (2003, p.7) cautioned that "teachers are not a homogenous group and data should therefore be disaggregated as much as possible. It follows that impact management must, at the very least, be country specific, and target different sub-groups of teachers in different ways".

Despite the need to study different sections of the Namibian educational sector, there were no empirical and specific reports (to the researcher's knowledge) that spoke to the impacts of HIV/AIDS on the supply, demand and quality of science education at secondary school level. Evidence of the risk factors, knowledge gaps, norms, attitudes, and practices of secondary school science teachers and learners with regard to HIV/AIDS is also anecdotal. Corollary, myths and misconceptions that exist among secondary school science teachers and learners are not clearly understood.

In 2003, HIV/AIDS education was incorporated into the syllabi for Life Science, Biology and Life Skills (GRN, 2003). However, the HIV/AIDS content was not informed by an assessment of teachers' and learners' knowledge needs, and since 2003, the constraints that followed the infusion of HIV/AIDS content into Life Science and Biology subjects had not been revealed. According to Campbell and Lubben (2003), effective delivery of HIV/AIDS education depended on the quality of organizational and professional environments in secondary schools. However, it was not clear whether the professional and organizational environments in Namibian secondary schools were adequately prepared to deliver effective HIV/AIDS education and prevention. Against this backdrop, the purpose of this study was to explore the HIV/AIDS impacts, risk factors, knowledge gaps, constraints of twinning HIV/AIDS education to the science curriculum, and the organizational and professional dimensions of HIV/AIDS education in Namibian secondary schools.

1.3 Goals of the study

The study focussed on the impacts of HIV/AIDS on secondary school science teachers and learners, their risk factors and knowledge gaps, constraints of twinning HIV/AIDS education to Life Science and Biology subjects, and organizational and professional dimensions of HIV/AIDS education in secondary schools. The study was an inaugural effort towards the creation of knowledge about HIV/AIDS and secondary school science education in Namibia.

The immediate objective of the study is to collect data that elucidate the HIV/AIDS impacts, risk factors, and knowledge gaps among secondary school science teachers and learners. The long-range objective of the study is to inform the discussion of HIV/AIDS in Namibian secondary schools, and present empirical evidence that would eventually become fodder to persuade a paradigm shift at curriculum and educational policy levels. By so doing, the study constitutes a praxis upon which a negotiated HIV/AIDS curriculum and policy may be developed. In other words, the study forms a lens through which Namibian curriculum specialists and policy makers may mould appropriate HIV/AIDS curricula and policies for secondary schools.

In terms of goals, the study is expected to:

1. Reveal the impacts of HIV/AIDS on secondary school science teachers and learners;
2. Establish an awareness of the risk factors that fuel HIV/AIDS infection among secondary school teachers and learners;
3. Create an understanding of the contextual and personal barriers that hinder secondary school teachers and learners from enacting recommended HIV/AIDS behaviours;

4. Highlight secondary school science teachers' and learners' knowledge gaps and the need for them to seek new knowledge of HIV/AIDS;
5. Inform a paradigm shift towards novel and desirable HIV/AIDS curricula and policies for secondary schools;
6. Provide evidence that might help government and school authorities to amend the external environment in which secondary school science teachers and learners contract HIV/AIDS;
7. Inform the content of new secondary school science and HIV/AIDS education curricula and policies;
8. Elucidate targeted interventions that may enable secondary school science teachers and learners to effectively prevent and manage HIV/AIDS; and
9. Contribute to Namibian, regional, and global knowledge of HIV/AIDS and science education.

In sum, the study was undertaken as a contribution to evidence-based HIV/AIDS interventions, curricula and policies for secondary school science teachers and learners.

1.4 Research questions

With respect to the Namibian secondary schools, the study attempted to answer the following questions:

1. What are the impacts of HIV/AIDS on the supply, demand, and quality of science education?
2. What factors place science learners and teachers at the risk of HIV/AIDS infection?
3. What are the gaps in the knowledge, norms, attitudes, practices and skills of secondary school science learners and teachers towards HIV/AIDS?
4. What constraints affect the integration of HIV/AIDS education into the syllabi for Life Science and Biology subjects?
5. What professional and organizational dimensions affect the delivery of HIV/AIDS education and prevention?

1.5 Significance of the study

Data on how HIV/AIDS impacts secondary school science teachers and learners may enable government decision-makers, school authorities, community based organizations, and donors to devise appropriate coping strategies. Such coping strategies might enhance the personal performance of learners and teachers, and ultimately improve the quality of science education in secondary schools.

Overall, the study hoped to contribute knowledge towards targeted interventions that stem the impacts and risks of the HIV/AIDS epidemic on secondary school science learners and teachers. Understanding the factors that placed secondary school science learners and teachers at the risk of contracting HIV/AIDS would help peer-educators, the HAMU and the Regional AIDS Committees for Education teams to target appropriate behaviour change messages thereby reducing the number of new HIV/AIDS infections among secondary school science learners and teachers. Further, a knowledgeable cadre of secondary school science learners and teachers was needed to dispel myths and misconceptions about HIV/AIDS.

Given the rapid pace at which new HIV/AIDS knowledge was being discovered, there was a danger that secondary school science teachers and learners were ignorant of the new shifts in the understanding of HIV/AIDS. Sound knowledge of HIV/AIDS can encourage voluntary counseling and testing for HIV/AIDS, reduce stigma, and motivate positive living and treatment of those infected by HIV/AIDS. This would improve the management of HIV/AIDS and ensure that HIV-positive teachers and learners were productive.

The incorporation of HIV/AIDS education into the syllabi for Life Science, Biology and Life Skills was done without any baseline data (Campbell & Lubben, 2003). Results from this study could help curriculum developers and school authorities to strengthen the teaching and learning of HIV/AIDS education. But effective delivery of HIV/AIDS education shall also depend on the prevailing organizational and professional milieu in secondary schools. In this regard, the study shed light on the status of the organizational and professional environments in which HIV/AIDS education was being delivered in secondary schools. Such evidence may provide the basis on which educational policy makers and curriculum developers can formulate appropriate science and HIV/AIDS educational reforms.

1.6 Limitations of the study

Most of the data in the study were collected through the use of researcher-administered questionnaires. However, since questionnaires elicited quantitative data, study participants might have misreported data either wilfully or because of failure to recall numbers and statistics. Moreover, not all researchable information was available in the form of numbers and statistics. Thus, the results of this study would have been enriched by qualitative data. Further, the study was based on data collected in a cross-sectional survey. In certain cases, it was difficult to ascribe causality to some of the associated factors in a cross-sectional study (Rothman & Greenland, 2005).

During the study, the researcher did not have access to teacher and learner medical reports due to ethical and confidentiality restrictions. Taboos and traditional norms also made it difficult to obtain sensitive personal data as some people might have felt uncomfortable to talk about HIV/AIDS. In addition, study sites in northern Namibia were more expensive to survey because of the long distances the researcher had to travel by road. In certain educational regions, it was difficult to obtain permission from authorities; therefore it was impossible to conduct research in certain schools. In such educational regions, the required sample size was not met. Among secondary school Life Science and Biology teachers, the required sample size of 100 was not achieved because most teachers were 'too busy' to complete the structured questionnaires.

1.7 Delimitations of the study

Study sites in northern Namibia were chosen because the highest HIV prevalence rates are in northern Namibia where close to 60.0% of the population is concentrated

(UNDP, 2000). The UNDP also reported that obstacles to HIV/AIDS prevention tended to be greatest in the north where the public educational system struggled to maintain basic aspects of science education delivery to learners. The researcher was based at the University of Namibia, Windhoek campus. Therefore, research sites in Windhoek (Khomas region) were less costly to survey. Regional Directors of Education and school principals in north-eastern Namibia (Caprivi, Kavango, Ohangwena, and Omusati) were very kind and immensely assisted the researcher during data collection. For that reason, the return rate for questionnaires was higher in those regions than in the Khomas region.

1.8 Clarification of terms

Knowledge: understanding of a particular phenomenon.

Norm: a designated standard or average behaviour within a society or group of persons.

Attitude: an individual's orientation or degree to like or dislike something.

Practice: custom or tradition of doing something.

Skill: ability or capacity to perform a task.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

A wealth of literature on HIV/AIDS and education enriched this study. The literature includes reports, journal articles, and books authored by authorities from the academia, government, United Nations, World Bank, bilateral and multilateral cooperating partners or donors, Non-Governmental Organisations, and consultancy firms. Only pertinent literature that sheds more light on the questions of the study is included in this chapter.

A study at this level cannot stand the vicissitudes of academic rigour unless it is based on a strong and sound conceptual framework. Likewise, the research questions posed and the subsequent instruments used cannot be meaningful unless they are supported by the empiricism of known theories. Therefore, the first part of the literature review discusses the conceptual and theoretical foundations upon which the study was conceived. Here, the usefulness of cognitive theories of behaviour, notably the Health Belief Model, and the Theory of Planned Behaviour, are applied to the understanding of HIV/AIDS behaviours. Later, arguments for fresh insights into Namibia's secondary school science and HIV/AIDS curricula and policies are articulated on a pedestal of critical and postmodernistic theories.

The second part of the literature review focuses on the following issues: historical and contemporary contexts of secondary school science education in Namibia; impacts of HIV/AIDS; general risk factors that fuel the HIV/AIDS; knowledge, norms, attitudes, practices, and skills in relation to HIV/AIDS; the incorporation of HIV/AIDS education into the school curriculum; and organisational and professional environments in which HIV/AIDS education is delivered in schools. The literature cited here is general in nature and does not specifically address HIV/AIDS and science education in Namibian secondary schools as presented in section 1.2 (Statement of the Problem).

2.2 Conceptual and theoretical frameworks

2.2.1 Importance of theory and conceptual/theoretical frameworks

The word *theory* originated from the Greek word *theoria* meaning "wakefulness of mind" (Ornstein & Hunkins, 1998, p.176). *Theory* enabled the researcher to wake up and start "pure viewing" (Ornstein & Hunkins, 1998, p.176) of the truth. *Theory*, they contended, explains reality; it makes people aware of their world and its interactions. Many scholars ascribe four functions of *theory*: description, prediction, explanation, and guidance (Ornstein & Hunkins, 1998). *Theory*, therefore, helped the researcher to describe or unravel the research problem: "without theoretical orientations, people cannot decide what facts to gather or what issues to address" (Ornstein & Hunkins, 1998, p.176). *Theory* also helped the researcher to explain the research findings. In this dissertation, the terms theoretical framework and conceptual framework are synonymous to theoretical orientations as in Ornstein and Hunkins (1998).

According to Punch (2009), a conceptual framework shows in a diagrammatic or narrative form the theoretical status of the factors and variables or phenomena researchers wish to study. Earlier, Tashakkori and Teddlie (2003) defined a conceptual framework as a consistent and comprehensive theoretical perspective emerging from an inductive integration of previous literature, theories, and other pertinent information. Of note was the fact that Tashakkori and Teddlie (2003) also used the terms conceptual framework and theoretical framework interchangeably. They emphasised that a conceptual framework was usually the basis for reframing the research questions or making informal tentative predictions about the possible outcome of the study.

However, Giroux (1983) was more eloquent about the importance of a theoretical framework. According to Giroux (1983, p.20):

> A dialectical notion of society and theory would argue that observation [research] cannot take the place of critical reflection and understanding. That is, one begins not with an observation [research] but with a theoretical framework that situates the observation [research] in rules and conventions that give it meaning while simultaneously acknowledging the limitations of such a perspective or framework.

Given the above prelude about the importance of theory and conceptual/theoretical frameworks, the researcher was compelled to critically reflect and understand the conceptual foundations of the study.

2.2.2 Definitions of health and health-related behaviour

The WHO defined health as “the state of complete physical, social and spiritual well-being, not simply the absence of illness” (Marks, Murray, Evans, Willig, Woodall, & Sykes, 2005, p.4). According to the WHO definition of health, it is quite likely that few individuals in Namibia are healthy. This is because, strictly speaking, it is very difficult to attain a complete state of physical, social, and spiritual well-being.

HIV/AIDS is the greatest health challenge in Namibia. Therefore, it is not farfetched to suggest that, with respect to HIV/AIDS, many Namibians are most likely not healthy because they are either infected or affected by HIV/AIDS. That iss the reason the WHO definition of health is criticized for being Utopian because it is very difficult for anyone in the world to feel a state of complete well-being (Heaven, 1996). Moreover, the WHO definition misses key determinants of well-being: social factors, economic forces, and psychological factors (Marks et al., 2005). The latter determinants are crucial in Namibia where HIV/AIDS may be riding on the back of poor personal wellbeing, exacerbated by dire social factors such as poverty, grave economic conditions such as unemployment and unequal wealth distribution (UNDP, 2000), in addition to the indelible psychological scars of Apartheid rule that left many indigenous people displaced, stressed, and depressed (Tersbol, 2006). All these factors were assumed to undermine the health of Namibians.

According to Gochman (1988), a definition of health incorporates three perspectives: (i) physiological malfunctioning, germ theory, and symptoms of disease; (ii) social roles that individuals performed to remain compliant and non-deviant; and (iii) a psychological perspective that emphasised an individual's attitudes and perceptions. Corollary to Gochman's (1988) definition, it seems that although people have sound knowledge of HIV/AIDS physiology and symptoms, their well-being is not guaranteed as they may still be stressed by HIV/AIDS-related social and psychological burdens.

Heaven (1996) stated that health was not just a function of one's physical condition (absence of disease) but was also related to one's attitudes towards health, perceptions of risk, diet, and the environment. According to Heaven (1996), one's health status is determined, in part, by cognitive and behavioural factors. Thus, many behaviours that affect an individual's health are under an individual's personal control; meaning that many diseases do in fact "reflect lifestyle and personal choice" (Heaven, 1996, p.3). Heaven's (1996) views are of direct relevance to this study because even when individuals are not biologically infected by HIV/AIDS and therefore seem to be in sound physical condition, they may still be unhealthy because of harbouring wrong attitudes and perceptions towards HIV/AIDS.

Health-related behaviour is defined as “any activity undertaken by a person believing himself [herself] to be healthy for the purpose of preventing disease or detecting it at an asymptomatic stage” (Kasl & Cobb, 1966, p.246). Gochman (1997) later improved on this definition and stated that health-related behaviour consists of personal attributes (beliefs, expected actions, motives, values, perceptions) and personality characteristics (emotional traits, overt behaviour patterns, actions, and habits) that are related to health maintenance, restoration, and improvement. This is what Pitts (1996, p.3) called preventive health behaviours: “behaviours undertaken by people to enhance or maintain their health”. Therefore, human behaviour is at the centre of much research in the health domain because of its potential contribution to the myriad of medical conditions that afflict people everyday (Ajzen & Manstead, 2007).

2.2.3 Compliant health-related behaviour

Leventhal and Cameron (1987) discussed five main theoretical perspectives of compliant health-related behaviours: (1) biomedical; (2) communication; (3) behavioural; (4) self-regulatory; and (5) cognitive. The biomedical perspective assumes that health or disease is a function of the presence or absence of aetiological agents such as bacteria and viruses, and that a patient was a passive recipient of a doctor's 'fix' (prescriptions and medicines). However, a fundamental limitation of this theory is that it ignores the important role of preventive health behaviour and the demographic, psycho-social, and socio-economic factors related to it. Therefore, although antiretroviral drugs prolong the lives of infected persons, HIV/AIDS remains an incurable condition; hence biomedical solutions alone are not sufficient. On the other hand, limitations of the biomedical standpoint should not encourage educational and school authorities to deny teachers and learners access to doctors and life-prolonging medications. In fact, lack of access to antiretroviral treatment encourages HIV-infected teachers to transfer to places where they can easily access therapy (UNESCO, 2008a).

The communication perspective postulates that better health-related behaviours are achieved by improved provider-client communication, implying that patient education and good health-care worker communication skills enhance health behaviours. "Interpersonal skills are very important in shaping doctor-patient interactions" (Harari & Legge, 2001, p.54). Thus, many patients shun health services because of the hostile attitudes of health staff. This is applicable to many people living in rural areas where a single clinic is the only health facility available. The behaviour of nurses and doctors at such clinics can either encourage or discourage an individual to turn up for voluntary HIV/AIDS counselling and testing, or treatment. For learners, it is even a much more Herculean task because most sexually transmitted disease services are not adolescent-friendly (Chinsembu, 2009b).

The Behavioural perspective focuses on the environment and the teaching of skills to manage behaviour (WHO, 2003). It engages the Behavioural Learning Theory characterised by the use of antecedents and consequences that influence behaviour. Antecedents are either internal (thoughts) or external (environmental cues) while consequences are punishments or rewards for a behaviour. In the researcher's opinion, the use of external influences (e.g. punishments and rewards) to condition people's behaviours is very unlikely in contemporary Namibia. Besides, Behavioural Learning Theory was criticised by Blackwell (1992) for lacking an individualized approach, and for not considering less conscious influences on behaviour not linked to immediate rewards.

The self-regulatory perspective mainly involves the Self-Regulatory Theory (SRT). The SRT proposes that it is necessary to examine individuals' subjective experiences of health threats in order to understand how they adapt to those threats (Munro, Lewin, Swart, & Volmink, 2006). The SRT posits that individuals combine new information with past experiences in order to form own representations (or interpretations) of health threats (Edgar & Skinner, 2003). That seems to support the view that 'experience is the best teacher'. This means that past encounters and experiences with HIV/AIDS can make people refrain from HIV infection. The process of creating health threat interpretations and choosing coping strategies is assumed to be dynamic and informed by an individual's personality, religious, social, and cultural contexts (Edgar & Skinner, 2003). According to the SRT, people are programmed natural objects that tend towards equilibrium and self-regulation. However, in the real world, an individual's behaviour towards HIV/AIDS is difficult to programme, as it is a complex interplay of many environmental and personal factors (Leventhal, Leventhal, & Schaefer, 1992). Since the SRT offers little guidance to the design of HIV/AIDS interventions (WHO, 2003), it has not been applied in this study.

The cognitive perspective encompasses the most widely used health-related behaviour theories, including the Health Belief Model, and the Theory of Planned Behaviours. These theories focus on cognitive variables as part of behaviour change, and share the assumption that attitudes and beliefs (Stroebe, 2000), as well as expectations of future events and outcomes (Gebhardt & Maes, 2001), are major determinants of health-related behaviour. Cognitive theories argue that in the face of various alternatives, individuals choose actions that lead to positive health-related outcomes. Cognitive theories deem that the success of AIDS campaigns is for the most part dependent on understanding the psychological factors (perceptions, attitudes and beliefs) that influence risky sexual behaviours.

2.2.4 The Health Belief Model

The Health Belief Model (HBM) is perhaps the most widely used psychological theory of health-related behaviours (Richard, Van der Pligt, & De Vries, 1995). It was developed by Rosenstock (1966) to explain the lack of public participation in free and conveniently located tuberculosis screening programmes in the United States of America. The model has been applied to a broader range of health behaviours (preventive, sick role, and clinic use) and subject populations than any other social cognitive model (Sheeran & Abraham, 1996). The HBM recognises that perceptions, rather than facts, are important in weighing up benefits and barriers that affect health behaviour (Rosenstock, 1966). It has been studied using a variety of data collection methods, the majority of which use self-completed questionnaires (Sheeran & Abraham, 1996).

According to Family Health International (2004), the model attempts to explain and predict health behaviours by focusing on the attitudes and beliefs of individuals. The HBM proposes that: “intentions and behaviour in health matters can be predicted from health-related attitudes and values…[and that]…preventive health action is influenced by the belief that one is susceptible to the disease or illness in question” (Rosenthal, Hall, & Moore, 1992, p.166).

The HBM postulates six determinants of health behaviours (Richard, Van der Pligt, & De Vries, 1995):

1. Perceived severity: feelings concerning the seriousness of contracting an illness such as HIV/AIDS;

2. Perceived susceptibility: one’s subjective perception of the risk of contracting an illness such as HIV/AIDS;

3. Perceived barriers: practical, social and psychological constraints that hinder compliant health-related behavioural actions. The current study assumes that perceived barriers circumvent prevention, management and treatment of HIV/AIDS. Such barriers include: time, expenses, availability of resources and opportunity, transport, waiting time, pain, embarrassment, peer pressure,

change of lifestyle, poor quality of condoms, lack of skills to negotiate condom use, etc);

4. Perceived benefits: medical and psychological gains of engaging in health-related behaviours, including efficacy of the recommended health action. In this study, perceived benefits include early start of antiretroviral treatment emanating from an individual's attendance of voluntary counselling and testing for HIV; or improved health status after embarking on antiretroviral therapy;

5. Health motivation: incentives that lead to compliant health-related behaviours e.g. the 'feel-good-factor' about one's HIV negative status, or receiving a certificate or prize after testing HIV negative; and

6. Cues to action: bodily (e.g. clinical symptoms of HIV/AIDS) or environmental (e.g. media publicity, advice from doctor, or knowledge about HIV/AIDS) events that can motivate an individual to take a compliant health-related action. According to Heaven (1996), cues to action arise from reading about a disease or through one's perceptions; such cues activate the 'readiness' to act and stimulate a person towards an overt health-related behaviour.

Figure 4 shows the various determinants of the HBM.

Figure 4: The Health Belief Model (Source: Sheeran & Abraham, 1996).

Perceived susceptibility to HIV/AIDS
Perceived seriousness (severity) of HIV/AIDS
Demographic variables
Socio-psychological variables
Perceived benefits of preventive action
minus
Perceived barriers to preventive action

Cues to Action

Mass media campaigns
Advice from others
Reminder postcard
Illness of family member/friend
Newspaper or magazine article
Likelihood of taking recommended preventive health action.
Perceived threat of HIV/AIDS

Demographic (regional, rural/urban, age, gender, ethnicity, socio-economic) and psychological (personality, peer pressure) factors influence all the six variables in the HBM. Demographic and psychological variables affect an individual's perceptions and thus indirectly influence health-related behaviours (Family Health International, 2004). All the six determinants of the HBM account for an individual's 'readiness to act'.

In a review of all HBM studies published from 1974 to 1984, Janz and Becker (1984) found that 'perceived barriers' is the most influential variable for predicting and explaining health-related behaviours. Sheeran and Abraham (1996) found that 'perceived barriers' is the most reliable predictor of behaviour, i.e. accounted for 89% of behaviour; followed by 'perceived susceptibility' (81.0%); 'perceived benefits' (78.0%); and 'perceived severity' (65.0%). Both 'perceived severity' and 'perceived susceptibility' constitute an individual's 'perceived threat' of contracting a disease (Munro, Lewin, Swart, & Volmink, 2007). High perceived threat, low barriers and high perceived benefits to action increase the likelihood of engaging in a recommended health-related behaviour (Becker, Maiman, Kirscht, Haefner, Drachman, & Taylor, 1979).

The original HBM was modified by introducing another variable called self-efficacy, which measures the belief that people do exert control over their motivation and behaviour, and over their social environment (Bandura, 1992; 1997). Self-efficacy depends on an individual's belief that they are able to successfully execute a health-related action. Self-efficacy assumes that an individual should first feel competent before they can carry out any health-related behaviour and change (Strecher & Rosenstock, 1997). An individual's perceived ability to successfully carry out a health strategy, according to Bandura (1989), greatly spurs their decision to enact and sustain a changed behaviour. Several studies have demonstrated the importance of self-efficacy in health-related behaviours (Bandura, 1991; O'Leary, 1985), and more importantly in HIV preventive behaviours of adolescents (O'Leary, Goodgart, Jemmont, & Bocchet-Lattimore, 1992; Richard & Van Der Pligt, 1991; Rosenthal, Moore, & Flyn, 1991; Schaalma, Kok, & Peters, 1993).

Despite the applicability of the HBM to the study, the researcher was not oblivious to the fact that the model has limitations such as:

(a) Most HBM-based research incorporates only selected components of the model, hence the usefulness of the entire model has not been tested (Family Health International, 2004);

(b) The model does not account for social norms and peer influences on behaviour (Family Health International, 2004; Stroebe, 2000; Stroebe & De Wit, 1996);

(c) The model assumes that variables affect health behaviour directly and remain unmediated by behavioural intentions and habits (Rosenstock, 1990; Stroebe, 2000); and

(d) Relationships between the model's variables are not explicitly spelt out (Stroebe & De Wit, 1996), no definitions are constructed for the individual components, and clear rules of variable combination have not been formulated (Armitage & Conner, 2000). Thus, attributes of the Theory of Planned Behaviour were further utilized in this study.

2.2.5 The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, Czasch, & Flood, 2009; Ajzen & Cote, 2008; Ajzen & Manstead, 2007; Ajzen, 1991) provides the most popular theoretical framework for the determinants of HIV/AIDS behaviours. It is also successfully used to provide a better comprehension of other health-related behaviours: exercising, donating blood, adhering to low-fat diet, and wearing safety helmets (Ajzen & Manstead, 2007). The TPB is an extension of the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975). It was developed because of the TRA's limitations in dealing with behaviours over which people had partial volitional control.

The TRA assumes that most socially relevant behaviours are under complete volitional control, and that a person's intention to perform a particular behaviour is the immediate determinant and the single most powerful predictor of that behaviour (Sutton, 1997). An intention to perform a behaviour is influenced by attitudes towards the action, including the individual's positive or negative beliefs and evaluations of the outcome of that behaviour (Munro, Lewin, Swart, & Volmink, 2007). Intention to perform is also influenced by subjective norms, including the perceived expectations of 'important others' (e.g. family, health workers, peers or workmates) with regard to a person's behaviour; and the motivation for a person to comply with others' wishes (Munro, Lewin, Swart, & Volmink, 2007). According to the TRA, a behavioural intention leads to action (Fishbein & Ajzen, 1975). Intention is therefore assumed to be an immediate antecedent of behaviour. However, the TRA omits two important facets, the fact that: (i) behaviour is not always under volitional control, and (ii) past behaviour also affects current behaviours (Munro, Lewin, Swart, & Volmink, 2007). When these limitations were recognised, Fishbein and

Ajzen (1975) included behavioural control into the TRA and termed it the TPB. Figure 5 shows the various components of the TPB.

Belief about outcomes
X
Evaluation of outcomes

External Variables

Demographic
Age, sex, occupation, education

Personality
Extraversion
Agreeableness
Neuroticism
Openness

Perceived likelihood of occurrence
X
Perceived facilitating/ inhibiting power

Attitude
towards
behaviour

Normative beliefs
X
Motivation to comply

Subjective norm

Perceived control/ self- efficacy

Intention

Behaviour

Motivational stage Volitional stage

Figure 5: The Theory of Planned Behaviour (Source: Conner and Sparks, 1998)

According to the TPB, recommended HIV/AIDS behaviours are influenced by three major constructs (Ajzen, Czasch, & Flood, 2009; Ajzen & Manstead, 2007; Ajzen, 1985):

(a) A favourable or unfavourable evaluation of the recommended behaviour (attitude towards the behaviour);

(b) Perceived social pressure to perform or not to perform the recommended behaviour (subjective norm), and;

(c) Perceived capability to perform the recommended behaviour (perceived behavioural control).

According to the TPB, a combination of attitudes, subjective norms, and perceptions of behavioural control may enable persons to form good or poor intentions towards recommended HIV/AIDS behaviours. Similarly, a person's decisions to HIV/AIDS preventive behaviours are made after a careful consideration of available information (Ajzen, 1985; Conner & Sparks, 1998; Ajzen & Manstead, 2007). Each piece of information contributes in its own way to the formation of good or poor intentions for HIV/AIDS behaviours. In this regard, Conner and Sparks (1998) mathematically defined a behavioural intention as a linear regression function of attitudes, subjective norms, and perceived behavioural control. Here, a behavioural intention was expressed as an index or manifestation of attitudes, subjective norms, and perceived behavioural control.

Chinsembu (2009a) documented some of the obstacles that hinder access to antiretroviral therapy in Namibia: lack of health worker skills, lack of resources and opportunities at health centres, lack of transport to health centres, lack of confidentiality, long queues, and lack of treatment supporters. In the same vein, it was argued that adolescents find it difficult to use condoms because they do not have much control over the supply and acquisition of condoms. Therefore, a plethora of factors discourage young people from using condoms: youth-unfriendly health services, high prices, stigma, fear of school authorities and parents, uncooperative sexual partners, and non-availability of condoms at the school. Briefly, the premise is that even when individuals are willing to enact a recommended HIV/AIDS behaviour, they still face many daunting challenges.

Since many HIV/AIDS behaviours are difficult to execute because they are out of a person's volitional control, it is useful to consider perceived behavioural control in addition to intention (Ajzen & Manstead, 2007). Perceived behavioural control is synonymous to perceived self-efficacy which is "concerned with judgements of how well one can execute courses of action required to deal with prospective situations" (Bandura, 1982, p.122). Self-efficacy means that self-protective behaviour is dependent on a sense of personal power over sexual situations, such as social pressure from an unwilling partner, and situational constraints (Richard, Van der Pligt, & De Vries, 1995). Corollary, actions towards recommended HIV/AIDS behaviour are strongly influenced by a person's confidence in the ability to perform such behaviour. Consequent to Bandura's (1991) insights, the ability to accomplish recommended HIV/AIDS behaviours is contingent upon several factors such as: the choice of, and preparations towards the recommended HIV/AIDS behaviour; efforts expended during performance of the recommended HIV/AIDS behaviour; and thought patterns, and emotional reactions that precede or precipitate the recommended HIV/AIDS behaviour in question.

The theories of achievement motivation, self-efficacy, and perceived behavioural control tend to strengthen the claim that respondents who feel confident to effect a recommended HIV/AIDS behaviour would most likely persevere and enact that behaviour than respondents who resign and doubt their abilities (Ajzen, 1991). On the whole, intentions and perceived behavioural control can help to predict the likelihood that a person will actually enact the recommended HIV/AIDS behaviour.

According to the TPB, beliefs are influenced by background characteristics such as:

1. Demographic: age, gender, occupation, socio-economic status, religion, education;
2. Environmental: ecological, rural/urban, media exposure, peer pressure, parental care, availability of resources, curricula, policies; and
3. Personal: self-esteem, extraversion, agreeableness, conscientiousness, neuroticism, and openness.

Ajzen and Manstead (2007) observed that the TPB is an important tool for designing effective and focused interventions provided the necessary preliminary research is carried out. Despite its overall success, the TPB has limitations: it fails to explain volitional control of HIV/AIDS behaviour in relation to addictions and habits, besides being silent with respect to how beliefs should be changed.

2.2.6 Critical analysis of school HIV/AIDS curriculum and policies

The thrust to reform the curriculum and policies surrounding secondary school HIV/AIDS education emanates from the study's indulgence in critical theory. Critical theory asserts that "every human being is capable of critically engaging the world in a dialogical encounter with others" (McLaren & Leonard, 1993, p.1). According to this theory, preferences of teachers and learners, as far as they want HIV/AIDS education and prevention to be delivered, should be brought on board.

Gonzales (2000, p.119) was also unequivocal about the need for dialogue in Namibian education:

> By inviting dialog[ue] among administrators and educators, recognizing them as stakeholders in the education process, hearing their concerns, and working with them in finding creative solutions to these problems, the Ministry can more fully insure the adoption and implementation of the new, democratic, learner-centred approach by the staff in schools.

Unfortunately, to the researcher's knowledge, Namibian educational authorities integrated HIV/AIDS education into Life Science and Biology subjects without any empirical studies to assess teachers' and learners' preferences and knowledge gaps.

There was also a possibility that the HIV/AIDS curriculum faced resistance in secondary schools, as was observed by Gonzales (2000, p.119): "educators' resistance to these efforts [Namibia's early educational reforms] stemmed from the fact that they were not consulted …[nor] had their concerns heard". Therefore, this study serves as a timely conversational and discursive attempt to confront the systemic failure of non-engagement. It constitutes a new praxis upon which a negotiated HIV/AIDS curriculum and a brokered HIV/AIDS policy for Namibian secondary schools can be developed.

As a student of critical theory, the researcher had fundamental questions about the HIV/AIDS curriculum. To use Ornstein and Hunkins' language: "the questions relate to who is controlling the content of the curriculum and for what purpose" (Ornstein & Hunkins, 1998, p.187). Such concerns are encapsulated in the following quotations (Shor, 1993, p.28):

> Curriculum is controlled from above as a means to impose the dominant culture on each new generation of students. Knowledge is not neutral. Rather, it is the expression of historical moments where some groups exercise dominant power over others. That domination in school includes a traditional curriculum which interferes with...critical development of students.

Shor further stated that "all forms of education are political, whether or not teachers and students acknowledge the politics in their work" (Shor, 1993, p.27). Therefore, in post-Apartheid Namibia, it would be very naive to assume that the country's HIV/AIDS curriculum and policy were apolitical and completely free of the remnants and scars of *Bantu education*, which education did not encourage learners to engage in critical social reflection of issues. Before Namibia's independence, indigenous peoples' education was under the control of the South African *Bantu Education* system (Meyer, 2002). Kustaa (1997) explained that for the majority of Namibians, education was meant to meet the needs of others: colonialists, missionaries, and occupiers. According to Meyer (2002, p.116):

> The missionaries perceived the need to educate for the salvation of the savages…the Germany and South African colonials perceived a suitable education for indigenous people as one that prepared

> colonised Africans for subservient roles in relation to the colonial economy… and for the occupying South African Nationalist Party, education for blacks was a way to institutionalise segregation and keep Africans in their place.

Although the ill motives of *Bantu education* were widely condemned at Namibia's independence in 1990, Meyer (2002, p.116) observed that "official policy had changed, however, local practices still reflected the authoritarian structures under which the educational practitioners, many now in leadership positions, had been trained". More likely than not, with regard to the formulation of the secondary school HIV/AIDS curriculum and policy, Meyer's (2002) observations were very much appropriate. Apartheid was gone, but those trained under it, had assumed authoritarian positions over the curriculum and policy. Taken together, it seemed that due to "historical remembrance" (McLaren & Leonard, 1993, p.4) of Apartheid, an HIV/AIDS curriculum and policy, handed down from a centralized educational bureaucracy, would not allow a critical encounter between teachers and learners across the breadth and width of Namibia.

Further, according to Gonzales (2000, p.106), Namibia's pre-independence education system was characterised by:

> Ideological propagandizing, institutional discrimination, dependence on rote memorization of the canon, and alienation of both pupils and educators…its methods of rote learning and hierarchical educational structure ensured the system's dependency upon the state and its institutions… Once SWAPO took power, it developed and began implementing a plan for educational reform that embraced learners, targeted the material of education toward pragmatism and relevance to pupils, and truly invested in human capital development rather than indoctrination.

Following Paulo Freire's philosophy of critical education, Namibian educational authorities stated that a liberating education would involve developing a sense of critical consciousness and self-confidence (Gonzales, 2000). The study agreed with these noble ideals because critical consciousness and self-confidence are important behavioural cornerstones in the fight against HIV/AIDS. In early post-independent Namibia, "the critical questioning of one's life experiences sought to replace the pre-independence educational process of deposit-making" (Gonzales, 2000, p.111). Disappointingly, however, at the level of pedagogy, the Namibian HIV/AIDS curriculum is still an embodiment of banking education and an act of depositing. In fact, one can argue that it is a curriculum based on the mistaken notion that "knowledge is a gift bestowed by those who consider themselves knowledgeable upon those whom they consider to know nothing" (Shor, 1993, p.26).

As an heir of Freirean philosophy, the researcher believed that the method of devising a school curriculum must be a shared decision and not a prerogative of educational authorities; that there should be a negotiated curriculum, not one imposed unilaterally. In Moulton's words, "educational reform is a brokered- not engineered- process" (1997, p.12). Therefore, in principle, the researcher agreed with the government's learner-centred approach which: "(1) uses learners' existing knowledge as a starting point, (2) encourages young people's natural curiosity to learn by way of challenging tasks, (3) appreciates the perspective of learners, and (4) involves learners as partners in, rather than receivers of, educational growth (GRN, 1992, p.60). Despite all the post-Apartheid rhetoric for a Freirean education, it was astonishing why the secondary school HIV/AIDS curriculum was formulated through a non-critical, non-democratic, and top-down approach, without the significant input of teachers and learners.

Critical theory also implores the secondary school HIV/AIDS curriculum to “promote in students an awareness of themselves as social beings” (Ornstein & Hunkins, 1998, p.187). It demands that the language used in the teaching and learning of HIV/AIDS should be that of teachers and learners, from their everyday lives and contexts; language that helps them to discern their daily social interactions with HIV/AIDS. Thus, Rompel (2001) documented that in Oshiwambo, HIV/AIDS is called “*omukithi gwonena*” which means “modern disease”. This label means that HIV/AIDS is deeply embedded into modern living conditions; that AIDS has a lot to do with modernity.

Since HIV/AIDS is a sensitive issue in Namibian society (Rompel, 2001), sex and preventive tools such as condoms are rarely talked about in public and at home. Gonzales (2000, p. 120) wrote that there is a “reluctance to discuss sex and AIDS education” in schools. Societal values and norms prohibit open discussion of sex and the use of condoms. Moreover, despite the realities of sexual activity among Namibian in-school adolescents (Chinsembu, Siziya, Rudatsikira, & Muula, 2008), the provision of condoms in schools is still a socially-divisive policy issue ostensibly because the supply of condoms would encourage increased coital activity. Thus, donors such as the United States of America President’s Emergency Plan for AIDS Relief (PEPFAR) did not want their money to be spent on condoms (Kamwi, Kenyon, & Newton, 2006; Han & Bennish, 2009). Rompel (2001, p.95) also bemoaned that there were powers that tamed the HIV/AIDS discourse in Namibia: "the active role is almost inevitably attributed to HIV/AIDS experts and government officials who seem to control the dominant positions in debates on HIV/AIDS".

Given the above observations, it was assumed that Namibia's HIV/AIDS conversations, controlled by experts and government (later on parents, donors, churches, etc.), were unable to produce a secondary school curriculum and policies progressive to the fight against HIV/AIDS. This is because curriculum designers and educational policy makers tend to lean towards prevailing societal values and preferences. Therefore, the HIV/AIDS curriculum and policies should have been liberated from domesticating and dominating forces inherent in the Namibian national psyche. As Constas (1998) put it, the curriculum should not have evolved out of the nuances and discourses of the elite.

2.2.7 Postmodernism versus HIV/AIDS curriculum and policies

In postmodernism, there is a reluctance to accept any one way of viewing the world (Ornstein & Hunkins, 1998). Consequently, the theoretical posture to reform the Namibian secondary school HIV/AIDS curriculum is distilled out of postmodernistic principles that posit that there is no single way to interpret or theorize about the curriculum; that no one master or grand narrative of the curriculum exists; that no one paradigm is dominant; and that no one way of thinking of the curriculum reigns supreme (Ornstein & Hunkins, 1998).

According to postmodernistic theory, a sound curriculum is one that reflects the demographic, environmental, and personal differences of learners. In the words of Ornstein and Hunkins (1998, p.188), such a curriculum ought to be one that:

> Centres on pluralism by stressing the mixing of genres, creating hybrid subject matter, celebrating differences of purpose, and applauding divergences of audiences. And all this variety is made even more exciting, complex, and dynamic in that everything is to be contested, nothing is sacred, no idea is exempt from challenge, and no curriculum is perennial.

In the light of such postmodernistic understanding, the current Namibian secondary school HIV/AIDS curriculum is inappropriate because it organizes and homogenises learners into one standard or average group without taking into consideration their educational regions, ethnic groups, cultures, ages, school Grades, and gender. Literally speaking, the Namibian HIV/AIDS curriculum does not distinguish the complexion of the learners. Again, the point is that a good secondary school HIV/AIDS curriculum is one committed to pluralism.

Going forwards, the challenge is for secondary school science and HIV/AIDS curriculum developers to generate curricula that are responsive to learner diversity, while at the same time encouraging the civic culture that serves to bind the Namibian nation. In advancing the argument for reforms to the Namibian secondary school HIV/AIDS curriculum, the premise is that the curriculum which was devised in 1993 is obsolete given the advancements that have taken place in the field of HIV/AIDS. For example, the current curriculum does not contain content on antiretroviral drugs. Revisions to the curriculum are necessary, as can be seen from Ornstein and Hunkins' (1998, p.150) statement that "every 15 years or so, our significant knowledge doubles, and this trend makes it important to continuously reappraise and revise existing curricula". They further stated that:

> New knowledge must be constantly introduced into the curriculum while less important material is pruned away…knowledge taught must be related to the future. Nothing should be included in the required curriculum unless it can be strongly justified in terms of the future. If this means scrapping a substantial part of the curriculum, so be it. To deal with this knowledge explosion, as it shapes the future, curriculum specialists have two major problems that require continuous attention: (1) what knowledge to select and (2) how to organize it (Ornstein and Hunkins, 1998, p.151).

Due to the enormous amount of new HIV/AIDS knowledge that is being generated from research, it is imperative that the school HIV/AIDS curriculum is abreast with such knowledge. Such new knowledge can enable teachers and learners to face up to the future challenges of HIV/AIDS. Therefore, it is envisaged that the results of this study may act as a lens through which Namibian curriculum developers will devise an appropriate HIV/AIDS curriculum for secondary schools.

The desire to reform the Namibian secondary school HIV/AIDS curriculum is further buttressed by the following statement (Ornstein & Hunkins, 1998, p.152):

> Because our knowledge is changing so rapidly, we must continuously ask ourselves what is the most worthwhile knowledge, and we must continuously reappraise what we mean by worthwhile… we need to organize a curriculum that is conducive to change and that enables scholars and practitioners to work together and test their ideas in the context of changing problems and issues of society… thus subject matter in school should also be modified on a regular basis. Indeed old knowledge must be pruned away, while new knowledge should be assimilated and integrated into specific knowledge areas and new contexts.

To re-emphasise the need for scepticism of the Namibian secondary school HIV/AIDS curriculum and policies, the researcher returned to Constas (1998, p.31):

> The discourses of postmodernism … demonstrate a solid commitment to the idea of doubt. In this sense, postmodernism represents the reinvigoration of a sceptical attitude and should cause us to raise questions about the veracity, appropriateness, and morality of the frameworks used to make sense of the world. In this, postmodernism may have something important to offer educational inquiry.

On the other hand, due to the complex nature of reforms, most educational bureaucracies and knowledge institutions would rather maintain the *status quo*, what Constas (1998, p.30) terms "the principle of homeostasis". Therefore, despite the delirium to look at the Namibian secondary school HIV/AIDS curriculum and policy within the prism of postmodernistic scrutiny, the same Constas (1998) cautioned that postmodernistic perspectives had several limitations: ambiguity, indeterminacy, lack of blueprints, and the danger of a "curriculum utopia" (Doll, 1993, p.151) with impractical guidelines. In practice, implications for curriculum and educational policy reforms are supposed to be weighed very carefully.

2.3 Education in Namibia

Writing on the history of education in Namibia, Clegg (2005, p.36) noted that:

> Given the all-pervasive nature of the apartheid system, the educational context at independence was entirely entwined within the political context. Inadequate educational provision prior to independence had led to a massive backlog of needs to be attended to– as evidenced by the 60% illiteracy amongst the adult population. Within the formal sector, two immediate problems faced were the shortage of classroom space and the inadequate level of training of the existing teaching staff. In what was a most wasteful system,

> education was managed through no fewer than eleven separate, independent, educational administrations reflecting the different ethnic groupings across the country.

The history of education in post-independent Namibia can be traced to 1989 when an international conference was held at the United Nations Institute for Namibia, in Lusaka, Zambia. The aim of the conference was to interrogate teacher education in Namibia (Tjikuua, 2000).

A policy brief, *Towards Education for All*, was published in 1993 (Tjikuua, 2000). *Towards Education for All* was a development brief for education and training in Namibia. It translated the philosophy developed at the United Nations Institute for Namibia into concrete and implementable policies (Tjikuua, 2000). In December 2001, the Education Act was promulgated and provided for accessible, equitable, qualitative, and democratic national education service. In 2004, the national report on the development of education in Namibia was released (GRN, 2004b). The report posited that universal education reform was the principal means of promoting human capital development. According to the report, teacher education was considered one of the core areas of reform at independence. In fact, teachers were seen as both agents of change and implementers of change.

According to Clegg (2005), teacher education in pre-independence Namibia was underdeveloped for the country as a whole, and the majority of teachers were not adequately trained, or not trained at all. Clegg (2005, p.37) bemoaned that "under the Apartheid system students from the non-white population groups did not normally take Science and Mathematics classes beyond junior secondary education… This vicious cycle of poor teacher preparation and poor student achievement had resulted in a fairly desolate state of Science and Mathematics education, which required breaking after independence".

In response to the poor state of Science and Mathematics education in the country, government set up the In-service Training and Assistance for Namibian Teachers (INSTANT) project. The aim of the INSTANT project was to guide educational reforms in Science and Mathematics in secondary education. The goal of INSTANT was primarily to achieve a change in teaching methodology, but that needed to be done against the background of a largely unqualified teaching force (Clegg, 2005). Statistics from 1988 on teacher qualifications (Cohen 1994) showed that 70.0-90.0 % of black teachers were unqualified.

Tjikuua (2000) noted that five major changes were implemented after independence in 1990: (i) Mathematics and Physical Science became compulsory until Grade 10; (ii) Life Science was introduced as a separate subject at Junior Secondary School; (iii) International General Certificate of Education (IGCSE) was introduced to replace the South African Matric; (iv) a learner-centred approach replaced the teacher-centred and practical approach; and (v) English became the new medium of instruction for Mathematics and Science education.

Despite these efforts, a World Bank-funded study noted that "student performance at the junior and senior secondary levels is poor, especially for Mathematics and Science" (Marope, 2005, p.95). The study noted that the Namibian education system fails to meet labour market skills requirements. There is an acute shortage of skilled labour across all sectors of the economy, especially in Science- and Mathematics-based professions such as engineers, agro and natural resource specialists, medical doctors, nurses, and Mathematics and Science teachers (Marope, 2005). The study reiterated that the key cause of the skills deficits was the narrow pipeline of good-quality senior secondary school graduates, especially those with good grades in Mathematics and Science.

2.4 HIV/AIDS and education

In the following sections, literature that alludes to the different variables in the study is explored. The literature gives general perspectives only and does not specifically refer to secondary school science education in Namibia as demanded in this study. Notwithstanding, the references provide a microcosm through which questions in the current study (see section 1.4) are examined.

2.4.1 Impacts of HIV/AIDS on general education

Kelly (2000) stated that HIV/AIDS generally impacts education through ten mechanisms: the supply of education, demand for education, content of education, availability of resources for education, potential clientele for education, process of education, organization of schools, planning of the education sector, management of education systems, and donor support for education. Gachuhi (1999, p.iii) noted that the "AIDS epidemic [was] beginning to have a serious impact on the education sector, specifically on the demand for, supply of, and the management and quality of education provided at all levels".

With reference to the effects of HIV/AIDS on Namibian education, a report by Marope (2005, p.97) stated that:

> The impact of HIV/AIDS could impair qualitative and quantitative developments thus far made in the education system. At the same time, the education system faces a difficult challenge: to effectively contribute to HIV/AIDS prevention and mitigation while it is being weakened by the pandemic. On the demand side, the effects on the health and psychosocial balance of children affected and/or infected by HIV/AIDS are bound to reduce effective participation. On the

> supply side, HIV/AIDS could fast deplete the professional and experienced educators who should drive the system's development.

Marope (2005, p.xxii) noted that "further work [was] required to sharpen strategies for effectively using education and training to curb the spread of HIV/AIDS, while at the same time, mitigating the impact of the pandemic on the system".

2.4.1.1 HIV/AIDS and supply of education

Kelly (2000) observed that HIV/AIDS reduced the supply of education through teacher mortality and absenteeism due to illness. Namibia trained about 1,000 teachers each year (Malaney, 2000). However, various authors predicted different AIDS-mortality deaths in Namibia's educational system. According to Gachuhi (1999, p.5): "In Namibia, the incidence of HIV infection among teachers is likely to be well above that for the population as a whole, which is currently between 20.0 and 25.0%. By 2010, therefore, at least 3,500 serving teachers may have died in Namibia, but this figure could be as high as 6,500".

Other estimates suggested that about 20.0% of teachers would be lost between 2002 and 2010 due to AIDS (Abt Associates, 2002). Malaney (2000) also estimated that about 3,500 teachers working in Namibia would die from AIDS by 2010. The median age of death of staff due to HIV/AIDS-related illnesses was set at 36.5 years for women staff and 40 years for males (Abt Associates, 2002). The cumulative loss of teachers to HIV/AIDS between 2002 and 2010 would be 860 and 3,360 under the antiretroviral and non-antiretroviral scenarios, respectively (Abt Associates, 2002). It remained to be ascertained whether all these projections were accurate.

Kahivere (2000) estimated that 3,000 out of 17,085 teachers were probably infected, and would die in the subsequent 7-10 years. About 63.0% of Namibia's teachers were younger than 40 years in 2001, and of these 60.0% were female, and this suggested a relatively high risk of HIV infection (Abt Associates, 2002). Castro, Duthilleul and Caillods (2007) studied teacher absenteeism in nine schools situated in the Caprivi and Kavango regions and found serious impacts of HIV-related teacher absenteeism in some schools but noted that, due to stigma, HIV was never directly mentioned as the cause of teachers' absences. Clarke (2008, p.62), quoting the Castro et al. (2007) study, noted that:

> The most important manifestations of the epidemic were attendance at funerals and burials, but it is possible that some teachers reported as being frequently absent without a clear cause (sickness) or having behavioural problems (remaining silent in front of a class)...It was not possible to isolate the impact of HIV on teacher absences, but it was possible to conclude that the problem of teacher absences in an HIV context is serious.

Kahivere (2000) also noted increased teacher absenteeism due to ill health but bemoaned that replacement teachers were difficult to find. Thus, government was recruiting expatriate and volunteer teachers to cover the shortfall. Kahivere (2000) further observed that educational delivery in rural areas was worse because teachers moved to urban areas to seek better medical facilities. However, "recent evidence suggests that the impact of HIV on teachers varies significantly by gender and by school level they teach; it is dangerous to make generalizations about the teaching profession given that teachers' vulnerability to HIV infection is not well-researched and evidenced across country contexts" (UNAIDS Inter-Agency Task Team on Education, 2009, p.5).

2.4.1.2 HIV/AIDS and demand for education

A decline in school enrolment was a notable manifestation of the HIV/AIDS epidemic. In Namibia, evidence from Katima Mulilo showed that declining school enrolments were likely caused by HIV/AIDS (Abt Associates, 2002). Shaeffer (1994) predicted that by 2020, Africa's school enrolment would be less by 22.0% and 14.0% in primary and secondary schools, respectively. Due to HIV/AIDS and orphanhood, school enrolment in 1998 fell by 20.0-36.0% in the Central African Republic and Swaziland, and by 20.0% in South Africa (Malaney, 2000). Other manifestations of the HIV/AIDS epidemic included the withdrawal of children, especially girls, from school because of inability to meet school costs, the irregular school attendance of children from AIDS-affected and infected homes, the failure to provide for the education of orphans, and the inability of communities to provide as much support for schools as they did in the past (UNECA, 2000). Thus, HIV/AIDS was expected to reduce the demand and quality of science education in Namibia. The above postulation was supported by Gachuhi (1999, p.iii):

> Children will be the most affected as a result of HIV/AIDS as they live with sick relatives in households stressed by the drain on their resources. They will be left emotionally and physically vulnerable by the illness or death of one or both parents. Subsequently, children who have lost one or both parents are more likely to be removed from school, to stay home to care for the sick and to be pulled into the informal economy to supplement lost income. This is especially the case for girls…As a result of HIV/AIDS, there are relatively fewer children needing education. Fewer children are being born because of the early death of one or both parents. Moreover, fewer parents will want to send their children to school, and there will be fewer families who are able to afford to send their children to school. Fewer students in the education system and lower demand for places in education programmes, will most probably lead to a smaller supply of facilities and places. Schools that have enrolments below a certain minimum may therefore be closed and the remaining pupils moved to other schools.

In Namibia, young people aged 10-24 years old accounted for up to 60.0% of all new HIV infections (GRN, 2003). Therefore, it was expected that the demand for education would be lower in Namibia as school enrolments would be 8% less by 2010 than in 1998 due to AIDS (Malaney, 2000), which already accounted for 50.0% of deaths among young people aged 15-19 years. Projections showed that "over one quarter of the nation's investment in education could be lost through premature AIDS illness and deaths among today's learners and students" (Abt Associates, 2002, p.127). Due to declining fertility attributable to HIV/AIDS, school enrolment was expected to drop (Shemeikka, Notkola, & Siiskonen, 2005).

HIV/AIDS also aggravated poverty and reduced the wealth of infected individuals and their households (Bachmann & Booysen, 2003). The dire socio-economic situation of children that have lost parents to AIDS negatively affected the children's school attendance, performance, nutrition, and the ability to pay school fees and transport costs (Cohen, 1999). When poverty set in due to AIDS-related illness or mortality, children easily dropped out of school to take care of sick parents or fellow siblings after the death of both parents. Children also engage into income generation activities. These new roles usually disrupted the education of girls, who typically cared for the sick and provided for the family (UNICEF, 2006b). Thus, there was a negative correlation between school attendance and loss of parents due to AIDS (Haihambo, Hayden, Otaala, & Zimba, 2004).

2.4.1.3 HIV/AIDS and quality of education

UNECA (2000) enumerated indicators of how HIV/AIDS affected the performance of teachers and learners. These indicators included frequent teacher absenteeism, repeated bouts of teacher sickness, and increased reliance on less qualified relief teachers (UNECA, 2000). Other indicators were: sporadic learner attendance, low teacher morale, inability on the part of both teachers and learners to concentrate on school work because of concern for those that were sick at home, repeated funerals in the community, and considerable learner and teacher trauma. In Namibia, a UNICEF (2006b, p.4) report stated that "HIV/AIDS [was] beginning to undermine teachers' capacity to deliver quality education". Thomas (2006) also found that HIV/AIDS had negative impacts on the physical and psychological wellbeing of people; it destroyed an individual's self-esteem, self-sufficiency, and key social support networks. These factors lowered the productivity of HIV-infected or affected teachers/learners thereby jeopardising the quality of science education.

2.4.2 Risk factors for HIV/AIDS

A recent study by De la Torre et al. (2009) documented the behavioural and contextual risk factors of sexual transmission of HIV/AIDS in Namibia. These factors included multiple and concurrent partnerships, intergenerational sex, transactional sex, HIV risk perceptions, low and inconsistent condom use, low male circumcision, alcohol abuse, mobility and migration patterns, and decline in marital and cohabiting partners (De la Torre et al., 2009).

An earlier report (GRN, 2004a) observed that HIV/AIDS was driven by ignorance, high mobility of individuals within the country, cross-border travel, high prevalence of Sexually Transmitted Infections (STIs), widespread alcohol and substance abuse, gender inequalities and domestic physical violence, poverty, certain cultural practices, disintegration of the traditional family structures, and intergenerational sex between older men and young women, or vice versa.

Cohen (1998) stated that social deprivation and inequalities, especially those that were gender-based, exacerbated HIV transmission in Namibia. Thus, many young girls in Namibia implored boyfriends to provide money and material support in exchange for sex (Mufune, 2003). Grobler (2000) found that ego, interpersonal relations and tourism were some of the factors that helped to spread HIV/AIDS in Namibia. Lorway (2008) also linked HIV vulnerability to 'sex tourism'. However, Smith and Morrison (2006) found that most HIV-infected persons in Namibia did not want to openly declare their HIV-positive status because of widespread stigma.

In Namibia, high levels of concurrent relationships and rapid turnover of partners among certain subgroups of the population were significant contributors to the AIDS epidemic (De la Torre et al., 2009). Over 40.0% of male respondents in a study by Parker and Connolly (2008) reported multiple partners over a period of 12 months. Multiple and concurrent partnerships were fundamentally linked to high levels of population mobility (De la Torre et al., 2009). The north-eastern part of Namibia in particular had seen a striking rise in the proportion of men reporting two or more partners (De la Torre et al., 2009). Among men in the Caprivi region, multiple partnerships increased from 4 to 18% between 2000 and 2006; and in Kavango, from 7 to 13% over the same time period (De la Torre, 2009).

The same De la Torre et al. (2009, p.39-40) study revealed that:

> Male residents of Caprivi report paying for sex more frequently than elsewhere in Namibia, which introduces the virus to the local community… Condom use in Caprivi is among the lowest in the country for men and women of all ages. ..Three out of four youths in Caprivi are sexually active…There is a rapid accumulation of partners among young men this region [Caprivi], possibly because sex is initiated quite early.

The high incidence of HIV/AIDS in northern Namibia was mainly attributed to male rural-urban migrants (Webb & Simon, 1995; UNDP, 1999), alcohol abuse (LeBeau & Mufune, 2001; Weiser, Leiter, Heisler, McFarland, de Korte, & DeMonner, 2006), and cultural notions of male superiority (Brown, Sorrell, & Raffaelli, 2005) that allowed men to have unprotected sex with multiple sexual partners. Married women that complained about their husbands' infidelity and risky behaviour were often assaulted. Thus, having multiple sexual partners was associated with domestic physical violence (Andersson, Ho-Foster, Mitchell, Scheepers, & Goldstein, 2007). In the Caprivi region, the increasing costs of bride-wealth payments reinforced patriarchal attitudes that fuelled HIV transmission (Thomas, 2007). In northern Namibia, information to promote safer sexual practices had little impact among Ovambo men that faced existential doubt caused by grinding poverty (Tersbol, 2006).

Sexual activity in Namibia begun at a very young age, often as low as 10 years (Cohen, 1998) or 11 years (Chinsembu et al., 2008). Data obtained from a cross-sectional survey conducted among learners aged 12-18 years, living in school-based hostels in Namibia, showed that 56.0% of the boys had already experienced sexual intercourse (Stanton, Fitzgerald, Li, Shipena, Ricardo, Galbraith, Terreri, Strijdom, Hangula-Ndlovu, & Kahihuata, 1999). Data on factors associated with early coital debut are not available for Namibian learners.

However, in Jamaica, Kempadoo and Dunn (2001) found that early sexual activity among girls was associated with exploitation by male family members; sexual curiosity; experimentation and ignorance; seeking fun and pleasure; seeking love and affection; pressure from peers, friends, boys, and adult men; fear, force and physical violence; establishment of gender identity; and reproduction, whereby girls used a baby as a means to gain financial support from a man. Among boys, early sexual activity was associated with pleasure-seeking, peer-pressure, and relieving of sexual urges (Kempadoo & Dunn, 2001). In Jamaica, girls usually had their first sex with step-fathers, fathers, uncles, and other male family members while boys had their first coitus with sisters and female cousins (Kempadoo & Dunn, 2001).

In another Namibian survey, only 47.8%, 51.0%, 60.3% and 62.5% of Grade 6-10 learners in the north-west, north-east, central and southern regions, respectively, used a condom during their previous coitus (Global School Health Survey Namibia, 2004). In the same survey, 19.6%, 25.2%, 17.9%, and 13% of learners in the north-west, north-east, central and southern regions, respectively, reported having had sex with more than one partner (Global School Health Survey Namibia, 2004). Other results showed that 29.0% of learners had more than one sex partner in six months, and only 50.0% used a condom during their previous sexual intercourse (Stanton et al., 1999). Despite such sexual realities, the provision of condoms in Namibian schools was still a contentious issue, ostensibly because shifting resources to condoms could compromise expansion of programmes to empower young people to say no to sex (Kamwi et al., 2006).

In a 2004 school survey, the overall prevalence of sexual intercourse among 13-15 year-old in-school adolescents within a period of 12 months was 43.9% for boys and 25.4% for girls (Chinsembu et al., 2008). About 30.0% of learners initiated sexual intercourse at 11 years and younger (Global School Health Survey Namibia, 2004). The odds of having sexual intercourse were higher for students that were male, those that smoked cigarettes, imbibed alcohol, and used drugs (Chinsembu et al., 2008). These authors found that parental supervision was negatively associated with sexual intercourse; that meant learners in boarding schools were at a higher risk of contracting HIV. Kahivere (2000) also stated that young people were particularly susceptible to HIV because traditional taboos deny open discussion of sexual issues, and this was compounded by poverty, joblessness and the fact that girls rarely insisted on the use of condoms.

Teenage pregnancy was a problem in Namibian secondary schools (Mufune, Kaundjua, Indongo, Nickanor, & Mchombu, 2004). About 39.0% of 19-year-old girls in Namibia were either mothers or were pregnant (UNICEF, 2006b). The UNICEF report stated that adolescents aged 10-14 years were at a higher risk of HIV infection, with 1 in 4 sexually active 10- to 14-year-olds in the three sites of Kavango, Omaheke, and Ohangwena reporting their first sexual partner was 10 or more years older (UNICEF 2006c).

2.4.3 Knowledge and behaviours to HIV/AIDS

Rogers et al. (2010) conducted a Knowledge, Attitudes, Practices and Behaviours (KAPB) survey among Namibian teachers and found that 24.0% of teachers had received formal HIV education at work. The survey showed that teachers had poor knowledge of HIV prevention. McGinty and Mundy's (2009) study also found a lot of gaps in HIV/AIDS knowledge among Namibian Bachelor of Education students. "Moreover, many students indicated reluctance and a lack of self-efficacy to properly implement HIV/AIDS education", concluded McGinty and Mundy (2009, p. 141).

Among Namibian secondary school learners, Zimba (1995) found that half were unaware of HIV/AIDS. In 2004, 53.5% of learners had never heard of HIV/AIDS, and only 42.2% of learners had been taught in school about HIV/AIDS (Global School Health Survey Namibia, 2004). About 47.0% of leaners indicated that mistrust was communicated when one used or suggested the use of a condom during sexual intercourse (Zimba, 1995). Stigma and discrimination were common among the youth as 51% said they could not be friends with someone with HIV/AIDS (Family Health International, 2007). Even among teachers, stigmatization of those that were infected was high (USAID, 2006b). In terms of attitudes toward HIV/AIDS, most teachers that reported unprotected sex with multiple partners had not been tested for HIV (USAID, 2006b). Persuading teachers and learners to test for HIV and disclosing their result was often difficult because of prescriptive and authoritative counsellors that confronted, judged and shamed clients (Buskens & Jaffe, 2008).

In the year 2000, less than one third of Namibians aged 15-19 did not know all the three main ways of HIV transmission, namely: through unprotected sex, mother-to-child, and transfusion with contaminated blood (Abt Associates, 2002). In addition, many Namibian education managers and staff had inadequate basic knowledge about HIV/AIDS. Fitzgerald, Terreri, Shipena, Li, Kahihuata, Ricardo, Galbraith, and De Jaeger (1999) showed that knowledge increased significantly among intervention compared to control youth that were trained under the UNICEF-sponsored project *My Future is My Choice* in Windhoek. For example, youths in the intervention group revealed that they could be intimate without having sex, could have a girlfriend or boyfriend for a long time without having sex, could explain the process of impregnation, knew how to use a condom, and could ask for condoms in a clinic. Youths that had not been educated about HIV/AIDS interventions believed that if a girl refused to have sex with her boyfriend it was permissible for him to beat her, and that condoms took away a boy's pleasure (Fitzgerald et al., 1999). These results were also confirmed by Ndjoze-Ojo (2001) who found that extra-curricular activities under *My Future is My Choice* were more likely to reduce risky behaviour among learners than HIV/AIDS education delivered through Life Skills. *My Future is My Choice* was an official extra-curricular activity of the Ministry of Education for secondary and combined schools whose aim was to prevent young people from becoming infected with HIV and dying from AIDS (GRN, 2006).

There were many scientific misunderstandings of HIV/AIDS in Namibia. According to Iipinge (2003), 14.0% of surveyed Namibians stated that one could get AIDS by drinking out of a cup used by a person with AIDS, 12.0% stated that AIDS was cured by modern medicine, 8.0% stated that AIDS was caused by witchcraft, 30.0% stated that HIV was spread by mosquitoes, 13.0% stated that birth control pills prevented the spread of HIV, and 3.0% stated that one could get rid of AIDS if they had sex with a virgin. In Iipinge's (2003) study, some respondents indicated that the lubricant on condoms was a possible carrier for HIV. Another study in the Kavango region showed that AIDS was associated with witchcraft and sexual intercourse with someone else's partner (Susser & Stein, 2000). The national policy on HIV/AIDS for the educational sector (GRN, 2003) was unequivocal on the need for knowledgeable teachers. The policy stated that (GRN, 2003, p.7):

> Education regarding HIV/AIDS must be given in an accurate and scientific manner and in language and terms that are understandable. Such education shall take the form of stand-alone sexual health, HIV prevention skills, and HIV and AIDS education programmes that are reinforced by including these topics into all aspects of the curriculum. Such education and information should specifically address and dispel myths concerning HIV/AIDS (for example, having sex with a young girl will cure HIV and AIDS). They should also inform learners and students about particular factors in the education institution's local community that place learners and students at risk of HIV infection.

Despite a high prevalence of STIs among female teenagers, knowledge of such infections was very low among young people in rural Namibia (Harms, Iyambo, Corea, Radebe, Fehler, & Ballard, 1998). On the other hand, learners with sound knowledge of HIV/AIDS said science teachers were their major source of information (Ndjoze-Ojo, 2001).

In Armenia, Ghukasyan (2002) found that Biology teachers' knowledge of HIV transmission was rather superficial. Thus, Ghukasyan (2002, p.12) emphasized the need for up-to-date knowledge of HIV/AIDS:

> The content of AIDS education programs should be based on most updated medical information about HIV/AIDS in order to achieve maximum effectiveness. Essentially, a curriculum should include information about the cause, acquisition, and prevention of HIV/AIDS. Knowledge on how to prevent becoming infected with HIV is also of a great importance. Moreover, [the] education program should dispel myths and misconceptions about HIV acquisition, as well as provide training in healthy decision-making skills.

Some of the topics which teachers were expected to demonstrate correct and up-to-date understanding were: origin and structure of HIV (*Keele, van Heuverswyn, Li, Bailes, Takehisa, Santiago, Bibollet-Ruche, Chen, Wain, Liegois, Loul, Mpoudi Ngole, Bienvenue, Delaporte, Brookfield, Sharp, Shaw, Peeters, & Hahn,* 2006), HIV infection and male circumcision (Kahn, Marseille, & Auvert, 2006), discordant couples and genetic resistance to HIV infection (Calles, Evans, & Terlonge, 2006), clinical course of HIV infection, CD4 and viral load testing (Ungvarske & Flasderud, 1999), micronutrients as immune boosters (Hurwitz, Klaus, Llabre, Gonzalez, Lawrence, Maher, et al., 2005), use of anti-HIV herbal plants (Chinsembu &

Hedimbi, 2010a), immune reconstitution syndrome, and antiretroviral therapy (Richman, 2001).

A knowledgeable cadre of science teachers are expected to foster healthy lifestyles for themselves, other teachers, learners and the wider community. Such teachers can become role players in changing behaviour and dispelling common myths and beliefs, some of which insinuate that HIV/AIDS-infected people could get cured if they have sex with virgins or minors (Ahmad, 2001). Education is so strongly predictive of better knowledge, safer sex behaviours and reduced infection rates that experts regarded it as a ‘social vaccine’ against HIV infection (Deutsche Gesellschaft fur Technische Zusammenarbeit, 2005). Particularly for women and girls, who were more vulnerable to HIV infection, education was an effective way of empowering them to protect themselves (Deutsche Gesellschaft fur Technische Zusammenarbeit, 2005).

Since the first cases of HIV/AIDS were diagnosed over 25 years ago, local people have witnessed the impacts of HIV/AIDS in their households and neighbourhoods. Through close interaction with relatives or neighbours that are infected, people have accrued a lot of indigenous knowledge about HIV/AIDS. Although such indigenous knowledge may not be verified, local communities still use it in their informal discussions of and behavioural interventions against HIV/AIDS. In this light, it is important that the formal (school) HIV/AIDS curriculum is implemented within a microcosm of indigenous knowledge of HIV/AIDS. Thus, formal HIV/AIDS education should take into account the indigenous knowledge and jargon of HIV/AIDS that people already possess. In fact, UNESCO (2008a) also recommended that HIV/AIDS curricula were to acknowledge the prior knowledge, experiences, and obstacles of the learners. This would have helped to dispel some of the stigma and widely held myths or misconceptions about HIV/AIDS.

2.4.4 Incorporation of HIV/AIDS education into the curriculum

Kelly (2000) observed that the school was an appropriate site for HIV/AIDS education because learners were a captive audience. However, Ministries of Education were slow to appreciate the importance of school health education in promoting healthiness among young people (Clarke, 2008). Clarke (2008, p.8) wrote that "school health in general represents a broad approach to address the poor health that compromises the ability of the most disadvantaged children to attend school and learn effectively. Within that, HIV prevention becomes an area for development of relevant skills, practices and knowledge". At the levels of pedagogy and the curriculum, responding creatively to HIV/AIDS necessitates considerable adjustments and reforms (Coombe & Kelly, 2001) such as the mainstreaming of HIV/AIDS into the existing curriculum or making HIV/AIDS education become a stand-alone subject.

However, in most countries, Clarke (2008) stated that such reforms and adjustments of the curriculum had been very difficult to implement because educational authorities did not know how to incorporate HIV/AIDS education into the curriculum. In many countries including Namibia, the framework for incorporating HIV/AIDS education into the curriculum was not clearly thought-through. For example, there were obvious conceptual misunderstandings between the terms *integration* and *mainstreaming* of HIV/AIDS into the curriculum. Clarke (2008, p.53-54) wrote:

> A barrier to effective implementation is that while the term *mainstreaming* is much used, it is also often misunderstood. Attention needs to be paid to clarifying the concept and how it is applied to the education sector. A useful conceptual framework for mainstreaming HIV together with implementing principles was developed by the German technical cooperation for development GTZ and UNAIDS. This contrasts *integration* with *mainstreaming*, noting that the two terms are often used interchangeably. *Integration* occurs when HIV issues are introduced as a component or content area, without much interference with the specific core business of the institution or main purpose of the policy instrument. *Mainstreaming*, however, moves beyond *integration* by: identifying specific areas of responsibility related to HIV, relevant to the institution; outlining context-specifications, underpinned by adequate financial commitments...HIV mainstreaming contrasts with integration, which is considered an add-on approach in that it [mainstreaming] becomes aligned with and influences the core business of an institution. This approach [mainstreaming] is more likely to be effective....

From the above quotation, it would seem, therefore, that *mainstreaming* HIV/AIDS into the educational system, policies, and curricula had more preventive impact than *integration*. Thus, from the outset, Namibian educational authorities were supposed to be clear about the feasibility of the method to be applied, whether it should have been *integration*, or *mainstreaming*. Unfortunately, the distinction between *integration* and *mainstreaming*, and their feasibility in terms of institutional readiness and potential, were not done. Therefore, although government adopted and implemented the national policy on HIV/AIDS for the educational sector in 2003, it was not clear whether HIV/AIDS was to be *mainstreamed* or *integrated* into the secondary school curriculum. The confusion was evident in the wording of the national policy on HIV and AIDS for the education sector (GRN, 2003, p.7):

> HIV and AIDS should therefore be considered core business for every educational institution and professional" (p.1); 'Learners and students must receive education about HIV and AIDS on an ongoing basis in the context of sexual health and life skills

> education. Stand-alone life skills, sexual health and HIV and AIDS education programmes should be reinforced through the inclusion of these topics in the whole curriculum" (p.2)... "Course content should be included in the pre-service and in-service training of educators" (p.3). "Age- and ability-appropriate education on HIV and AIDS must form part of the curriculum for all learners and students. Such education should be *integrated* into the life skills and sexual health education programme and all other subjects for pre-primary, primary and secondary school learners.

Although *mainstreaming* of HIV/AIDS into the curriculum was the more widely preferred option, the above quotations clearly showed that the concepts of *integration* and *mainstreaming* were often mixed-up in Namibia's policy of HIV/AIDS education. In fact, the confusion between *integration* and *mainstreaming* was symptomatic of the same misunderstanding at national policy level. Deutsche Gesellschaft fur Technische Zusammenarbeit and UNAIDS (2002, p.10-11) reported the same shifts in the use of the terms *integration* and *mainstreaming* during Namibia's national development planning:

> Namibia, with one of the most intense epidemics in the world, has long recognized the impact of HIV/AIDS on the further development of the country… Thus, as the first National Development Plan [NDP] ended in 2000, and work started on its successor, or NDPII, the government saw the need to incorporate HIV/AIDS in a meaningful way within the overall development vision of the country…The initial direction was one of *integration* with the intention that an HIV/AIDS chapter be introduced into the main narrative of the document to establish a frame of reference for a response to HIV/AIDS within the context of national development. As this idea developed, the reaction of the National Planning Commission was that the "AIDS Chapter", alone, would not be sufficient to influence the direction of development within the context of the growing epidemic. A reorientation of the process was undertaken and a *mainstreaming* approach adopted.

Despite the apparent confusion between *integration* and *mainstreaming* of HIV/AIDS education into the curriculum, Abt Associates (2002) reported that the

Namibian Institute for Educational Development (NIED) integrated HIV/AIDS into the curriculum. Campbell and Lubben (2003) also reported that HIV/AIDS education was integrated into the syllabi for Life Science (for junior secondary grades), Biology (for senior secondary grades) and Life Skills (for all grades of learners in secondary school). Both reports, however, agreed that there were many challenges that faced the integration of HIV/AIDS education into the curriculum. Furthermore, integration of HIV/AIDS education into Life Science and Biology was a contentious issue.

Elsewhere, Ghukasyan (2003, p.3) stated that "Biology [was] not the best carrier subject, since it puts too much emphasis on biomedical aspects of HIV/AIDS/STD, sacrificing preventive and behavioural aspects". According to Ghukasyan (2002, p.48), "the most appropriate form of HIV education delivery [was] thought to be a separate course taught from 8 to high grades". In Namibia, the Life Skills curriculum was found to be well tailored to prepare learners to deal with HIV/AIDS, but the greatest impact in changing learners' risky behaviours was attributable to extra-curricular activities under *My Future is My Choice* programme (Ndjoze-Ojo, 2001) that stressed abstinence before marriage, faithfulness to one sexual partner, and encouraged the use of condoms. In addition, many learners and educational implementers felt that the Physical Education period could be replaced with HIV/AIDS education, or at least the two could alternate (Ndjoze-Ojo, 2001).

Clarke (2008) bemoaned that the major constraint to developing HIV prevention education within a broad school health paradigm was the general lack of importance attached to health promotion in the school curriculum, in addition to the non-development and non-implementation of school health policies. In a review of global trends, Clarke (2008) identified various constraints that hindered the incorporation of HIV/AIDS education into school health policies and curricula: absence of political concern; lack of well-defined national strategy and policies for school health programmes; limited funding allocations; lack of disaggregated data for programme planning; overcrowding of pupils in schools and content in the curriculum; inadequate production and supply of teaching and learning materials; lack of trained people, including teachers, to implement school health programmes; unsupportive conditions in the school and its environment; low teacher morale; low and inadequate teacher salaries; poor training; insufficient teacher support; and underrepresentation of female teachers.

2.4.5 Organizational and professional environments for HIV/AIDS education

In order to promote behavioural change through school-based HIV/AIDS education interventions, Barnett, de Koning and Francis (1995) insisted that a strong health promoting school environment was essential. In Namibia, Campbell and Lubben (2003, p.530-532) stated that there were two key dimensions to such a school environment:

> The first is organizational and the second is professional. With regard to the organizational dimension we identify four contributing elements. These are: (i) the existence and implementation of a school health policy document; (ii) in addition to the incorporation of HIV/AIDS education into the core curriculum, the provision by the school of opportunities for extracurricular health related activities; (iii) the provision of school-based sexual health care; and (iv) school–community links. [With regard to the professional dimension]…There are three elements of HIV/AIDS teacher education programmes that are required to help teachers to contribute to a strong health promoting school environment. These are: (i) the teaching and learning of the HIV/AIDS content knowledge required by teachers; (ii) the provision of appropriate learning and teaching methods for use by the teachers and their learners; (iii) the cultivation of teachers'

> willingness and ability to take responsibility for HIV/AIDS education.

To implement HIV/AIDS education in schools, the Namibian government started pre-service and in-service teacher education programmes. According to Clarke (2008), 762 out of 895 teacher trainees had received 2-3 hours a week of pre-service training on HIV knowledge and life skills. There were no data on how many weeks the pre-service training was conducted. He also noted that 4,823 primary and 3,781 secondary school teachers received 9 and 18 hours of HIV/AIDS in-service training, respectively. Although Clarke (2008) conceded that in-service training in HIV/AIDS was ineffective, the training courses were a requirement in the national policy on HIV/AIDS for the educational sector (GRN, 2003, p.7) which emphasised that:

> A continuing life skills, sexual health and HIV and AIDS education, prevention and care programme must be implemented at all educational institutions for all learners, students and education sector employees. Such programmes must also be implemented at hostels. Age- and ability-appropriate education on HIV and AIDS must form part of the curriculum for all learners and students. Such education should be integrated into life skills and sexual health education programme and all other subjects for pre-primary, primary and secondary school learners.

Therefore, the effective delivery of HIV/AIDS education was dependant on the quality of the organizational and professional capacities in secondary schools.

With reference to the organizational dimension, Campbell and Lubben (2003, p.531) wrote that:

> School-based HIV/AIDS education is strengthened through the existence and implementation of a whole-school health policy document. Such a document needs to set out clearly the school commitment to HIV/AIDS education, how this will be met and by whom. It also needs to include how the schools will respond to learners and staff with HIV/AIDS and to those members of the

> school community who have family living with HIV/AIDS. Thus, such policy documents should not be restricted to the need to communicate facts about HIV/AIDS, the transmission of the virus and behaviours that reduce the risk of infection but also include ways of relating to and supporting people with HIV/AIDS.

Despite the need to promote the school as an ideal place for HIV/AIDS prevention, Campbell and Lubben (2003) found that few Namibian secondary schools met the organizational and professional requirements for effective HIV/AIDS education. "Schools cannot be differentiated according to the ways in which they integrate HIV/AIDS education into the curriculum. Decisions seem to be unique to individual schools and may well depend on the wishes of the Principal, the availability of resources and the willingness of staff", bemoaned Campbell and Lubben (2003, p.538). Five years after Campbell and Lubben's (2003) study, Mufune (2008, p.145) also found that:

> Teachers have very little training in SRH [sexual and reproductive health] education; some are reportedly uninspiring while Namibia suffers from a paucity of teaching materials. SRH teachers would like active parental support, but many parents are suspicious of schools teaching SRH and do not have an idea what to do. There is need for the students to be graded in sex education for them to value it more. Namibia should also invest more in training SRH teachers.

Besides reforming the curriculum, government set up organizational structures such as the Regional AIDS Committees for Education (RACE) (GRN, 2005a). These committees supervised the roll-out and programming of school HIV/AIDS activities in all the thirteen regions of Namibia. RACE programmes were meant to improve linkages and interface between the school and the community.

2.5 Summary

Cognitive theories of behaviour elucidate actions towards prevention, management, and treatment of HIV/AIDS. The HBM explains how people perceive the impacts of and risks to HIV/AIDS. However, the TPB that provides better insights into the knowledge and behaviours to HIV/AIDS. The study also uses critical-postmodernistic theories to argue for a re-think of the school HIV/AIDS curriculum and policies. The latter part of the literature review provides perspectives on the history of education in Namibia, impacts of HIV/AIDS on the general education sector, risk factors for HIV/AIDS, knowledge of HIV/AIDS, incorporation of HIV/AIDS into the curriculum, and organizational and professional environments for HIV/AIDS education in schools.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter describes the technical layout and operational aspects of the study. It gives details of the experimental and sampling designs, data collection instruments and procedures, and the tools used during data analysis.

3.2 Research design

Mouton (2001) defined a research design as a plan of how one intends to conduct the research. Primary data were collected through a cross-sectional survey design. According to Mouton (2001), cross-sectional surveys are used to make observations of a defined population at a single point in time. This study used a cross-sectional design because it allowed a 'one-off' collection of data (snap-shot) from a representative group of the population.

3.3 Population

The population included all secondary school science teachers and learners in six educational regions of Namibia (Caprivi, Kavango, Ohangwena, Omusati, Oshikoto, and Khomas). The northern regions were selected because about 60.0% of Namibia's population is concentrated there and the prevalence rates of HIV/AIDS in those regions were reportedly higher than the prevalence rates in southern regions of the country (Hardap and Karas regions). The Khomas region was included because it was cosmopolitan with Windhoek as the commercial and administrative capital of Namibia. These regions have more than 94 secondary schools with over 3,465 teachers (GRN, 2005b). For the purposes of this study, secondary school science teachers were those involved in teaching Life Science and Biology, and secondary school science learners were those that learnt Life Science and Biology subjects.

3.4 Sample

The primary sample consisted of six education regions: Caprivi, Kavango, Khomas, Ohangwena, Omusati, and Oshikoto. The eighteen secondary sampling units were: three secondary schools in Caprivi, three secondary schools in Kavango, three secondary schools in the Khomas, three secondary schools in Ohangwena, four secondary schools in Omusati, and two secondary schools in the Oshikoto regions. Life Science and Biology learners and teachers constituted the tertiary sampling units. The names of the education regions and secondary schools are provided in Table 1. The geographical locations of the sampled schools are shown in Figure 6.

Table 1: List of sampled education regions and secondary schools

Educational region	Constituency/Town	Secondary school
Caprivi	Katima Mulilo	Caprivi senior *
Caprivi	Katima Mulilo	Ngwezi*
Caprivi	Katima Mulilo	Mavuluma*
Kavango	Rundu central	Dr. Romanus Kampungu*
Kavango	Rundu central	Rundu senior*
Kavango	Rundu central	Noordgrens*
Ohangwena	Eenhana	Haimbili Haufiku
Ohangwena	Ongha	Ongha
Ohangwena	Ohangwena	Ponhofi
Omusati	Outapi	David Sheehama
Omusati	Outapi	John Pandeni
Omusati	Tsandi	Mwaala senior
Omusati	Tsandi	Shikongo Iipinge senior
Oshikoto	Onayena/Ondangwa	Nehale senior
Oshikoto	Oniipa/Ondangwa	Hans Daniel Namuhuja
Khomas	Katutura/Windhoek	A. Shipena*
Khomas	Katutura/Windhoek	Immanuel Shifidi*
Khomas	Khomasdal/Windhoek	Ella Du Plessis*

Schools in urban locations are marked with *; Schools in rural locations are unmarked.

3.4.1 Demographic characteristics of learners

A total of 829 learners participated in the study. The mean age of the students was 16.96 ± 0.06 years, standard error. The students' median age was 17.0 years. The demographic characteristics of the learners are summarized in Table 2.

Table 2: Demographic characteristics of learners in the study

Variable	**Counts, N (%)**
Regions:	
Caprivi	103 (12.4)
Kavango	140 (16.9)
Khomas	166 (20.0)
Ohangwena	108 (13.0)
Omusati	208 (25.1)
Oshikoto	104 (12.5)
Constituencies/towns:	
Eenhana	45 (5.4)
Katima Mulilo	103 (12.4)
Ohangwena	33 (4.0)
Onayena	64 (7.7)
Ongha	31 (3.7)
Oniipa	39 (4.7)
Outapi	67 (8.1)
Rundu	140 (16.9
Tsandi	141 (17.0)
Windhoek	166 (20.0)
Location of school:	
Rural	420 (50.7)
Urban	409 (49.3)
Gender:	
Male	365 (44.1)
Female	462 (55.9)
Ethnic group:	
Damara-Nama	30 (3.6)
Herero	29 (3.5)
Kavango	123 (14.8)
Lozi	114 (13.8)
Ovambo	514 (62.0)
Others (Basters, Coloureds, non-Namibians)	19 (2.3)
Learners' Grades:	
Grade 9	301 (36.4)
Grade 11	527 (63.6)
Age (years)	

13	5 (0.6)
14	32 (3.9)
15	109 (13.3)
16	173 (21.0)
17	245 (29.8)
18	130 (15.8)
19	74 (9.0)
20	37 (4.5)
21	9 (1.1)
22	5 (0.6)
23	2 (0.2)
27	1 (0.1)

3.4.2 Demographic characteristics of Life Science and Biology teachers

A total of 61 teachers participated in the study. The ages of the teachers ranged from 23 to 52 years, with a mean age of 31.62 ± 0.95 years, standard error. The median age was 32 years. Table 3 presents the demographic characteristics of the teachers.

Table 3: Demographic characteristics of teachers in the study

Variable	**Counts, N (%)**
Regions:	
Caprivi	10 (16.4)
Kavango	10 (16.4)
Khomas	7 (11.5)
Ohangwena	15 (24.6)
Omusati	8 (13.1)
Oshikoto	11 (18.0)
Location of school:	
Rural	43 (70.5)
Urban	18 (29.5)
Gender:	
Male	25 (41.0)
Female	36 (59.0)
Ethnic group:	
Himba	1 (1.6)
Damara-Nama	1 (1.6)
Herero	1 (1.6)
Kavango	9 (14.8)
Lozi	10 (16.4)
Ovambo	34 (55.7)

Others (Non-Namibians)	5 (8.2)
Subjects taught:	
Life Science	44 (72.1)
Biology	23 (37.7)
Life Science and Biology	8 (13.1)
Marital status:	
Married	16 (26.2)
Single	45 (73.8)
Qualifications:	
Certificate	1 (1.6)
Masters' degree	2 (3.3)
Postgraduate Diploma	3 (4.9)
Bachelors' degree	17 (27.9)
Diploma	38 (62.3)

3.5 Sampling procedure

A three-stage stratified sampling design was used in this study. The three strata were education regions, schools, and Life Science/Biology learners or teachers. At the first stage of sampling, six education regions were purposefully selected into the primary sample. At the second stage, secondary schools were randomly selected with probability proportional to the population of schools in the region. Randomization was done using tables of random numbers according to Strydom (2005). In the third stage, one Life Science or Biology class was randomly selected and all learners in the selected class participated in the study. All Life Science and Biology teachers at the selected schools were included into the sample.

3.6 Instruments

3.6.1 Learner and teacher questionnaires

Two different sets of structured questionnaires were used in this study. One questionnaire was for secondary school Life Science/Biology learners (Appendix 1), and another was for secondary school Life Science/Biology teachers (Appendix 2).

To ensure validity (measuring what the study set out to measure), the study instruments reflected the purpose of the study, research questions, and the literature review. The wording of the questions was kept as simple as possible. Both learner and teacher questionnaires were divided into seven sections:

1. Demographical data without personal identifiers;
2. Impacts of HIV/AIDS on Life Science/Biology learners;
3. Risk factors for HIV/AIDS;
4. Knowledge, norms, attitudes, practices, and skills to HIV/AIDS;
5. Constraints of incorporating HIV/AIDS content into Life Science/Biology subjects;
6. Organizational and professional dimensions that affected the delivery of HIV/AIDS education and prevention; and
7. Policy interventions for HIV/AIDS

3.6.2 Construction of the questionnaires

To ensure content validity (meaning all important aspects of the construct are covered), construction of the questionnaires was based on the various tenets of the HBM, TPB, critical and postmodernistic theories. A brief account of the usefulness of these theories and model in the content validity of the questionnaires is illustrated in the following paragraphs.

Consistent with the HBM, perceived severity involved questionnaire statements that estimated the impacts of HIV/AIDS. Respondents were asked whether they were aware of any putative impacts of HIV/AIDS on secondary school science teachers and learners, and how they coped with such impacts.

Perceived susceptibility involved respondents' subjective perceptions of the risks of contracting HIV/AIDS. In this regard, the study was influenced by Heaven's (1996, p.2) postulation that "a teenager who believes that he or she is unlikely ever to become HIV positive is more likely to engage in risky behaviours such as practising unsafe sex or sharing needles". Thus, although some individuals view the threat of HIV/AIDS as serious, they still engage in risky sexual behaviours. For such individuals, "perceptions of risk were not matched by preventive behaviour" (Heaven, 1996, p.35).

Although Heaven's (1996) observations were appreciated, the researcher pitched the line of reasoning at a higher level, and gave the benefit of a doubt to the respondents' level of risk perception and knowledge of the HIV/AIDS life cycle. The researcher assumed that respondents knew about HIV/AIDS. Yet, the danger was that 'know-it-all' attitudes fuelled notions of invincibility from HIV/AIDS. Following onto these assumptions, the researcher was curious to explore whether teachers and learners mistakenly felt invincible from HIV/AIDS. For example, did they perceive that HIV/AIDS only infected immoral people like prostitutes? In the case of learners, the assumption was that some of them were so naïve that they might have thought all their peers were free of HIV/AIDS. Hence the idea was to estimate the number of learners that could not perceive that they, too, could contract HIV/AIDS from their young colleagues.

Constructs of the TPB compelled the researcher to cross-examine the levels of risk, knowledge, norms, attitudes, practices and skills of respondents in relation to

HIV/AIDS. For example, the TPB was used to examine some of the factors and causal antecedents of HIV/AIDS-related behaviour, and probed why respondents performed or failed to perform recommended HIV/AIDS behaviours. The term 'recommended' HIV/AIDS behaviour meant practices that helped to prevent, manage and treat HIV/AIDS infection, including the use of condoms during casual sex, attending voluntary counselling and testing for HIV/AIDS, and starting on or adhering to antiretroviral treatment. Following the TPB's assertions, execution of recommended HIV/AIDS behaviour was a function of good intentions and right opportunities. Therefore, it was plausible that secondary school science teachers and learners did not enact compliant behaviours because of personal and contextual barriers.

In the TPB, the three determinants of intentions (i.e. attitudes, perceived social pressures, and perceived behavioural control) are also influenced by corresponding sets of beliefs (Ajzen, 1985), the mathematics of which was explained by Conner and Sparks (1998). Accordingly, it was argued that the behaviour of individuals towards HIV/AIDS was influenced by their cultural and social beliefs, myths, values, accepted wisdoms, philosophies, dogmas, ways of life, and worldviews. The perceived social pressure to perform or not to perform a recommended HIV/AIDS behaviour was determined by the beliefs of the society, family members, peers, friends, co-workers and health professionals. Sometimes the beliefs were learnt from the church, media and other avenues.

In line with critical theory, the instruments also attempted to interrogate the constraints of integrating HIV/AIDS education into Life Science and Biology subjects, organizational and professional environments that affected the delivery of

HIV/AIDS education and prevention, and policies related to science and HIV/AIDS education or prevention in secondary schools. In order to collect data to test the study's postmodernistic views on the HIV/AIDS curriculum and policies, the questionnaires contained identifiers such as region, rural/urban, town/constituency, ethnicity, gender, age, and school Grade.

3.7 Pilot study

Both teacher and learner questionnaires were piloted at Ngwezi secondary school in Katima Mulilo, Caprivi region. Piloting enabled the researcher to test whether instruments were adequate in soliciting data that addressed the research questions. In this regard, the pilot study was meant to improve the validity of the questionnaires, that is, whether the survey questionnaires measured what they were intended to measure. Piloting also helped the researcher to scan the environment in which the instruments were employed thereby ensuring their validity. It identified ambiguities, difficult questions, culturally-sensitive questions, range of responses, issues of confidentiality of respondents, and logistical problems during data collection.

Slight modifications were made to the contents of the questionnaires after piloting. For example, questions related to the impacts of HIV/AIDS on science teachers were removed from the learner questionnaire and re-worded to make them more culturally-sensitive. In the learners' questionnaire, the age range in item 13 was increased to include 8 years and 23 years. In item 52, 'no need to use condoms if the girl is using family planning pills' was added to the list of responses. In item 53, 'cuca-shop' was included as one of the places where learners would buy condoms. In the teacher questionnaire, 'seeks early retirement' was included to the responses in item 11.

The pilot sample size of the learners was 30 (one Grade 9 Life Science class). All the learners belonged to the Lozi ethnic group. Trial statistics were also calculated on the pilot sample. For example, counts and percentage frequencies showed that there were more female (n = 18, 60.0%) than male (n = 12, 40.0%) learners. The age of the learners ranged from 14-20 years, with a median age around 17 years. Interestingly, a few learners had initiated coital activity at 8 years of age. The mean age of coital debut was 13.33 ± 0.57 years. Female learners (66.7%) had undergone more voluntary counselling and testing for HIV than males (33.3%). This difference was tested using crosstabulations and a Pearson Chi-square test, and was shown to be significant, $\chi^2 = 4.00$, df = 1, $p < 0.046$. Therefore, the pilot study showed that the data were indeed amenable to statistical analysis.

3.8 Data collection procedures

Data were collected between October 2009 and June 2010 as follows: Caprivi region during 20-23 October, 2009; Ohangwena and Oshikoto regions, and one school (David Sheehama senior secondary school) in the Omusati region during 16-20 November, 2009; Kavango region during 6-9 April, 2010; the other schools in the Omusati region during 16-18 June, 2010; and the Khomas region during 21-25 June, 2010.

Due to ethical considerations, permission to conduct the research was obtained from the Permanent Secretary of the Ministry of Education in Windhoek (Appendix 3). In the regions, permission to visit the schools was obtained from the Regional Directors of Education (Appendices 4-8). The Regional Director for the Caprivi education region personally granted verbal permission to the researcher; hence a letter was not obtained.

At the schools, permission to collect data was granted by the school principals who introduced the researcher to the Heads of Departments for Life Science and Biology subjects. Teachers and learners invited to participate in the study were informed that they were free not to participate in the study and that they were free not to answer any questions in the questionnaires.

Study participants self-completed the questionnaires without any personal identifiers. Thus, the data collection procedure followed the ethical principles of voluntary and informed participation, confidentiality, respect, anonymity and non-harm.

The Heads of Departments introduced the researcher to Life Science/Biology teachers. After explaining the nature of the research study, consenting teachers were given questionnaires that they self-completed and handed back to the researcher the following day. The questionnaire return rate for teachers in rural areas (approximately 70.0%) was better than their counterparts in urban areas (30.0%). There was one spoilt teacher questionnaire in the whole study.

In the case of learners, teachers introduced one Life Science or Biology class to the researcher who then explained the purpose of the research study to the learners. In order to reduce intimidation of learners, teachers were requested to leave the classroom immediately after the researcher was introduced to the learners. After obtaining their verbal consent, learners self-completed the questionnaires within one class period. The researcher administered the completion of questionnaires by the learners. The return rate for learner questionnaires was approximately 98.0%. There were six spoilt learner questionnaires in the whole study.

3.9 Data analysis

Data in questionnaires were coded and entered for analysis into the Statistical Package for the Social Sciences (SPSS) software (PASW Statistics 18) version 18 (SPSS Inc., 2010). The system of coding was such that "yes" entries were coded as 1 and "no" entries were coded as 2. "Ticked" options were considered as "yes" and "non-ticked" options were taken as "no". Data cleaning was undertaken to remove outliers (e.g. a learner with an age of 46 years) and invalid entries such as 11 instead of 1 or 22 instead of 2. Missing values were not used when calculating percentage frequencies.

There were several independent variables in the learner and teacher questionnaires: education regions, constituencies/towns, ethnic groups, male/female, age, and Grade 9 Life Science or Grade 11 Biology. Additional independent factors for teachers included marital status, years of service, and highest qualifications.

Quantitative nominal data were analysed by computing counts and percentage frequencies of the "yes" or "ticked" responses. Cross-tabulations and Pearson Chi-square analysis were done to compare whether the proportions were significantly different ($p < 0.05$) across various independent factors. Bivariate (odds ratios) and multivariate (logistic regression) analyses were used to test for association between selected dichotomous variables.

In the case of scale data, descriptive statistics (means, range, standard deviation or standard errors, 95% confidence intervals) were computed. Analysis of Variance (ANOVA) was performed to test if the means were significantly different ($p < 0.05$) across selected independent variables. Means were ranked by using either Scheffe's or Duncan's multiple-comparisons tests ($p = 0.05$). ANOVA assumed that the data were normally distributed. To safeguard against the lack of normality, non-parametric statistics (Independent-samples Mann-Whitney U test and Independent-samples Kruskal-Wallis test) were also performed on the scale data.

Qualitative data such as names and symptoms people associated with HIV/AIDS, and policy suggestions, were analysed by themes. Names respondents associated with HIV/AIDS were grouped into the following themes: sex, prostitutes, HIV infection, AIDS syndrome, fear-factor, derogatory names, witchcraft, and slang. Wherever possible, names provided in local languages were translated into English. Symptoms were divided into two themes: typical symptoms and non-typical symptoms. Suggested policy interventions were analysed by themes such as HIV testing, prevention, treatment, and curriculum reform.

3.10 Summary

The study was designed as a stratified cross-sectional survey. A three-stage sampling design was used. The first stage involved the purposeful selection of six education regions. In the second stage, 18 secondary schools were randomly sampled. Finally, Life Science and Biology learners/teachers formed the tertiary sampling units. Self-completed structured questionnaires were used for data collection. Quantitative data were analysed using non-parametric and parametric statistics. Qualitative data were analysed by themes

CHAPTER 4: RESULTS

4.1 Introduction

In this chapter, findings from the respondents are presented. The chapter is divided into two parts: responses from learners, and responses from teachers. The findings include perceptions of the impacts of HIV/AIDS on science learners and teachers; their risk factors to HIV/AIDS; their gaps in the knowledge, norms, attitudes, practices, and skills to HIV/AIDS; constraints of incorporating HIV/AIDS into the syllabi for Life Science and Biology; and the organizational and professional dimensions that affect the delivery of HIV/AIDS education in Namibian secondary schools.

4.2 Findings from Life Science and Biology learners

4.2.1 Learners' perceptions of the impacts of HIV/AIDS on science education

In this section, the results of the impacts of HIV/AIDS on science teachers, learners, and the quality of science education are provided.

When learners were asked whether, in the past two years, they had lost a science teacher due to illness, only 10.0% of learners in the study reported that they had lost a science teacher due to illness. However, there were significant regional differences (Pearson Chi-square value = 16.51, df = 5, $p < 0.006$) in the proportion of learners that reported losing a science teacher due to illness: 4.9% from the Oshikoto region; 5.3% from the Khomas region; 7.8% from the Caprivi region; 8.3% from the Ohangwena region; 14.3% from the Kavango region; and 15.1% from the Omusati region. The Omusati and Kavango learners reported the highest losses of science teachers while learners in the Oshikoto and Khomas regions reported the lowest losses of science teachers due to an illness, not necessarily HIV/AIDS-related.

There were also marked differences in the reported levels of science teacher losses due to illnesses across sampled constituencies and towns (Pearson Chi-square = 19.70, $p < 0.020$). The highest reported science teacher losses were in Outapi (16.7%), Rundu and Tsandi (14.4%), and Ohangwena (12.1%). The lowest levels of science teacher losses due to illness were reported in Oniipa (0%), Eenhana (4.4%), and Windhoek (5.3%). Figures 7 and 8 show the percentage frequencies of learners that reported losses of science teachers due to putative HIV illness in different educational regions, and different constituencies/towns, respectively.

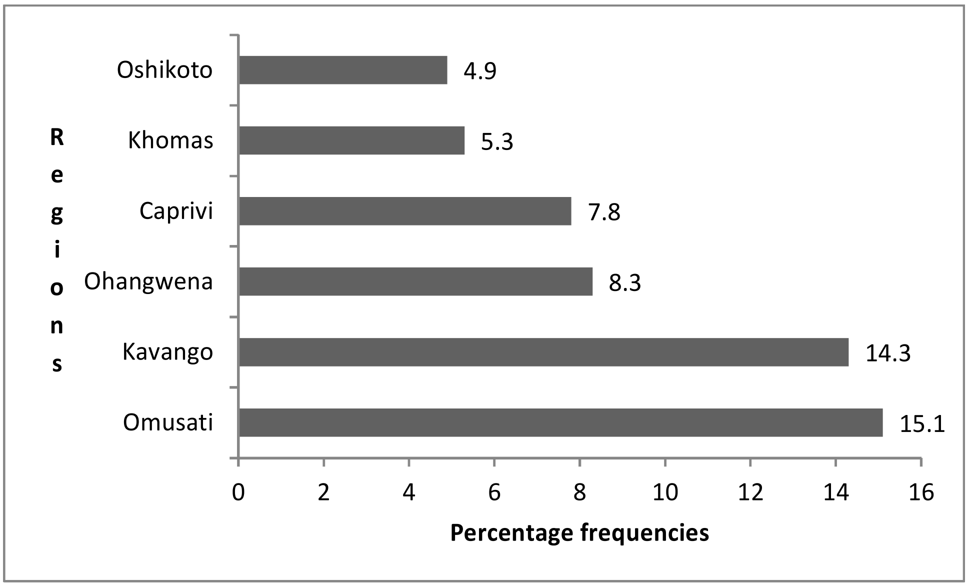

Figure 7: Learners that reported science teacher losses due to illness in regions

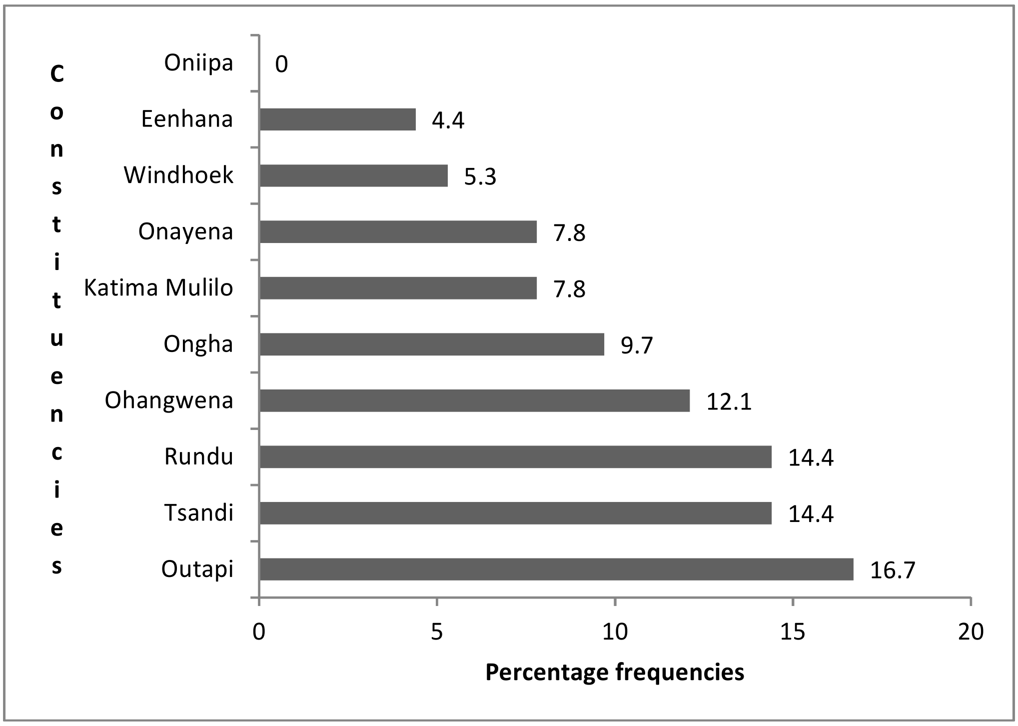

Figure 8: Learners that reported science teacher losses due to illness in constituencies and towns

In response to the question, "in the past two years, have you lost a science learner due to illness", an average of 13.7% of the learners reported having lost a class mate due to illness. Although Kavango and Ohangwena regions had the highest and lowest frequencies of respondents that reported loss of learners due to illness, respectively, (see Figure 9), statistical analysis revealed that the differences were insignificant (Pearson Chi-square value = 5.46, df = 5, $p > 0.363$).

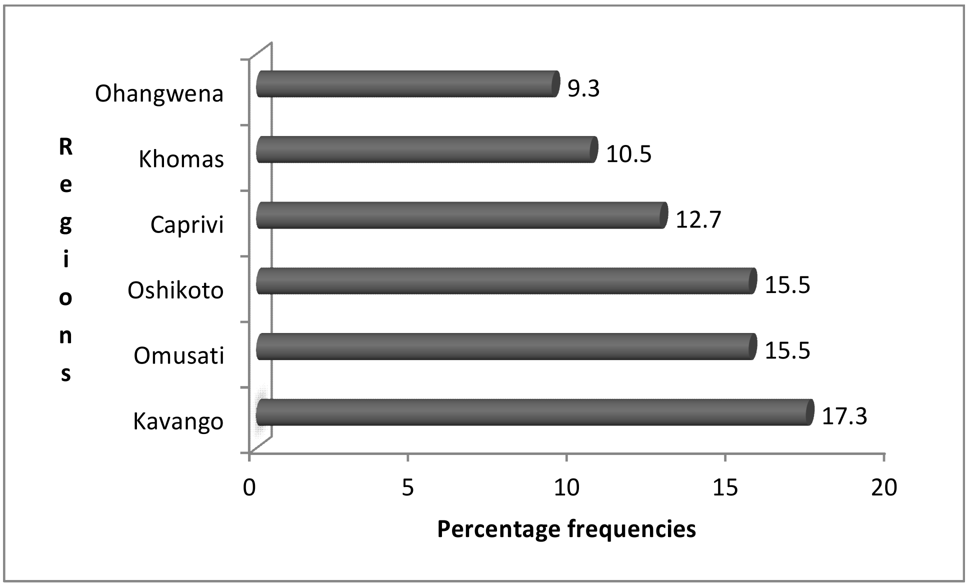

Figure 9: Learners that reported loss of a class mate due to illness in different regions

When learners were asked the question, "have you ever received a replacement teacher because your science teacher was sick", the average percentage frequency of learners that reported ever having received a replacement teacher was 17.3%. Figure 10 shows the percentage frequencies of learners that reported ever having received a replacement science teacher in the various regions: 12.9% (Caprivi), 13.3% (Ohangwena), 13.9% (Oshikoto), 18.6% (Omusati), 19.5% (Khomas), and 21.6% (Kavango). However, further analysis showed that the observed differences in the number of learners that reported ever having received a replacement teacher were not significant (Pearson Chi-square value = 5.89, df = 5, $p > 0.317$).

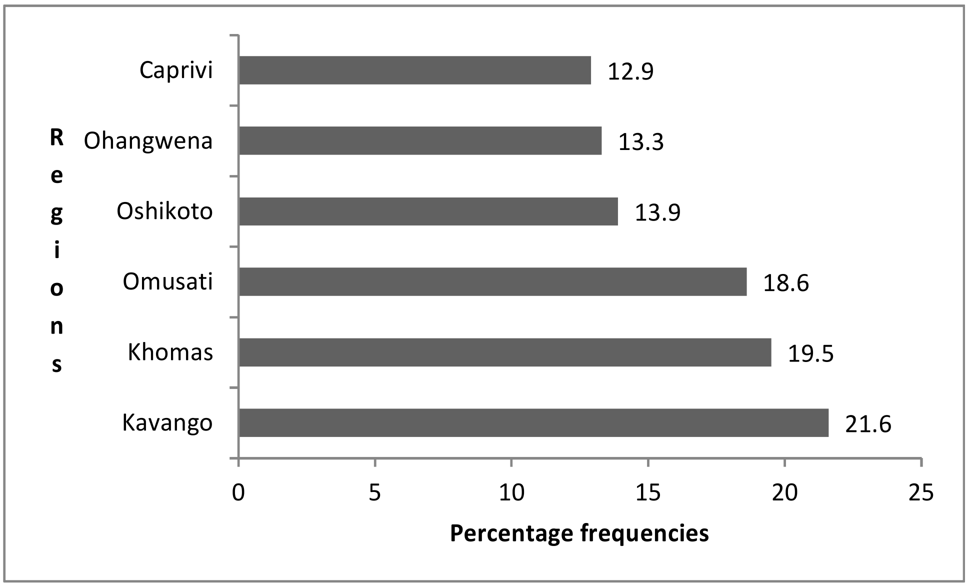

Figure 10: Percentage frequencies of learners that reported ever having received a replacement teacher

In order to ascertain the level of absenteeism among secondary school science learners, the learners were asked the question: "this term, how many times have you been absent from school?" Table 4 shows the mean number of days that learners were absent from school in different geographical locations, and results of the significance tests (parametric and non-parametric) and multiple-comparisons tests.

Table 4: Number of days learners were absent during the term in different geographical locations

Category	Mean number of days ± SE	95% C.I Lower	95% C.I Upper	Univariate analysis F-value (*p*-value)	Non-Parametric statistics (*p*-value)
Rural/Urban					
Rural	0.76 ± 0.01	0.57	0.95	18.80	Independent-samples
Urban	1.46 ± 0.01	1.08	1.98	($p < 0.000$)	Mann-Whitney U test
					($p < 0.000$)
Regions					
Khomas	1.76 ± 0.16b	1.45	2.06	8.13	Independent-samples
Caprivi	1.25 ± 0.19ab	0.88	1.63	($p < 0.000$)	Kruskal-Wallis test
Ohangwena	1.05 ± 0.19ab	0.68	1.42		($p < 0.000$)
Oshikoto	1.05 ± 0.19ab	0.67	1.42		
Kavango	0.99 ± 0.16ab	0.66	1.31		
Omusati	0.46 ± 0.14a	0.10	0.73		
Constituencies/towns					
Ohangwena	2.24 ± 0.33b	1.59	2.90	6.89	Independent-samples
Windhoek	1.76 ± 0.15ab	1.45	2.06	($p < 0.000$)	Kruskal-Wallis test
Katima Mulilo	1.25 ± 0.19ab	0.88	1.62		($p < 0.000$)
Onayena	1.06 ± 0.24ab	0.59	1.53		
Oniipa	1.05 ± 0.31ab	0.44	1.67		
Rundu	0.99 ± 0.16ab	0.67	1.30		
Outapi	0.71 ± 0.24a	0.24	1.17		
Ongha	0.60 ± 0.35a	-0.09	1.29		
Eenhana	0.43 ± 0.29a	-0.14	1.00		
Tsandi	0.35 ± 0.16a	0.03	0.67		

Means ± standard error (SE) with same letter or letters are not significantly different according to Scheffe's post-hoc test, $p = 0.05$.

Both ANOVA and Independent-samples Mann-Whitney U test showed that the number of days urban learners were absent from school was notably higher than for the rural learners (ANOVA F-value = 18.80, df =1, $p < 0.000$). ANOVA, Independent-samples Kruskal-Wallis test, and Scheffe's multiple-comparisons tests showed that learners from the Khomas region had the highest levels of absenteeism while those from the Omusati region had the lowest (ANOVA F-value = 8.13, df = 5, $p < 0.000$). Across constituencies and towns, ANOVA, Independent-samples Kruskal-Wallis test, and Scheffe's multiple-comparisons tests revealed that Ohangwena constituency had the highest level of absenteeism among science learners, while Tsandi constituency had the lowest reported level of absenteeism (ANOVA F-value = 6.89, df = 9, $p < 0.000$).

Table 5 presents the mean number of days that learners were absent from school in different gender and ethnic groups, and the results of the significance tests (parametric and non-parametric) and multiple comparisons tests. Both ANOVA and Independent-samples Mann-Whitney U test showed that the levels of absenteeism were basically the same in male and female learners (ANOVA F-value = 2.23, df = 1, $p > 0.140$). Across ethnic groups, ANOVA, Independent-samples Kruskal-Wallis test, and Scheffe's multiple-comparisons test showed that the Damara-Nama had the highest levels of learner absenteeism compared to the other ethnic groups (ANOVA F-value = 9.02, df = 5, $p < 0.000$).

Table 5: Number of days learners were absent during the term in different gender and ethnic groups

Category (count)	Mean number of days ± SE	95% C.I Lower	95% C.I Upper	Univariate analysis F-value (*p*-value)	Non-Parametric statistics
Gender					
Male	1.16 ± 0.10	0.96	1.37	2.23	Independent-samples
Female	0.96 ± 0.09	0.77	1.14	($p > 0.136$)	Mann-Whitney U test
					($p > 0.248$)
Ethnic groups					
Damara-Nama	3.21 ± 0.36b	2.50	3.91	9.02	Independent-samples
Herero	1.14 ± 0.36a	0.43	1.86	($p < 0.000$)	Kruskal-Wallis test
Kavango	0.80 ± 0.17a	0.46	1.15		($p < 0.000$)
Lozi	1.20 ± 0.18a	0.85	1.56		
Ovambo	0.92 ± 0.09a	0.75	1.09		
Other	1.94 ± 0.45ab	1.05	2.84		

Means ± standard error (SE) with same letter or letters are not significantly different according to Scheffe's post-hoc test, $p = 0.05$.

In order to find out why science learners were absent from school, Life Science and Biology learners were asked: "what is your main reason for being absent from school?" Table 6 shows regional differences in the proportions of learners that cited various reasons for being absent from school. Considerably higher proportions of learners from the Caprivi region cited "death in family" (Pearson Chi-square value = 38.63, df = 5, $p < 0.000$), "illness in family" (Pearson Chi-square value = 15.77, df = 5, $p < 0.008$), and "attending a funeral" (Pearson Chi-square value = 30.69, df = 5, $p < 0.000$) than learners from other regions. Proportions of learners that cited reasons such as "I was sick", "needed at home", and "lack of food" were the same across the regions (see Table 6).

Table 6: Reasons for being absent from school in different regions

Reasons for absenteeism	**Number of learners that cited reason (%)**						**Pearson chi-square value (p-value)**
	Regions						
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
I was sick	44.7	32.1	36.7	31.5	34.6	33.7	5.66 ($p > 0.351$)
Death in family	29.6	8.6	4.4	12.1	12.0	12.6	38.63 ($p < 0.000$)
Illness in family	7.1	0.7	1.9	2.2	0.5	2.3	15.77 ($p < 0.008$)
Needed at home	4.1	5.7	8.1	5.5	3.7	12.6	10.97 ($p > 0.052$)
Lack of uniform	6.1	5.7	1.9	2.2	4.7	1.0	7.97 ($p > 0.158$)
Lack of food	8.2	5.7	1.9	6.6	4.7	3.9	6.44 ($p > 0.266$)
Attending a funeral	22.4	6.4	3.1	6.6	10.5	13.6	30.69 ($p < 0.000$)

Most learners that were absent because they were sick were Ovambo (n = 171, 58.4%) (Pearson Chi-square value = 14.07, $p < 0.015$). “I was sick” was significantly less cited by learners from other ethnic groups: Lozi (n= 50, 17.1%), Kavango (n = 34, 11.6%), Herero (n = 15, 5.1%), and Damara-Nama (n = 14, 4.8%). “Death in family” was most frequently reported by learners from the Ovambo (n = 49, 51.6%) and Lozi (n = 29, 30.5%) ethnic groups (Pearson Chi-square value = 26.09, $p < 0.000$). “Death in family” was less reported by other ethnic groups: Kavango (n = 11, 11.6%), Damara-Nama (n =3, 3.2%), and Herero (n = 1, 1.1%). “Illness in family” was mainly mentioned by learners from the Lozi (n = 7, 38.9%) and Ovambo (n = 6, 33.3%) ethnic groups (Pearson Chi-square value = 20.85, $p < 0.001$), and less quoted by learners from other ethnic groups: Herero (n = 2, 11.1%), Kavango (n = 1, 5.6%), and Damara-Nama (n = 0).

Learners that were absent from school because they were needed at home were more likely from the Ovambo ethnic group (n = 31, 62.0%) (Pearson Chi-square value = 20.93, $p < 0.001$). Learners from other ethnic groups were less likely to be absent from school because of the fact that they were needed at home: Damara-Nama (n = 6, 12.0%), Kavango (n = 5, 10.0%), and Herero (n = 1, 2.0%). Learners that were absent from school because they were attending a funeral were more significantly from the Ovambo (n = 43, 56.6%) and Lozi (n = 22, 28.9%) ethnic groups (Pearson Chi-square value = 24.51, $p < 0.000$). Attending a funeral was less mentioned by learners from other ethnic groups: Kavango (n = 3, 3.9%), Herero (n = 2, 2.6%), and Damara-Nama (n = 2, 2.6%).

In order to rank the most frequently cited reason for being absent from school, the regional means of the percentage frequencies of learners that cited a particular reason for being absent from school were calculated and compared using ANOVA. In all the six regions, the most frequently cited reason was "I was sick" while the least cited reason was "illness in family" (ANOVA F-value = 32.02, df = 7, $p < 0.000$) (see Table 7).

Table 7: Overall frequencies of science learners that cited reasons for being absent from school

Reasons cited by science learners for being absent from school	Mean* ± Standard Error (SE)
I was sick	35.55 ± 1.98a
Other reasons	28.32 ± 2.99a
Death in family	13.22 ± 3.52b
Attending a funeral	10.43 ± 2.82b
Needed at home	6.62 ± 1.35b
Lack of food	5.17 ± 0.89b
Lack of uniform	3.60 ± 0.88b
Illness in family	2.45 ± 0.98b

*Mean of six regions; means ± SE with same letter are not significantly different according to Scheffe's post-hoc test, $p = 0.05$.

To obtain an insight into the perceived impacts of HIV/AIDS on the demand for and quality of science education, learners were asked the question: "which of the following characteristics would you associate with a science learner trying to cope with HIV/AIDS?" The percentage frequencies of learners that cited various characteristics are presented in Table 8. There were marked regional differences in the proportions of learners that cited specific characteristics. "Poor class performance" was more significantly cited by learners in the Ohangwena region (57.9%) than in the Kavango region (34.3%). "Absent from school most times" was more significantly reported by learners in the Oshikoto region (55.3%) than in the Omusati region (30.5%). "Looks tired" was cited by a noticeably higher proportion of learners in the Ohangwena region (57.0%) than in the Omusati region (31.0%). "Poor concentration in class" was mostly reported in the Ohangwena (63.6%), Oshikoto (62.1%) and Caprivi (61.8%) regions than in the Omusati region (37.0%).

Table 8 also shows that "looks stressed" was more predominantly reported in the Caprivi (63.7%), Ohangwena (63.6%), and Oshikoto (62.1%) regions than in the Khomas region (44.0%). "Fails to attend after-school activities" was mostly reported by Oshikoto (46.6%) and Caprivi (45.1%) learners than their peers in the Omusati region (25.8%). "Looks sick" was a major characteristic of learners coping with HIV/AIDS in the Caprivi region as this characteristic was reported by 55.9% of the learners while the same characteristic was reported by 49.5% of learners in the Ohangwena region, 45.6% in the Oshikoto region, 42.1% in the Kavango region, 41.5% in the Khomas region, and 34.5% in the Omusati region. "Often comes late to school" was more frequently reported in the Caprivi region (34.3%) than in the Omusati region (18.0%). There were no significant regional differences in the percentage frequencies of learners that reported the following characteristics: "withdraws from other learners", "bullied and teased by other learners", "looks hungry", and "completely stops attending school" (Table 8).

Table 8: Characteristics of learners coping with HIV/AIDS in different regions

Characteristics of learners coping with HIV/AIDS	**Percent number of learners that cited characteristic**						**Pearson Chi-square value (p-value)**
	Regions						
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
Poor class performance	54.9	34.3	46.5	57.9	38.0	54.4	25.21 ($p < 0.000$)
Absent from school most times	52.0	43.6	47.2	51.4	30.5	55.3	25.62 ($p < 0.000$)
Looks tired	51.0	43.6	42.8	57.0	31.0	40.8	23.21 ($p < 0.000$)
Poor concentration in class	61.8	47.1	47.2	63.2	37.0	62.1	33.96 ($p < 0.000$)
Looks stressed	63.7	48.6	44.0	63.6	36.5	62.1	38.55 ($p < 0.000$)
Fails to attend after-school activities	45.1	32.9	33.3	37.4	25.8	47.6	19.83 ($p < 0.001$)

Looks sick	55.9	42.1	41.5	49.5	34.5	45.6	15.09 ($p < 0.010$)
Often comes late to school	34.3	21.4	26.4	26.2	18.0	27.2	11.46 ($p < 0.043$)
Withdraws from other learners	29.7	24.3	23.3	25.2	15.0	23.3	10.27 ($p > 0.068$)
Bullied and teased by other learners	29.4	31.7	30.2	34.6	22.5	36.9	8.97 ($p > 0.110$)
Looks hungry	29.4	22.9	27.8	29.0	19.0	32.0	9.18 ($p > 0.102$)
Completely stops attending school	30.4	30.7	22.6	20.6	23.5	31.1	7.24 ($p > 0.203$)

In all the regions, "poor concentration in class" and "looks stressed" were the most commonly reported characteristics of science learners trying to cope with HIV/AIDS while the least reported characteristics were "withdraws from other learners" and "often comes late to school" (ANOVA F-value = 16.61, df = 12, $p < 0.000$) (see Table 9).

Table 9: Overall frequencies of learners that cited characteristics exhibited by science learners trying to cope with HIV/AIDS

Characteristics of learners trying to cope with HIV	Mean* ± Standard Error (SE)
Poor concentration in class	54.1 ± 4.4a
Looks stressed	53.1 ± 4.7a
Poor class performance	47.7 ± 4.0ab
Absent from school most times	46.7 ± 3.6ab
Looks sick	44.8 ± 3.0ab
Looks tired	44.4 ± 3.6ab
Fails to attend after-school activities	37.0 ± 3.3ab
Bullied and teased by other learners	29.2 ± 1.7bc
Completely stops attending school	27.3 ± 1.8bc
Looks hungry	25.6 ± 2.0cd
Often comes late to school	25.6 ± 2.3d
Withdraws from other learners	23.5 ± 1.9d

*Mean of six regions; means ± SE with same letter(s) are not significantly different according to Scheffe's post-hoc test, $p = 0.05$.

4.2.2 Learners' perceptions of the risk factors to HIV/AIDS

In this section, the results of the various risk factors and variables associated with HIV/AIDS are presented. Many factors and variables that placed science learners at the risk of HIV/AIDS infection were: age at sexual debut, sexual intercourse, multiple sexual partners, boyfriend-girlfriend relationships, peer pressure, having older sexual partners (intergenerational sex), exchanging sex for money or gifts (transactional sex), forced sexual intercourse, beer or alcohol drinking, and cigarette smoking.

In order to assess their age of sexual debut, learners were asked the question “how old were you when you had sexual intercourse for the first time?” Overall, sexual debut for a total of 447 learners ranged from 8 to 21 years, with a mean of 13.7 ± 3.4 years (standard deviation). The median age of coital debut was 15.0 years. The percentage frequencies of learners in the various ages of sexual debut are plotted in Figure 11.

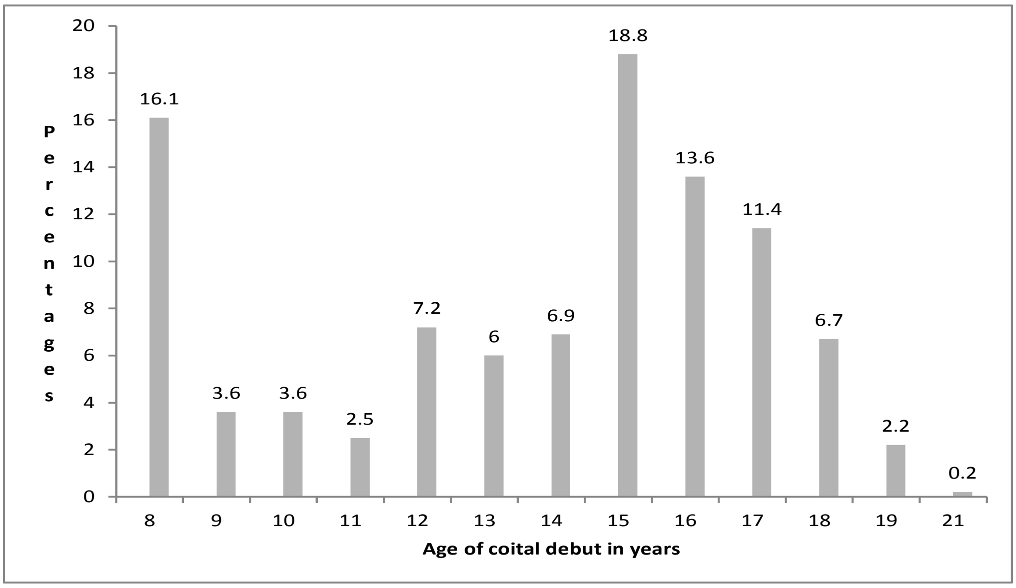

Figure 11: Learners’ ages of sexual debut

In the whole study, a total of 16.1% of the learners had their first sex at 8 years of age. Most learners (18.8%) had their sexual debut at 15 years (Figure 11). Among those learners that had sex at 8 years of age, 25.3% (n = 20) were Kavango, 22.2% (n = 4) were Herero, 14.9% (n = 35) were Ovambo, and 9.7% (n = 9) were Lozi (Pearson Chi-square value = 110.79, df = 65, $p < 0.000$). None of the Damara-Nama learners had sex at 8 years of age. Therefore, sexual debut at 8 years of age was significantly more common among Kavango and Herero than among Damara-Nama learners.

ANOVA revealed significant regional differences (F-value = 3.38, df = 5, $p < 0.005$) in the learners' mean ages of sexual debut (years ± standard error): Kavango, 12.86 ± 0.39 years; Oshikoto, 13.10 ± 0.55 years; Khomas, 13.10 ± 0.38 years; Caprivi, 13.83 ± 0.29 years; Ohangwena, 14.44 ± 0.44 years; and Omusati, 14.50 ± 0.35 years. Therefore, learners from the Kavango region had their sexual debut at a statistically younger age than learners from other regions. Ages of sexual debut (years ± standard error) were much lower in urban (13.30 ± 0.20) than rural (14.19 ± 0.25) areas (ANOVA F-value = 7.66, df = 1, $p < 0.006$), male (12.86 ± 0.21) than female (14.97 ± 0.22) learners (ANOVA F-value = 45.00, df = 1, $p < 0.000$), and Grade 9 (12.40 ± 0.27) than Grade 11 (14.28 ± 0.19) learners (ANOVA F-value = 31.03, df = 1, $p < 0.000$), respectively.

The percentage frequencies of learners that cited other HIV/AIDS risk variables are shown in Table 10.

Table 10: Percentage frequencies of learners that reported "yes" to HIV/AIDS risk variables

Risk factor or variable statement/question	% frequency
I have never had sexual intercourse before	50.2
Have you ever had sexual intercourse?	48.1
During the past 12 months, have you had sexual intercourse?	29.2
Are boyfriend-girlfriend relations common in your school?	74.4
Do you have a boyfriend or girlfriend?	55.7
Will your friends laugh at you if they know you are a virgin?	29.0
Are you aware of girls that have older men as boyfriends?	76.7
Are you aware of boys that have older women as girlfriends?	60.0
Are you aware of learners that engage in sex for money?	74.0
Have you ever been physically forced to have sexual intercourse?	22.7
Do you drink beer or any other alcoholic drink?	32.4
Do you smoke cigarettes?	4.3
Do you think science teachers are at a higher risk of contracting HIV?	25.9
Are you worried that your science teacher could be infected by HIV?	36.8
Do you think some of your fellow learners could be infected by HIV?	72.4

In order to assess their sexual activity, one statement and two questions were posed to the learners. The learners were requested to state "yes" or "no" to the statement, "I have never had sexual intercourse". Learners were also requested to answer the questions: "have you ever had sexual intercourse", and "during the past 12 months, have you had sexual intercourse?" The results showed that 48.1% of the learners ever had sex, and 29.2% were sexually-active.

Table 11 shows that regional differences in the percentage frequencies of learners that never had sexual intercourse were significantly different.

Table 11: Assessment of learners' risk factors across regions

Risk factor assessment question or statement	**Percent frequency of learners that reported "yes"**						**Pearson Chi-square value (*p*-value)**
	Regions						
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
I have never had sexual intercourse before	32.4	44.4	52.2	52.3	55.2	61.0	21.90 ($p < 0.001$)
Have you ever had sexual intercourse	61.2	49.3	44.6	50.0	46.8	39.6	10.81 ($p < 0.055$)
During the past 12 months, have you had sexual intercourse?	49.5	29.0	27.2	32.7	21.2	24.5	28.43 ($p < 0.000$)
Are boyfriend-girlfriend relations common in your school?	67.6	75.9	71.3	85.0	68.6	83.5	17.30 ($p < 0.004$)
Do you have a boyfriend or girlfriend?	67.6	52.9	56.6	51.4	54.0	53.9	7.52 ($p > 0.184$)

Will your friends laugh at you if they know you are a virgin?	25.7	33.3	28.7	24.1	30.4	29.0	3.32 ($p > 0.661$)
Are you aware of girls that have older men as boyfriends?	84.2	82.4	86.3	76.6	62.7	74.8	36.23 ($p < 0.000$)
Are you aware of boys that have older women as girlfriends?	66.3	48.9	60.3	65.7	59.8	62.5	10.41 ($p > 0.064$)
Are you aware of learners that engage in sex for money?	85.1	78.4	75.3	76.6	63.1	74.0	21.20 ($p < 0.001$)
Have you ever been physically forced to have sexual intercourse?	17.8	24.8	23.1	17.9	24.0	26.2	4.02 ($p > 0.544$)
Do you drink beer or any other alcoholic drink?	16.2	20.0	39.0	38.3	33.5	46.6	36.22 ($p < 0.000$)
Do you smoke cigarettes?	6.0	5.0	5.1	3.7	2.5	4.9	2.91 ($p > 0.709$)

The highest percentage frequency of learners that never had sex was from the Oshikoto region (61.0%) while the lowest was from the Caprivi region (32.4%). The highest percentage frequency of learners that ever had sexual intercourse was from the Caprivi region (61.2%) while the lowest was from the Oshikoto region (39.6%). Again, the largest proportion of learners that reported that they had sexual intercourse in the 12 months prior to the study was from the Caprivi region (49.5%) while the smallest fraction was from the Omusati region (21.2%). In addition, significantly more Grade 11 learners (32.3%, n = 163) than Grade 9 learners (20.8%, n = 58) had sexual intercourse in the previous 12 months (Pearson Chi-square value = 14.71, df = 2, $p < 0.001$).

Table 12 shows that across constituencies and towns, the highest percentage frequency of learners that had sexual intercourse in the 12 months prior to the study was from Katima Mulilo town (49.5%), followed by Ohangwena (48.5%) and Oniipa (47.2%) constituencies, and the lowest percentage frequency of learners that had sexual intercourse in the previous 12 months was from Onayena constituency (11.5%).

Table 12: Assessment of learners' risk factors across different constituencies and towns

Risk factor assessment question or statement	**Percentage frequencies in different constituencies/towns**										**Pearson Chi-square value**
	Een n=45	KM n=103	Ohan n=33	On an=64	Ong n=31	Oni n=39	Out n=67	Run n=140	Tsa n=141	Wdh n=166	
During the past 12 months, have you had sexual intercourse?	25.0	49.5	48.5	11.5	25.8	47.2	28.1	29.0	18.0	27.2	50.36 ($p < 0.000$)
Do you have a girlfriend or boyfriend?	53.3	67.6	59.4	37.5	41.9	81.1	64.1	52.9	49.3	56.6	31.38 ($p < 0.000$)
Are you aware of girls that have older	82.2	84.2	75.8	76.6	70.0	71.1	65.2	82.4	61.6	86.3	38.50 ($p < 0.000$)

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Constituencies/towns: Een = Eenhana; KM = Katima Mulilo; Ohan = Ohangwena; Ona = Onayena; Ong = Ongha; Oni = Oniipa; Out = Outapi; Run = Rundu; Tsa = Tsandi; Wdh = Windhoek.

Table 13: Assessment of learners' risk factors across rural-urban areas

Risk factor assessment question or statement	Percent frequencies Rural (n = 420)	Urban (n = 409)	Pearson Chi-square value (*p*-value)
I have never had sexual intercourse before	55.9	44.4	10.50 ($p < 0.001$)
Have you ever had sexual intercourse?	45.8	50.4	1.66 ($p > 0.198$)
During the past 12 months, have you had sexual intercourse?	25.0	33.6	7.12 ($p < 0.008$)
Are boyfriend-girlfriend relations common in your school?	76.6	72.2	2.1 ($p > 0.150$)
Do you have a boyfriend or girlfriend?	53.3	58.2	1.90 ($p > 0.163$)
Will your friends laugh at you if they know you are a virgin?	28.4	29.5	0.13 ($p > 0.719$)
Are you aware of girls that have older men as boyfriends?	69.3	84.4	25.7 ($p < 0.000$)
Are you aware of boys that have older women as girlfriends?	62.0	57.8	1.40 ($p > 0.230$)
Are you aware of learners that engage in sex for money or gifts?	69.3	78.9	9.73 ($p < 0.002$)
Have you ever been physically forced to have sexual intercourse?	23.0	22.3	0.05 ($p > 0.821$)
Do you drink beer or any other alcoholic drink?	38.0	26.6	11.91 ($p < 0.001$)
Do you smoke cigarettes?	3.4	5.3	1.76 ($p > 0.184$)

Table 13 shows that urban areas had a significantly smaller proportion of learners that never had sexual intercourse. On the other hand, urban areas had a significantly higher proportion of learners that had sexual intercourse in the previous 12 months. Thus, learners' sexual activity was higher in urban than rural areas.

The sexual activity of learners was influenced by their ethnicity. Table 14 shows that the lowest percentage frequency of learners that never had sex were from the Lozi ethnic group (32.1%) while the highest percentage count were Damara-Nama (60.7%). There were also remarkable ethnic differences in the proportions of learners that reported ever having engaged in sexual intercourse: 59.6% (Lozi), 54.2% (Kavango), 50.0% (Herero), 44.3% (Ovambo), and 37.9% (Damara-Nama). Further, there were highly significant ethnic differences in the proportions of learners that reported having had sex in the previous 12 months: 47.3% (Lozi), 40.7% (Herero), 37.9% (Damara-Nama), 28.9% (Kavango), and 23.7% (Ovambo).

Table 14: Assessment of learners' risk factors across ethnic groups

Risk factor assessment question or statement	**Percent frequency of learners that reported "yes"**						**Pearson Chi-square value (*p*-value)**
	Ethnic groups						
	Damara-Nama (n = 30)	Herero (n = 29)	Kavango (n = 123)	Lozi (n = 114)	Ovambo (n = 514)	Other (n = 190	
I have never had sexual intercourse before	60.7	44.4	44.1	32.1	56.2	31.6	27.80 ($p < 0.000$)
Have you ever had sexual intercourse?	37.9	50.0	54.2	59.6	44.3	55.6	12.20 ($p < 0.033$)
During the past 12 months, have you had sexual intercourse?	37.9	40.7	28.9	47.3	23.7	37.5	28.30 ($p < 0.000$)
Do you have a boyfriend or girlfriend?	71.4	64.3	48.3	69.6	52.7	63.2	17.30 ($p < 0.004$)

Will your friends laugh at you if they know you are a virgin?	34.5	33.3	31.4	25.2	28.1	42.1	3.50 ($p > 0.617$)
Have you ever been physically forced to have sexual intercourse?	34.5	28.6	23.3	17.0	22.7	29.4	5.40 ($p > 0.367$)
Do you drink beer or any other alcoholic drink?	51.7	34.5	13.9	17.3	38.7	38.9	45.10 ($p < 0.000$)
Do you smoke cigarettes?	10.3	0.0	3.3	6.3	3.8	11.1	7.50 ($p > 0.184$)

Several factors were found to increase the chances of sexual intercourse among learners. Table 15 presents the results of Pearson Chi-square and odds ratio statistics for factors that were positively associated with having engaged in sexual intercourse in the 12 months prior to the survey. The odds to engage in sexual intercourse were significantly higher for learners that were male (odds ratio of 2.67), tested for HIV (odds ratio of 1.43), thought they could not get HIV if they were faithful to one sexual partner (odds ratio of 1.38), had boyfriends or girlfriends (odds ratio of 7.29), drunk beer or alcohol (odds ratio of 1.77), and smoked cigarettes (odds ratio of 3.7). Therefore, having a boyfriend or a girlfriend increased the likelihood of sexual intercourse by a factor of seven, while drinking beer or alcohol, and smoking cigarettes, increased the chances of engaging in sexual intercourse by factors of two and four, respectively. Multivariate logistical regression analysis also showed that the odds of having sexual intercourse were three-times higher for learners that were from the Herero ethnic group (Table 16).

Table 15: Factors associated with sexual intercourse in the 12 months prior to the survey among learners

Variable	**Percent frequency of learners that had sex**	
	Pearson Chi-square value (*p*-value)	Odds ratio (95% Confidence Interval)
Gender:	38.70 ($p < 0.000$)	
Male		2.67 (1.95, 3.66)
Female		1.00
Grade:	7.60 ($p < 0.006$)	
Grade 11		1.17 (1.05, 1.30)
Grade 9		1.00
Urbanl/Rural:	7.10 ($p < 0.008$)	
Urban		1.23 (1.06, 1.42)
Rural		1.00
I have been tested for HIV:	4.75 ($p < 0.029$)	
Yes		1.43 (1.04, 2.00)
No		1.00
You cannot get HIV if you stick to one sexual partner:	4.20 ($p < 0.039$)	
Yes		1.38 (1.02, 1.89)
No		1.00
Do you have a boyfriend or girlfriend?	111.12 ($p < 0.000$)	
Yes		7.29 (4.87, 10.89)
No		1.00
Do you drink beer or any other alcoholic drink?	12.46 ($p < 0.000$)	
Yes		1.77 (1.29, 2.43)
No		1.00
Do you smoke cigarettes?	15.17 ($p < 0.000$)	
Yes		3.70 (1.84, 7.48)

No	1.00

Table 16: Multivariate logistical regression analysis of factors associated with sexual intercourse in 12 months

Variable	**Odds ratios (95% Confidence Interval)**	***p*-value**
Ethnic groups:		
Herero	2.97 (1.03, 8.57)	0.044
Ovambo	1.00	
Male	2.81 (1.92, 4.10)	0.000
Female	1.00	
I have been tested for HIV:		
Yes	1.50 (0.99, 2.26)	0.050
No	1.00	
You cannot get HIV if you stick to one sexual partner:		
Yes	1.56 (1.07, 2.27)	0.002
No	1.00	
Do you have a boyfriend or girlfriend?		
Yes	6.63 (4.24, 10.36)	0.000
No	1.00	

The frequency of sexual intercourse increased with the learners' ages and levels of boyfriend-girlfriend relationships as shown by the trends in Figure 12.

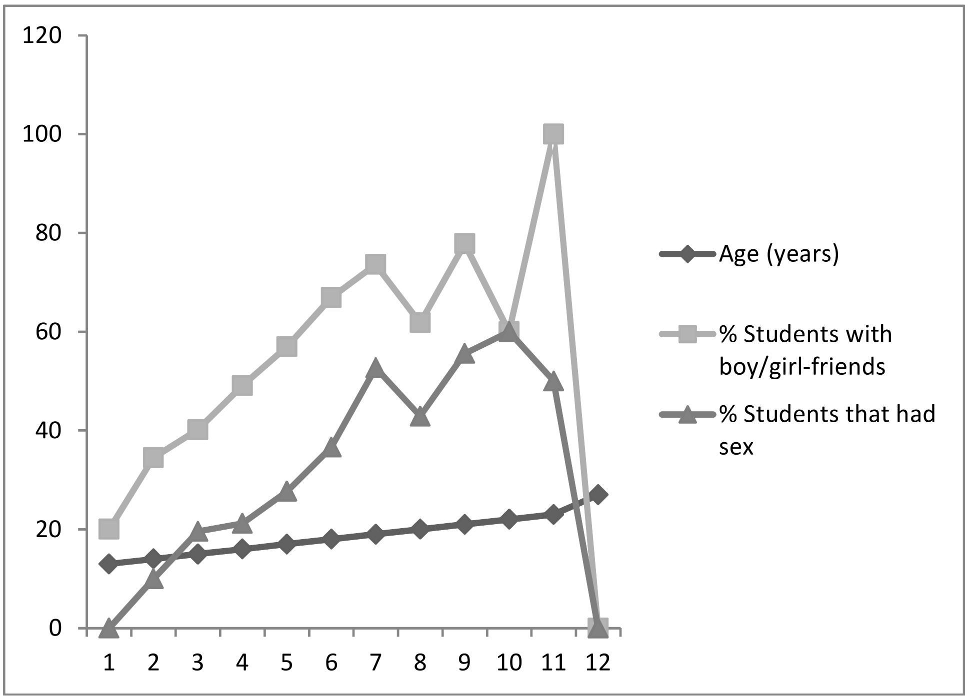

Figure 12: Relationships among learners' ages, percentage frequencies of learners that have a girlfriend or boyfriend, and percentage frequencies of learners that had sexual intercourse in 12 months

There were also significant regional differences ($p < 0.004$) in the percentage frequencies of learners that reported that boyfriend-girlfriend relationships were common at their school (see Table 11). The highest percentage frequency of school boyfriend-girlfriend relationships was from Ohangwena region (85.0%) while the lowest was from the Caprivi region (67.6%). Oniipa constituency had the highest percentage frequency of learners (81.1%) that had boyfriends and girlfriends (see Table 12).

Intergenerational sex (sexual intercourse with much older partners) and transactional sex (exchanging sex for money or gifts) were explored in this study. The highest significant proportions of learners that reported that they were aware of girls that had older men as boyfriends were from the Khomas (86.3%), Caprivi (84.2%), and

Kavango (82.4%) regions while Omusati region had the lowest proportion (62.7%) (Table 11). The lowest percentage frequency of learners that were aware of peers that engaged in sex for money or gifts was also from the Omusati region (63.1%) while the highest statistically significant percentage frequency of learners that were aware of peers that engaged in sex for money or gifts was from the Caprivi region (85.1%) (Table 11). Moreover, urban areas had higher proportions of learners that were aware of peers that engaged in sex for money or gifts (Table 11).

Tables 17 presents the gender analysis of several factors associated with learners' risks to HIV/AIDS. Chi-square statistics showed that significantly more males than females were associated with sexual intercourse, beer or alcohol drinking, and smoking cigarettes. Drinking beer or alcohol was more frequently practised in the Oshikoto region (46.6%) than Caprivi region (16.2%) learners (Table 11). On the other hand, significantly more Damara-Nama learners drunk beer or alcohol, compared to 13.9% and 17.3% of Kavango and Lozi learners, respectively (Table 14).

Table 17: Assessment of learners' risk factors across gender

Risk factor assessment question or statement	**Percent frequency of learners that reported "yes"**		**Pearson Chi-square value (p-value)**
	Gender		
	Male (n = 365)	Female (n = 462)	
I have never had sexual intercourse before	31.1	65.2	92.02 ($p < 0.000$)
Have you ever had sexual intercourse?	64.8	35.1	69.51 ($p < 0.000$)
During the past 12 months, have you had sexual intercourse?	40.5	20.3	38.74 ($p < 0.000$)
Do you have a girlfriend or boyfriend?	59.7	52.6	4.10 ($p < 0.042$)
Have you ever been physically forced to have sexual intercourse?	19.4	25.1	3.63 ($p > 0.056$)
Do you drink beer or any other alcoholic drink?	36.9	29.1	5.50 ($p < 0.019$)
Do you smoke cigarettes?	6.5	2.7	6.91 ($p < 0.009$)

In order to ascertain whether learners had sex with multiple partners, they were asked the question: "in the past 12 months, how many people have you had sexual intercourse with?" In this study, 50.1% of students had multiple sexual partners 12 months prior to the survey. The results showed that there were no noteworthy regional differences in the mean numbers of sexual partners (ANOVA F-value = 1.69, df = 5, $p > 0.1340$). The means ± standard errors for different regions were: 2.04 ± 0.32, Caprivi; 1.69 ± 2.43, Khomas; 1.45 ± 0.31, Oshikoto; 1.39 ± 0.24, Omusati; 1.19 ± 0.24, Kavango; and 1.16 ± 0.28, Ohangwena.

Girls were more faithful to one sexual partner than boys as was demonstrated by the analysis that significantly more girls (42.7%, n = 88) than boys (22.8%, n = 64) had sex with one partner (Pearson Chi-square value 41.42, df = 10, $p < 0.000$). However, significantly more boys than girls had multiple sexual partners. The mean number of sexual partners was higher for boys (1.75 ± 0.15, standard error) than girls (1.13 ± 0.13, standard error) (ANOVA F-value = 8.22, df = 1, $p < 0.004$). Comparatively, 26.7% of boys and 11.7% of girls had sex with 2-5 partners, 3.7% of boys and 0% of girls had sex with 6-9 partners, and 5.7% of boys and 2.4% of girls had sex with 10-11 partners, respectively. Of note was that 1.0% of girls (n = 2) from Outapi and Tsandi in the Omusati region had sex with eleven partners in the 12 months prior to the study.

Across the regions, Khomas (38.1%) and Caprivi (30.6%) had the highest percentage counts of learners that had sex with multiple partners while Kavango region (19.1%) had the lowest proportion of learners that reported multiple partners (Pearson Chi-square value = 85.97, df = 50, $p < 0.001$). Multiple sexual partners were most frequently reported by learners that were Damara-Nama (46.2%) and Herero (39.0%) and least frequently reported by learners from the Kavango ethnic grouping (16.6%) (Pearson Chi-square value = 100.66, df = 50, $p < 0.000$). Among those that had multiple sexual partners, 51.5% of learners had also stated they preferred "sex with many partners with condoms" compared with 24.7% that did not have the intention to have "sex with many partners with condoms", a statistically significant comparison (Pearson Chi-square value = 25.48, df = 10, $p < 0.005$).

The frequency of unprotected sex (i.e. sex without condoms) was considered in this study. Learners were asked the question: "the last time you had sexual intercourse, did you or your partner use a condom?" Throughout the study, about 20.0% of learners and their partners did not use condoms during their previous sexual intercourse.

There were major regional differences in the proportions of learners that used condoms during their previous sexual intercourse (Pearson Chi-square value = 19.41, df = 5, $p < 0.002$). Kavango region had the lowest proportion of learners that used condoms during their previous sexual intercourse (72.9%), while Omusati region had the highest proportion (91.9%). Other regions had intermediate levels of learner-proportions that used condoms during their previous sexual intercourse: Caprivi region (80.2%), Khomas region (81.9%), Oshikoto region (82.9%), and Ohangwena (84.7%).

The proportions of learners that used condoms varied according to their ethnic backgrounds: 92.9% (Damara-Nama), 87.3% (Ovambo), 81.8% (Herero), 81.4% (Lozi), and 69.9% (Kavango). Pearson Chi-square analysis revealed that these differences were significant, Chi-square value = 18.47, df = 5, $p < 0.002$. Thus, condom use was highest among Damara-Nama and lowest among Kavango learners.

Table 18: Mean number of times that learners had sex without condoms in 12 months

Independent variables	Means number of times for sex without condoms ± SE	ANOVA F-values (p-values)	Non-parametric tests (p-values)
Rural	0.45 ± 0.12	8.20 ($p < 0.000$)	Independent-samples Mann-Whitney U test ($p < 0.000$)
Urban	0.91 ± 0.11		
Grade 9	0.67 ± 0.13	0.05 ($p > 0.81$)	Independent-samples Mann-Whitney U test ($p > 0.375$)
Grade 11	0.71 ± 0.10		
Male	0.81 ± 0.11	2.53 ($p > 0.112$)	Independent-samples Mann-Whitney U test ($p < 0.006$)
Female	0.56 ± 0.12		
Constituencies/towns:			
Onayena	0.03 ± 0.33a	3.40 ($p < 0.001$)	Independent-samples Kruskal-Wallis test ($p < 0.000$)
Eenhana	0.08 ± 0.39ab		
Tsandi	0.13 ± 0.21ab		
Outapi	0.52 ± 0.27ab		
Windhoek	0.62 ± 0.18ab		
Rundu	0.76 ± 0.19ab		
Ohangwena	0.90 ± 0.35ab		
Oniipa	1.00 ± 0.35bc		
Ongha	1.10 ± 0.39c		
Katima Mulilo	1.40 ± 0.20c		

Regions:			
Omusati	0.28 ± 0.17a	4.16 ($p < 0.001$)	Independent-samples Kruskal-Wallis test ($p < 0.000$)
Oshikoto	0.48 ± 0.24 ab		
Khomas	0.62 ± 0.18ab		
Ohangwena	0.72 ± 0.22ab		
Kavango	0.76 ± 0.20ab		
Caprivi	1.42 ± 0.20b		
Ethnic group:			
Damara-Nama	0.29 ± 0.46a	4.57 ($p < 0.000$)	Independent-samples Kruskal-Wallis test ($p < 0.000$)
Ovambo	0.44 ± 0.10ab		
Kavango	0.74 ± 0.21ab		
Other	1.13 ± 0.49ab		
Lozi	1.33 ± 0.19ab		
Herero	1.48 ± 0.40b		

Means ± standard error (SE) with same letter(s) are not significantly different ($p = 0.05$) according to Scheffe's multiple-comparison's test (for regions and constituencies/towns), and Duncan's test (for ethnic groups). Scheffe's test failed to separate the means for ethnic groups.

Learners that had sex were requested to state the number of times that they had sex without condoms. The ANOVA and non-parametric test results are shown in Table 18. The mean number of times that learners had sex without condoms was notably higher for urban than rural learners. The mean number of times that learners had sex without condoms was also dependent on their ethnic backgrounds. ANOVA and Duncan's multiple-comparisons tests (ANOVA F-value = 4.57, df = 5, p < 0.000) revealed that the mean number of times that learners had sex without condoms was statistically high for learners that were Herero, moderate for learners that were Kavango, Ovambo and Lozi, and statistically low for learners that were Damara-Nama.

The mean number of times that learners had sex without condoms was also considerably higher in Katima Mulilo town and Ongha constituency, and statistically lower in Onayena constituency and Eenhana town (Table 18). Across the regions, ANOVA and Scheffe's multiple-comparisons tests showed that the mean number of times that learners had sex without condoms was highest in the Caprivi region and lowest in the Omusati region (Table 18).

The mean number of times that learners failed to buy condoms was analysed and the results are presented in Table 19. It was also found that significantly more male than female learners failed to buy condoms in 12 months. In the different constituencies, significantly more learners in Oniipa and Ohangwena constituencies failed to buy condoms than learners in Tsandi constituency.

Table 19: Mean number of times that learners failed to buy condoms in 12 months

Independent variables	Mean number of times learners failed to buy condoms ± SE	ANOVA F-values (p-values)	Non-parametric tests (p-values)
Rural	1.07 ± 0.13	3.59 ($p > 0.059$)	Independent-samples Mann-Whitney U test ($p > 0.706$)
Urban	0.70 ± 0.13		
Grade 9	0.86 ± 0.16	0.07 ($p > 0.790$)	Independent-samples Mann-Whitney U test ($p > 0.626$)
Grade 11	0.91 ± 0.12		
Male	1.16 ± 0.14	6.76 ($p < 0.010$)	Independent-samples Mann-Whitney U test ($p < 0.002$)
Female	0.66 ± 0.13		
Tsandi	0.39 ± 0.42	2.08 ($p < 0.029$)	Independent- samples Kruskal-Wallis test ($p > 0.107$)
Katima Mulilo	0.58 ± 0.58		
Windhoek	0.63 ± 0.62		
Rundu	0.87 ± 0.24		
Ongha	1.10 ± 0.48		
Outapi	1.29 ± 0.33		
Eenhana	1.41 ± 0.42		
Onayena	1.45 ± 0.35		
Ohangwena	1.48 ± 0.47		
Oniipa	1.75 ± 0.44		
Caprivi	0.58 ± 0.26	2.56 ($p < 0.024$)	Independent- samples Kruskal-Wallis test ($p > 0.233$)
Khomas	0.63 ± 0.22		
Omusati	0.68 ± 0.19		
Kavango	0.87 ± 0.24		
Ohangwena	1.35 ± 0.26		
Oshikoto	1.55 ± 0.27		

ANOVA results showed that Oshikoto and Ohangwena regions had the highest mean numbers of learners that failed to buy condoms (ANOVA F-value = 2.56, df = 5, $p < 0.024$), while Caprivi and Khomas regions had the lowest. However, Independent-samples Kruskal-Wallis test did not reveal any meaningful regional differences in the mean numbers of times that learners failed to buy condoms ($p > 0.233$).

Several factors were positively associated with condom use as shown in Table 20. The odds of using condoms were by far higher for learners that were willing to be tested for HIV/AIDS (odds ratio of 2.77), and those that had been previously tested for HIV/AIDS (odds ratio of 1.75). The odds of using condoms were also noticeably higher for learners whose parents were very strict, learners that belonged to HIV/AIDS clubs, learners from schools that had AIDS awareness clubs and *My Future is My Choice*, and learners that were willing to get or buy condoms from clinics, hospitals, pharmacies, Shebeens, shops, and Cuca-shops. Drinking beer or alcohol negatively affected the use of condoms.

Pregnancy levels were estimated in this study. Learners were asked the question: "in the past 12 months, how many girls in your class became pregnant?" Overall, the mean number of pregnant girls was 0.91 ± 0.05 (standard error). The mean numbers of girls that were pregnant in different geographical areas and Grades are presented in Table 21.

Table 20: Factors associated with condom use in 12 months

Variables	**Percent frequency of learners that used condoms during previous sexual intercourse**	
	Pearson Chi-square value (p-value)	Odds ratios (95% C.I.)
Do you drink beer or any other alcoholic drink?	0.19 ($p > 0.0661$)	
Yes		0.92 (0.63, 1.34)
No		1.00
I have been tested for HIV:	7.29 ($p < 0.007$)	
Yes		1.76 (1.16, 2.65)
No		1.00
I would like to be tested for HIV:	9.93 ($p < 0.002$)	
Yes		2.77 (1.44, 5.35)
No		1.00
My parents are very strict:	4.54 ($p < 0.033$)	
Yes		3.46 (1.03, 11.60)
No		1.00
I belong to an HIV/AIDS awareness club:	4.75 ($p < 0.029$)	
Yes		1.50 (1.04, 2.16)
No		1.00
I would get condoms from a store or shop or from a street vendor, Cuca-shop or shebeen:	8.62($p < 0.003$)	
Yes		1.88 (1.23, 2.87)
No		1.00
I would get condoms from a pharmacy, clinic or hospital:	6.60($p < 0.010$)	
Yes		1.61 (1.12, 2.33)
No		1.00
My school offers *My Future is My Choice*:	4.63 ($p < 0.031$)	
Yes		1.54 (1.04, 2.28)
No		1.00
My school has an AIDS awareness club:	3.85 ($p < 0.050$)	
Yes		1.45 (1.00, 2.11)
No		1.00

Table 21: Mean number of girls that were pregnant in 12 months

Independent variables	Mean number of pregnant girls ± SE	ANOVA F-values (p-values)	Non-parametric tests (p-values)
Rural	0.53 ± 0.07	66.2 ($p < 0.00$)	Independent- samples Mann Whitney U test ($p < 0.000$)
Urban	1.31 ± 0.07		
Grade 9	0.65 ± 0.08	15.5 ($p < 0.00$)	Independent- samples Mann Whitney U test ($p < 0.000$)
Grade 11	1.06 ± 0.06		
Ongha	0.13 ± 0.22a	27.1 ($p < 0.000$)	Independent-samples Kruskal-Wallis test ($p < 0.000$)
Outapi	0.18 ± 0.15a		
Eenhana	0.42 ± 0.19ab		
Windhoek	0.47 ± 0.09ab		
Tsandi	0.50 ± 0.10ab		
Onayena	0.59 ± 0.15ab		
Ohangwena	1.06 ± 0.21abc		
Oniipa	1.16 ± 0.20bc		
Rundu	1.62 ± 0.10cd		
Katima Mulilo	2.30 ± 0.13d		
Omusati	0.40 ± 0.09a	44.5 ($p < 0.000$)	Independent-samples Kruskal-Wallis test ($p < 0.000$)
Khomas	0.47 ± 0.10a		
Ohangwena	0.54 ± 0.12a		
Oshikoto	0.80 ± 0.12a		
Kavango	1.62 ± 0.11b		
Caprivi	2.30 ± 0.13c		

Means ± standard error (SE) with same letter(s) are not significantly different ($p = 0.05$) according to Scheffe's multiple-comparisons test.

ANOVA and non-parametric tests showed that significantly more urban than rural learners were pregnant in the previous 12 months. The mean number of pregnant girls was higher in Grade 11 than Grade 9. In addition, Scheffe's multiple-comparisons test revealed that Katima Mulilo and Rundu had the highest statistically significant mean numbers of pregnant learners, while the lowest mean numbers of pregnant learners were reported in Ongha constituency and Outapi town. Caprivi region also reported the highest mean number of pregnant learners while Omusati region had the lowest mean number of pregnant learners.

The reported mean numbers of school boys that made school girls pregnant are shown in Table 22. Ohangwena region and Eenhana town had the highest statistically significant learner-reported mean numbers of school boys that made school girls pregnant while Omusati region and Outapi town had the lowest mean numbers of school boys that made school girls pregnant. The mean number of school boys that made school girls pregnant was also statistically lower in the Caprivi region.

Table 22: Mean number of boys that made girls pregnant in 12 months

Independent variables	Mean number of boys ± SE	ANOVA F-values (p-values)	Non-parametric tests (p-values)
Rural	0.36 ± 0.05	0.06 ($p > 0.80$)	Independent-samples Mann-Whitney U test ($p > 0.59$)
Urban	0.37 ± 0.05		
Grade 9	0.17 ± 0.06	16.3 ($p < 0.00$)	Independent-samples Mann-Whitney U test (p < 0.000)
Grade 11	0.48 ± 0.05		
Outapi	0.19 ± 0.13a	4.57 ($p < 0.000$)	Independent-samples Kruskal-Wallis test ($p < 0.000$)
Tsandi	0.20 ± 0.09a		
Katima Mulilo	0.23 ± 0.10a		
Windhoek	0.23 ± 0.08a		
Oniipa	0.26 ± 0.17a		
Ongha	0.29 ± 0.18a		
Ohangwena	0.37 ± 0.18ab		
Onayena	0.43 ± 0.13ab		
Rundu	0.64 ± 0.09ab		
Eenhana	1.1 ± 0.16b		
Omusati	0.19 ± 0.07a	5.2 ($p < 0.000$)	Independent-samples Kruskal-Wallis test ($p < 0.000$)
Caprivi	0.23 ± 0.10ab		
Khomas	0.23 ± 0.09ab		
Oshikoto	0.37 ± 0.10ab		
Kavango	0.63 ± 0.09b		
Ohangwena	0.65 ± 0.10b		

Means ± standard error (SE) with same letter(s) are not significantly different ($p = 0.05$) according to Scheffe's multiple-comparisons test.

Learners' perceptions were used to estimate teachers' and learners' risks and susceptibility to HIV/AIDS. Table 23 shows that there were important regional differences in the percentage frequencies of learners that thought their science teachers were at a higher risk of contracting HIV/AIDS. The highest science teacher HIV/AIDS risk was reported by learners from the Caprivi region (35.6%) while the lowest risk was reported by learners from the Khomas region (17.4%). Significantly more learners from the Omusati region (46.8%) than from the Khomas region (25.7%) were worried that their science teachers could be infected by HIV/AIDS. Caprivi region (82.2%) had the highest significant percentage frequency of learners that reported that some of their peers could be infected by HIV/AIDS while Khomas region (54.8%) learners least reported that their peers could be HIV-infected.

Among the various constituencies and towns, Windhoek recorded the lowest percentage frequencies of learners that thought their fellow learners were HIV-infected, and that their science teachers were at a higher risk of HIV/AIDS infection (Table 24).

Table 23: Learners' perceptions of risk and susceptibility to HIV/AIDS across regions

Risk and susceptibility to HIV assessment question	Percent frequency of learners that reported "yes" Regions						Pearson Chi-square value (p-value)
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
Do you think science teachers are at a higher risk of contracting HIV?	35.6	21.2	17.4	27.2	28.7	27.7	13.23 ($p < 0.022$)
Are you worried that your science teacher could be infected by HIV?	45.1	32.4	25.7	34.0	46.8	33.7	21.71 ($p < 0.001$)
Do you think some of your fellow learners could be infected by HIV?	82.2	80.9	54.8	77.8	71.8	73.5	35.34 ($p < 0.000$)

Table 24: Learners' perceptions of risk and susceptibility to HIV/AIDS in different constituencies and towns

Risk and susceptibility to HIV assessment question	Percentage frequencies in different constituencies/towns										Pearson Chi-square value
	Een n=45	KM n=103	Ohan n=33	Ona n=64	Ong n=31	Oni n=39	Out n=67	Run n=140	Tsa n=141	Wdh n=166	
Do you think science teachers are at a higher risk of contracting HIV?	30.2	35.6	18.2	30.2	35.7	21.6	28.1	21.1	29.0	17.4	16.70 ($p < 0.053$)
Are you worried that your science teacher could be infected by HIV?	26.7	45.1	48.5	34.9	27.6	32.4	35.4	32.4	52.1	25.7	31.64 ($p < 0.000$)
Do you think some of your fellow learners may be infected by HIV?	84.4	82.2	84.8	71.9	61.3	75.7	73.4	80.9	71.0	54.8	41.76 ($p < 0.000$)

Een, Eenhana; KM, Katima Mulilo, Ohan, Ohangwena; Ona, Onayena; Ong, Ongha; Oni, Oniipa; Out, Outapi; Run, Rundu; Tsa, Tsandi; Wdh, Windhoek.

Table 25 also shows that significantly more rural learners than urban learners were worried that their science teachers could be infected by HIV/AIDS.

Table 25: Learners' perceptions of risk and susceptibility to HIV/AIDS in rural and urban areas

Risk and susceptibility to HIV assessment question	**Percent frequency of learners that reported "yes"**		**Pearson Chi-square value (*p*-value)**
	Rural (n = 420)	Urban (n = 409)	
Do you think science teachers are at a higher risk of contracting HIV?	28.1	23.6	2.11 ($p > 0.148$)
Are you worried that your science teacher could be infected by HIV?	40.3	33.2	4.32 ($p < 0.037$)
Do you think some of your fellow learners may be infected by HIV?	73.8	70.9	0.83 ($p > 0.363$)

4.2.3 Learners' gaps in knowledge, norms, attitudes, practices and skills to HIV/AIDS

This section presents results of responses to questions and statements that tested science learners' levels of knowledge, norms, attitudes, practices, and skills (KNAPS) to HIV/AIDS. The results included statistical analyses of variables relating to knowledge of HIV/AIDS (e.g. traditional healers, prostitution, circumcision, CD4 counts, tuberculosis, antiretroviral drugs, local caricatures and symptoms associated with HIV/AIDS); and norms, attitudes, practices and skills to HIV/AIDS (e.g. HIV testing). Table 26 shows the frequency counts and percentage frequencies of learners that answered "yes" to the KNAPS variables named above.

Table 26: Learners that answered "yes" to different KNAPS variables

KNAPS variable	Answer	% frequency
Some traditional healers can cure HIV	X	9.3
Only immoral people like prostitutes get HIV/AIDS	X	6.8
You cannot get HIV if you stick to one sexual partner	X	46.8
Circumcision can reduce HIV infection in men	√	33.3
You can tell by looks that a person is HIV positive	X	9.4
An HIV-positive person can live for >10 years without showing signs of AIDS	√	79.5
High CD4 count means one's immune system is good	√	61.8
One can get HIV from a mosquito that fed on blood from an HIV-positive person	X	12.2
People suffering from tuberculosis also have HIV/AIDS	X	12.1
Antiretroviral drugs are the new cure for HIV/AIDS	X	33.1
HIV/AIDS can cause loss of memory	√	55.7
I have been tested for HIV	n/a	31.1
I would like to be tested for HIV	n/a	93.5
Will your girlfriend/boyfriend be angry with you if you refused to have sex without a condom?	n/a	41.4
It is difficult to use a condom with one regular sexual partner	n/a	12.2

X = wrong answer; √ = correct answer; n/a = statement or question is not applicable to correct or wrong interpretation.

Learners' gaps in HIV/AIDS knowledge were compared across regions. Table 27 shows the results of the Pearson Chi-square analysis of learners' knowledge of various variables related to HIV/AIDS. Omusati region had the highest statistically significant proportion of learners that reported that some traditional healers could cure HIV/AIDS. There were marked regional differences in the proportions of learners that reported that one could not get HIV if they were faithful to one sexual partner: the lowest percentage frequency was from Oshikoto region (35.9%), and the highest was from the Khomas region (53.3%). Fewer learners from the Kavango region reported that "an HIV-positive person can live for more than ten years without showing signs of AIDS". In addition, a significantly high percentage of learners from the Caprivi region reported that "one can get HIV from a mosquito that fed on blood from an HIV-positive person", "people suffering from tuberculosis also have HIV/AIDS", and "antiretroviral drugs are the new cure for HIV/AIDS".

There were also definitive ethnic differences (Pearson Chi-square value 21.69, df =5, $p < 0.001$) in the percentage frequencies of learners that stated that antiretroviral drugs were the new cure for HIV/AIDS: 39.3% (Lozi, n = 44), 36.5% (Ovambo, n = 179), 24.8% (Kavango, n = 29), 16.7% (Herero, n = 4), and 8.3% (Damara-Nama, n = 2). Therefore, high percentage frequencies of learners that were Lozi and Ovambo thought that antiretroviral drugs were the new cure for HIV/AIDS.

Table 27: Learners' gaps in HIV/AIDS knowledge across regions

Knowledge/ attitude assessment statement	Percent frequency of learners that reported "yes" — Regions						Pearson Chi-square value (p-value)
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
Some traditional healers can cure HIV	7.1	6.7	6.5	3.9	19.1	5.9	29.78 ($p < 0.000$)
Only immoral people like prostitutes get HIV/AIDS	10.1	4.4	4.6	6.5	7.9	8.0	4.73 ($p > 0.449$)
You cannot get HIV if you stick to one sexual partner	52.9	46.3	53.3	38.1	49.0	35.9	12.62 ($p < 0.027$)
Circumcision can reduce HIV infection in men	29.2	32.0	32.0	39.6	33.1	34.0	2.86 ($p < 0.722$)

You can tell by looks that a person is HIV positive	12.9	6.6	12.5	9.3	7.5	8.7	5.32 ($p > 0.378$)
An HIV-positive person can live for >10 years without showing signs of AIDS	83.2	64.6	79.2	80.2	83.8	86.1	23.63 ($p < 0.000$)
High CD4 count means one's immune system is good	60.2	65.8	59.0	68.9	56.5	64.6	6.03 ($p > 0.303$)
One can get HIV from a mosquito that fed on blood from an HIV-positive person	20.6	9.6	13.4	3.8	13.0	12.1	14.88 ($p < 0.011$)
People suffering from TB also have HIV/AIDS	25.3	8.8	7.2	6.6	16.9	7.8	30.02 ($p < 0.000$)
Antiretroviral drugs are the new cure for HIV/AIDS	41.2	23.0	8.0	28.3	51.7	40.8	83.98 ($p < 0.000$)

HIV/AIDS can cause loss of memory	59.4	57.0	30.4	56.6	66.2	63.9	47.83 ($p < 0.000$)

Further, key ethnic differences (Pearson Chi-square 32.67, df = 5, $p < 0.000$) were found in the percentage frequencies of learners that stated that "an HIV-positive person can live for more than ten years without showing signs of AIDS": 83.8% (Lozi, n = 93), 83.7% (Ovambo, n = 416), 79.2% (Damara-Nama, n = 19), 61.5% (Kavango, n = 72), and 28.0% (Herero, n = 17).

Table 28 shows that there were major differences in the levels of HIV/AIDS knowledge between Grades 9 and 11 learners. The analysis showed that predominantly more Grade 9 than Grade 11 learners thought that some traditional healers can cure HIV, a person cannot get HIV if they stick to one sexual partner, one can tell by looks that another person is HIV-positive, and an individual can get HIV from a mosquito that had fed on blood from an HIV-positive person. Thus, with respect to the answers they provided to the eight knowledge statements, Grade 11 Biology learners demonstrated a better understanding of HIV/AIDS than Grade 9 Life Science learners.

In this study, the attitude to test for HIV was seen as an important cornerstone of compliant HIV/AIDS behaviour (AIDS prevention and treatment). Thus, learners were requested to state "yes" or "no" to the statement: "I have been tested for HIV". Overall, only 31.1% (n = 254) of learners in the study had ever tested for HIV/AIDS. Factors that influenced HIV testing among learners were also determined. Statistical analysis showed that significantly more rural (40.1%, n = 166) than urban (21.8%, n = 88) learners had ever been tested for HIV/AIDS (Pearson Chi-square value = 32.03, $p < 0.000$). Therefore the odds of testing for HIV were significantly higher (odds ratio of 2.4) for rural than urban learners.

Table 28: Comparison of knowledge gaps between Life Science and Biology learners

Knowledge statement	Answer	Percent frequency of learners that agreed with knowledge statement		Pearson Chi-square value (p-value)
		Life Science (n = 301)	Biology (n = 527)	
Some traditional healers can cure HIV	X	13.3	7.1	8.05 ($p < 0.005$)
You cannot get HIV if you stick to one sexual partner	X	56.7	41.2	17.96 ($p < 0.000$)
Circumcision can reduce HIV infection in men	√	25.6	37.7	11.08 ($p < 0.001$)
You can tell by looks that a person is HIV-positive	X	13.7	7.0	9.88 ($p < 0.002$)
An HIV-positive person can live for more than ten years without showing signs of AIDS	√	75.6	81.8	4.24 ($p < 0.040$)
High CD4 count means one's immune system is good	√	49.4	68.2	23.83 ($p < 0.000$)
One can get HIV from a mosquito that fed on blood from an HIV-positive person	X	15.7	10.1	5.39 ($p < 0.020$)
HIV/AIDS can cause loss of memory	√	50.9	58.4	3.40 ($p < 0.046$)

X = wrong answer; √ = correct answer.

Of those learners that had ever tested for HIV/AIDS, there were significantly more girls (34.6%, n = 158) than boys (26.7%, n = 96) (Pearson Chi-square = 5.98, df = 1, $p < 0.014$). In addition, significantly more Grade 11 (35.8%, n = 185) than Grade 9 (23.0%, n = 69) learners had ever tested for HIV/AIDS (Pearson Chi-square 14.48, df = 1, $p < 0.000$).

Across the regions, there were substantial differences in the percentage frequencies of learners that had ever been tested for HIV/AIDS: Kavango (17.4%, n = 24), Khomas (20.7%, n = 34), Caprivi (29.4%, n = 30), Ohangwena (33.6%, n = 36), Omusati (40.3%, n = 83), and Oshikoto (46.5%, n = 47) (Pearson Chi-square =

40.17, df = 5, $p < 0.000$). The proportions of learners that had ever tested for HIV in various constituencies and towns were significantly different (Pearson Chi-square value = 105.29, df = 9, $p < 0.000$): 81.6% (Oniipa, n = 31), 62.7% (Outapi, n = 42), 47.7% (Eenhana, n = 21), 29.5% (Tsandi, n = 41), 29.4% (Katima Mulilo, n = 30), 25.8% (Ongha, n = 8), 24.2% (Ohangwena, n = 8), 24.2% (Onayena, n = 15), 20.7% (Windhoek, n = 34), and 17.4% (Rundu, n = 24). Therefore, Rundu and Oniipa had the lowest and highest percentage frequencies of HIV-tested learners, respectively.

Age significantly influenced the percentage frequency of learners that had ever been tested for HIV/AIDS (Pearson Chi-square value = 33.07, df = 11, $p < 0.001$). Figure 13 shows that the proportion of learners that ever tested for HIV increased between 14 and 19 years of age, and thereafter declined between 20 and 21 years of age. Overall, the percentage frequencies of learners that ever tested for HIV/AIDS were: 18.8% for 14-year olds, 20.2% for 15-year olds, 21.6% for 16-year olds, 35.0% for 17-year olds, 38.6% for 18-year olds, 40.5% for 19-year olds, 37.8% for 20-year olds, and 33.3% for 21-year olds.

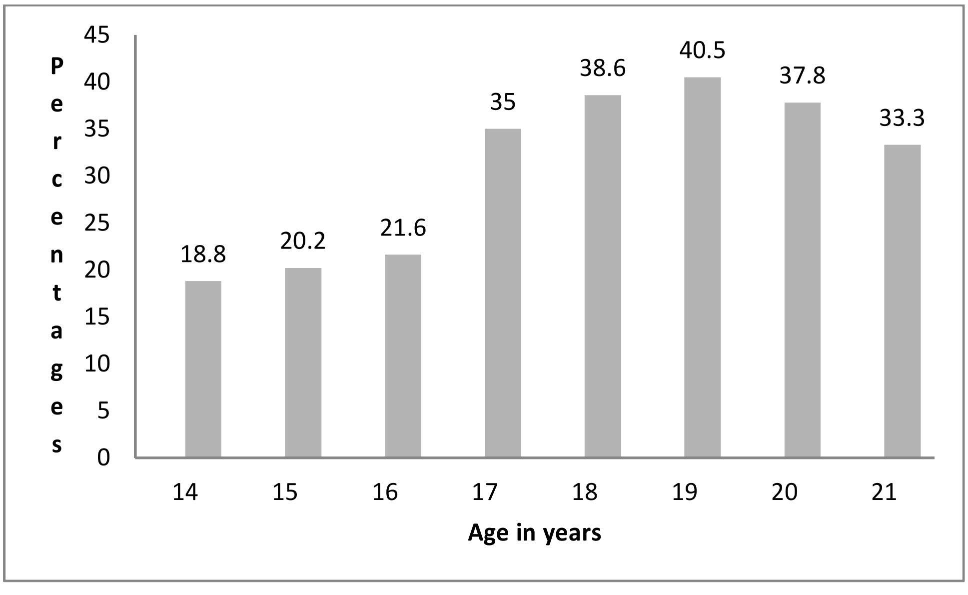

Figure 13: Learners of different ages that ever tested for HIV/AIDS

There were also conspicuous ethnic differences in the proportions of learners that had ever tested for HIV/AIDS: Kavango (16.4%, n = 20), Herero (21.4%, n = 6), Damara-Nama (26.7%, n = 8), Lozi (29.2%, n = 33), and Ovambo (36.1%, n = 183) (Pearson Chi-square = 20.58, df = 5, $p < 0.001$). Thus, the lowest percentage frequencies of learners that ever tested for HIV/AIDS were from the Kavango and Herero ethnic groups.

Multinomial logistic regression analysis revealed that the percentages of learners that had tested for HIV/AIDS were dependent on their age ($p < 0.000$, odds ratio = 1.27); gender ($p < 0.003$, odds ratio for males = 0.607); and region ($p < 0.050$; Kavango odds ratio = 0.289, Khomas odds ratio = 0.327, and Ohangwena odds ratio = 0.525). Thus, the uptake of HIV tests significantly increased with age but decreased for male learners, and learners in the Kavango, Khomas, and Ohangwena regions. Logistic regression analysis did not show significant effects for rural-urban areas, Grade, and ethnic groups.

Since intention was an important prerequisite to the actual action to test for HIV, learners were requested to state “yes” or “no” to the statement “I would like to be tested for HIV”. Overall, 93.5% (n = 751) of the learners expressed the intention to test for HIV. But the intention to test for HIV/AIDS was significantly different across the regions (Pearson Chi-square = 16.32, df = 5, $p < 0.006$). Kavango region (86.0%, n = 117) had the lowest percentage frequency of learners that stated they would like to be tested for HIV/AIDS, compared to higher frequencies from other regions such as Khomas (93.7%, n = 148), Ohangwena (94.2%, n = 98), Caprivi (95.0%, n = 95), Oshikoto (95.9%, n = 94), and Omusati (96.1%, n = 199).

The results showed that ethnic background also influenced the learners' intentions to test for HIV. This was demonstrated by the fact that there were evident ethnic differences in the percentage frequencies of learners that wanted to test for HIV (Pearson Chi-square value = 17.30, df = 5, $p < 0.004$): 96.4% (Herero, n = 27), 95.5% (Lozi, n = 106), 95.2% (Ovambo, n = 477), 88.9% (Damara-Nama, n = 24), and 85.6% (Kavango, n =101). Therefore, learners that were from the Herero, Lozi, and Ovambo ethnic groups were the most likely to test for HIV while learners that were from the Damara-Nama and Kavango ethnic groups were the least likely to test for HIV/AIDS.

Learners' norms to sexual intercourse were estimated using the question: "what is the main reason you have not had sexual intercourse?" Percentage frequencies of learners that cited various reasons/norms for not having engaged in sexual intercourse are shown in Figure 14 and their analysis is presented in Table 29.

According to the results in Table 29, "I want to wait until I am married" was the least frequently cited reason by learners in the Khomas region but the most frequently cited norm by learners in the Oshikoto region (Pearson Chi-square value = 17.88, $p <$ 0.000). "I am afraid of getting a sexually transmitted infection such as HIV/AIDS" was the most frequently cited norm by learners in the Caprivi region but the least cited in the Kavango region (Pearson Chi-square value = 26.05, $p < 0.000$).

Table 29: Sexual norms of learners from different regions

Main reason why learners did not have sexual intercourse	Percent frequency of learners that reported "yes" Regions						Pearson Chi-square value (*p*-value)
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
I want to wait until I am older	22.1	13.6	23.2	21.6	13.8	15.4	9.43 ($p > 0.095$)
I want to wait until I am married	50.6	45.7	42.2	60.2	55.7	63.5	17.88 ($p < 0.003$)
I am afraid of getting pregnant	19.5	15.0	15.7	20.4	19.3	12.5	3.95 ($p > 0.557$)
I am afraid of getting STDs/HIV	50.6	25.0	26.5	45.9	30.7	25.6	26.05 ($p < 0.000$)
I have not had a chance to have sex	5.3	4.3	3.0	4.1	4.2	6.7	2.30 ($p > 0.806$)
I have not met the right person	13.0	15.0	10.8	13.3	5.7	7.7	9.92 ($p > 0.077$)
It is against my religious beliefs	3.9	7.1	6.6	7.1	3.6	2.9	4.77 ($p > 0.445$)
My parents are very strict	6.5	4.3	6.6	4.1	3.6	5.8	2.47 ($p > 0.781$)

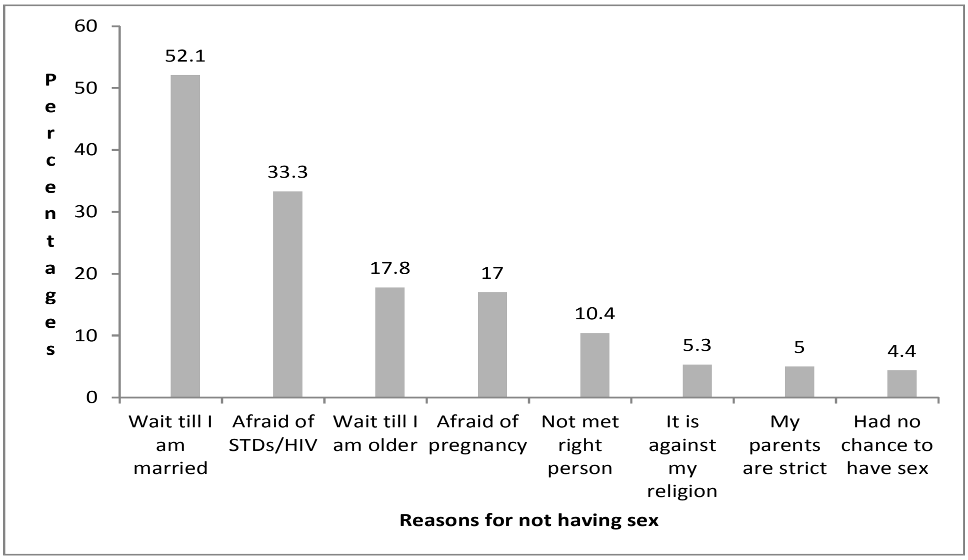

Figure 14: Learners that cited reasons for not having engaged in sexual intercourse

In the study, 17.8% of learners reported "I want to wait until I am older", 52.1% reported "I want to wait until I am married", 17.0% stated "I am afraid of getting pregnant", 33.3% reported "I am afraid of getting a sexually transmitted infection such as HIV/AIDS", 10.4% reported "I have not met the right person", 5.3% reported "it is against my religious beliefs", and only 5.0% reported "my parents are very strict".

Table 30 shows the sexual norms cited by learners from different ethnic backgrounds. The highest percentage tally of learners that cited "I want to wait until I am married" were Ovambo (56.9%) while the lowest was recorded for Damara-Nama learners (30.0%). Therefore, "waiting to get married" delayed sex among Ovambo than among Damara-Nama learners. The percentage of Lozi learners

(46.1%) that were afraid of getting sexually transmitted diseases (STDs) such as HIV/AIDS was higher than for the Herero learners (27.6%).

Table 30: Sexual norms as reported by learners from different ethnic backgrounds

Variable	**Percent frequency of learners**					**Pearson Chi-square (p-value)**
	Learners' ethnic groups					
	Damara-Nama (n = 30)	Herero (n = 29)	Kavango (n = 123)	Lozi (n = 114)	Ovambo (n = 514)	
I want to wait until I am married	30.0	37.9	45.5	48.3	56.9	15.47 ($p < 0.009$)
I am afraid of getting STDs/HIV	33.3	27.6	29.3	46.1	33.3	12.29 ($p < 0.031$)
Sex with one partner without condoms	3.4	10.3	3.3	7.0	3.7	10.54 ($p > 0.061$)
Condoms are not 100% safe	16.7	27.6	38.5	44.2	28.3	17.20 ($p < 0.004$)
It is difficult to use condoms when the weather is too hot	3.3	13.8	4.1	7.1	3.1	11.52 ($p < 0.042$)
I am tired of using condoms for a long time	23.3	7.1	6.6	17.7	10.5	13.27 ($p < 0.021$)
Condoms spread STDs	0.0	0.0	10.7	8.0	2.7	24.62 ($p < 0.000$)

Learners were also requested to state their personal attitudes in the event that they wanted to change their sexual behaviours. Overall, 45.4% (n = 374) of all learners stated they would "stop all sex"; 22.8% (n = 188) stated they would have "sex with condoms", 0.7% (n = 6) reported they would have "sex without condoms", 4.6% (n = 38) reported they would rather have "sex with one partner without condoms", 5.0% (n = 41) stated they would have "sex with many partners with condoms", 10.3% (n = 85) reported they would "reduce the number of sexual partners", and 7.2% (n = 59) reported they would have "sex with reduced number of partners with condoms". The results of learners' sexual attitudes in the different educational regions are provided in Table 31.

The percentage count of learners that preferred "sex with condoms" was clearly different (Pearson Chi-square value = 20.79, $p < 0.001$) across the regions: 33.6% (Ohangwena), 33.0% (Caprivi), 22.3% (Kavango), 21.2% (Oshikoto), 20.5% (Khomas), and 15.1% (Omusati). Predominantly more Grade 9 learners (52.3%) than Grade 11 learners (41.4%) stated they would "stop all sex" (Pearson Chi-square value = 9.22, df = 1, $p < 0.002$). However, "sex with condoms" was equally preferred by both Grade 9 learners (22.6%) and Grade 11 learners (22.8%) (Pearson Chi-square value = 0.005, df = 1, $p > 0.946$).

Table 31: Sexual attitudes of learners in different regions

Sexual preferences	Percent frequency of learners that reported "yes" — Regions						Pearson Chi-square value (*p*-value)
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
Stop all sex	45.1	46.8	40.4	49.5	43.9	51.0	4.03 ($p > 0.546$)
Sex with condoms	33.0	22.3	20.5	33.6	15.1	21.2	20.79 ($p < 0.001$)
Sex without condoms	1.9	0.0	0.0	0.9	1.5	0.0	6.69 ($p > 0.244$)
Sex with one partner without condoms	7.8	4.3	5.5	5.6	2.9	2.9	4.89 ($p > 0.430$)
Sex with many partners with condoms	7.8	2.9	4.2	6.5	4.4	5.8	4.11 ($p > 0.534$)
Reduce the number of sexual partners	7.8	12.9	15.1	11.2	6.8	7.7	9.36 ($p > 0.095$)
Sex with reduced number of partners with condoms	10.7	8.6	4.8	7.5	7.8	3.8	5.60 ($p > 0.347$)

Behavioural and contextual norms that influenced condom use were also investigated in this study. Learners were asked to state “yes” or “no” to the statement: “it is difficult to use a condom with one regular sexual partner”. Overall, 12.2% of the learners reported that it was difficult to use a condom with one regular sexual partner. Significantly high proportions of learners from the Caprivi (17.8%), Kavango (17.7%), and Khomas (14.3%) regions reported that it was difficult to use condoms with one regular sexual partner (Pearson Chi-square value = 14.61, df = 5, $p < 0.012$).

Learners were also asked to state “yes” or “no” to the question: “will your girlfriend or boyfriend be angry with you if you refused to have sex without a condom?” Overall, 41.4% of the learners reported that their partners would be angry in they refused to engage in unprotected sex. There regional differences (Pearson Chi-square value = 29.03, df = 5, $p < 0.000$) in the percentage frequencies of learners that reported that their girlfriends or boyfriends would be angry if they refused to have sex without a condom. Five regions: Caprivi (33.0%), Kavango (33.1%), Ohangwena (34.9%), Khomas (38.6%), and Oshikoto (39.8%) had lower percentage frequencies of learners that stated their girlfriends or boyfriends would be angry if they refused to have unprotected sex. However, Omusati region recorded a significantly higher percentage frequency (57.1%) of learners that stated their girlfriends or boyfriends would be angry if they refused to have unprotected sex.

Contextual (societal) norms that undermine the use of condoms were also determined in this study. Hence, learners were asked the question: “what reasons do people give for not using condoms?” The percentage frequencies of learners that cited “reasons that people give for not using condoms” are shown in Table 32.

Table 32: Learners that reported contextual norms that undermined condom use

Reasons for not using condoms	% frequency
No need to use condoms if my partner looks healthy	27.8
Condoms smell	13.2
Condoms are small	4.0
No need to use condoms if you trust your partner	29.3
Condoms are not 100% safe	31.5
It is difficult to use condoms when the weather is too hot	4.1
It is difficult to use condoms when a person is drunk	14.5
I am tired of using condoms for a long time	11.2
No need to use condoms if the girl is using family planning pills	16.0
No need to use condoms if they want to have a baby	28.5
Condoms spread sexually transmitted diseases	4.7
Condoms are expensive	2.4
Condoms are not available locally	4.8
I feel shy to buy and carry condoms	23.9
Condoms are not available at the school	8.7
They want more sexual satisfaction	17.6

Overall, the most frequently cited contextual norms for not using condoms were "condoms are not 100% safe" with 31.5% frequency, "no need to use condoms if you trust your partner" with 29.3% frequency, and "no need to use condoms if my partner looks healthy" with 27.8% frequency. The least frequently cited contextual norm was "condoms are expensive" with 2.4% frequency. Across the regions, there were insignificant differences ($p > 0.05$) in the percentage tallies of learners that cited "condoms are small", "it is difficult to use condoms when the weather is too hot", "condoms are expensive", and "condoms are not available locally".

Table 33 presents statistically significant results of the Pearson Chi-square analysis of contextual norms that learners from the six regions cited for not using condoms. Ohangwena region had the highest statistically significant percentage frequencies of learners that reported that there was "no need to use condoms if my partner looks healthy", "no need to use condoms if you trust your partner" "condoms smell", "it is difficult to use condoms when a person is drunk", "I feel shy to buy and carry condoms", and "they want more sexual satisfaction". On the other hand, Caprivi region had the highest percentage counts of learners that reported that "condoms are not 100% safe", "I am tired of using condoms for a long time", and "no need to use condoms if the girl is using family planning pills". Kavango region had the highest statistically significant percentage frequency of learners that reported that "condoms spread sexually transmitted diseases". Oshikoto region had the highest proportional count of learners that reported that "condoms are not available at the school".

Table 33: Contextual norms about condoms as reported by learners from different regions

Contextual norms	**Percent frequency of learners that cited norms** **Regions**						**Pearson Chi-square value (*p*-value)**
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
No need to use condoms if my partner looks healthy	30.4	27.5	34.3	38.3	17.4	25.0	21.36 ($p < 0.001$)
Condoms smell	8.8	11.5	13.9	24.3	6.8	20.4	25.70 ($p < 0.000$)
No need to use condoms if you trust your partner	33.3	33.8	32.5	37.4	18.4	27.9	18.43 ($p < 0.002$)
Condoms are not 100% safe	46.1	36.0	36.1	27.1	23.2	25.0	22.61 ($p < 0.000$)
Difficult to use condoms when drunk	14.7	14.4	13.9	24.3	10.1	14.4	11.48 ($p < 0.043$)
I am tired of using condoms for a long time	18.6	6.5	12.7	14.0	5.3	16.3	20.05 ($p < 0.001$)

No need to use condoms if girl is using family planning pills	25.5	17.4	16.9	20.6	6.3	18.3	23.71 ($p < 0.000$)
Condoms spread STDs	8.8	10.1	3.6	1.9	2.4	2.9	18.15 ($p < 0.003$)
Shy to buy and carry condoms	19.6	18.7	27.7	34.6	18.4	28.8	16.03 ($p < 0.007$)
Condoms are not available at school	4.9	5.8	8.4	10.3	8.2	16.3	11.40 ($p < 0.044$)
Want more sexual satisfaction	15.7	19.4	21.1	26.2	7.7	22.1	22.78 ($p < 0.000$)

There were distinct ethnic differences in the percentage frequencies of learners who reported that it was difficult to use condoms when the weather was too hot: 13.8% (Herero), 7.1% (Lozi), 4.1% (Kavango), 3.3% (Damara-Nama), and 3.1% (Ovambo) (see Table 30). Therefore, Herero learners most likely blamed their lack of condom use on hot weather. Significantly higher percentages of Damara-Nama (23.3%) and Lozi (17.7%) learners were tired of using condoms for a long time compared to lower percentages of Kavango (6.6%) and Herero (7.1%) learners. Statistically more learners that were Kavango (10.7%) and Lozi (8.0%) reported that "condoms spread sexually transmitted diseases".

Since skills and practices of accessing condoms were important in forming the intention to use condoms during sexual intercourse, learners were asked the question: "if you were to get a condom, how would you most likely get it?" Figure 15 shows that most learners (60.3%) would get condoms from pharmacies, clinics, and hospitals. Statistical analysis showed that learners' ability to access condoms varied extensively according to regions, gender, Grade, ethnic, and rural-urban schools. A characteristically large proportion of learners from the Caprivi region (8.8%, n = 9) stated that they would rather give someone else money to buy condoms for them (Pearson Chi-square value = 13.46, df = 5, $p < 0.019$). A distinctively high percentage count of learners from the Ohangwena region (40.6%, n =43) reported that they would get condoms from a store, shop, street vendor, *Cuca-shop*, or Shebeen (Pearson Chi-square value = 12.13, df = 5, $p < 0.033$).

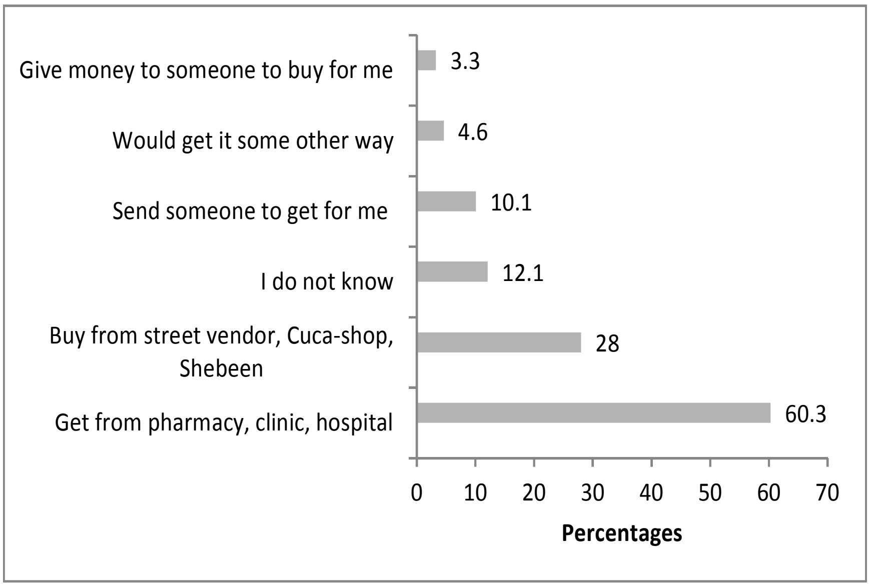

Figure 15: Learners that reported how to access condoms

On the other hand, more females (16.7%, n =76) than males (6.3%, n = 23) reported that they did not know how or where they would get condoms (Pearson Chi-square value = 20.30, df = 1, $p < 0.000$). However, statistically more males (13.5%, n =49) than females (7.5%, n = 34) would send someone else to get condoms for them from a pharmacy, clinic, hospital or shop (Pearson Chi-square value = 8.10, df = 1, $p < 0.004$). Preponderantly more males (5.0%, n = 18) than females (2.0%, n = 9) would also give someone else money to buy condoms for them (Pearson Chi-square value = 5.65, df = 1, $p < 0.017$). Further, significantly more males (36.6%, n = 133) than females (21.3%, n = 97) would buy condoms from a store, shop, street vendor, *Cuca-shop* or Shebeen (Pearson Chi-square value = 23.63, df = 1, $p < 0.000$).

Across learners' Grades, significantly more Grade 9 learners (17.7%, n = 53) than Grade 11 learners (8.8%, n = 46) did not know how or where they would get condoms (Pearson Chi-square value = 13.94, df = 1, $p < 0.000$). Yet, predominantly more Grade 11 learners (30.6%, n = 159) than Grade 9 learners (23.7%, n = 71) would get condoms from, shop, street vendor, Cuca-shop, or Shebeen (Pearson Chi-square value = 4.50, df =1, $p < 0.034$). Lozi learners (72.6%, n = 82) were more likely to get condoms from a pharmacy, clinic, or hospital than Damara-Nama learners (41.4%, n = 12) (Pearson Chi-square value = 14.39, df = 5, $p < 0.013$). In addition, considerably more urban learners (6.2%, n = 25) than rural learners (3.1%, n = 13) stated that they would get condoms "some other way" (Pearson Chi-square value = 4.29, df = 1, $p < 0.038$).

Since local names (including caricatures) and symptoms of HIV/AIDS were important in forming local meanings of the AIDS epidemic, in addition to reducing stigma and reforming the curriculum, learners were asked the questions: "what names do people associate with AIDS", and "what symptoms do people associate with AIDS?" Local names and caricatures associated with HIV/AIDS (and their possible English translations), and symptoms (typical and non-typical) of HIV/AIDS, as perceived by the learners from the six educational regions, are provided in Tables 34 and 35, respectively.

Table 34: Names associated with HIV/AIDS (and their possible English translations) in different regions

Regions	**Local names for HIV/AIDS (English translation)**
Caprivi	Prostitutes: *Butuku bwa sihule* (disease for prostitutes); m*bushahi, ndarabangwa, buhure* (promiscuous) AIDS syndrome: *Ci lwala* AIDS (suffering from AIDS); *Kibutu bwa masapo* (bone disease); disease without cure Derogatory names: *Mbwa* (dog); i*cho* (there he/she goes) Death: Dead girl; Mr. Killer Fear-factor: ***Simbandembande* (eagle); killer disease; m**_amuingelele_ (disease that takes everything or everyone); m*ashinya bomu* (destroys without mercy) Slang: English; George; k*alikaava* (she hit herself or he hit himself); m*apilelo* (place where people are saved) Witchcraft: *kaliloze* (gun)
Kavango	Prostitutes: Whore; ***ihule*** (bitch or prostitute)**;** foolish prostitute; s***ikumbu*** (prostitute) HIV infection: ***Kambumburu*** (HIV virus); *sakwata kehamba* (got infected by HIV) AIDS syndrome: Bad disease; *karukukute* (a skinny person); k*atjumba* (a young boy, child); **skeleton** Derogatory names: Chameleon; e*singahogo* (pretender, snake, somebody that comes up with bad ideas in which they do not take part); *kangweru* (a liar); **Mosquito**; transmitter Death: Living corpse; dead-alive; living on borrowed time; z*eguru (keguru* is something of heavenly nature) Fear-factor: Calamity; h*epaka nyoko* (make your mom to suffer); n*gomana* (you are finished); z*amu zuguma* (something has been thrown at him/her; victim) Slang: 4 x 4 (name of musical band, a stronger type of vehicle); *CD;* Sida (AIDS in French); English; s*hikembandai* (a bird)

Khomas

Prostitutes: Bitch; *Mate*

HIV infection: ***Ekiya*** (thorn); *Ombuto* (HIV virus)

AIDS syndrome: AIDS boy; Bones; ***Ekomba*** (AIDS); Killer disease

Derogatory names: rotten apple; Red house; Donkey; *Ekifi* (Satan); **Fool;** *Gaba xub/xus* (go and die you bastard); Mr/Mrs AIDS, HIV, Skinny, or Skeleton

Death: Dead; killer

Slang: **Four letters** (HIV or AIDS)

Ohangwena

Sex: *Okapendi* (underwear); sugar-dad

HIV infection: ***Ekiya*** or ***Okakiya*** (thorn); **Infected people;** *Otalumbu nombuto* (living with the virus or seed); ***Owayapa*** (HIV-infected)

AIDS syndrome: **Killer disease**

Death: Dead baboon; dead body; o*mudimba* (corpse); *Oto kunghula nombila, etsetse* (approaching death); dead-alive

Fear-factor: Fire; *Katanga kamufifi* (hot ball); person on the red line; lion; victims

Slang: **Four letters** (HIV or AIDS); **modern disease**

Omusati

Sex: *Ekululume* ('real man')

Prostitute: *Shikumbu* (bitch)

HIV infection: *aantu yena omukithi gwoshinanena* (HIV/AIDS infected people); **Infected people;** *ekiya, Kakiya* (small thorn); *namukithi ta kunu ombuto* (person sowing the virus or seed); *ombuto, Omuntu talumbu nombuto (virus/infected person); okuyina* (already infected); *okwayapa, yapa* (somebody that is already infected)

AIDS syndrome: *Oshimbebe* (very weak); *oshinkapa* (very weak or disabled); ***Osuvi*** (AIDS); *aantu mboka yeli kepango* (people on ARVs); **AIDS people;** ARVs; *idisa* (disease); *omukithi, kakithi* (disease); *masipa* (bones); *kuundanda une* (of 4 letters or AIDS); *obustanga* (AIDS); *odjou* (AIDS); **patient;** uncured disease

Derogatory names: Idiot; *kaavulika* (somebody who does not listen to advice or is stubborn)

Death: ***Kadhipagi, dhipagi, edhipagi-kithi*** (killer disease); *nakusa, onakusa*

	(someone who will die); dead body
	Slang: **Four letters** (HIV or AIDS); Mr. Four letters; Desert soul; *skele* (skeleton); waiter; Mr. Deeds
	Witchcraft: *omulodi* (witch)
Oshikoto	Sex: *aaholiyiipala* (people addicted to sex); *akulyuunona* (sex); *ekululume* ('real man'); *tondo* (testes)
	HIV infection: Carrier; *ota yapa* (he or she is caught or HIV-infected); ***okakwega*** (small thorn); **positive people**
	AIDS syndrome: A bag of bones; **AIDS people, infected people, infections;** *omukwati gwepango* (somebody receiving treatment); *shinangele* (very thin person); stick
	Derogatory names: *Shinyakwi noyana* (somebody useless with his/her children)
	Death: Only one month ahead
	Fear-factor: *Iihakanwa* (AIDS victims); disaster; terminator
	Slang: **Four letters** (HIV or AIDS); ***Oondanda ne*** (four letters or AIDS); skeleton

Terms in bold were cited several times

Table 35: Symptoms associated with HIV/AIDS in different regions

Regions	Typical symptoms	Non-typical symptoms
Caprivi	**Weight loss**, **flu** or colds, **fever**, **diarrhoea**, **vomiting**, **coughing**, neck pain, thin, getting thin without being sick, high temperature, gonorrhoea, syphilis, **TB,** headache, tiredness, **loss of appetite**, malaria, night sweats, **weakness**, pain when passing urine, rash, sores on body, spots on body, stressed, lonely, **tired**, and pneumonia.	Body changes colour, cannot work, red lips, impaired vision, aloof, painful joints, and **hair changes colour**.
Kavango	Burning during urination, **coughing**, **diarrhoea**, **weight loss**, fatigue, headache, fever, having different diseases, high temperature, insanity, blind, TB, loss of appetite, loss of weight and body colour, low CD4 count, many opportunistic infections, persistent dry cough, sores on body, sores on sex organs, sores around anus, **skin rashes**, **tired** and weak all the time, and vomiting.	Dizziness, too fat, spots on face, and pimples.
Khomas	**Thin**, coughing, **fever**, vomiting, nausea, skinny, flu, fragile and sick, gonorrhoea, headaches, helpless, loss of appetite, **loss of weight**, sick every time, skinny, **sores on body**, sores on genitals, **TB**, and **rashes**.	Red eyes, laziness, afraid of being with others, their shape starts to change, sleeps too much, and their stress levels increase.
Ohangwena	**Diarrhoea**, **coughing**, high blood pressure, always sick, **thin**, body weakness, headache, change of skin colour, loss of appetite, coughing deep, ulcers around mouth, unexpected weight loss, fever, **body sores**, impaired vision, **loss of appetite**, persistent cough, **whooping cough**, **low CD4 count**, have STDs most times, pimples around body, **skin rashes**, swollen glands, swollen skin, syphilis, gonorrhoea, TB, malaria, **tired**, night sweats, and many opportunistic infections.	**Neck stiffness**, **neck pain**, loses temper, not peaceful, stays away from relatives, swollen legs, and skin becomes dark.
Omusati	TB, **weight loss**, **thin**, coughing, many diseases manifest at once, body weakness, **loss of appetite**, persistent cough, headache, **diarrhoea**, bad cough, STDs, fever, tiredness, **body weakness**, high body temperature, sores around mouth, lack of confidence, cannot work long hours, loss of energy, many wounds on body, rashes, syphilis, gonorrhoea, short body, **sores on genitals**, **swollen glands**, **vomiting**, feeling cold, and **weak**.	Big head, change of skin colour, loss of muscles, vomiting, sneezing, running nose, hair becomes yellow and old-like, hair falling, smallpox on face, **sores around mouth**, bald head, red eyes, sore lips, very angry at people, and stressed.

Oshikoto	**Coughing**, vomiting, **thin**, **neck stiffness**, **diarrhoea**, **fever**, **loss of appetite**, **headache**, tired, stressed, **weight loss**, low CD4 count, loss of body colour, STDs, TB, and **fatigue**.	Angry, **impaired vision**, neck pain, sneezing, swollen muscles, unfriendly to others, dizziness, and wounds all over the body.

Terms in bold were cited several times

4.2.4 Learners' perceptions of the constraints of incorporating HIV/AIDS education into the syllabi for Life Science and Biology

In this section, the constraints of incorporating HIV/AIDS education into the syllabi for Life Science and Biology subjects were analysed. The percentage frequencies of learners that reported the various constraints are shown in Table 36.

Table 36: Learners that reported constraints of incorporating HIV/AIDS education into the syllabi for Life Science and Biology

Constraints	% frequency
Life Science and Biology teachers do not test or examine learners on HIV/AIDS	62.1
Life Science and Biology teachers have no access to appropriate resources	52.1
Life Science and Biology teachers emphasize facts but not life-skills or behaviour change	51.3
Life Science and Biology teachers are few and already over-worked	50.6
HIV/AIDS education is not covered comprehensively	47.7
Life Science and Biology teachers lack adequate training	46.9
Life Science and Biology teachers do not talk about sensitive topics	43.8
HIV/AIDS education is not appropriate for my age	10.7

Regional differences in the proportions of learners that cited the various constraints of incorporating HIV/AIDS education into the syllabi for Life Science and Biology subjects are presented in Table 37. Lack of adequate HIV/AIDS training by Life Science and Biology teachers was nearly a universal constraint in all the regions (Pearson Chi-square value = 9.95, df = 5, $p > 0.077$). A significantly large proportion of learners in the Kavango region reported that HIV/AIDS education was not covered comprehensively by Life Science and Biology teachers. Khomas and Kavango regions had notably high percentage frequencies of learners that indicated that Life Science and Biology teachers emphasised facts but did not impart life-skills or encourage behaviour change.

Table 37: Constraints of incorporating HIV/AIDS education into Life Science and Biology in different regions

Constraints	**Percent frequency of learners that cited constraint**						**Pearson Chi-square (p-value)**
	Regions						
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
Life Science and Biology teachers are few/over-worked	30.0	58.6	55.4	50.9	53.5	47.1	22.98 ($p < 0.000$)
Life Science and Biology teachers lack adequate training	35.4	48.1	54.8	42.9	49.2	45.6	9.95 ($p > 0.077$)
HIV/AIDS education is not covered comprehensively	42.3	60.3	52.6	35.5	45.0	47.1	18.24 ($p < 0.003$)
Life Science and Biology teachers emphasize facts but not life-skills or behaviour change	35.9	58.9	59.3	48.1	51.2	48.5	17.36 ($p < 0.004$)
Life Science and Biology teachers	30.1	40.3	51.0	39.8	45.1	52.9	16.10 ($p < 0.007$)

do not talk about sensitive topics							
Life Science and Biology teachers do not test or examine learners on HIV/AIDS	55.3	69.1	64.3	61.3	63.8	53.9	8.35 ($p > 0.138$)
HIV/AIDS education is not appropriate for my age	12.6	6.5	12.4	8.5	13.9	7.9	6.94 ($p > 0.225$)
Life Science and Biology teachers have no access to appropriate resources	44.7	65.6	53.5	50.0	47.5	51.5	13.93 ($p < 0.016$)

Table 37 shows that "Life Science and Biology teachers do not talk about sensitive topics such as gender issues, sexuality, and socio-cultural contexts" was more especially reported by learners from the Oshikoto and Khomas regions than elsewhere (Pearson Chi-square value = 16.10, df = 5, $p < 0.007$). "Life Science and Biology teachers do not test or examine learners on HIV/AIDS" was a universal or unanimous constraint in all the regions (Pearson Chi-square value = 8.35, df = 5, $p > 0.138$). "HIV/AIDS education is not appropriate for my age" was reported by very low frequencies of learners in all the regions. In fact, the results showed that HIV/AIDS education was age-appropriate for 89.3% of the learners in all the regions (Pearson Chi-square value = 6.94, df = 5, $p > 0.225$). The highest percentage frequency of learners that stated that Life Science and Biology teachers did not have access to appropriate resources to teach HIV/AIDS content effectively was from the Kavango region.

As a whole, the results clearly showed that the delivery of HIV/AIDS education was most significantly constrained in the Kavango region as evidenced by the significantly high percentage frequencies of learners that reported that "Life Science and Biology teachers are few and are already over-worked", "HIV/AIDS education is not covered comprehensively by Life Science and Biology teachers", "Life Science and Biology teachers emphasize facts but do not impart life-skills or encourage behaviour change", and "Life Science and Biology teachers have no access to appropriate resources to teach HIV/AIDS content effectively". In the Khomas region, the most notable constraint was that Life Science and Biology teachers emphasized facts but did not impart life-skills or encourage behaviour change.

Out of all the eight constraints that were analysed, only one was pointedly different for urban and rural schools (Pearson Chi-square value = 7.47, df = 1, $p < 0.006$). "HIV/AIDS education is not covered comprehensively by Life Science and Biology teachers" was more significantly reported by urban learners (52.7%, n = 205) than their rural counterparts (43.0%, n = 176). Therefore, Life Science and Biology teachers in rural areas covered HIV/AIDS education more comprehensively than their counterparts in urban areas. Significantly more male learners than female learners were critical of Life Science and Biology teachers' resourcefulness in the delivery of HIV/AIDS education. More male learners (57.4%, n = 202) than female learners (47.8%, n = 210) reported that "Life Science and Biology teachers have no access to appropriate resources to teach HIV/AIDS content effectively" (Pearson Chi-square value = 7.14, df = 1, $p < 0.008$).

Table 38 shows results of an analysis of the constraints according to learners' Grades/subjects. The results showed that two of the eight constraints were common to both Grade 9 (Life Science) and Grade 11 (Biology) learners. "Life Science and Biology teachers are few and are already over-worked" and "Life Science and Biology teachers lack adequate training" were common constraints in the delivery of HIV/AIDS education in both Life Science and Biology subjects.

Table 38: An analysis of the constraints according to learners' Grades and subjects

Constraints	Percent frequency of learners that cited constraint		Pearson Chi-square (p-value)
	Grade 9 (Life Science) (n = 301)	**Grade 11 (Biology)** (n = 527)	
Life Science and Biology teachers are few and are already over-worked	48.2	51.8	0.91 ($p > 0.339$)
Life Science and Biology teachers lack adequate training	42.3	49.2	3.31 (p > 0.069)
HIV/AIDS education is not covered comprehensively by Life Science and Biology teachers	38.8	52.8	14.48 ($p < 0.000$)
Life Science and Biology teachers emphasize facts but do not impart life-skills or encourage behaviour change	43.9	55.2	9.20 ($p < 0.002$)
Life Science and Biology teachers do not talk about sensitive topics such as gender issues, sexuality, and socio-cultural contexts	34.4	48.9	16.13 ($p < 0.000$)
Life Science and Biology teachers do not test or examine learners on HIV/AIDS	52.1	67.6	19.04 ($p < 0.000$)
HIV/AIDS education is not appropriate for my age	15.4	8.1	10.33 ($p < 0.001$)
Life Science and Biology teachers have no access to appropriate resources to teach HIV/AIDS content effectively	35.8	60.8	45.17 ($p < 0.000$)

The results showed that the constraints of incorporating HIV/AIDS education into Life Science and Biology subjects were more conspicuous in Grade 11 Biology than Grade 9 Life Science. Significantly more Grade 11 Biology learners than Grade 9 Life Science learners reported that "HIV/AIDS education is not covered comprehensively by Life Science and Biology teachers"; "Life Science and Biology teachers emphasize facts but do not impart life skills or encourage behaviour change"; "Life Science and Biology teachers do not talk about sensitive topics such as gender issues, sexuality, and socio-cultural contexts"; "Life Science and Biology teachers do not test or examine learners on HIV/AIDS"; and "Life Science and Biology teachers have no access to appropriate resources to teach HIV/AIDS content effectively". On the other hand, significantly more Grade 9 Life Science learners (15.4%) than Grade 11 Biology learners (8.1%) stated that "HIV/AIDS education is not appropriate for my age" (Table 38).

4.2.5 Learners' perceptions of the organizational and professional dimensions of HIV/AIDS education

This section presents the results of learners' perceptions of the organizational (school) and professional (teaching-learning) characteristics that affected the delivery of HIV/AIDS education. Learners were requested to state how they wanted HIV/AIDS education to be taught at their schools. Table 39 presents the percentage frequencies of learners that preferred the various options for the delivery of HIV/AIDS education at school.

A regional analysis of learners' preferred modes of delivery of HIV/AIDS education in secondary schools was conducted, and the results are presented in Table 40. Pearson Chi-square statistics showed that learners from all the six regions were unanimous on only two variables, namely, "I would like HIV/AIDS to be taught as a separate subject by a specially trained teacher", and "I would like learners to sit for an examination in HIV/AIDS education". All the learners from the six regions were agreeable that HIV/AIDS education should be taught as a separate subject by a specially trained teacher (Pearson Chi-square value = 4.28, df = 5, $p > 0.510$).

Table 39: Percentage frequencies of learners that preferred various modes of delivering HIV/AIDS education

Options for the delivery of HIV/AIDS education at school	**% frequency**
I would like learners to sit for an examination in HIV/AIDS education	82.4
I would like HIV/AIDS to be taught as a separate subject by a specially trained teacher	74.0
I would like HIV/AIDS to be taught by Guidance and Counseling teachers	72.9
I would like HIV/AIDS to be taught as part of Biology lessons	71.1
HIV/AIDS education should have separate timetable slots	64.1
HIV/AIDS should be taught as an after-school activity in clubs	48.9

All learners from the six regions were undivided that HIV/AIDS should be an examinable subject (Pearson Chi-square value = 3.11, df = 5, $p > 0.684$). There were significant regional differences in the proportions of learners that preferred the other modes of delivering HIV/AIDS education (Table 40).

Table 40: Regional analysis of learners' perceptions regarding the modes of delivery of HIV/AIDS education

Delivery options for HIV/AIDS education	**Percent frequency of learners that preferred delivery option** **Regions**						**Pearson Chi-square value (*p*-value)**
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
HIV/AIDS education should have separate timetable slots	43.1	78.8	66.7	65.4	64.4	59.6	33.81 ($p < 0.000$)
HIV/AIDS should be taught as an after-school activity in clubs	27.5	51.1	42.0	58.1	54.0	58.7	31.59 ($p < 0.000$)
I would like HIV/AIDS to be taught as part of Biology lessons	81.6	54.4	67.3	80.4	72.7	75.7	30.81 ($p < 0.000$)
I would like HIV/AIDS to be taught by Guidance and Counseling teachers	72.5	76.3	83.3	79.2	60.9	70.3	26.67 ($p < 0.000$)

I would like HIV/AIDS to be taught as a separate subject by a specially trained teacher	68.6	79.6	71.9	73.6	74.0	75.7	4.28 ($p > 0.510$)
I would like learners to sit for an examination in HIV/AIDS education	77.2	82.6	84.7	84.0	81.3	84.5	3.11 ($p > 0.684$)

Table 41 shows the percentage frequencies of learners that reported various organizational characteristics related to HIV/AIDS education and prevention.

Table 41: Learners that cited various organizational characteristics related to HIV/AIDS education and prevention

Organizational characteristics	% frequency
The school has got enough materials for HIV/AIDS education	20.0
I belong to an HIV/AIDS awareness club	47.5
The school provides out-of-school activities for HIV/AIDS education	37.9
Condoms are available at the school	27.9
School authorities allow the distribution of condoms at the school	39.8
Condoms should be distributed freely at the school	79.6
There is a Voluntary Counselling and Testing (VCT) centre near the school	54.6
The school involves the community and Non-Governmental Organizations (NGOs) in HIV/AIDS education	42.9

Almost all the schools in the study lacked materials for HIV/AIDS education. This was evidenced by the fact that 4 out of every 5 learners in the study reported that their school did not have enough materials for HIV/AIDS education. Nearly two-thirds of the learners reported that condoms were not available at their school. Most school authorities did not allow the free distribution of condoms at their schools despite the fact that about 80.0% of the learners wanted condoms to be freely distributed at the schools. Only 54.6% of the learners in the study reported that their schools were located near Voluntary Counselling and Testing centres, and that their schools involved the community and non-Governmental Organizations in HIV/AIDS education. School characteristics in relation to HIV/AIDS education and prevention were analysed across regions, and the results are shown in Table 42. Despite the general scarcity of materials for HIV/AIDS education, schools in the Oshikoto region had slightly more materials than schools in the Caprivi region.

Table 42 shows that Omusati (64.5%), Ohangwena (52.3%) and Oshikoto (52.0%) regions had statistically high percentage frequencies of learners that belonged to an HIV/AIDS awareness club. Khomas (31.4%), Kavango (37.3%), and Caprivi (42.2%) had significantly low proportions of learners that belonged to an HIV/AIDS awareness club. The proportions of learners that belonged to HIV/AIDS awareness clubs varied significantly across towns and constituencies. Rundu (37.3%) and Windhoek (31.4%) recorded appreciably lower percentage frequencies of learners that belonged to HIV/AIDS awareness clubs, while Tsandi (60.3%) and Ongha (60.0%) had the highest proportions, respectively (Pearson Chi-square value = 55.39, df = 9, $p < 0.000$).

Table 42: Regional analysis of learners' perceptions of school characteristics for HIV/AIDS education and prevention

School characteristics in relation to HIV/AIDS education and prevention	Percent frequency of learners that cited characteristic						Pearson Chi-square value (*p*-value)
	Regions						
	Caprivi (n = 103)	Kavango (n = 140)	Khomas (n = 166)	Ohangwena (n = 108)	Omusati (n = 208)	Oshikoto (n = 104)	
The school has got enough materials for HIV/AIDS education	13.9	13.1	21.1	19.0	23.2	28.7	5.60 ($p < 0.027$)
I belong to an HIV/AIDS awareness club	42.2	37.3	31.4	52.3	64.5	52.0	48.37 ($p < 0.000$)
The school provides after-school activities for HIV/AIDS education	45.1	34.3	29.3	41.5	38.3	43.4	9.54 ($p > 0.089$)
Condoms are available at the school	49.5	20.6	8.8	59.8	12.9	42.2	143.40 ($p < 0.000$)

School authorities allow the distribution of condoms at the school	57.8	41.9	20.1	57.5	27.7	54.0	72.76 ($p < 0.000$)
Condoms should be distributed freely at the school	86.3	89.6	82.9	87.9	61.8	81.4	56.93 ($p < 0.000$)
There is a Voluntary Counseling and Testing (VCT) centre near the school	54.5	42.5	31.4	63.9	63.0	78.6	74.62 ($p < 0.000$)
The school involves the community and Non-Governmental Organizations in HIV/AIDS education	47.5	35.9	31.5	48.1	43.9	55.9	19.28 ($p < 0.002$)

Ohangwena region (59.8%) had the highest significant percentage frequency of learners that reported that condoms were available at their school, while Khomas region had the lowest (8.8%). A remarkably higher percentage frequency of learners reported that condoms were available at schools in Oniipa (89.5%), Eenhana (68.9%), Ongha (66.7%), Katima Mulilo (49.5%), and Ohangwena (39.4%) while lower percentage frequencies of learners reported the availability of condoms at schools in Windhoek (8.8%), Tsandi (13.9%), Outapi (10.8%), Onayena (14.3%), and Rundu (20.6%) (Pearson Chi-square value = 218.66, df = 9, $p < 0.000$). In general, significantly more rural learners (n = 133, 32.4%) than urban (n = 93, 23.4%) learners reported that condoms were available at their schools.

School authorities in the Caprivi, Ohangwena, and Oshikoto regions more readily allowed the free distribution of condoms at their schools than authorities in the Khomas and Omusati regions. Thus, considerably fewer learners in the Omusati region than elsewhere stated that condoms should be freely distributed at their schools. The results also showed that authorities in Oniipa, Eenhana, Ongha, and Katima Mulilo were more likely to allow the distribution of condoms at their schools than authorities in Windhoek, Outapi, and Tsandi (Pearson Chi-square value = 117.25, df = 9, $p < 0.000$).

Oshikoto region had the highest percentage tally of learners that reported that their school was located near a Voluntary Counselling and Testing centre. The lowest percentage frequency of learners that reported that their school was located near a Voluntary Counselling and Testing centre was from the Khomas region. Voluntary Counselling and Testing centres were located nearer to the schools in Eenhana, Oniipa, Outapi, and Onayena than schools in Windhoek, Ohangwena, Ongha, and Rundu (Pearson Chi-square value = 125.69, $p < 0.000$).

Furthermore, Oshikoto region had the highest percentage total number of learners that reported that their school involved the community and Non-Governmental Organizations in HIV/AIDS education. The lowest percentage frequency of learners that reported that their school involved the community and Non-Governmental Organizations in HIV/AIDS education was from the Khomas region. The involvement of the community and non-Governmental Organizations in HIV/AIDS education was statistically low for schools in Windhoek and Rundu (Pearson Chi-square value = 22.44, df = 9, $p < 0.008$).

Learners were asked the question: "which after-school HIV/AIDS education activities are offered at the school?" The percentage frequencies of learners that cited the various after-school activities related to HIV/AIDS education are shown in Figure 16.

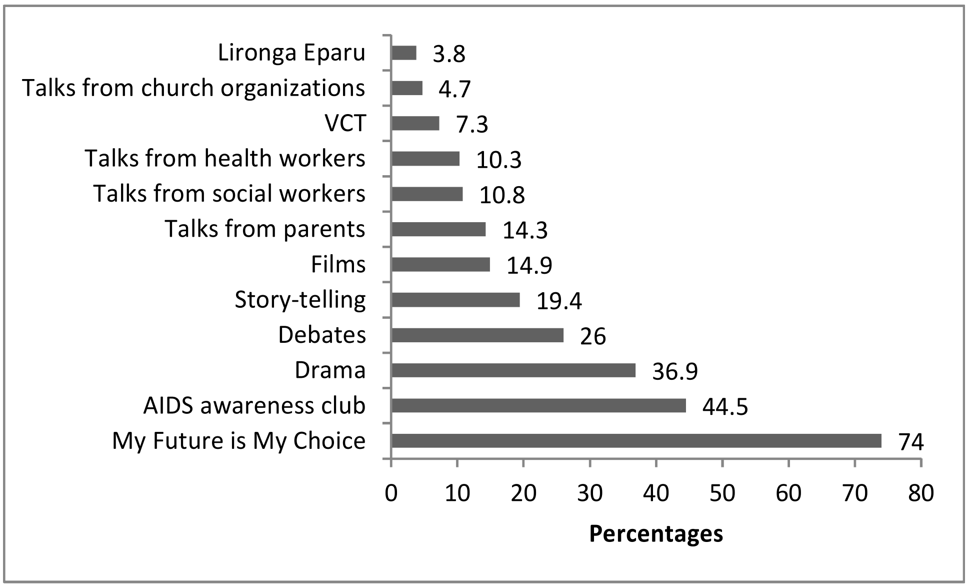

Figure 16: Percentage frequencies of learners that cited the various after-school activities related to HIV/AIDS education

Overall, most learners (74.0%) notably reported that *My Future is My Choice* was offered at their school. The second and third most frequently offered activities were AIDS awareness clubs (44.5%), and drama (36.9%), respectively. Oniipa constituency in the Oshikoto region had the highest percentage count of learners that cited films (Pearson Chi-square value = 63.10, df = 9, $p < 0.000$), talks from health workers (Pearson Chi-square value = 31.66, df = 9, $p < 0.000$), story-telling (Pearson Chi-square value = 14.90, df = 9, $p < 0.000$), talks from parents (Pearson Chi-square value = 17.94, df = 9, $p < 0.000$), talks from social workers (Pearson Chi-square value = 23.15, df = 9, $p < 0.000$), and AIDS awareness clubs (Pearson Chi-square value = 38.62, df = 9, $p < 0.000$). Caprivi region had the highest significant percentage frequencies of learners that cited debates (Pearson Chi-square value = 24.15, df = 5, $p < 0.000$), *My Future is My Choice* (Pearson Chi-square value = 13.46, df = 5, $p < 0.000$), drama (Pearson Chi-square value = 32.95, df = 5, $p < 0.000$), and talks from church organizations (Pearson Chi-square value = 14.06, df = 5, $p < 0.000$).

Debates were mainly cited by learners in Eenhana constituency of the Ohangwena region (Pearson Chi-square value = 34.28, df = 5, $p < 0.000$). Kavango region had the highest statistically significant percentage frequency of learners that cited Lironga Eparu (Pearson Chi-square value = 13.70, df = 5, $p < 0.018$). Further, films (Pearson Chi-square value = 19.67, df = 1) and AIDS awareness clubs (Pearson Chi-square value = 9.75, df = 1) were more expressly cited by learners in rural than urban areas ($p < 0.002$). In contrast, debates (Pearson Chi-square value = 3.82, df = 1) and drama (Pearson Chi-square value = 4.59, df = 1) were more significantly cited by learners in urban than rural areas ($p < 0.050$).

Learners were further asked: "what is your main source of HIV/AIDS information?" The percentage counts of learners that cited the various sources of HIV/AIDS information are shown in Figure 17.

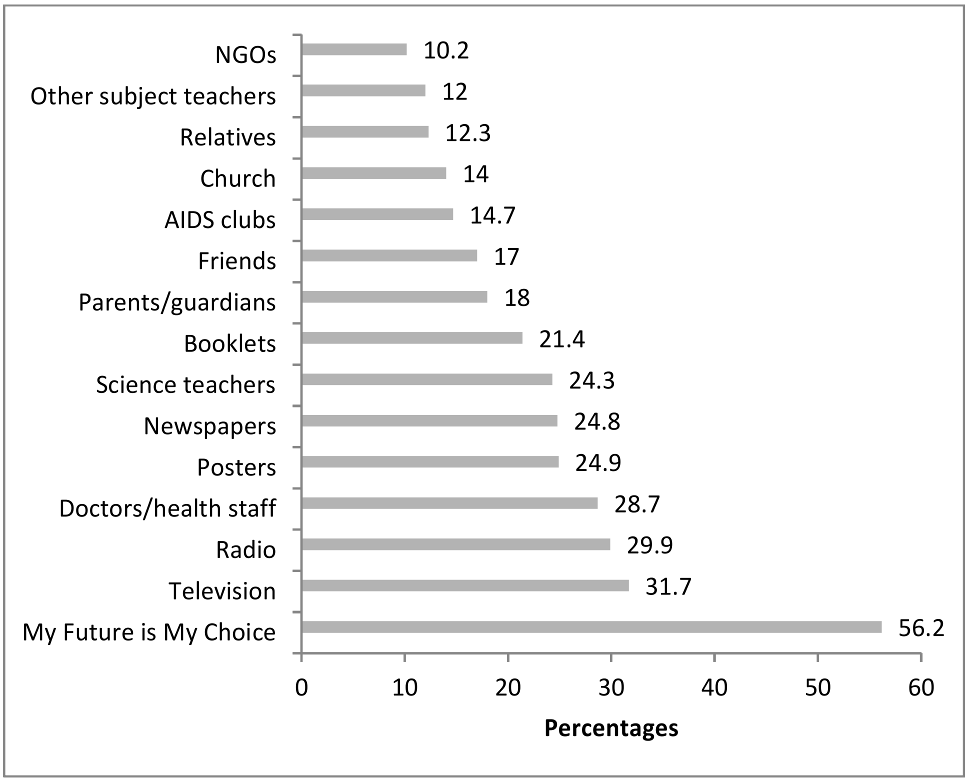

Figure 17: Percentage frequencies of learners that cited various sources of HIV/AIDS information

Overall, most learners (56.2%) reported that *My Future is My Choice* was their main source of HIV/AIDS information. Other sources of information cited by learners were television (31.7%), radio (29.9%), doctors/health staff (28.7%), and posters (24.9%). Only 24.3% of learners cited science teachers as their main source of

HIV/AIDS information. However, the percentage frequency of learners that cited science teachers as their main source of HIV/AIDS information was twice that of learners that cited "other subject teachers" (12.0%).

Booklets were more exceedingly used as a source of information in the Khomas (32.5%) and Caprivi (32.0%) regions than elsewhere (Pearson Chi-square value = 36.41, df = 5, $p < 0.000$). "Other subject teachers" were the principal source of HIV/AIDS information in the Ohangwena (19.6%) and Oshikoto (16.3%) regions than in the Omusati (7.8%), Kavango (10.1%), Khomas (11.5%), and Caprivi (11.7%) regions (Pearson Chi-square value = 11.68, df = 5, $p < 0.039$). AIDS awareness clubs were most significantly reported in the Oshikoto (22.1%), Ohangwena (19.8%), Omusati (17.1%), and Kavango (15.2%) regions than in the Khomas (9.7%) and Caprivi (4.9%) regions (Pearson Chi-square value = 18.93, df = 5, $p < 0.002$). Sourcing HIV information from doctors and health staff was more prevalent in the Caprivi (44.7%), Ohangwena (35.5%), Khomas (30.3%), and Oshikoto (28.7%) regions than in the Omusati (22.0%) and Kavango (19.4%) regions (Pearson Chi-square value = 25.87, df = 5, $p < 0.000$).

Parents and guardians were a more notable source of HIV/AIDS information in the Caprivi (32.0%), Ohangwena (29.9%), and Khomas (22.4%) regions than in the Omusati (13.7%), Oshikoto (9.7%), and Kavango (5.8%) regions (Pearson Chi-square value = 47.74, df = 5, $p < 0.000$). In the Oshikoto region, learners most significantly received HIV/AIDS information from their relatives. A higher percentage frequency of learners in the Oshikoto region (29.8%) cited "relatives" more than Ohangwena (15.0%), Caprivi (12.6%), Kavango (10.8%), Khomas (7.9%), and Omusati (6.3%) regions (Pearson Chi-square value = 40.37, df = 5, $p < 0.000$).

Science teachers were a more noteworthy source of HIV/AIDS information for learners in the Khomas (35.8%), Ohangwena (34.6%), and Caprivi (32.0%) regions than for learners in the Kavango (18.7%), Oshikoto (16.3%) and Omusati (13.7%) regions (Pearson Chi-square value = 39.83, df = 5, $p < 0.000$).

Television was more noticeably used as a main source of HIV/AIDS information in the Caprivi (47.6%), Khomas (42.4%) and Ohangwena (38.3%) regions than in Oshikoto (28.8%), Kavango (20.9%), and Omusati (20.5%) regions (Pearson Chi-square value = 42.74, df =5, $p < 0.000$). Newspapers were least significantly used as a main source of HIV/AIDS information in the Omusati region (Pearson Chi-square value = 16.56, df = 5, $p < 0.005$). The church was a major source of HIV/AIDS information in the Oshikoto region, with 42.7% of Oshikoto learners having reported that they received HIV/AIDS information from the church; this was a very highly significant difference when compared to the lower percentage frequencies recorded elsewhere: 19.4% (Kavango), 16.5% (Caprivi), 12.1% (Ohangwena), 4.8% (Khomas), and 2.9% (Omusati) (Pearson Chi-square value = 107.2, df = 5, $p <$ 0.005).

Non-Governmental Organizations (NGOs) were also a major source of HIV/AIDS information in the Oshikoto region, with 38.5% of Oshikoto learners reporting that they received information from NGOs. This was a very highly significant difference when compared to the lower percentage frequencies recorded in other regions: 12.3% (Kavango), 11.2% (Ohangwena), 4.9% (Caprivi), 3.0% (Khomas), and 2.4% (Omusati) (Pearson Chi-square value = 117.2, df = 5, $p < 0.005$). Friends were a more conspicuous source of HIV/AIDS information for learners in the Khomas (27.9%), Caprivi (24.3%), and Ohangwena (21.5%) regions than for learners in the

Omusati (12.2%), Oshikoto (9.6%), and Kavango (8.0%) regions (Pearson Chi-square value = 34.53, df = 5, $p < 0.000$). *My Future is My Choice* was a less significant source of HIV/AIDS information for learners in the Kavango (8.0%) and Khomas (7.2%) regions (Pearson Chi-square value = 32.11, df = 5, $p < 0.000$).

The learners' main sources of HIV/AIDS information were differentiated according to rural-urban areas. Pearson Chi-square statistics revealed that exceedingly more rural than urban learners received HIV/AIDS information from AIDS awareness clubs (Pearson Chi-square value = 12.34, df = 1, $p < 0.000$), posters (Pearson Chi-square value = 6.25, df = 1, $p < 0.012$), Non-Governmental Organizations (Pearson Chi-square value = 11.14, df = 1, $p < 0.001$), and *My Future is My Choice* (Pearson Chi-square value = 21.75, df = 1, $p < 0.000$). Predominantly more urban than rural learners received HIV/AIDS information from booklets (Pearson Chi-square value = 25.39, df = 1, $p < 0.000$), science teachers (Pearson Chi-square value = 9.63, df = 1, $p < 0.002$), television (Pearson Chi-square value = 8.04, df = 1, $p < 0.005$), and friends (Pearson Chi-square value = 5.69, df = 1, $p < 0.017$).

When learners' main sources of HIV/AIDS information were analysed according to gender, only *My Future is My Choice* was more prominently used by one gender. More female (60.9%) than male (50.3%) learners used *My Future is My Choice* as their main source of HIV/AIDS information (Pearson Chi-square value = 9.27, df = 1, $p < 0.002$). The other sources of HIV/AIDS information were equally used by male and female learners.

The main sources of HIV/AIDS information were also analysed according to whether learners were in Grade 9 or 11. Significantly more Grade 9 than Grade 11 learners cited doctors/health staff (Pearson Chi-square value = 5.44, df = 1, $p < 0.020$) and science teachers (Pearson Chi-square value = 14.75, df = 1, $p < 0.000$) as their main sources of HIV/AIDS information. In contrast, Grade 11 learners had a broader variety of sources of HIV/AIDS information. Pearson Chi-square analysis showed that significantly more Grade 11 than Grade 9 learners used radio (Pearson Chi-square value = 7.86, df = 1, $p < 0.005$), posters (Pearson Chi-square value = 11.87, df = 1, $p < 0.001$), television (Pearson Chi-square value = 3.82, df = 1, $p < 0.050$), church (Pearson Chi-square value = 8.67, df = 1, $p < 0.003$), Non-Governmental Organizations (Pearson Chi-square value = 10.72, df = 1, $p < 0.001$), relatives (Pearson Chi-square value = 21.42, df = 1, $p < 0.000$), and friends (Pearson Chi-square value = 5.49, df = 1, $p < 0.019$).

Table 43 shows an analysis of the main sources of HIV/AIDS information by learners from different ethnic backgrounds. The results show that Damara-Nama learners significantly received their HIV/AIDS information from booklets, HIV/AIDS clubs, parents, and television. The Herero learners primarily received their HIV/AIDS information from clubs, posters, and friends. Kavango learners' only significant mode of receiving HIV/AIDS information was through clubs. For Lozi learners, their most significant mode of receiving HIV/AIDS information was from doctors and health staff. Ovambo learners principally obtained their HIV/AIDS information from clubs, posters, and *My Future is My Choice*.

Table 43: Main sources of HIV/AIDS information for learners from different ethnic backgrounds

Main source of HIV/AIDS information	**Percent frequency of learners that cited source of information**					**Pearson Chi-square (p-value)**
	Learners' ethnic groups					
	Damara-Nama (n = 30)	**Herero** (n = 29)	**Kavango** (n = 123)	**Lozi** (n = 114)	**Ovambo** (n = 514)	
Booklets	35.7	17.2	23.3	29.8	18.6	11.37 ($p < 0.045$)
Clubs	17.2	17.2	14.9	6.1	16.9	12.17 ($p < 0.033$)
Doctors/health staff	24.1	27.6	20.5	43.0	28.4	18.79 ($p < 0.002$)
Parents/guardians	13.8	10.3	7.4	28.9	18.9	20.39 ($p < 0.001$)
Posters	13.8	31.0	13.9	21.9	28.9	16.02 ($p < 0.007$)
Television	34.5	31.0	22.1	47.4	30.4	18.59 ($p < 0.002$)
Friends	6.9	31.0	10.7	22.8	17.3	12.79 ($p < 0.025$)
My Future is My Choice	41.4	53.6	43.8	54.9	61.2	18.32 ($p < 0.003$)

Learners were asked the question: "among your teachers, which ones usually talk to you about HIV/AIDS?" The percentage numbers of learners that cited the various subject teachers that talked to learners about HIV/AIDS are presented in Figure 18.

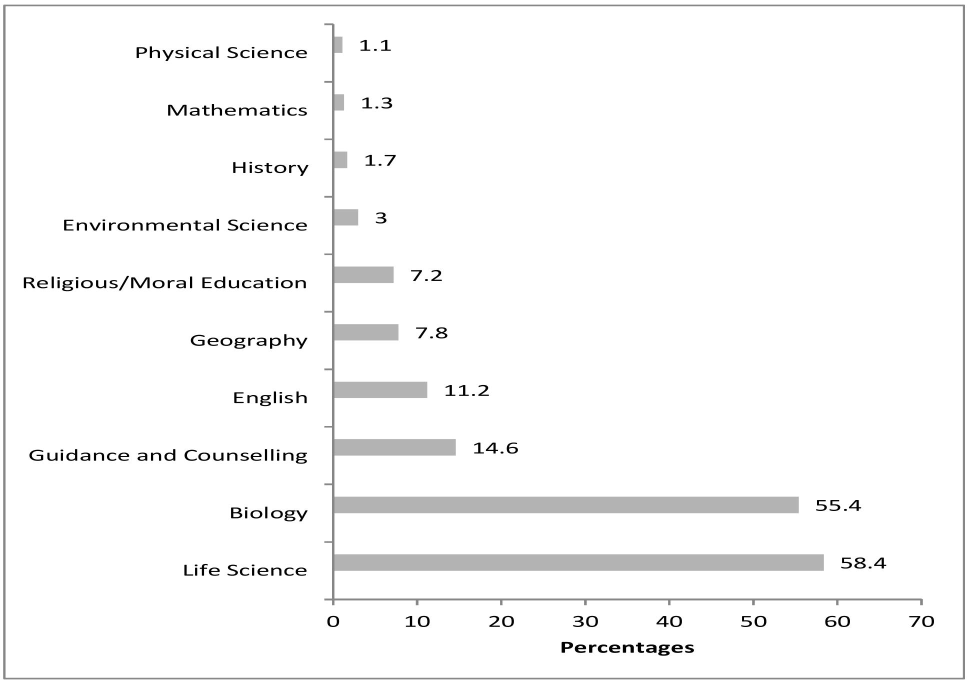

Figure 18: Percentage frequencies of learners that cited various subject teachers that talked to them about HIV/AIDS

The highest percentage frequency of learners (58.4%) stated that Life Science teachers usually talked to them about HIV/AIDS. The second most cited subject teachers that talked to learners about HIV/AIDS were Biology teachers (55.4%). The least cited subject teachers in respect of talking to learners about HIV/AIDS were Physical Science (1.1%), Mathematics (1.3%), and History (1.7%). Thus, exceptionally high percentage frequencies of learners stated that Life Science and Biology teachers talked to them about HIV/AIDS.

Across the regions, there were clear differences (Pearson Chi-square value = 24.82, df = 5, $p < 0.000$) in the percentage frequencies of learners that reported that Biology teachers talked to them about HIV/AIDS: 71.0% (Ohangwena, n = 76), 62.7% (Caprivi, n = 64), 59.6% (Oshikoto, n = 62), 56.5% (Kavango, n = 78), 49.5% (Omusati, n = 102), and 44.2% (Khomas, n = 73). The proportions of learners that reported that Life Science teachers talked to them about HIV/AIDS varied according to regions (Pearson Chi-square value = 27.00, df = 5, $p < 0.000$): 75.2% (Khomas, n = 124), 58.8% (Caprivi, n = 60), 57.6% (Kavango, n = 80), 55.8% (Oshikoto, n = 58), 51.5% (Omusati, n = 106), and 49.5% (Ohangwena, n = 53).

Considerably more learners in urban (65.0%, n = 264) than rural (52.0%, n = 217) areas reported that Life Science teachers talked to them about HIV/AIDS (Pearson Chi-square value = 14.28, df = 1, $p < 0.000$). There were no significant differences between the percentage frequencies of rural (57.6%, n = 240) and urban learners (53.1%, n = 215) that reported that Biology teachers talked to them about HIV/AIDS (Pearson Chi-square value = 1.66, df = 1, $p > 0.198$). Significantly more Grade 9 learners in urban areas (95.4%, n = 166) than Grade 9 learners in rural areas (86.5%, n = 109) stated that Life Science teachers talked to them about HIV/AIDS (Pearson Chi-square value = 7.57, df = 1, $p < 0.006$). In addition, statistically more Grade 9 learners in urban areas (12.1%, n = 21) than Grade 9 learners in rural areas (5.6%, n = 7) stated that Guidance and Counselling teachers talked to them about HIV/AIDS (Pearson Chi-square value = 3.72, df = 1, $p < 0.054$).

4.2.6 Learners' suggestions on policy interventions

Learners were asked the question: "in your own opinion, what should government do to protect science teachers and learners from HIV/AIDS?" Learners stated that government should distribute condoms freely at school and in the community (44.0%), build more HIV testing centres (40.0%), create more awareness by distributing more information (30.0%), encourage learners to abstain from sex (24.0%), start AIDS awareness at an early stage (15.0%), build clinics near the school (14.0%), start compulsory HIV testing for teachers and learners (8.0%), discourage alcohol abuse (7.0%), provide sex education (7.0%), and start HIV/AIDS clubs in the community (2.0%).

4.3 Findings from Life Science and Biology teachers

4.3.1 Teachers' perceptions of impacts of HIV/AIDS on science education

Life Science and Biology teachers were requested to state characteristics which they associated with science learners trying to cope with HIV/AIDS. Table 44 shows the counts and percentage counts of teachers that cited various characteristics associated with HIV/AIDS among learners. Pearson Chi-square analysis showed that the percentage frequencies of teachers that cited all the characteristics associated with learners trying to cope with HIV/AIDS were the same across education regions (Table 44).

Table 44: Teachers that cited characteristics of science learners trying to cope with HIV/AIDS

Characteristics of learners trying to cope with HIV/AIDS	% frequency	Pearson Chi-square values for regions, df = 5, (*p*-values)
Poor concentration in class	88.5	4.20 ($p > 0.520$)
Absent from school most times	80.3	5.35 ($p > 0.374$)
Poor class performance	77.0	5.13 ($p > 0.400$)
Looks stressed	72.1	9.18 ($p > 0.102$)
Withdraws from other learners	70.5	8.98 ($p > 0.110$)
Easily drops-out of school	57.4	6.06 ($p > 0.300$)
Looks tired	55.7	5.49 ($p > 0.358$)
Fails to attend after-school activities	49.2	7.67 ($p > 0.176$)
Looks sick	45.9	8.37 ($p > 0.137$)
Bullied and teased by other learners	44.3	1.60 ($p > 0.904$)

Pearson Chi-square analysis also revealed that "looks stressed" was more regularly reported by urban (n = 17, 94.4%) than rural (n = 27, 62.8%) teachers (Pearson Chi-square value = 6.32, df = 1, $p < 0.012$), and "poor class performance" was more frequently cited by urban (n = 17, 94.4%) than rural (n = 30, 69.8%) teachers (Pearson Chi-square value = 4.37, df = 1, $p < 0.037$). "Bullied and teased by other learners" was more often reported by Biology (n = 14, 60.9%) than Life Science (n = 13, 34.2%) teachers (Pearson Chi-square value = 4.13, df = 1, $p < 0.042$).

Life Science and Biology teachers were requested to state the characteristics that they associated with science teachers trying to cope with HIV/AIDS. The percentage counts of Life Science and Biology teachers that cited the various characteristics of HIV/AIDS among science teachers are shown in Table 45. The most cited characteristics of science teachers affected by HIV/AIDS were “absent from work most of the time because of sickness” (91.7%), “looks stressed” (68.3%), “poor performance at school” (68.3%), and “seeks treatment elsewhere” (66.7%). “Looks thin” (28.3%) and “retired on medical grounds” (31.7%) were the least reported characteristics. However, “retired on medical grounds” was more significantly reported by male (n = 11, 45.8%) than female (n = 8, 22.2%) teachers (Pearson Chi-square value = 3.71, df = 1, $p < 0.054$).

Pearson Chi-square analysis revealed no significant regional and rural-urban differences in the percentage frequencies of teachers that cited the various characteristics of science teachers trying to cope with HIV/AIDS (Table 45).

Life Science and Biology teachers were requested to answer the following questions: “is absenteeism due to illness a big problem among science learners at your school” and “is absenteeism due to illness a big problem among science teachers at your school?” Only 49.2% (n = 30) of the teachers reported that absenteeism due to illness was a major problem among science learners. Further, 40.0% (n = 24) of the teachers stated that absenteeism due to illness was a major problem among science teachers at their schools.

Table 45: Teachers that cited characteristics of science teachers trying to cope with HIV/AIDS

Characteristics of teachers trying to cope with HIV/AIDS	% frequency	Pearson Chi-square values for regions, df = 5, (p-values)	Pearson Chi-square values for rural-urban, df = 1, (*p*-values)
Absent from work most of the time because of sickness	91.7	4.61 ($p > 0.466$)	0.187 ($p > 0.666$)
Looks stressed	68.3	9.19 ($p > 0.102$)	0.056 ($p > 0.813$)
Poor performance at school	68.3	3.06 ($p > 0.690$)	0.144 ($p > 0.704$)
Seeks treatment elsewhere	66.7	5.31 ($p > 0.380$)	2.01 ($p > 0.156$)
Easily gets annoyed	53.3	5.43 ($p > 0.365$)	0.375 ($p > 0.540$)
Looks absent-minded	50.0	2.53 ($p > 0.772$)	0.082 ($p > 0.774$)
Produces poor results in student examinations	48.3	2.51 ($p > 0.775$)	0.015 ($p > 0.901$)
Is very forgetful	45.0	5.73 ($p > 0.334$)	0.140 ($p > 0.708$)
Seeks early retirement	45.0	6.39 ($p > 0.270$)	0.604 ($p > 0.437$)
Transfers to a school in town	41.7	5.47 ($p > 0.361$)	0.002 ($p > 0.961$)
Coughing	41.7	2.64 ($p > 0.775$)	0.284 ($p > 0.594$)
Retired on medical grounds	31.7	7.08 ($p > 0.215$)	0.144 ($p > 0.704$)
Looks thin	28.3	1.80 ($p > 0.877$)	0.014 ($p > 0.907$)

The percentage frequencies of teachers that reported on teacher absenteeism were the same across regions (Pearson Chi-square value = 6.83, df = 5, $p > 0.233$), rural-urban areas (Pearson Chi-square value = 0.48, df = 1, $p > 0.490$), and gender (Pearson Chi-square value = 0.29, df = 1, $p > 0.593$). Similarly, Pearson Chi-square analysis revealed no regional (Pearson Chi-square value = 9.41, df = 5, $p > 0.094$), rural-urban (Pearson Chi-square value = 2.56, df = 1, $p > 0.109$), and gender (Pearson Chi-square value = 0.45, df = 1, $p > 0.500$) differences in the proportions of teachers that reported on levels of learner absenteeism.

Teachers were also requested to state the reasons for learner absenteeism. The most frequently cited reason was "learner was sick" (n = 39, 63.9%), followed by "looking after younger siblings" (n = 28, 45.9%), "funeral" (n = 25, 41.0%), "sickness in family" (n = 20, 32.8%), and "raising money" (n = 4, 6.6%). Except for the significantly more Biology (n = 12, 70.6%) than Life Science (n = 13, 29.5%) teachers who reported that funerals were a major reason for absenteeism among their learners (Pearson Chi-square value = 8.54, df = 1, $p < 0.003$), Pearson Chi-square analysis revealed insignificant regional, rural-urban, and gender differences in the percentage frequencies of teachers that reported on the other reasons for learner absenteeism.

4.3.2 Teachers' perceptions of risk factors to HIV/AIDS

In order to ascertain learners' risks to HIV/AIDS, Life Science and Biology teachers were requested to state "yes" or "no" to the following five risk factor statements: "boyfriend-girlfriend relationships are common among the learners", "learners have easy access to condoms", "some learners smoke cigarettes", "some learners drink beer", and "some learners engage in sex for money or gifts". The percentage frequencies of Life Science and Biology teachers that cited the various risks of learners to HIV/AIDS are shown in Table 46.

Table 46: Teachers' perceptions of learners' risks to HIV/AIDS

Risk factors	% frequency of teachers that cited risk factor
Boyfriend-girlfriend relationships are common among the learners	95.1
Learners have easy access to condoms	60.7
Some learners smoke cigarettes	75.4
Some learners drink beer	95.1
Some of the learners engage in sex for money and gifts	83.6

Statistical analysis of the percentage frequencies of teachers that agreed with the risk factor statements showed that "some learners smoke cigarettes" was more significantly reported by teachers from Caprivi (n = 10, 100.0%), Khomas (n = 7, 100.0%), and Kavango (n = 9, 90.0%) regions than the other three regions: Ohangwena (n = 8, 53.3%), Omusati (n = 4, 50.0%), and Oshikoto (n = 8, 72.7%) (Pearson Chi-square value = 13.46, df =5, $p < 0.019$). Significantly more urban (94.4%) than rural (64.4%) of the teachers reported that "some learners smoke cigarettes" (Pearson Chi-square value = 5.00, df = 1, $p < 0.026$).

Teachers were requested to answer the question: "in the past 12 months, how many times have you travelled outside your duty school?" The means (± s.e) of the number of times that Life Science and Biology teachers travelled outside their duty schools were: Omusati, 5.37 ± 1.22; Ohangwena, 3.92 ± 0.96; Oshikoto, 3.46 ± 1.04;

Caprivi, 2.30 ± 1.09; Kavango, 1.89 ± 1.15; and Khomas, 1.83 ± 1.41. There were no marked regional differences in the means of the number of times that Life Science and Biology teachers travelled outside their duty schools (ANOVA F-value = 1.35, df = 5, $p > 0.260$).

The means for the number of times that Life Science and Biology teachers travelled outside their duty schools was compared across several independent factors such as rural-urban areas, gender, and marital status. ANOVA did not reveal any significant differences across rural-urban areas (F-value = 1.69, df = 1, $p > 0.199$), gender (F-value = 1.94, df = 1, $p > 0.169$), and marital status (F-value = 0.07, df = 1, $p > 0.791$). Non-parametric tests also retained the null hypotheses that the distributions for the number of times that teachers travelled outside their duty schools were the same across categories of region (Independent-samples Kruskal-Wallis test, $p > 0.261$), rural-urban areas (Independent-samples Mann-Whitney U test, $p > 0.196$)), gender (Independent-samples Mann-Whitney U test, $p > 0.108$), and marital status (Independent-samples Mann-Whitney U test, $p > 0.827$).

Further, teachers were asked the question: "in the past 12 months, how many of your female learners became pregnant?" The mean (± s.e) of the number of girls reported pregnant throughout the study was 4.18 ± 0.28. The means (± s.e) of the numbers of girls that were reported pregnant in the different regions were: Caprivi, 5.75± 0.72; Khomas, 4.33 ± 0.83; Kavango, 4.22 ± 0.68; Ohangwena, 3.54 ± 0.56; Omusati, 3.50 ± 0.72; and Oshikoto, 3.20 ± 1.06. ANOVA showed no statistical regional differences in the means of girls reported pregnant (F-value = 1.38, df = 5, $p > 0.242$). Independent-samples Kruskal-Wallis test also revealed no significant regional differences in the reported numbers of pregnant girls ($p > 0.269$). The means (± s.e) of girls that were reported pregnant in rural and urban areas were 4.20 ± 0.34 and 4.12 ± 0.49, respectively. ANOVA revealed no significant rural-urban differences in the means of pregnant girls (F-value = 0.02, df = 1, $p > 0.898$). Independent-samples Mann-Whitney U test revealed no significant rural-urban differences in the means of pregnant girls ($p > 0.890$).

4.3.3 Teachers' knowledge, norms, attitudes, practices, and skills to HIV/AIDS

Table 47 shows the percentage frequencies of Life Science and Biology teachers that consented to the various statements meant to assess their gaps in knowledge of and attitudes to HIV/AIDS. Overall, teachers' knowledge of HIV/AIDS about discordant couples, circumcision, and memory was scanty. This was demonstrated by the fact that only half of the teachers agreed that "in some co-habiting couples, one spouse may be HIV positive while the other is HIV negative even though they always have unprotected sex". Moreover, less than half of all the teachers agreed that "circumcision can protect men against HIV infection" and "HIV/AIDS can lead to loss of memory".

Table 47: Percent teachers that cited various HIV/AIDS knowledge and attitude statements

HIV/AIDS knowledge and attitude statements	Answer	% frequency
In some co-habiting couples, one spouse may be HIV positive while the other is HIV negative even though they always have unprotected sex	√	50.0
Depletion of CD4 cells leads to the onset of AIDS	√	90.9
HIV/AIDS is higher in northern Namibia because of mosquitoes	X	1.7
Circumcision can protect men against HIV infection	√	43.3
People with HIV do not live for more than 10 years	X	1.6
HIV/AIDS can lead to loss of memory	√	47.5
Antiretroviral (ARV) drugs are the new cure for AIDS	X	11.5
Antiretroviral drugs can prevent mother-to-child transmission of HIV	√	68.4
Persons that have tuberculosis (TB) also have HIV	X	10.2
Charcoal-smoked (or braai) foods are not good for people on ARV treatment	√	37.3
I have heard about immune reconstitution syndrome during ARV treatment	n/a	13.8
Selenium-rich mushrooms can delay the onset of AIDS	√	25.5
Sexually transmitted Infections (STIs) help to spread HIV	√	72.4
I am willing to go to my nearest health centre to collect ARVs	n/a	85.0
If answer to above question is "no", would you consider a transfer to a school in town where you could get ARVs?	n/a	46.2
Are you able to recognize someone that is infected with HIV?	n/a	11.7
Have you ever been tested for HIV?	n/a	98.4
Would you like to be tested for HIV?	n/a	93.1

X = wrong answer; √ = correct answer; n/a = not applicable to correct or wrong interpretation.

Life Science and Biology teachers' knowledge of HIV/AIDS in relation to antiretroviral treatment and nutrition was also very limited. This was evidenced by the fact that a paltry 13.8% of the teachers had ever heard about immune reconstitution syndrome during antiretroviral treatment.

Furthermore, only 25.5% of the teachers knew that selenium-rich mushrooms could delay the onset of AIDS, and only 37.3% of the teachers agreed that charcoal-smoked (braai) foods were not good for people on antiretroviral treatment. Nearly one-third (31.6%) of all Life Science and Biology teachers in the study did not know that antiretroviral drugs could prevent mother-to-child transmission of HIV. Another 27.6% of the teachers did not know that sexually transmitted infections helped to spread HIV/AIDS.

About one in every ten Life Science and Biology teachers in the study had erroneous understanding of HIV/AIDS facts. For example, 11.7% of teachers stated that they could recognise somebody that was HIV-infected; 11.5% of the teachers believed that antiretroviral drugs were the new cure for HIV/AIDS; 10.2% of the teachers thought persons suffering from tuberculosis also had HIV/AIDS; and 9.1% of the teachers did not know that depletion of CD4 cells led to the onset of AIDS. In terms of their attitudes to HIV/AIDS prevention and treatment, almost all the Life Science and Biology teachers had ever tested or were willing to test for HIV/AIDS. Only 15.0% of the teachers would not get antiretroviral treatment from their nearest health centre. Some 46.2% of the teachers stated that since they could not access antiretroviral treatment from their nearest health centre, they would consider a transfer to a school in town where they could receive antiretroviral treatment.

Table 48: Knowledge and attitudes to HIV/AIDS among teachers from different regions

Statements	**Perecent frequency of teachers that reported "yes" Regions**						**Pearson Chi-square value (*p*-value)**
	Caprivi (n = 10)	**Kavango** (n = 10)	**Khomas** (n = 7)	**Ohangwena** (n = 15)	**Omusati** (n = 8)	**Oshikoto** (n = 11)	
In some co-habiting couples, one spouse may be HIV positive while the other is HIV negative	70.0	30.0	14.3	60.0	57.1	50.0	7.60 ($p > 0.179$)
Depletion of CD4 cells leads to the onset of AIDS	100.0	100.0	100.0	85.7	75.0	90.0	5.23 ($p > 0.390$)

HIV/AIDS is higher in northern Namibia because of mosquitoes	0.0	0.0	0.0	0.0	0.0	9.1	4.53 ($p > 0.476$)
Circumcision can protect men against HIV infection	55.6	40.0	57.1	46.7	25.0	36.4	2.52 ($p > 0.774$)
People with HIV do not live for more than 10 years	0.0	0.0	0.0	6.7	0.0	0.0	3.12 ($p > 0.682$)
HIV/AIDS can lead to loss of memory	55.6	40.0	42.9	71.4	25.0	36.4	5.91 (p > 0.315)
ARVs are the new cure for AIDS	10.0	0.0	0.0	6.7	50.0	9.1	14.32 ($p < 0.014$)
ARVs can prevent mother-to-child transmission of HIV	77.8	50.0	71.4	57.1	71.4	90.0	4.97 ($p > 0.419$)
Persons that have TB are also infected with HIV	10.0	10.0	14.3	6.7	0.0	22.2	2.67 ($p > 0.751$)

Charcoal-smoked (or braai) foods are not good for people on ARV treatment	80.0	20.6	28.6	46.2	37.5	9.1	13.48 ($p < 0.019$)
I have heard about immune reconstitution syndrome during ARV treatment	10.0	22.2	33.3	7.1	25.0	0.0	5.71 ($p > 0.335$)
Selenium-rich mushrooms can delay the onset of AIDS	33.3	20.0	50.0	33.3	14.3	11.1	3.55 ($p > 0.616$)
STIs help to spread HIV	70.0	77.8	66.7	73.3	75.0	70.0	0.320 ($p > 0.997$)
I am willing to go to my nearest health centre to collect ARVs	88.9	80.0	57.1	100.0	100.0	72.7	9.92 ($p > 0.077$)
Are you able to recognize someone that is infected with HIV?	20.0	0.0	0.0	26.7	14.3	0.0	7.69 ($p > 0.174$)
Have you ever been tested for HIV?	90.0	100.0	100.0	100.0	100.0	100.0	5.18 ($p > 0.394$)

Would you like to be tested for HIV?	90.0	90.0	100.0	93.3	100.0	90.0	1.41 ($p > 0.923$)

Table 49: Knowledge and attitudes to HIV/AIDS among rural and urban teachers

Statements	Answer	Percent frequency of teachers that agreed with statement or reported "yes"		Pearson Chi-square value (p-value)
		Rural (n = 43)	Urban (n = 18)	
In some co-habiting couples, one spouse may be HIV positive while the other is HIV negative	√	61.9	22.2	7.94 ($p < 0.005$)
Depletion of CD4 cells leads to the onset of AIDS	√	87.5	100.0	2.06 ($p > 0.151$)
AIDS is higher in northern Namibia because of mosquitoes	X	2.4	0.0	0.44 ($p > 0.509$)
Circumcision can protect men against HIV infection	√	40.5	50.0	0.46 ($p > 0.495$)
People with HIV do not live for more than 10 years	X	2.3	0.0	0.436 ($p >0.514$)
HIV/AIDS can lead to loss of memory	√	51.2	38.9	0.76 ($p > 0.382$)
ARVs are the new cure for AIDS	X	16.3	0.0	3.31 ($p > 0.690$)
ARVs can prevent mother-to-child transmission of HIV	√	71.8	61.1	0.651 ($p > 0.420$)
Persons that have TB are also infected with HIV	X	9.5	11.8	0.07 ($p > 0.796$)
Charcoal-smoked (or braai) foods are not good for people on ARV treatment	√	43.9	22.2	2.51 ($p > 0.113$)
I have heard about immune reconstitution syndrome during ARV treatment	n/a	9.5	25.0	2.33 ($p > 0.127$)
Selenium-rich mushrooms can delay AIDS	√	25.0	26.7	0.01 ($p > 0.901$)
STIs help to spread HIV	√	71.4	75.0	0.07 ($p > 0.786$)
I am willing to go to my nearest health centre to collect ARVs	n/a	90.5	72.2	3.29 ($p > 0.070$)
Are you able to recognize someone that is infected with HIV?	n/a	16.7	0.0	3.40 ($p > 0.065$)
Have you ever been tested for HIV?	n/a	97.7	100.0	0.43 ($p > 0.514$)
Would you like to be tested for HIV?	n/a	92.5	94.4	0.073 ($p > 0.787$)

X = wrong answer; √ = correct answer; n/a = not applicable to correct or wrong interpretation.

Life Science and Biology teachers' gaps in knowledge and attitudes to HIV/AIDS were also compared across different educational regions (Table 48). Omusati region had a statistically high percentage frequency of Life Science and Biology teachers that stated that antiretroviral drugs were the new cure for HIV/AIDS. Caprivi region also had a significantly high percentage frequency of Life Science and Biology teachers that stated that charcoal-smoked (braai) foods were not good for people on antiretroviral treatment.

Assessment of gaps in knowledge and attitudes to HIV/AIDS was compared among rural and urban Life Science and Biology teachers (Table 49). Knowledge of HIV discordancy was higher among rural teachers as evidenced by the fact that considerably more rural than urban teachers agreed that in some co-habiting couples, one spouse may be HIV positive while the other would be HIV negative even though they always had unprotected sex. Except for that variable, statistical analysis showed that the percentage frequencies of respondent teachers that answered the other HIV/AIDS knowledge and attitude assessment statements were not substantially different for rural and urban areas.

A gender comparison (Table 50) showed that significantly more female than male teachers believed antiretroviral drugs were the new cure for HIV/AIDS. In contrast, significantly more male than female teachers knew that selenium-rich mushrooms could delay the onset of AIDS.

Table 50: Assessment of gaps in knowledge and attitudes to HIV/AIDS among male and female Life Science and Biology teachers

Statements	**Answer**	**Percent frequency of teachers that agreed with statement or reported "yes"**		**Pearson Chi-square value (*p*-value)**
		Male (n = 25)	Female (n = 36)	
In some co-habiting couples, one spouse may be HIV positive while the other is HIV negative	√	48.0	51.4	0.07 ($p >$ 0.793)
Depletion of CD4 cells leads to the onset of AIDS	√	95.8	87.1	1.25 ($p >$ 0.264)
AIDS is higher in northern Namibia because of mosquitoes	X	0.0	2.8	0.68 ($p >$ 0.410)
Circumcision can protect men against HIV infection	√	36.0	48.6	0.94 ($p >$ 0.333)
People with HIV do not live for more than 10 years	X	0.0	2.8	0.71 ($p >$ 0.401)
HIV/AIDS can lead to loss of memory	√	44.0	50.0	0.21 ($p >$ 0.648)
ARVs are the new cure for AIDS	X	0.0	19.4	5.49 ($p <$ 0.019)
ARVs can prevent mother-to-child transmission of HIV	√	62.5	72.7	0.673 ($p >$ 0.412)
Persons that have TB are also infected with HIV	X	16.0	5.9	1.61 ($p >$ 0.204)
Charcoal-smoked (or braai) foods are not good for people on ARV treatment	√	40.0	35.3	0.14 ($p >$ 0.712)
I have heard about immune reconstitution syndrome during ARV treatment	n/a	20.8	8.8	1.71 ($p >$ 0.191)
Selenium-rich mushrooms can delay onset of AIDS	√	39.1	14.3	4.10 ($p <$ 0.043)
STIs help to spread HIV	√	75.0	70.6	0.14 ($p >$ 0.711)
I am willing to go to my nearest health centre to collect ARVs	n/a	79.2	88.9	1.07 ($p >$ 0.302)
Are you able to recognize someone that is infected with HIV?	n/a	8.0	14.3	0.56 ($p >$ 0.455)
Have you ever been tested for HIV?	n/a	100.0	97.2	0.71 ($p >$ 0.401)

Would you like to be tested for HIV?	n/a	91.3	94.3	0.19 ($p > 0.661$)

X = wrong answer; √ = correct answer; n/a = not applicable to correct or wrong interpretation.

A comparison of gaps in knowledge and attitudes to HIV/AIDS showed that statistically more married than single teachers thought antiretroviral drugs were the new cure for HIV/AIDS (Table 51).

Age analysis of teachers' gaps in knowledge and attitudes to HIV/AIDS showed that statistically higher proportions of older (40 years and older, n = 4) than younger teachers (n = 2) thought that antiretroviral drugs were the new cure for HIV/AIDS (Pearson Chi-square value = 39.63, df = 21, $p < 0.008$). Taken together, the statistical results clearly revealed that older, female, and married Life Science and Biology teachers from the Omusati region believed that antiretroviral drugs were the new cure for HIV/AIDS.

Differentiation of gaps in knowledge and attitudes to HIV/AIDS according to teachers' highest qualifications was also conducted. The percentage frequencies of Certificate (0.0%) and Diploma (n = 7, 19.4%) teachers that stated that "Selenium-rich mushrooms can delay the onset of AIDS" were noticeably less than those of teachers with Bachelor's (n = 3, 27.3%) and Masters (n = 1, 100.0%) degrees and post-graduate diplomas (n = 2, 100.0%) (Pearson Chi-square value = 9.82, df = 4, $p < 0.044$). Thus, despite the fact that Selenium-rich mushrooms can delay the onset of AIDS, teachers with less than a Bachelor's degree did not know this fact. Except for that one variable, knowledge and attitudes to HIV/AIDS were the same among Life Science and Biology teachers of various qualifications.

Table 51: Assessment of gaps in knowledge and attitudes to HIV/AIDS among single and married Life Science and Biology teachers

Statements	Answer	Percent frequency of teachers that reported "yes"		Pearson Chi-square value (*p*-value)
		Single (n = 45)	Married (n = 16)	
In some co-habiting couples, one spouse may be HIV positive while the other is HIV negative	√	53.3	40.0	0.80 ($p > 0.371$)
Depletion of CD4 cells leads to the onset of AIDS	√	90.0	93.3	0.15 ($p > 0.702$)
AIDS is higher in northern Namibia because of mosquitoes	X	0.0	6.3	2.80 ($p > 0.094$)
Circumcision can protect men against HIV infection	√	36.4	62.5	3.26 ($p > 0.071$)
People with HIV do not live for more than 10 years	X	0.0	6.3	2.86 ($p > 0.091$)
HIV/AIDS can lead to loss of memory	√	48.8	43.8	0.12 ($p > 0.728$)
ARVs are the new cure for AIDS	X	4.4	31.3	8.35 ($p < 0.004$)
ARVs can prevent mother-to-child transmission of HIV	√	66.7	73.3	0.23 ($p > 0.633$)
Persons that have TB are also infected with HIV	X	11.6	6.3	0.37 ($p > 0.543$)
Charcoal-smoked (or braai) foods are not good for people on ARV treatment	√	34.1	46.7	0.76 ($p > 0.384$)
I have heard about immune reconstitution syndrome during ARV treatment	n/a	9.5	25.0	2.33 ($p > 0.127$)
Selenium-rich mushrooms can delay AIDS	√	21.6	35.7	1.06 ($p > 0.303$)
STIs help to spread HIV	√	76.2	62.5	1.09 ($p > 0.297$)
I am willing to go to my nearest health centre to collect ARVs	n/a	86.7	80.0	0.39 ($p > 0.531$)
Are you able to recognize someone that is infected with HIV?	n/a	8.9	20.0	1.35 ($p > 0.246$)
Have you ever been tested for HIV?	n/a	97.8	100.0	0.36 ($p > 0.548$)
Would you like to be tested for HIV?	n/a	92.9	93.8	0.014 ($p > 0.905$)

X = wrong answer; √ = correct answer; n/a = not applicable to correct or wrong interpretation.

A statistical comparison of gaps in knowledge and attitudes to HIV/AIDS was conducted for Life Science and Biology teachers. Only three variables were found to be different for Life Science and Biology teachers. Firstly, significantly more Biology (n = 16, 100.0%) than Life Science (n = 35, 79.5%) teachers were willing to go to their nearest health centre to collect antiretroviral drugs (Pearson Chi-square value = 3.85, df = 1, $p < 0.050$). Secondly, a distinctively higher percentage frequency of Life Science (n = 5, 21.7%) than Biology (n = 2, 5.4%) teachers stated that they were able to recognise someone infected with HIV (Pearson Chi-square value = 3.67, df = 1, $p < 0.054$). Thirdly, a particularly higher percentage frequency of Biology (n = 14, 63.6%) than Life Science (n = 14, 37.8%) teachers agreed that HIV/AIDS could lead to loss of memory (Pearson Chi-square value = 3.68, df = 1, $p < 0.054$).

Teachers were also requested to state the local names that people in their community associated with HIV/AIDS. Local names and their possible English translations are given in Table 52. The symptoms of HIV/AIDS as reported by teachers are also shown in Table 53. The most typical symptoms were coughing, diarrhoea, weight loss, tuberculosis, and skin rashes. Other symptoms included depression, mental problems, stiff neck, loss of hair, swollen eyes, pale face, and dark body.

Table 52: Names associated with HIV/AIDS in different regions as reported by teachers

Regions	Local names for HIV/AIDS (English translation)
Caprivi	Prostitutes: *sihule* (prostitutes) AIDS syndrome: Big disease; live skeleton; hunger Fear-factor: ***simbandembande*** (fish eagle) Death: moving coffin; open grave
Kavango	Sex: womanizers Prostitutes: road walkers; the rewarded; the paid HIV infection: infected; infected people AIDS syndrome: HIV/AIDS patient; patients; pill survivors Slang: big-big; fat people
Khomas	Sex: adulterous; *makalani* (sugar daddy) HIV infection: *okakiya* (thorn or HIV) AIDS syndrome: bone; slim disease recipient Death: walking coffin; dead people; walking corpse
Ohangwena	Prostitutes: *buhure* (prostitutes) HIV infection: e*kiya* (thorn or HIV); PLWA (people living with HIV/AIDS) Death: the killer Slang: four letters
Omusati	Sex: *kanova* (from Casanova, somebody who likes sex) Prostitutes: *oondekwila* (prostitutes) HIV infection: HIV positive; **victim** AIDS syndrome: walking sticks, walking dead
Oshikoto	Sex: *kanova* (from Casanova, somebody who likes sex) HIV infection: HIV positive; HIV positive patients; ***okuna ombuto*** (seed, HIV infection); *okakiya* (thorn or HIV) AIDS syndrome: ARV person Slang: four letters Derogatory names: irresponsible people

Terms in **bold** were cited by several teachers

Table 53: Symptoms associated with HIV/AIDS as reported by teachers

Regions	Typical symptoms	Non-typical symptoms
Caprivi	**Coughing**; **diarrhoea**; **weight loss**; **rash**; thin; tiredness; **weakness**	Mental problem; easily gets annoyed; stressed; pale face
Kavango	**Coughing**; **diarrhoea**; **weight loss**; severe muscle loss; rash; thin; usually sick; loss of appetite	Looks healthy; sores on face and body; dehydration; depression
Khomas	**Diarrhoea**; night sweats; weight loss; swollen glands; fatigue; fever; and cancer.	Skin looks like blown-up doll; less hair; loss of hair
Ohangwena	**Coughing**; vomiting; **diarrhoea**; headache; swollen lymph nodes; rashes; *weight loss*; TB; fever; loss of appetite; rashes; weak; pale skin	Depression, nausea, unhappy, mentally disturbed, worried; swollen eyes; unhealthy hair; dark skin
Omusati	**Coughing**; **diarrhoea**; **TB**; headache; vomiting; loss of appetite; flu; weight loss; skin diseases; weak; tired; vomiting	Pale face; depression
Oshikoto	**Coughing**; **diarrhoea**; loss of appetite; TB; pneumonia; herpes zoster; weight loss; opportunistic infections; **blisters on mouth**; sore throat; fatigue.	**Stiff neck**; neck pain; nausea; wounds.

Terms in **bold** were frequently cited by teachers

Life Science and Biology teachers were also requested to report the contextual norms that undermined condom use. The percentage frequencies of teachers that cited the various norms are plotted in Table 54.

Table 54: Teachers that cited various norms for not using condoms

Norms for not using condoms	% frequency
No need to use condoms if my partner looks healthy	63.3
Condoms smell	30.0
Condoms are small	11.7
No need to use condoms if you trust your partner	76.7
It is difficult to use condoms when the weather is too hot	6.7
It is difficult to use condoms when a person is drunk	58.3
I am tired of using condoms for a long time	40.0
No need to use condoms if the girl is using family planning pills	46.7
No need to use condoms if they want to have a baby	78.3
Condoms spread sexually transmitted diseases	11.7
Condoms are expensive	8.3
Condoms are not available locally	26.7
I feel shy to buy and carry condoms	48.3
I want more sexual satisfaction	60.0

More than 50.0% of the Life Science and Biology teachers reported that there was "no need to use condoms if they want to have a baby", "no need to use condoms if you trust your partner", "no need to use condoms if my partner looks healthy", "I want more sexual satisfaction", and "it is difficult to use condoms when a person is drunk". Between 40.0% to 49.0% of the teachers reported that "I am tired of using condoms for a long time", "no need to use condoms if the girl is using family planning pills", and "I feel shy to buy and carry condoms".

The reasons "condoms smell" and "condoms are not available locally" were cited by 30% and 26.7% of teachers, respectively. Only 11.7% of teachers reported that “condoms are small” and “condoms spread sexually transmitted diseases”. In addition, 8.3% of teachers reported that “condoms are expensive”.

The percentage frequencies of teachers that cited various reasons for not using condoms were compared across educational regions (Table 55). Significantly high percentage frequencies of teachers from the north-east educational regions (Oshikoto, Caprivi, Omusati, and Ohangwena) reported that there was “no need to use condoms if girl is using family planning pills”. Except for that one variable, there were no evident regional differences in the percentage frequencies of teachers that cited the various barriers to condom use.

Table 55: Norms for not using condoms as reported by teachers in different regions

Reasons for not using condoms	Percent frequency of teachers						Pearson Chi-square (p-value)
	Regions						
	Caprivi (n = 10)	**Kavango** (n = 10)	**Khomas** (n = 7)	**Ohangwena** (n = 15)	**Omusati** (n = 8)	**Oshikoto** (n = 11)	
No need to use condoms if my partner looks healthy	80.0	60.0	42.9	64.3	62.5	63.6	2.52 ($p > 0.774$)
Condoms smell	30.0	10.0	14.3	28.6	37.5	54.5	6.11 ($p > 0.296$)
Condoms are small	20.0	0.0	14.3	14.3	12.5	9.1	2.21 (p > 0.819)
No need to use condoms if you trust your partner	100.0	80.0	85.7	57.1	87.5	63.6	7.98 ($p > 0.157$)
Difficult to use condoms when weather is hot	10.0	0.0	0.0	7.1	0.0	18.2	4.31 ($p > 0.505$)
Difficult to use condoms when person is drunk	90.0	40.0	57.1	50.0	50.0	63.6	6.27 ($p > 0.281$)

I am tired of using condoms for a long time	60.0	30.0	42.9	21.4	62.5	36.4	5.87 ($p > 0.319$)
No need to use condoms if girl is using family planning pills	70.0	10.0	28.6	42.9	50.0	72.7	11.63 ($p < 0.040$)
No need to use condoms if they want a baby	90.0	90.0	71.4	57.1	100.0	72.7	7.92 ($p > 0.161$)
Condoms spread STDs	20.0	10.0	14.3	14.3	0.0	9.1	1.97 ($p > 0.854$)
Condoms are expensive	20.0	10.0	0.0	7.1	0.0	9.1	3.22 ($p > 0.667$)
Condoms are not available locally	30.0	10.0	10.0	28.6	25.0	45.5	4.05 ($p > 0.542$)
I feel shy to buy and carry condoms	70.0	20.0	28.6	42.9	75.0	54.5	8.80 ($p > 0.117$)
I want more sexual satisfaction	60.0	50.0	85.7	42.9	75.0	63.6	4.87 ($p > 0.432$)

The percentage counts of Life Science and Biology teachers that cited various norms for non-use of condoms were also compared for rural and urban areas (Table 56).

Table 56: Norms for not using condoms as reported by teachers in rural and urban areas

Reasons for not using condoms	**Percent frequency of teachers**		**Pearson Chi-square (p-value)**
	Rural (n = 43)	**Urban** (n = 18)	
No need to use condoms if my partner looks healthy	69.0	50.0	1.97 ($p > 0.161$)
Condoms smell	38.1	11.1	4.37 ($p < 0.037$)
Condoms are small	14.3	5.6	0.93 ($p > 0.340$)
No need to use condoms if you trust your partner	76.2	77.8	0.02 ($p > 0.894$)
Difficult to use condoms when weather is hot	9.5	0.0	1.84 ($p > 0.175$)
Difficult to use condoms when person is drunk	64.3	44.4	2.04 ($p > 0.153$)
I am tired of using condoms for a long time	42.9	33.3	0.48 ($p > 0.490$)
No need to use condoms if girl is using family planning pills	59.5	16.7	9.30 ($p < 0.002$)
No need to use condoms if they want a baby	76.2	83.3	0.38 ($p > 0.538$)
Condoms spread STDs	11.9	11.1	0.01 ($p > 0.930$)
Condoms are expensive	9.5	5.6	0.26 ($p > 0.610$)
Condoms are not available locally	33.3	11.1	3.18 (p > 0.074)
I feel shy to buy and carry condoms	59.5	22.2	7.02 ($p < 0.008$)
I want more sexual satisfaction	59.5	61.1	0.01 ($p > 0.908$)

The results showed that science teachers in rural areas faced three notable contextual barriers to condom use: “condoms smell”, “no need to use condoms if girl is using family planning pills”, and “I feel shy to buy and carry condoms” (Table 56). “No need to use condoms if one is using family planning pills” was also cited by significantly more female than male teachers (Table 57).

Table 57: Norms for not using condoms as reported by male and female teachers

Reasons for not using condoms	Percent frequency of teachers		Pearson Chi-square (p-value)
	Male (n = 25)	**Female** (n = 36)	
No need to use condoms if my partner looks healthy	68.0	60.0	0.402 ($p > 0.526$)
Condoms smell	28.0	31.4	0.08 ($p > 0.775$)
Condoms are small	4.0	17.1	2.44 ($p > 0.118$)
No need to use condoms if you trust your partner	76.0	77.1	0.01 ($p > 0.918$)
Difficult to use condoms when weather is hot	0.0	11.4	3.06 ($p > 0.080$)
Difficult to use condoms when person is drunk	60.0	57.1	0.05 ($p > 0.825$)
I am tired of using condoms for a long time	36.0	42.9	0.29 ($p > 0.593$)
No need to use condoms if girl is using family planning pills	32.0	57.1	3.70 ($p < 0.054$)
No need to use condoms if they want a baby	72.0	82.9	1.01 ($p > 0.314$)
Condoms spread STDs	8.0	14.3	0.56 ($p > 0.455$)
Condoms are expensive	4.0	11.4	1.05 ($p > 0.305$)
Condoms are not available locally	20.0	31.4	0.97 (p > 0.324)
I feel shy to buy and carry condoms	44.0	51.4	0.32 ($p > 0.570$)
I want more sexual satisfaction	64.0	57.1	0.29 ($p > 0.593$)

In addition, significantly higher percentage frequencies of married than single teachers reported that there was no need to use condoms because “I want more sexual satisfaction” and “no need to use condoms if you trust your partner” (Table 58).

Table 58: Norms for not using condoms as reported by single and married teachers

Reasons for not using condoms	Percent frequency of teachers		Pearson Chi-square (p-value)
	Single (n = 45)	**Married** (n = 16)	
No need to use condoms if my partner looks healthy	59.1	75.0	1.28 ($p > 0.258$)
Condoms smell	31.8	25.0	0.26 ($p > 0.610$)
Condoms are small	11.4	12.5	0.01 ($p > 0.903$)
No need to use condoms if you trust your partner	68.2	100.0	6.64 ($p < 0.010$)
Difficult to use condoms when weather is hot	4.5	12.5	1.19 ($p > 0.275$)
Difficult to use condoms when person is drunk	54.5	68.8	0.974 ($p > 0.324$)
I am tired of using condoms for a long time	36.4	50.0	0.91 ($p > 0.340$)
No need to use condoms if girl is using family planning pills	50.0	37.5	0.74 ($p > 0.391$)
No need to use condoms if they want a baby	77.3	81.3	0.11 ($p > 0.741$)
Condoms spread STDs	9.1	18.8	1.10 ($p > 0.303$)
Condoms are expensive	6.8	12.5	0.50 ($p > 0.481$)
Condoms are not available locally	25.0	31.3	0.23 (p > 0.628)
I feel shy to buy and carry condoms	47.7	50.0	0.02 ($p > 0.876$)
I want more sexual satisfaction	52.3	81.3	4.10 ($p < 0.043$)

4.3.4 Constraints of integrating HIV/AIDS education into Life Science and Biology subjects

Life Science and Biology teachers were requested to state the various constraints that they thought affected the integration of HIV/AIDS education into the syllabi for Life Science and Biology subjects. The percentage counts of Life Science and Biology teachers that cited the various constraints are presented in Table 59. The most frequently cited constraint was that "there is no pre- and in-service training of Life Science and Biology teachers in HIV/AIDS education" (82.0%), followed by "HIV/AIDS education is not covered comprehensively" (75.0%), and "there is no provision for psycho-social and economic support" (75.0%). The least cited constraints were "Life Science and Biology teachers are few and already over-worked" (54.1%), and "HIV content does not address high risk behaviours" (55.0%).

Percentage frequencies of teachers that cited the various constraints were compared across regions, rural-urban areas, gender, qualifications, subject areas, and marital status. Except for one variable, Pearson Chi-square analysis showed that there were insignificant regional differences in the percentage frequencies of teachers that cited the various constraints. "There are no evaluation and monitoring systems for HIV/AIDS content" was more significantly cited by teachers in Caprivi (n = 10, 100.0%) and Ohangwena (n = 13, 86.7%) than in Oshikoto (n = 5, 45.5%), Kavango (n = 5, 50.0%), Omusati (n = 5, 62.5%), and Khomas (n = 5, 71.4%) regions (Pearson Chi-square value = 11.65, df = 5, $p < 0.040$).

Table 59: Teachers that cited various constraints

Constraints of integrating HIV/AIDS education into Life Science and Biology	**% frequency**
Biology/ Life Science teachers are few and are already over-worked	54.1
Biology/ Life Science teachers lack adequate training	62.3
HIV/AIDS education is not covered comprehensively	75.0
HIV/AIDS content emphasises facts but does not impart life-skills or encourage behaviour change	73.8
HIV/AIDS content does not include sensitive topics such as gender issues, sexuality, and socio-cultural contexts	66.7
There are no evaluation and monitoring systems for HIV/AIDS content	70.5
HIV/AIDS content is not age-appropriate	60.7
There is no systematic assessment of learning outcomes	71.2
There is no pre- and in-service training of Biology/ Life Science teachers in HIV/AIDS education	82.0
Biology/ Life Science teachers have no access to appropriate resources to teach HIV content effectively	72.1
HIV content does not address high risk behaviours	55.0
There is no provision for psycho-social and economic support	75.0

There were no significant differences in the percentage frequencies of rural and urban teachers that cited the various constraints except for one variable, "Life Science and Biology teachers have no access to appropriate resources to teach HIV content effectively". Predominantly more urban (n = 17, 94.4%) than rural (n = 27, 62.8%) teachers stated that "Life Science and Biology teachers have no access to appropriate resources to teach HIV content effectively" (Pearson Chi-square value = 6.32, df = 1, $p < 0.012$). "Life Science and Biology teachers have no access to appropriate resources to teach HIV content effectively" was also the only constraint that was cited differently by male and female teachers.

Significantly more male (n = 23, 92.0%) than female (n = 21, 58.3%) teachers stated that Life Science and Biology teachers had no access to appropriate resources to teach HIV content effectively (Pearson Chi-square value = 8.32, df = 1, $p < 0.004$). Thus, male rather than female (odds ratio value = 8.21) Life Science and Biology teachers in urban rather than rural areas (odds ratio value = 6.57) were more likely to report that teachers did not have access to appropriate resources to teach HIV content effectively. No obvious differences in percentage frequencies of teachers that cited the various constraints were found for independent variables such as teachers' qualifications, subject areas (Life Science or Biology), and marital status.

4.3.5 Teachers' perceptions of the organizational and professional dimensions of HIV/AIDS education

Life Science and Biology teachers were requested to report on the professional dimensions of HIV/AIDS education at their schools. Table 60 presents the percentage frequencies of teachers that reported on the various professional dimensions of HIV/AIDS education.

Table 60: Teachers that reported on the professional dimensions of HIV/AIDS education

Professional dimensions of HIV/AIDS education	% frequency
I feel confident to teach HIV/AIDS	96.7
I would like HIV/AIDS education to be taught as a separate subject by a specially trained teacher	85.0
I would like HIV/AIDS to be taught by Guidance and Counselling teachers	78.3
I would like HIV/AIDS to be taught as an after-school activity in clubs	73.3
Current HIV/AIDS content effectively covers the issues of nutrition and immune system	68.3
Current HIV/AIDS content effectively covers the issue of ARVs	60.7
The school provides out-of-school activities for HIV/AIDS education	60.7
HIV/AIDS education should have separate timetable slots	60.0

Although Life Science and Biology teachers felt very confident about teaching HIV/AIDS education, most of them (85.0%) wanted HIV/AIDS education to be taught as a separate subject by a specially trained teacher. Thus, "I would like HIV/AIDS education to be taught as a separate subject by a specially trained teacher" was the most preferred option as it was cited by 85.0% of the teachers. The second most preferred option, cited by 78.3% of the teachers, was "I would like HIV/AIDS to be taught by Guidance and Counselling teachers". The least preferred option was "I would like HIV/AIDS to be taught as after-school activity in clubs" (73.3%). Only 68.3% and 61.7% of the teachers reported that HIV/AIDS content effectively covered the issues of nutrition and immune system, and antiretroviral drugs, respectively.

Table 61 shows the percentage frequencies of Life Science and Biology teachers that reported various organizational characteristics related to HIV/AIDS education and prevention.

Table 61: Teachers that reported various organizational characteristics of HIV/AIDS education and prevention

Organizational characteristics	% frequency
Condoms should be distributed freely at the school	85.0
Free distribution of condoms among learners is allowed at my school	63.3
The school involves the community and Non-Governmental Organizations (NGOs) in HIV/AIDS education	63.3
Condoms are available at my school	61.0
The school has an HIV/AIDS policy document	58.3
There is a Voluntary Counselling and Testing (VCT) centre near the school	54.1
The school implements the HIV/AIDS policy document	48.3

The percentage counts of teachers that cited the various professional dimensions of HIV/AIDS education were compared across regions and the results are presented in Table 62. Teachers from all the six regions were unanimous that HIV/AIDS education should be taught as separate subject by a specially trained teacher. Still, science teachers from all the six regions were also undivided that HIV/AIDS education should have been taught by Guidance and Counselling teachers, or as an after-school activity in AIDS clubs. Table 63 shows the percentage frequencies of teachers that cited the various organizational dimensions of HIV/AIDS education and prevention in different regions.

Table 62: Professional dimensions that affected HIV/AIDS education as reported by teachers in different regions

Professional dimensions of HIV/AIDS education	Percent frequency of teachers that reported "yes" Regions						Pearson Chi-square (*p*-value)
	Caprivi (n = 10)	**Kavango** (n = 10)	**Khomas** (n = 7)	**Ohangwena** (n = 15)	**Omusati** (n = 8)	**Oshikoto** (n = 11)	
Do you feel confident to teach HIV/AIDS education	90.0	90.0	100.0	100.0	100.0	100.0	4.14 ($p > 0.530$)
Current HIV/AIDS content effectively covers issues of nutrition and immune system	90.0	60.0	50.0	73.3	50.0	72.7	4.94 ($p > 0.424$)
Current HIV/AIDS content effectively covers the issue of ARVs	70.0	70.0	42.9	50.0	87.5	54.5	4.94 ($p > 0.424$)
I would like HIV/AIDS to	80.0	66.6	85.7	73.3	62.5	81.8	3.12 ($p > 0.682$)

be taught as after-school activity in clubs							
I would like HIV/AIDS to be taught by Guidance and Counselling teachers	88.9	80.0	85.7	73.3	62.5	81.8	2.31 ($p > 0.804$)
I would like HIV/AIDS education to be taught as a separate subject by a specially trained teacher	90.0	70.0	83.3	100.0	75.0	81.8	5.34 ($p > 0.376$)
HIV/AIDS education should have separate timetable slots	60.0	50.0	66.7	73.3	50.0	54.5	2.11 ($p > 0.834$)

Table 63: Organizational dimensions that affected HIV/AIDS education and prevention as reported by teachers in different regions

Organizational dimensions	Percent frequency of teachers						Pearson Chi-square (p-value)
	Regions						
	Caprivi (n = 10)	**Kavango** (n = 10)	**Khomas** (n = 7)	**Ohangwena** (n = 15)	**Omusati** (n = 8)	**Oshikoto** (n = 11)	
Free distribution of condoms among learners is allowed at my school	80.0	60.0	33.3	86.7	37.5	54.5	9.75 ($p > 0.083$)
Condoms are available at my school	77.8	40.0	14.3	73.3	62.5	80.0	11.83 ($p < 0.037$)
Condoms should be distributed freely at the school	100.0	88.9	57.1	100.0	62.5	81.8	12.04 ($p < 0.034$)
The school provides after-school activities for HIV/AIDS education	80.0	30.0	14.3	80.0	75.0	63.6	14.90 ($p < 0.011$)

The school has an HIV/AIDS policy document	60.0	40.0	57.1	57.1	50.0	81.8	4.13 ($p > 0.531$)
The school implements the HIV/AIDS policy document	55.6	30.0	42.9	46.7	50.0	63.6	2.67 ($p > 0.750$)
There is a VCT centre near the school	80.0	60.0	57.1	33.3	25.0	72.7	9.74 ($p > 0.083$)
The school involves the community and NGOs in HIV education	50.0	60.0	66.7	66.7	62.5	72.7	1.33 ($p > 0.931$)

The percentage frequencies of teachers that cited variables that affected HIV/AIDS education and prevention in schools were the same across the regions except for three variables, namely: "the school provides out-of-school activities for HIV/AIDS education", "condoms are available at my school", and "condoms should be distributed freely at the school". Kavango and Khomas regions had exceedingly low percentage frequencies of teachers that reported that "the school provides after-school activities for HIV/AIDS education" and "condoms are available at my school".

A rural-urban comparison of percentage frequencies of teachers that cited the various organizational and professional dimensions that affected HIV/AIDS education was conducted, and the results are presented in Table 64. Considerably more teachers in rural than urban areas reported that "the school provides out-of-school activities for HIV/AIDS education", "condoms are available at my school", and "condoms should be distributed freely at the school".

Table 64: Organizational and professional dimensions that affected HIV/AIDS education and prevention as reported by teachers in rural and urban areas

Organizational and professional dimensions	**Percent frequency of teachers**		**Pearson Chi-square (*p*-value)**
	Rural (n = 43)	**Urban** (n = 18)	
I feel confident to teach HIV/AIDS education	97.7	94.1	0.48 ($p > 0.489$)
Current HIV/AIDS content effectively covers issues of nutrition and immune system	74.4	52.9	2.60 ($p > 0.107$)
Current HIV/AIDS content effectively covers the issue of ARVs	64.3	55.6	0.41 ($p > 0.524$)
Free distribution of condoms among learners is allowed at my school	69.8	47.1	2.71 ($p > 0.100$)
The school has an HIV/AIDS policy document	61.9	50.0	0.735 ($p > 0.391$)
The school implements the HIV/AIDS policy document	54.8	33.3	2.32 ($p > 0.128$)
HIV/AIDS education should have separate timetable slots	60.5	58.8	0.01 ($p > 0.907$)
The school provides out-of-school activities for HIV/AIDS education	76.7	22.2	15.81 ($p < 0.000$)
Condoms are available at my school	73.2	33.3	8.35 ($p < 0.004$)
I would like HIV/AIDS to be taught as an after-school activity in clubs	74.4	73.3	0.09 ($p > 0.762$)
Condoms should be distributed freely at the school	90.7	70.6	3.86 ($p < 0.049$)
There is a VCT centre near the school	53.5	55.6	0.02 (p > 0.883)
The school involves the community and NGOs in HIV education	65.1	58.8	0.21 ($p > 0.649$)
I would like HIV/AIDS to be taught by Guidance and Counselling teachers	76.2	83.3	0.38 ($p > 0.54$)
I would like HIV/AIDS education to be taught as a separate subject by a specially trained teacher	88.4	76.5	1.35 ($p > 0.245$)

Teachers were requested to state the number of times in a year that the school had held meetings with their local communities to discuss issues of HIV/AIDS. There were statistical regional differences in the number of school-community meetings that were held (ANOVA F-value = 3.55, df = 5, p < 0.008) (Table 65). Scheffe's multiple-comparisons test failed to rank the regional means. There were significant differences in the mean number of school-community meetings held in rural and urban areas (ANOVA F-value = 4.82, df = 1, p < 0.032) (Table 65). Regional and rural-urban differences in the means for the number of school-community meetings were also detected by Independent-samples Kruskal-Wallis test (p < 0.006) and Independent-samples Mann-Whitney U test (p < 0.025), respectively.

Table 65: Number of school-community meetings in different areas

Region	**Means**	**Standard errors**
Omusati	2.00	0.78
Ohangwena	1.80	0.35
Oshikoto	1.60	0.84
Khomas	1.00	0.58
Kavango	0.30	0.15
Caprivi	0.30	0.21
Rural area	1.44	0.22
Urban area	0.59	0.25

Teachers were requested to report which out-of-school HIV/AIDS activities were offered at their schools, and the results are presented in Figure 19. Most teachers (n = 46, 75.4%) reported that *My Future is My Choice* was offered at their school.

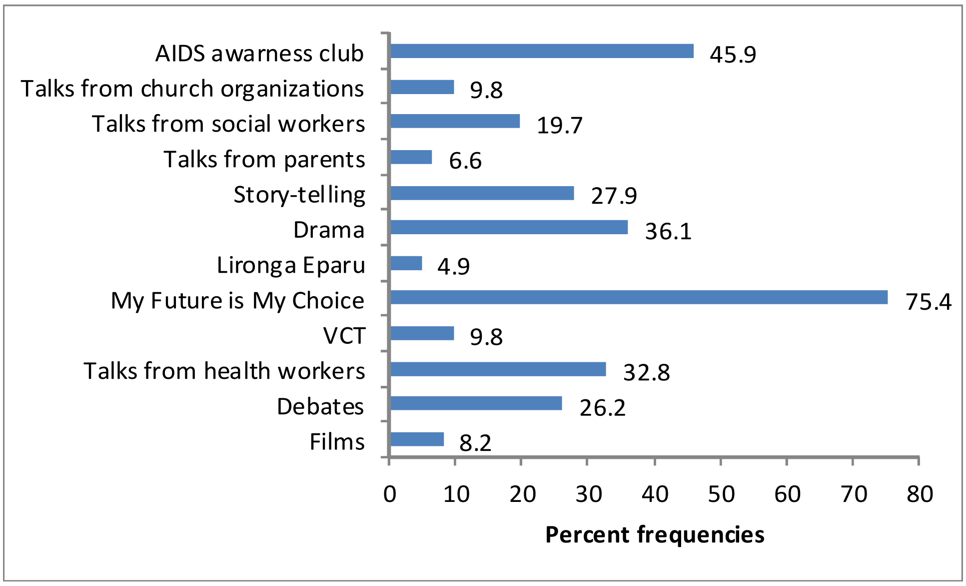

Figure 19: Percentage frequencies of teachers that cited after-school activities offered at their schools on HIV/AIDS awareness

My Future is My Choice was more frequently reported by teachers in Caprivi (n = 10, 100.0%), Ohangwena (n = 14, 93.3%), Omusati (n = 6, 75.0%), Oshikoto (n = 8, 72.7%) and Kavango (n = 6, 60.0%) regions than the Khomas region (n = 2, 28.6%) (Pearson Chi-square value = 15.46, df = 5, $p < 0.009$). Talks from church organizations were more frequently reported by teachers in the Khomas (n = 3, 42.9%), Oshikoto (n = 2, 18.2%) and Omusati (n = 1, 12.5%) regions than in Caprivi (0.0%), Kavango (0.0%), and Ohangwena (0.0%) regions (Pearson Chi-square value = 13.35, df = 5, $p < 0.020$). *My Future is My Choice* was more often reported by rural (n = 38, 88.4%) than urban (n = 8, 44.4%) teachers (Pearson Chi-square value = 13.20, $p < 0.000$). Drama was also more frequently reported by rural (n = 19, 44.2%) than urban (n = 3, 16.7%) teachers (Pearson Chi-square value = 4.17, df = 1, $p < 0.041$).

Life Science and Biology teachers were requested to state whether they had received in-service training in HIV/AIDS education. Only 37.7% (n = 23) of the teachers stated that they had received in-service training in HIV/AIDS education. The teachers were also requested to report whether they had a teaching guide for HIV/AIDS education. Only 28.3% (n = 17) of the teachers had a teaching guide for HIV/AIDS education. In addition, teachers were requested to state the teaching methods that they used in HIV/AIDS education. The percentage frequencies of teachers that cited the various teaching methods used in HIV/AIDS education are presented in Figure 20. Most teachers used "discussions" (n = 38, 67.9%), and "question and answer" (n = 35, 62.5%).

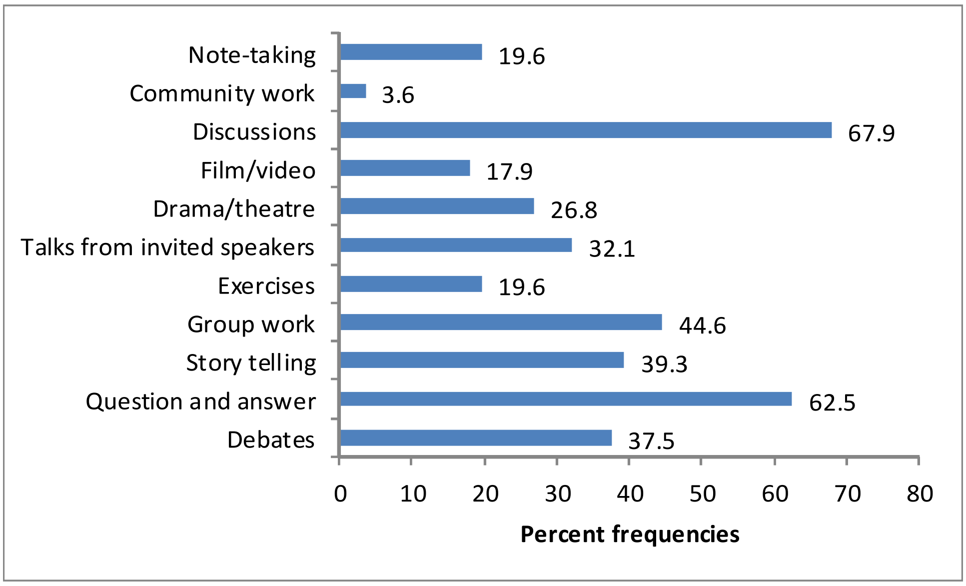

Figure 20: Percentage frequencies of teachers that cited various teaching methods for HIV/AIDS education

Teaching HIV/AIDS using the “question and answer” method was more frequently reported in the Caprivi (n = 9, 100.0%), Oshikoto (n = 8, 80.0%) and Ohangwena (n = 8, 61.5%) regions than in the Khomas (n = 2, 33.3%), Kavango (n = 4, 40.0%) and Omusati (n = 4, 50.0%) regions (Pearson Chi-square value = 11.58, df = 5, $p < 0.041$). Teaching HIV/AIDS using “group work” was more recurrently reported in Caprivi (n = 8, 88.9%) and Omusati (n = 5, 62.5%) regions than in Kavango (n = 2, 20.0%), Ohangwena (n = 4, 30.8%), Oshikoto (n = 3, 30.0%) and Khomas (n = 3, 50.0%) regions (Pearson Chi-square value = 12.57, df = 5, $p < 0.028$).

Teaching HIV/AIDS using the “question and answer” method was more frequently reported in rural (n = 28, 71.8%) than urban (n = 7, 41.2%) areas (Pearson Chi-square value = 4.74, df = 1, $p < 0.030$). “Story telling” was more frequently cited in rural (n = 20, 51.3%) than urban (n = 2, 11.8%) areas (Pearson Chi-square value = 7.75, $p < 0.005$). Teaching HIV/AIDS using the “question and answer” method was more frequently reported by female (n = 25, 73.5%) than male (n = 10, 45.5%) teachers (Pearson Chi-square value = 4.49, df = 1, $p < 0.034$). HIV/AIDS education and prevention through “community work” was more repeatedly reported by married (n = 2, 14.3%) than single (0.0%) teachers (Pearson Chi-square value = 6.22, df = 1, $p < 0.013$).

4.3.6 Teachers’ suggestions on policy interventions

Teachers were asked the question: “in your own opinion, what should government do to protect science teachers and learners from HIV/AIDS?” Teachers stated government should conduct seminars and workshops on behaviour change communication, distribute condoms at schools, use counsellors to provide HIV/AIDS education, make learners tour hospitals so that they see the realities of HIV/AIDS, make policies to limit alcohol consumption by restricting advertisements or extending age limit, provide first-aid kits, improve HIV awareness programmes, encourage regular testing for HIV, HIV/AIDS should be made a compulsory school subject, integrate HIV education into curriculum for colleges and University, integrate sex education in primary school curriculum, introduce HIV/AIDS as a separate subject, provide in-service training to teachers and workshops for learners, provide schools with social workers, fund HIV awareness clubs, science teachers should be trained so that they conduct Voluntary Testing and Counselling at school, train special teachers to teach HIV/AIDS education, provide more antiretroviral drugs, prevent stigma, and provide food to learners.

4.4 Summary

During the study, only 10.0% of the learners reported loss of science teachers due to illness. Most science teacher losses due to illness, and the use of replacement teachers, were most significantly reported in the Kavango region. Khomas region had the highest levels of science learner absenteeism, mostly among learners from the Damara-Nama ethnic group. Most teachers reported that learners perceived to be coping with HIV/AIDS exhibited poor concentration and performance in class, and absenteeism. Science teachers perceived to be coping with HIV/AIDS exhibited high levels of absenteeism from work because of illness.

The highest percentage frequency of learners that ever had sexual intercourse was from the Caprivi region while age at sexual debut was lowest among learners from the Kavango region. Condom use was statistically low among learners in Katima Mulilo town and Ongha constituency. Learner pregnancy rates were high throughout the study, with a mean of four pregnant girls per class per year. Katima Mulilo also had highest levels of pregnant learners. Multiple sexual partners, beer-drinking, and high levels of absenteeism were significantly found among learners from the Damara-Nama ethnic group. Learners also perceived that science teachers in the Caprivi region were at highest risk of HIV infection. Most gaps in knowledge, norms, attitudes, practices and skills to HIV/AIDS were significantly low among learners from the Kavango and Caprivi regions.

Almost 10.0% of Life Science and Biology teachers had erroneous understanding of basic facts about HIV/AIDS. Science teachers' knowledge of HIV/AIDS was also low as most of them failed to answer questions related to discordancy, circumcision, antiretroviral drugs, and immune reconstitution syndrome. Lack of science teacher training in HIV/AIDS was perceived by the learners to be the most notable constraint to the integration of HIV/AIDS education into the Life Science and Biology subjects. Most Life Science and Biology teachers had also not received in-service training for HIV/AIDS education. The delivery of HIV/AIDS education was most constrained in the Kavango region. The majority of science learners and teachers preferred HIV/AIDS education to be taught as a separate subject by a specially trained teacher.

CHAPTER 5: DISCUSSION OF RESULTS

5.1 Introduction

In this chapter, findings from the study were interpreted and discussed. The interpretation involved a deductive process in which inferences were made from the results of the statistical tests that were conducted. By so doing, common threads in the statistical results were discerned in order to unravel plausible emerging trends. Emergent trends and inferences were discussed in the context of available local and international literature.

5.2 Impacts of HIV/AIDS on science education

Since HIV/AIDS is a sensitive issue in Namibian society, and because the study was careful not to abrogate the ethical principle of respect to respondents, questions that measured the perceptions of HIV/AIDS impacts on science teachers and learners were cautious and implicit, rather than explicit. Rogers et al. (2010) were also cautious in their recent survey of Namibian teachers. For example, due to ethical and operational constraints, it was impossible to conduct rapid HIV testing of respondents.

Within the prism of such understanding, the question “have you lost a science teacher due to HIV/AIDS” was rephrased and stated politely as “have you lost a science teacher due to illness?” The question “have you lost a science learner due to HIV/AIDS” was also rephrased and stated differently as “have you lost a science learner due to illness?” Therefore, in this study the terms “illness” or “sickness” connoted only those illnesses or sicknesses that were HIV/AIDS-related. Moreover, because it was explained to all respondents that the study was on HIV/AIDS and science education in Namibian secondary schools, all the questions in the study questionnaires were understood within the context of HIV/AIDS. That said, the attribution of any impacts to HIV/AIDS was still putative.

5.2.1 Impacts of HIV/AIDS on science teachers

This study found that the perceived impacts of HIV/AIDS on the supply of science teachers were low. The poor perception of putative HIV/AIDS-related losses of science teachers may be due to low HIV infection rates among this group of teachers. But, it may also have meant that the quantitative impacts of HIV/AIDS were not yet visible, either because infected teachers were in the incubation period before the onset of AIDS, or because of the ameliorative power of antiretroviral therapy.

On the other hand, the perceived losses of science teachers due to AIDS were significantly higher in the Omusati and Kavango regions because these regions had some of the highest percentages of HIV-positive teachers (Rogers et al., 2010). Although Oshikoto region had a high prevalence of HIV among teachers (Rogers et al., 2010), it was not clear why significantly low percentages of learners in this region reported science teacher losses due to putative HIV/AIDS-related illnesses. But, a more reasoned examination hinted at the possibility that HIV infection did not immediately translate into perceptible impacts of AIDS-illness and death. It seemed, therefore, that the majority of HIV-positive teachers in the Oshikoto region were either not secondary school science teachers, or if they were, then they had not yet succumbed to putative illnesses related to HIV/AIDS.

In Namibia, HIV/AIDS prevalence rates were higher in north-eastern towns than in Windhoek (GRN, 2008a). This geographical difference in the distribution of HIV/AIDS could have explained the significantly higher perceptions of science teacher losses in Outapi, Tsandi, Ohangwena, and Rundu. Although Oniipa and

Eenhana constituencies were found in northern Namibia and had very high HIV/AIDS prevalence rates (GRN, 2008a), the low perceptions of putative HIV/AIDS impacts on science teachers was probably due to the presence of unique contextual dynamics for HIV/AIDS prevention and treatment in these two areas. For instance, compliant HIV/AIDS preventive behaviours, including improved access to antiretroviral treatment, may have contributed to the seemingly low impacts of putative HIV/AIDS-related illnesses on secondary school science teachers. This was most likely the case in the Oshikoto and Caprivi regions where the Directors of Education revealed to the researcher that behaviour change workshops, and access to antiretroviral treatment, respectively, had diminished the perceptive impacts of HIV/AIDS among teachers in these two regions.

Absenteeism was a common feature among teachers infected or affected by HIV/AIDS. In 2002, school principals reported upward trends in teacher absenteeism due to funeral attendance (Abt Associates, 2002). In the Caprivi region, many school principals cited funerals as the most common reason for teacher absenteeism (Abt Associates, 2002).

Poor performance and stress were the second most cited attributes of science teachers that coped with HIV/AIDS. A study by Abt Associates (2002) found evidence of poor quality of teaching by chronically-ill teachers. They found cases where sick teachers continued to teach even when they were incapacitated. Informants reported that such ailing teachers performed poorly for more than a year before they died (Abt Associates, 2002). Significant anxiety and stress of infected and affected Namibian teachers were also reported by Abt Associates (2002). They reported that stress emanated from grief, extra workloads, stigma, fear of personal infection or illness, and care of family members. Consequently, science teachers infected or affected by HIV/AIDS were likely to compromise the quality of science education and concomitantly contributed to poor learner examination results. Oyoo (2003, p.609) reiterated that "emotional stress of teachers and learners is also high through increased incidence of HIV and death due to AIDS among colleagues and relatives. This significantly affects the quality of learning". Furthermore, the "supply of education can also be hampered by declining productivity of teachers due to frequent absenteeism because of illness, care of the ill family members or in funeral attendances leading to severe decline in learner/teacher ratio and reduced teaching due to slow or non-replacement of teachers who have died from AIDS", noted Oyoo (2003, p.609).

"Looks thin" and "retired on medical grounds" were the least perceived features of teachers that were coping with HIV/AIDS. In the early years of the HIV/AIDS epidemic, posters usually painted persons suffering from HIV/AIDS as emaciated beings. These results suggested that body wasting may no longer be a highly perceived characteristic of teachers infected by HIV/AIDS. In the Caprivi region, educational authorities informed the researcher that antiretroviral therapy had dramatically improved the body weight of emaciated teachers to such an extent that the putative effects of AIDS were difficult to perceive. Antiretroviral therapy had also lessened the retirement of teachers on medical grounds. It was argued that with the advent of antiretroviral treatment, the perception of AIDS as a 'slimming' disease was probably in transition. Thus, contemporary Namibian teachers probably no longer perceive AIDS as a condition associated with body wasting.

5.2.2 Impacts of HIV/AIDS on science learners

In this study, the loss of science learners due to putative HIV/AIDS-related illnesses was low. This may be explained by the low HIV infection rates (≤ 11.8%) among learners in Namibia (GRN, 2008d).

In general, absenteeism among Life Science and Biology learners was lower in rural areas where learners were usually found in boarding schools. Uurban learners were day-scholars. Thus, lower levels of absenteeism among rural learners could have been explained by the strict boarding school environment. In urban areas, absenteeism was highest among Damara-Nama learners. Pearson Chi-square analysis did not specifically attribute any of the putative HIV/AIDS-related reasons for learner absenteeism to the Damara-Nama ethnic group. However, it was speculated that because beer or alcohol drinking were most significantly common among learners from the Damara-Nama ethnic group, 'hang-overs' may have prevented the Damara-Nama learners from frequently attending school.

Although rural learners generally reported lower levels of absenteeism, learners from rural Ohangwena constituency reported the highest levels of absenteeism probably because this region had one of the highest HIV/AIDS prevalence rates in Namibia (GRN, 2008a). There was reasonable suspicion that HIV/AIDS-related resilience skills (Haihambo-Muetudhana, 2005) may have contributed to learner absences in the Ohangwena region. Such resilience skills were most likely economic in nature, as Ohangwena constituency was located near Oshikango, a small trading town at the border with Angola. It was also reasoned that engagement into economic activities by learners coping with HIV/AIDS in the Ohangwena region may have furthered their tiredness and poor concentration or performance in class.

The results of this study showed that learners from the Caprivi region were frequently absent from school because they were sick, or they were attending to illnesses and deaths in their families. This may explain why learners perceived to have been coping with HIV/AIDS in the Caprivi region looked stressed. These results corroborated the perceived severity and manifestations of HIV/AIDS in the Caprivi, the region hardest-hit by HIV/AIDS in Namibia (GRN, 2008a).

Older Grade 11 learners were more likely to attend funerals than younger Grade 9 learners. This was evidenced by the finding that significantly more Biology than Life Science teachers reported absenteeism due to funerals. In the context of this study, absenteeism and dropping-out from school decreased learner numbers and therefore impacted negatively on the demand for science education. Moreover, learners' poor concentration and performance in class, stress, withdrawal, and tiredness adversely affected the quality of science education.

In Namibia, UNESCO (2008b) commissioned a study to examine the specific challenges faced by the education system in responding to the needs of HIV-positive learners. Further to the challenges highlighted by UNESCO (e.g. access to antiretroviral treatment), this study found that learners faced stigma, intolerant attitudes, human rights abuse, and severe difficulties in accessing antiretroviral treatment and care. It was reported that poverty and hunger exacerbated the school drop-out rate (UNESCO, 2008b). The hardships catalogued in the UNESCO (2008b) report corroborated the findings of this study that learners coping with HIV/AIDS not only looked stressed, withdrawn, and tired but also performed poorly in class, were usually absent from school, and eventually dropped-out. In Namibia, earlier reports also showed that children temporarily or permanently dropped out from school after parental death (Abt Associates, 2002). Teachers observed that parental death was an important reason for dropping out of school (Abt Associates, 2002).

Observations that learners coping with HIV/AIDS found it difficult to attend school were also echoed by Zimba's (2003) observations on orphans and other vulnerable children in Namibia. Zimba (2003, p.173) wrote that "because there is stigma attached to HIV/AIDS, persons who suffer or die from it may be shunned by society. Orphans left behind by such persons, in not uncommon cases, experience shame, fear and rejection perpetrated by their peers, teachers and the general public. Afraid to be shunned by others, some orphans become reluctant to go to school". But often times, learners coping with HIV/AIDS failed to attend school because they were needed at home to perform chores such as fetching water, firewood, or food, and looking after livestock or younger siblings, sick parents or guardians (Zimba, 2003).

Additionally, learners affected by HIV/AIDS also dropped out of school because they failed to pay school development fund and hostel fees, or failed to buy uniforms, books and other supplies (Zimba, 2003). Although this study did not specifically examine the plight of orphans and other vulnerable children, Zimba's (2003) comments offered a glimpse of why learners trying to cope with HIV/AIDS in this study were absent from or dropped out of school. The findings that learners coping with HIV/AIDS exhibited stress, withdrawal, and tiredness were also supported by Zimba (2003).

Overall, the above evidence illustrated that learners infected or affected by HIV/AIDS were a vulnerable group that required special interventions from their families, communities, teachers, and schools. In reality, learners coping with the effects of HIV/AIDS posed novel challenges for schools and teachers. In their report, UNESCO (2008b, p.18) implored that “school staff should be trained to keep accurate records on absenteeism and school performance, and to use these to identify children’s problems, so that a strategy to assist the child can be worked out between the school and the child’s family”. Unfortunately, “education has failed to deliver on its promise of support and inclusion of HIV-positive learners”, concluded the UNESCO (2008b, p.34) report.

There were significant rural-urban differences in the frequencies of teachers that reported that HIV/AIDS-affected learners looked stressed and performed poorly in class. Statistically more urban learners exhibited HIV/AIDS-related stress and poor class performance. Several factors may have led to this trend. It was reasoned that harsher ecological conditions in urban environments could have exacerbated stress among HIV/AIDS-affected learners. For example, the lack of social support systems from relatives and neighbours, coupled with hardships in securing shelter, food, water, electricity, and transport, could have led more urban HIV-affected learners to be stressed. Communal help and support can lessen HIV/AIDS-related hardships and stress. Such communal support was more forthcoming in rural than urban settings. Therefore, HIV/AIDS-related hardships were probably lessened in rural areas where there was a communal social support system of relatives and neighbours. The finding that poor class performance was more prevalent among urban learners also demonstrated that urban schools and teachers had not adapted their environments and services to suit the needs of learners coping with HIV/AIDS. In terms of the impacts of HIV/AIDS on the quality of science education, the findings from this study hinted that HIV/AIDS-affected learners in urban areas would most likely produce poorer

Grade 12 science examination results than HIV/AIDS-affected learners in rural areas. Verification of this claim was beyond the scope of this study.

The results also showed that significantly more Grade 11 than Grade 9 teachers reported bullying and teasing of learners that were affected by HIV/AIDS. This finding meant that teasing and bullying were more prevalent among HIV/AIDS-affected learners in Grade 11 than Grade 9. Thus, older learners were more likely to engage in bullying and teasing than younger learners. Bullying and teasing of learners affected by HIV/AIDS was common in many settings. In a review of studies on children affected by HIV/AIDS, USAID and UNICEF (2008) found many cases of bullying and teasing of children infected and affected by HIV/AIDS. Several studies documented evidence where children of HIV-positive parents were ridiculed and ostracized by peers at school (USAID & UNICEF, 2008). Thus, children were also affected by experiences of stigma and discrimination aimed at their guardians or parents. Such discrimination made HIV/AIDS-affected children to abandon school.

In Namibia, “non-physical maltreatment of children from AIDS affected families was most commonly cited, and included avoidance, teasing and neglect. Indications of inability to deal with psychosocial problems, such as lack of motivation, bad behaviour, social problems or substance abuse…were frequently cited as reasons for drop out by teachers” (Abt Associates, 2002, p.xvii). In case studies in Haiti and Brazil, HIV-infected teens reported experiencing violence and peer-fighting in schools as a response to teasing about their HIV status (USAID & UNICEF, 2008). Bullying and teasing hindered infected persons from getting tested and therefore delayed the onset of antiretroviral therapy.

5.2.3 Impacts of HIV/AIDS on the quality of science education

Apart from other external factors, stress and poor concentration in class were the two most important factors that negatively affected the quality of science education among the learners. Poor concentration in class and stress were significantly high in the Caprivi, Ohangwena, and Oshikoto regions. By parity of reasoning, HIV/AIDS-induced stress and poor concentration in class would more significantly reduce learners' understanding of science subjects in the Caprivi, Ohangwena, and Oshikoto regions. These three regions had some of the highest HIV/AIDS prevalence rates in Namibia (GRN, 2008a).

Stress is a common feature of Namibians living with HIV/AIDS (Plattner & Meiring, 2006). HIV/AIDS also negatively affects the psychological well-being of those living with the virus or those that care for sick family members. For the carers of sick family members in the Caprivi region, HIV/AIDS is also associated with stigma, low self-esteem, tension, and low personal and household productivity (Thomas, 2006). Coombe (2002), citing several sources, stated that many learners affected by the presence of HIV/AIDS had a widespread sense of anxiety, confusion and insecurity. She found that the psychosocial needs of affected children were not as well understood as their material needs.

The above evidence pointed to a paradigm shift in the perceptions of putative HIV/AIDS impacts. It is postulated that future preventive and coping interventions for learners should consider this evident shift from physical (or quantitative, losses and absenteeism) to psychological (or qualitative, stress and concentration in class) manifestations of HIV/AIDS. This evidence also entails that the management of HIV/AIDS should not just be about antiretroviral treatment but should also include behavioural health strategies that reduce stress and raise learners' attention in class.

5.3 Risk factors to HIV/AIDS

5.3.1 Learners' age at coital debut

Since engaging in first sexual intercourse was the entry point to subsequent risk behaviour, the first sexual intercourse was considered as risk behaviour for HIV/AIDS (Anderson, Beutel, & Maughan-Brown, 2007). In other words, delaying the age of sexual debut was accepted as an important strategy to protect adolescents from HIV/AIDS. Setswe (2007), with reference to Uganda, also stated that delayed sexual debut significantly contributed to the overall reduction of HIV/AIDS in the general population. In Uganda, the median age of sexual debut among young women increased by about one year over a period of ten years (Setswe, 2007).

However, according to UNICEF (2007), Namibian youth had sex by the age of 15 years. The Namibia School-Based Student Health Survey report of 2004 also found that age at sexual debut for learners was 11 years and younger (Global School Health Survey Namibia, 2004). But data from the Namibia School-Based Student Health Survey did not differentiate learners that were younger than 11 years, and those that were older than 16 years. In addition, data from the Namibia School-Based Student Health Survey did not stratify learners into their different education regions and ethnic groups. In the learner questionnaire used in this study, the lowest age of sexual debut was set at 8 years, while highest was set at 23 years. Besides, learners' education regions and ethnic groups were also known.

Early coital debut was defined as first sex at 15 years or younger (Mathews, Aaro, Flisher, Mukoma, Wubs, & Schaalma, 2009). Based on this definition, the ages of sexual debut for Namibian learners were very low indeed (as low as 8 years). It was not clear whether data of first coitus at 8 years were spurious, and whether children at 8 years of age could have engaged in 'real' sexual intercourse. For example, it was argued that boys of 8 years of age could not have produced spermatozoa. However, according to the Law Reform and Development Commission of Namibia, the definition of sexual intercourse was not premised on the ejaculation of spermatozoa. Law Reform and Development Commission (2006, p.25) defined sexual intercourse as: "vaginal intercourse between a man [boy] and a woman [girl] and is complete upon penetration, whether or not there is an emission of seed".

UNICEF (2006a) reported that the first coital encounter for most Namibian adolescents was due to forced sex. In the six education regions in this study, learners also reported that they had been previously forced into sexual intercourse. Still, the low ages of sexual debut may be caused by prevailing peer norms about sex, and watching sex on television (Collins, Elliot, Berry, & Kanouse, 2004). Collins et al. (2004) found that watching sex on television predicted and hastened adolescent sexual initiation. Reducing the amount of sexual content in entertainment programming, reducing adolescent exposure to sexual content, or increasing references to and depictions of possible negative consequences of sexual activity delayed the initiation of coital activity (Collins et al., 2004).

Grade 9 learners had a lower mean age of coital debut than Grade 11 learners. It was not clear why younger Grade 9 learners had a lower mean age of coital debut than older Grade 11 learners. However, Zwang and Garenne (2008) reported that contemporary adolescents tended to mature earlier than their counterparts did decades ago, thus increasing the odds of early sexual debut. Many girls had their menstruations earlier than expected, and therefore indulged in sexual intercourse at an earlier age. Respondents in Zwang and Garenne's (2008) study attributed the early maturation of contemporary adolescents to better and more diverse foods, particularly eggs, cheese, avocado and pears. Whether such foods may have contributed to the low ages of sexual debut among learners in this study was not known.

On the contrary, the results of this study demonstrated that it was feasible to delay sexual debut until learners were 21 years old. Lawoyin and Kanthula (2010) found some Ovambo youths initiated sex at 13 years or younger while some initiated sex between 21 and 30 years of age. Such evidence can be used in behaviour change communication interventions aimed at widening the 'window of hope' (UNICEF, 2007) by way of maintaining the virginity of learners in secondary schools.

The mean age of sexual debut was lower for urban learners because of ecological factors such as increased moral decay, accelerated urbanization, and the rapid development of information and communication technologies (Global School Health Survey Namibia, 2004). Low ages of sexual debut among Namibian learners could also be explained by the erosion of traditional family systems coupled with the rapid socio-economic changes that have created a different environment for learners (Global School Health Survey Namibia, 2004). The results of this study were similar to those in Ethiopia where Molla, Berhane, and Lindtjorn (2008) found that the norm of virginity had waned in urban areas. The Namibia Demographic and Health Survey (Ministry of Health and Social Services & Macro International Inc., 2008) found that the mean age of sexual debut for rural and urban women was the same.

Differences in gender norms may have influenced the age of sexual debut for learners in this study. For example, pressure on young women to remain virgins prior to marriage (Iipinge, 2003) may have underwritten the delay in the sexual debut of female learners. Ekundayo, Dodson-Stallworth, Roofe, Aban, Bachman, and Kempf et al. (2007) also reported that in rural Jamaica, boys were likely to experience sexual debut earlier than girls. In Ethiopia, Molla et al. (2008) found that belief in the traditional norm of virginity more likely delayed sexual debut among female than male youths. In addition, notions of masculinity may have lowered the mean age at sexual debut for the male learners in this study. Boys may have perceived sex as a symbol of masculinity and power domination over girls (Brown et al., 2005). But the finding that Namibian boys experienced sexual debut earlier than girls was very interesting as it raised the question as with whom these younger boys were having sex. Mufune et al. (2004) reported that some Namibian school-going adolescents who had sexual intercourse first had it with a commercial sex partner or client.

Statistical analysis showed that the overall mean age of sexual debut for learners from the Kavango region was significantly lower than the mean ages of sexual debut for learners from other regions. The Namibia Demographic and Health Survey (Ministry of Health and Social Services & Macro International Inc., 2008) also found that Kavango region had the lowest age at sexual debut, while Omusati had the highest. Interestingly, Kavango region had significantly low percentage frequency of learners that belonged to HIV/AIDS awareness clubs. This result may have implied that early coital debut in the Kavango region may have been caused by the failure to belong to AIDS awareness clubs.

Besides, the overall mean ages of sexual debut for learners from the Kavango and Herero ethnic groups were significantly lower than the other ethnic groups. These results suggested that ethnic values and cultural norms may have influenced Kavango and Herero learners to initiate sex at much younger ages. It was argued that learners' ages at sexual debut may have been brought forward by obligatory sexual practices inherent in some Namibian cultures (LeBeau, 1997). However, these results may have been biased by the small sample size for learners from the Herero ethnic group.

Fatusi and Blum (2008) reported that in Nigeria, the south of the country was significantly associated with early adolescent sexual initiation. Psychosocial factors associated with adolescent sexual debut for both genders included more positive attitudes regarding condom efficacy and more positive attitudes to family planning use (Fatusi and Blum, 2008). A greater perception of condom access and alcohol use among males and positive gender-related attitudes among females were associated with increased likelihood of adolescent sexual initiation (Fatusi and Blum, 2008). Conversely, personal attitudes in favour of delayed sexual debut were associated with lower sexual debut among both males and females (Fatusi and Blum, 2008). Higher levels of religiosity (religious commitment and not religious affiliation) were associated with delayed coital debut among females (Fatusi and Blum, 2008).

Henderson, Butcher, Wight, Williamson, and Raab (2008) found that variations in early sexual experiences among Scottish secondary school students, especially girls, were explained by school-level socio-economic factors and neighbourhood culture. Being socio-economically deprived but attending a school with an affluent catchment may have discouraged early sexual activity, whilst being affluent but attending a school with deprived catchment may have encouraged early sexual intercourse (Henderson et al., 2008). Mathews et al. (2009) found that among Grade 8 learners in Cape Town, South Africa, individual choices about sexual debut were constrained by socio-economic conditions (poverty). Thus, socio-economic conditions and neighbourhood dynamics may have influenced the sexual debut of learners in this study. Persuaded by such evidence, it would seem, therefore, that poor socio-economic conditions and neighbourhoods may have contributed to the significantly low age of sexual debut among learners in the Kavango region.

Low ages of sexual debut were a marker of increased risk to HIV/AIDS among learners (Mathews et al., 2009). In line with the HBM and TPB, inferences from the age at coital debut for various demographics of learners suggested that the risks to HIV/AIDS were higher for urban than rural learners, and for male than female learners, respectively. In addition, learners from the Kavango region, and learners from the Kavango and Herero ethnic groups, may have been at a higher risk of HIV/AIDS infection than learners from other regions and ethnic groups.

5.3.2 Heterosexual intercourse and associated factors among learners

Premarital sexual abstinence is advocated as a risk-reduction measure for HIV/AIDS (UNICEF, 2007), but heterosexual intercourse is a major risk determinant for HIV/AIDS among the youths in Namibia (Lawoyin & Kanthula, 2010). The prevalence of sexual intercourse among learners in this study was similar to that earlier reported by Chinsembu et al. (2008). It was also comparable to that of the Scottish students (Henderson et al., 2008). However, the Namibian learners were several-times more sexually active than their African counterparts in Kenya (Rudatsikira, Ogwell, Siziya, & Muula, 2007), Burkina Faso, and Ghana (Bankole, Biddlecom, Guiella, Singh, & Zulu, 2007). Yet, such high levels of sexual activity among Namibian learners raised the question whether learners should have unfettered access to condoms at school, and whether school HIV/AIDS prevention programmes that relied on abstinence were effective in protecting learners from HIV/AIDS and unwanted pregnancies.

Learners from the Caprivi region consistently reported the highest levels of sexual activity on all scores. Thus, evidence from this study was unequivocal that learners from the Caprivi region were the most sexually active. For example, Caprivi region had the lowest percentage frequency of learners that never had sex, the highest percentage frequency of learners that ever had sexual intercourse, and the highest proportion of learners that had coitus in the 12 months prior to the study. Of all the ethnic groups that participated in this study, the Lozi also had the highest significant proportion of learners that had ever engaged in sexual intercourse.

Although previous studies implicated *mulaleka*, a cultural practice that initialized girls into sex (McFadden & !Khaxas, 2007), data from this study hinted that other factors may have contributed to the significantly high sexual activities that characterized *Caprivian* learners. Caprivi region had significantly low perceptions of school boyfriend-girlfriend relationships, statistically very high perceptions of learners that had older men as boyfriends, and significantly high perceptions of learners that engaged in sex for money or gifts. These results suggested that sexually active learners in the Caprivi region may have been involved in intergenerational and transactional sexual relationships (outside school boyfriend-girlfriend circles). Estimates about whether learners had older partners or whether they engaged in sex for money or gifts were ascertained from other learners because what peers reported reflected the actual sexual behaviours of the adolescents in question (WHO, 2004).

Intergenerational sex exposed adolescents and young adults to partners who, by virtue of their age and longer sexual history, were more likely to be HIV positive (De la Torre et al., 2009). Data showed that single and married Namibian women had a partner ten or more years older (Ministry of Health and Social Services & Macro

International Inc., 2008). The Ministry of Health reported that intergenerational sex was associated with higher prevalence of sexually transmitted infections (including HIV/AIDS) and a higher probability of multiple sexual partnerships. Through intergenerational sexual relationships, HIV/AIDS was introduced into the younger population where it spread rapidly because of the high turnover of partners, especially among young men (De la Torre et al., 2009). It seemed that sexually-active learners in the Caprivi region were at a higher risk of HIV/AIDS infection because of intergenerational and transactional sex.

In many parts of Namibia, transactional sex was common and almost acceptable (De la Torre et al., 2009). Many young girls in Namibia expected boyfriends and sexual partners to provide money and material support in exchange for sexual favours (Mufune et al., 2004). Young girls used sexual relationships with *sugar-daddies* as a means to advance their status, as well as that of their family (Webb, 1997). It was clarified that, in Namibia, girls did not consider transactional sex as prostitution (Webb, 1997). Young Namibian girls used sex as a tool to access money, material goods, and fashion (Talavera, 2002). In the Ohangwena region, Tersbol (2002) found that transactional sexual relationships were widespread, with men expected to supply girlfriends with money and clothes.

Apart from Katima Mulilo constituency in the Caprivi region, the percentage frequency of learners that had sexual intercourse in the 12 months prior to the survey was also significantly high in the Ohangwena constituency. Ohangwena region also had a significantly high perception of intergenerational sexual relationships. The latter evidence supported the argument of intergenerational and transactional sexual activities among learners in the Ohangwena. Previous data from UNICEF (2006a) also showed that learners in the Ohangwena region had their coital debut with a partner ten or more years older. Among married or cohabitating women, Ohangwena region also had one of the highest prevalence of intergenerational partnerships with almost half of all young married women having a partner ten or more years older (Ministry of Health and Social Services & Macro International Inc., 2008).

Furthermore, the burden of HIV/AIDS was heavy in the Caprivi and Ohangwena regions (GRN, 2008a). In both regions, many children had been orphaned, and due to the threat of starvation, these children may have resorted to sex for survival (Rabbow, 2001). Caprivi and Ohangwena regions are also the poorest in Namibia (UNDP, 2000), and both are located near international borders that serve as major routes for truckers, traders, foreign University students, and migrant workers that may have lured learners into intergenerational and transactional sex.

However, intergenerational and transactional sexual relationships among learners in the Caprivi and Ohangwena regions may have been contracted by older male residents. Male residents of the Caprivi region more often paid for commercial sex than men from other regions of Namibia (De la Torre et al., 2009). Ohangwena region also had a high level of 'lover relationships' where males accessed girls' sexual services through gifts (Tersbol, 2002). Such evidence was also supported by the observations of one school Principal in the Ohangwena region who said: "*When these girls in boarding school go home over the weekend, they go to stay with their boyfriends instead of going home to parents. Many learners get pregnant from older boyfriends outside the school*". Therefore, older resident men and transiting truckers, merchants, foreign students, and migrant workers may have been at the centre of intergenerational and transactional sexual dynamics in the Caprivi and Ohangwena regions.

Although the high sexual activity among learners in the Caprivi and Ohangwena regions was attributable to intergenerational and transactional sex, it may also be ascribed to cultural traits because nearly all the leaners in these two regions were Lozi and Ovambo, respectively. In the Ohangwena region, one school principal narrated how cultural norms allowed men to have unhindered sexual access to females: "*A man just says I will come to your home, then he does it* [sex]. *Women are told not to scream*". That cultural norms contributed to the high sexual activity of learners was also evident from the findings that the highest proportions of learners that ever had sex, and those that had sex in the 12 months prior to this study, were from the Lozi ethnic group. The Lozi ethnic group also had significantly low proportions of learners that never had sex. These results seemed to suggest that ethnic customs and values may have contributed to the high sexual activity of learners in the Caprivi and Ohangwena regions. Knowledge of such customs and values was beyond the scope of this study. The results of this study also mirrored those of the Namibia School-Based Student Health Survey which found that most learners that had sex prior to the survey were in the North-east (included Caprivi region) and North-west (included Ohangwena region) health directorates (Global School Health Survey Namibia, 2004).

Damara-Nama learners were less sexually active in the 12 months prior to the study. This finding was also supported by the Namibia School-Based Student Health Survey which found that few learners from the South health directorate were sexually active. The South health directorate was mostly inhabited by people from the Damara-Nama ethnic group. Despite the small sample size of Damara-Nama learners in this study, ethnic background seemed to have contributed to the significantly high frequencies of Damara-Nama learners that never had sex, and to the significantly low frequencies of Damara-Nama learners that had sex in the 12 months prior to this study. Lawoyin and Kanthula (2010) stated that drivers of the epidemic in Namibia included factors that were tied directly or indirectly to established cultural and societal norms that contributed to unhealthy attitudes and behaviours.

Abstinence from sex was associated with lower risk to HIV/AIDS. In contrast, sexual intercourse among adolescents is a risk factor for teen pregnancy, clandestine abortions, sexually transmitted infections including HIV, and school dropout (Siziya, Muula, Kazembe, and Rudatsikira, 2008). Besides, intergenerational and transactional sexual activities increased learners' risks to HIV/AIDS (De la Torre et al., 2009). By parity of reasoning, the results on sexual activity showed that learners from the Caprivi and Ohangwena regions may have been at a significantly higher risk of HIV/AIDS infection than learners from other regions. Learners that may have been involved in intergenerational sex could have easily transferred the risk of HIV/AIDS to their in-school sexual partners.

This study found that the odds of sexual intercourse were significantly higher for learners that were male, learners that had boyfriends or girlfriends, learners that drank beer or alcohol, and learners that smoked cigarettes. Previous studies had established that alcohol drinking and cigarette smoking were associated with higher sexual activity among Namibian in-school adolescents (Chinsembu et al., 2008). The results of this study are supported by evidence that notions of masculinity encourage more male than female learners to engage in sexual intercourse (Brown et al., 2005).

Urban learners recorded high sexual activities. Thus, ecological factors related to urbanization, including intergenerational and transactional sex, may have significantly increased the sexual activity of urban learners. Molla et al. (2008) also found higher sexual activity among young urban dwellers in Ethiopia. However, the finding that higher percentage frequencies of learners in rural than urban areas drunk beer or alcohol suggested that drinking beer or alcohol was more significantly associated with high sexual activity among rural learners. This suggestion may have been evinced by the observation of numerous Shebeens and *Cuca-shops* that sold beer in rural northern Namibia.

Alcohol consumption was very high among the inhabitants of Omusati and Ohangwena regions (De la Torre et al., 2009). Lawoyin and Kanthula (2010) found that 15.0% of Namibian Ovambo youths aged 15-30 years reported alcohol use during their previous sexual encounter, while 8.0% reported alcohol use every time they wanted to have sex. The Global School Health Survey (2004, p.38) also found that the use of alcohol or drugs before sexual intercourse was high in the Northwest Health Directorate, followed by the Northeast Health Directorate, and Central Health Directorate. The South Health Directorate reported the lowest.

Excessive consumption of alcohol was associated with high-risk sexual behaviour in Namibia (United Nations Development Programme, 1999) and Botswana (Weiser, Leiter, Heisler, McFarland, de Korte, & DeMonner, 2006). It was not known whether beer-drinking was a prelude to sexual activity among learners in this study. But De la Torre et al. (2009) observed that bars and Shebeens were the places where new partners were readily found and hence were the hotspots for HIV infection; more so because they served as hubs that connected sexual networks. Earlier, Zimba (1995) found that half of all secondary school learners believed that alcohol facilitated communication with peers of the opposite sex. Kalichman, Simbayi, Cain, and Jooste (2007) stated that it was not possible to delineate whether learners used alcohol as part of sexual activity, or whether they drunk intentionally in order to be disinhibited, or whether sex was often available where alcohol was sold. Here, the researcher believed that all these undercurrents may have silently conspired to make rural learners sexually active, and vulnerable to HIV infection.

Additionally, this study established that the odds of sexual intercourse were high for learners that had been tested for HIV, and learners that thought one could not get HIV from one faithful sexual partner. It was not clear why testing negative or positive for HIV/AIDS increased learners' likelihoods of sexual intercourse. However, it was reasoned that a negative HIV test result may have most likely incentivized learners to frequently engage into sexual intercourse with one putative faithful partner. In an unlikely event, testing positive for HIV/AIDS may have induced cognitive dissonance (Mwale, 2008) and a psychological state of 'fatalism' to such an extent that such learners increased their coital encounters, probably to maliciously spread the virus.

The results of this study also showed that having a boyfriend or a girlfriend increased the likelihood of sexual intercourse by a factor of seven, while drinking beer or alcohol, and smoking cigarettes, increased the chances of engaging in sexual intercourse by magnitudes of two and four, respectively. Learners that were involved in boyfriend-girlfriend relationships (Figure 16), beer-drinking, and cigarette-smoking may have more frequently engaged in sexual intercourse because of peer-pressure. Zwang and Garenne (2008) noted that peer-pressure was much more than the desire to experiment sex with school mates. These authors contended that peer-pressure also led to the search for relationships with higher status mates, in order to receive gifts or various economic favours, thus it ultimately led to commercial sex. In view of Zwang and Garenne's (2008) definition of peer-pressure, it seemed that persons that purchased beer or cigarettes for the learners may have 'pressured' the learners into sexual intercourse. Social networking with friends also increased the likelihood of coitus among young people (Siziya, Muula, Kazembe, and Rudatsikira, 2008). It would have been interesting to find out whether learners that used social networking media such as Facebook had higher levels of sexual activity.

Nonetheless, the evidence presented above may have pointed to two scenarios of coital behaviour among Namibian learners:

1. Sexual intercourse among HIV-negative learners in a faithful school boyfriend-girlfriend relationship; and
2. Sexual intercourse among beer-drinking and cigarette-smoking socialites.

The first scenario alluded to a near-marriage and rural-based sexual behaviour where HIV-negative learners mated frequently as though they were invincible to HIV/AIDS. It was most likely 'rural' because significantly more rural than urban learners were tested for HIV. The second scenario, which occurred among both rural and urban learners, may have pointed to a more overtly risky sexual behaviour as beer-drinking and cigarette-smoking are often associated with unsafe sex. Intergenerational and transactional sex was most likely found in the latter scenario. More empirical data are needed to verify these two scenarios.

5.3.3 Multiple sexual partners among learners

Learners with multiple sexual partners were at high risk of HIV/AIDS (De la Torre et al., 2009). This study found high levels of sexual partners (up to 11 partners in 12 months) among learners. These results are similar to those of Lawoyin and Kanthula (2010) who found that youths in the Oshana region had up to eight partners in a three-month period. Chinsembu et al. (2008) also found that in-school adolescents had more than three life-time sex partners.

Multiple sexual relationships contribute to the rapid spread of HIV/AIDS in Namibia, especially among young women (Ministry of Health and Social Services & Macro International Inc., 2008). It was not clear why many Namibian learners had multiple sexual partners, but the fact that this risky sexual behaviour was significantly prevalent in certain regions (Caprivi and Khomas) and ethnic groups (Damara-Nama and Herero) suggested that ecological factors (geographical location near international borders, poverty, urbanization) and cultural values may have been involved. For instance, Zimba (2003, p.175) citing Talavera (2002, p.46; p.71) wrote that "Ovaherero girls can be made vulnerable to sexual abuse. This is the case because it is understood by tradition that their consent is unnecessary when boys or men wish to have sex with them". Moreover, Herero girls may have had multiple sexual partners because of the tradition of *tjiramues* (Desert Soul, 2008). Therefore, traditional norms may have contributed to multiple sexual relations among Herero learners in this study.

Significantly more girls were faithful to one sexual partner than boys. It goes without saying that significantly more boys than girls had multiple sexual partners. This finding was supported by Burgoyne and Drummond (2008) who stated that in many

African societies, males were traditionally permitted to have multiple sexual partners and sex outside the relationship, whereas even a suspected sexual affair by a girl or woman may have resulted in ostracism and abandonment. Even in marriage, men were culturally-allowed to have sexual partners outside marriage, yet female extramarital sex was culturally suppressed (Achan, Akweongo, Debpuur, & Cleland, 2009). Gender and cultural norms may have reinforced the mistaken notion that boys were supposed to conquer the sexuality of girls. In fact, boys were reported to show their power by having sex with many virgin girls (Mufune, 2003). “Multiple sexual partners are part of tradition and to have just one [partner] suggests poverty, low status, and weak manhood”, observed one Ovambo male respondent (Brown et al., 2005, p.590).

Lawoyin and Kanthula (2010) observed that in Namibia, there was a sense of awareness about the influence of certain gender, social and cultural norms on the transmission of HIV/AIDS among young people. Lawoyin and Kanthula (2010), quoting the Namibia Country Strategic Plan 2004-2010 on Gender Assessment, acknowledged the nexus between the transmission of HIV/AIDS and the stereotypical views about gender roles, including a passive tolerance for male dominance, aggression, and promiscuity. It seemed therefore, that the propensity by the male learners in this study to accrue many sexual partners was symbolic of a broader cultural psyche that endeared male domination.

Other than having multiple sexual partners, this study also found that significantly more boys than girls were associated with other HIV/AIDS risk variables: high sexual activity, beer-drinking, and cigarette-smoking. The predominance of males in potentially unhealthy lifestyles was also described in many other settings

(Rudatsikira, Muula, & Siziya, 2007; Siziya, Rudatsikira, Muula, & Ntata, 2007). The preponderance of risky sexual behaviours among boys was attributed to their masculinity. Brown et al. (2005) defined masculinity as a set of role behaviours that most men were encouraged to perform. Masculinity was a cross-cultural and achieved status which included toughness, aggressiveness, stoicism, and sexuality (Brown et al., 2005). Contemporary scholars considered masculinity as a collective gender identity, one that was fluid and socially-constructed, rather than a natural attribute (Brown et al., 2005). Men's sexual behaviours often demonstrated a denial of weakness, virility, the appearance of being strong, and emotional and physical control (Brown et al., 2005). To paraphrase Courtenay (2000), it was often in the pursuit of sexual power and privilege that men were led to harm themselves. "Having several sexual partners is seen as a sign of masculinity or *machismo*- the boy becomes a champion among his peers" (Mwale, 2008, p.296). Notwithstanding the role of masculinity in heightening risky sexual behaviours among the boys in this study, it was noted that 1.0% of girls (n = 2) from Outapi and Tsandi in the Omusati region had sex with eleven partners 12 months prior to this study. If such girls were HIV-positive, they may have posed the risk of becoming high-frequency transmitters of HIV/AIDS in the learner population.

A reduction in high risk behaviours was associated with a decline in HIV prevalence. Setswe (2007) found that in the two African countries (Uganda and Zambia) that experienced declines in HIV prevalence rates during the 1990s, there were also significant reductions in the numbers of sexual partners. Sandoy, Michelo, Siziya, and Fylkesnes (2007) found a significant decrease in the high risk behaviours of young people in Zambia, especially in higher-educated and urban groups. Fewer sexual partners and increased condom use were among the core factors that led to the declines in HIV prevalence rates in Zambia. In Namibia, UNAIDS (2008, p.18) reported that the “rates of sex before the age of 15 and sex with more than one partner in the last 12 months have decreased among young people”. The reported delays in sexual debut and reductions of sexual partners were not verified in this snapshot study. Nonetheless, it was reasoned that behavioural interventions aimed at increasing faithfulness to one sexual partner, and reducing the number of sexual partners, may significantly slash HIV/AIDS prevalence rates among young people in Namibia.

Statistical analysis of the data from this study showed that significantly high proportions of learners that were from the Damara-Nama and Herero ethnic groups had multiple sexual partners. Despite their early coital debut, significantly few learners from the Kavango ethnic group had multiple sexual partners. Since beer-drinking and cigarette-smoking were significantly associated with learners from the Damara-Nama ethnic group, it was possible that these social factors may have contributed to the multiplicity of sexual partners in this group. Previous studies revealed that alcohol blurred HIV risk perception and fostered multiple sexual partnerships (Ministry of Health and Social Services & Macro International Inc., 2008).

Furthermore, Damara-Nama and Herero learners that participated in this study were mostly found in the Khomas region, the most urbanized environment in Namibia. De la Torre et al. (2009) recorded high levels of multiple sexual relationships in the Khomas region. In Windhoek, the capital of the Khomas region, young women aged 15-24 years reported the highest numbers of multiple sexual partners in comparison with others from the rest of the country (De la Torre et al., 2009). Thus, urbanization and modernity may have driven Damara-Nama and Herero learners into multiple sexual relationships. Despite the urban environment, significantly fewer Lozi, Ovambo, and Kavango learners in the Khomas region had multiple sexual partners. Therefore, it was possible that ethnic traits may have also contributed to the large array of sexual partners among the Damara-Nama and Herero learners in this study. Mufune et al. (2004), quoting Talavera (2002), reported that in old Herero culture, wives or husbands offered their partners to visiting friends. Such kind of culture offered a glimpse into the role of ethnic traits in sexual behaviour.

5.3.4 Condom use among learners

Unprotected sex (i.e. sex without condoms) increases the risks of sexually transmitted infections including HIV/AIDS (WHO, 2006; UNAIDS, 2008). Studies in Uganda showed that the proportion of sexually active Ugandan women and girls who had ever used a condom increased between 1989 and 1995, a period that coincided with a significant decline in HIV prevalence (Green, Halperin, Nantulya, & Hogle, 2006). Among Ugandan men and boys, the proportion of those that used condoms also rose tremendously (Green et al., 2006). Increased condom use in Uganda was attributable to positive change in behaviour. Such positive behaviour to the use of condoms was not evident in this study where learners indicated that their partner would be angry if they suggested the use of a condom.

The mean number of times that learners had sex without condoms was higher in urban than rural areas. Although urban learners would have acquired condoms from non-school sources, the higher level of unprotected sex among urban learners was probably due to the inadequate supply of condoms in most urban schools (significantly less urban learners than rural leaners reported availability of condoms at their schools). Caprivi region had the highest mean number of times that learners had sex without condoms. Previous studies also found that condom use in the Caprivi region was low. Mensah, Black, and Gamatham (1998) found that three out of four adolescents in the Caprivi region did not use condoms. The Global School Health Survey (2004) also found that condom use at the previous coitus was lowest in the Northeast Health Directorate (Kavango and Caprivi regions).

Evidence from this study supported postulations from the TPB that the intention to use condoms was low in the Caprivi region because of a host of contextual (societal) and personal perceptions that undermined condom use, namely: the belief that condoms were not safe; the mistaken idea that there was no need to use condoms if a girl was using family planning pills, or if one trusted their partner; the erroneous perception that condoms spread sexually transmitted infections; the poor perception of HIV risk as evidenced by the fact that significantly high proportions of Caprivi learners thought that one could not get HIV if they were faithful to a particular sexual partner.

The considerably high levels of unprotected sex among learners in the Caprivi region were also evidenced by the finding that Caprivi region had the highest pregnancy rates in this study. It was deduced that even though Caprivi region learners had access to condoms, they may have failed to use them in intergenerational and transactional sexual relationships. Older partners that paid for sex may have dictated and insisted not to use condoms. Such an empirical speculation was founded in Langen’s (2005) observations that gender-power imbalances affect women’s ability to suggest condom use to their partners. Women with partners 10 or more years older than them and those economically dependent on their partners were less likely to suggest condom use to their partners.

The high prevalence of unprotected sex in the Kavango region may be explained by the finding that condoms were not available in most schools, as well as the fact that significantly fewer learners in this region belonged to AIDS awareness clubs. Besides, a confluence of contextual perceptions may have acted as a barrier to condom use in the Kavango region, namely: condoms spread sexually transmitted infections and were not entirely safe; there was no need to use condoms if they trusted their partner, and if the partner looked healthy.

Among the different ethnic groups, Damara-Nama learners had the lowest mean number of sexual episodes without condoms. The Damara-Nama learners were more likely to use condoms probably because they had multiple sexual partners. Be that as it may, the results of this study were consistent with the Global School Health Survey (2004) which reported that condom use was highest among Damara-Nama learners (South Health Directorate) and lowest among Kavango and Lozi learners (North-east Health Directorate).

Here, condom use was lowest among learners from the Herero ethnic group. Other than ethnic factors, Herero learners were also less likely afraid of sexually transmitted infections, and were the most likely to have believed that it was difficult to use condoms if the weather was too hot. Herero learners also significantly received their HIV/AIDS education from friends, rather than parents or guardians. Contextual perceptions, including those of friends, may have contributed to low condom use among Herero learners. Evidence from the United States of America and Ghana showed that adolescents who discussed sexual issues and HIV/AIDS with parents were less likely, than those who did not, to engage in risky sexual behaviours (Adu-Mireku, 2003).

In this study, high condom use was associated with having been tested for HIV, the intention to test for HIV, parental strictness, involvement in AIDS awareness clubs, *My Future is My Choice*, and the willingness to get or buy condoms. In Uganda, testing negative for HIV was found to increase HIV preventive behaviours such as the use of condoms and antiretroviral therapy (Nuwaha, Kabatesi, Muganwa, & Whalen, 2002). Parental strictness also reduced risky sexual behaviours among in-school adolescents in Namibia (Chinsembu et al., 2008). AIDS awareness clubs and access to condoms were also critical to the promotion of HIV preventive behaviours among learners (Campbell & Lubben, 2003).

All in all, the results of this study were in line with the TPB (Ajzen and Manstead, 2007; Conner and Sparks, 1998) because the intention and action to use condoms was increased by several antecedents: HIV testing, parental strictness, AIDS clubs, and the willingness to access condoms. When the findings on condom use were viewed within the prism of the TPB, it was hypothesized that the use of condoms by learners from urban areas, Caprivi and Kavango regions, and the Herero and Lozi ethnic groups may be improved by using interventions that encouraged HIV testing, participation in AIDS awareness clubs, parental strictness, and the willingness to acquire condoms.

Mufune (2005) described several myths that subtract from condom use in Namibia. Hendriksen, Pettifor, Lee, Coates, and Rees (2007, p. 1241), working in South Africa, found that condom use was affected, either negatively or positively, by factors such as self-efficacy (an individual's belief in his or her capacity to engage in the behaviours necessary to attain specific goals), perceived risk, knowledge of one's HIV status, and early age of sexual debut. They observed that both traditionally high-risk sexual activity (i.e. transactional sex- sex for goods or money- and sexual intercourse while under the influence of alcohol or drugs) and perceived low-risk sexual activity (i.e. sexual intercourse in the context of a marital or committed, trusting relationship) have been found to be associated with a lower likelihood of condom use.

5.3.5 Failure to buy condoms by the learners

The results showed that the mean number of times male learners failed to buy condoms was greater than for female learners. This finding may have suggested that male learners faced more difficulties in buying condoms. For example, they may have failed to buy condoms because they lacked time, money, and transport, or they failed to buy condoms because the service was not user-friendly. The other reason for the failure to buy condoms was that learners did not actually need to buy condoms as government distributed free 'smile' condoms. Coates, Richter, and Caceres (2008) reported that more than 25 million male condoms were distributed every year in Namibia. Thus, most adolescents indicated it would take less than an hour to obtain a male condom from the place closest to their home or school (Mufune et al., 2004).

In spite of the above considerations, the ability to buy condoms was an important contribution to the intention and action to use condoms. Therefore, the results suggested that male learners were at a higher risk of HIV/AIDS given that they failed to buy condoms most times. Further, learners in northern Namibia, especially those in Ohangwena and Oshikoto regions, or Ongha, Outapi, Eenhana, Onayena, Ohangwena, and Oniipa constitutuencis, were at higher risk of HIV/AIDS because they also failed to buy condoms most times. The Global School Health Survey (2004) reported that knowledge about the availability of condoms was lowest in the North-west Health Directorate which included Ohangwena, Oshikoto, and Omusati regions. Factors that hindered learners from buying condoms were not investigated in this study.

5.3.6 Learner pregnancies

In Namibia, pregnancies by most teenagers were unwanted (Gage, 1998), and because teenage pregnancies were a sign of unprotected sex, they were associated with increased risk to HIV/AIDS (WHO, 2006). In fact, declines in HIV prevalence rates were associated with delays in pregnancy and child-bearing (Sandoy et al., 2007). The nexus between pregnancy and the lack of condom use was illustrated by the results of this study. Urban areas, as well as Caprivi and Kavango regions, had the highest levels of pregnancy and these were the locations where significantly high numbers of learners did not use condoms.

In terms of levels of pregnancy, the results of this study were similar to the Namibia Demographic and Health Survey (Ministry of Health and Social Services & Macro International Inc., 2008) which found that Kavango region was one of the regions with the highest fertility rates in Namibia with an average woman having five children. However, the results of this study were not in conformity with the findings of Garenne and Zwang (2006) who reported that the Herero and Damara-Nama had the highest levels of premarital fertility.

Fertility varied with mother's education whereby women with no formal education had three-times more children than those who had secondary education. The role of formal education in reducing premarital fertility may have been indirectly reaffirmed by the finding that Kavango region had the least proportion of learners that belonged to an AIDS awareness club. AIDS awareness clubs could have increased learners' education about contraceptives. Fertility also varied with the economic status of women (Ministry of Health and Social Services & Macro International Inc., 2008). The poorest women had twice more children than women in wealthiest households.

Corollary, the high premarital fertility among learners in the Caprivi and Kavango regions may be a mirror of the poor socio-economic conditions in these regions (UNDP, 1999).

High levels of intergenerational and transactional sex may have contributed to the significantly high levels of pregnancy in Caprivi and Kavango regions. Similarly, higher levels of pregnancy among urban learners may have been caused by the high prevalence of school boyfriend-girlfriend relationships, as well as the high prevalence of sex for money or gifts. Caprivi had the highest mean number of pregnant school girls, yet the region had the least mean number of school boys that made the school girls pregnant. This trend partly depicted the prevalence of intergenerational sex in this region. Caprivi region also had high levels of learner pregnancy because of the myriad barriers to condom use, especially the frequently cited reason that it was difficult to use condoms with one regular sexual partner.

Across the different constituencies, Oniipa, Ohangwena, and Onayena had significantly high rates of learner pregnancy. These high rates of pregnancy could be explained by the findings that significantly high percentage frequencies of learners in these constituencies failed to buy condoms. Furthermore, in the Ohangwena region, pregnancy of school girls was most likely caused by fellow school boys, and this was also evident from the finding that this region had the highest percentage frequency of school boyfriend-girlfriend relationships.

5.3.7 Perception of HIV/AIDS risks by learners

According to the TPB, high perceptions of the risk and susceptibility to HIV infection were important precedents to the formation of good intentions for preventive AIDS behaviours (Ajzen & Manstead, 2007; Ajzen & Cote, 2008; Ajzen et al., 2009). In this study, learners from the Caprivi region reported significantly high perceptions of science teachers' and learners' risks and vulnerability to HIV/AIDS. Such high perceptions of risk and vulnerability to HIV/AIDS were probably associated with the high burden of HIV/AIDS in the Caprivi region (GRN, 2008a; Thomas, 2006). Paradoxically, the high perceptions of HIV/AIDS did not translate into high levels of preventive behaviour among learners in the Caprivi region. Nonetheless, the significantly low perception of HIV/AIDS risks and susceptibility among learners in the Khomas region was anathema to the execution of correct HIV/AIDS preventive behaviours.

5.3.8 HIV/AIDS risk factors for teachers

The demographics of Life Science and Biology teachers in this study pointed to their high risk of HIV/AIDS infection. For example, most teachers were single and in their early thirties, the age-group at the highest risk of HIV/AIDS infection (GRN, 2008a). Further, teachers that were single reported a higher risk of HIV/AIDS than their married counterparts (Chao, Gow, Akintola, & Pauly, 2007). This high risk of HIV/AIDS was also reported by Abt Associates (2002) because most teachers in Namibia were aged under 40 years, in addition to being female. Biological and socio-economic factors increased the risks of HIV infection for females (Chinsembu, 2009b; UNAIDS, 2006).

According to De la Torre et al. (2009), travel away from home is associated with an increase in multiple sexual partners in Namibia. Bennell (2003) also wrote that teachers are regarded in the same way as other economic migrants in Africa since they are often separated from their spouses and families due to lack of suitable housing. This, coupled with the reluctance of their spouses and children to live in rural locations, leads teachers to have more sexual partners than less mobile occupational groups. The observations by Bennell (2003) connoted that science teachers could have travelled away from their schools in order to visit spouses and families that were living elsewhere. Still, teachers may have left their duty schools because of a host of other reasons.

On par with the above understanding, teachers were requested to report how many times they had travelled out of their duty station in the 12 months prior to the survey. Although teachers from the Omusati, Ohangwena, Oshikoto, Caprivi and Kavango regions tended to travel from their duty stations more frequently than those in the Khomas region, the statistical analysis revealed that there were no significant regional, rural-urban, gender, and marital status differences in the mean number of times that teachers travelled out of their duty stations. Thus, in terms of travel out of their duty stations, teachers in this study were all at the same level of risk to HIV infection.

5.4 Gaps in knowledge, norms, attitudes, practices, and skills to HIV/AIDS

5.4.1 Knowledge gaps among learners

This study showed that there were a lot of knowledge gaps (misunderstandings, misconceptions and myths) about HIV/AIDS among science learners. For example, one out of every ten learners thought traditional healers could cure HIV/AIDS. Whilst traditional healers may treat HIV/AIDS-related opportunistic infections as was found in Katima Mulilo by Chinsembu and Hedimbi (2010b), they did not cure HIV/AIDS. There were also low levels of HIV/AIDS knowledge among the learners. This was evidenced by the fact that some of the learners thought antiretroviral drugs were the new cure for HIV/AIDS, persons suffering from tuberculosis also had AIDS, one could get HIV from a mosquito that fed on blood from an HIV-positive person, and one could tell by looks that a person was HIV-positive. Although Namibia had one of the highest tuberculosis infection rates in the world, with most tuberculosis cases being HIV positive (Chinsembu & Hedimbi, 2010b), that did not mean all persons that were infected with tuberculosis also had HIV/AIDS.

The knowledge gaps delineated in this study were similar to earlier findings by Iipinge (2003) where respondents thought AIDS could be cured by modern drugs, believed birth control pills prevented HIV/AIDS, or HIV was spread by mosquitoes. The author reported that some of the respondents in her study attributed HIV/AIDS infection to witchcraft, meat or vegetables. Some of the participants in Iipinge's (2003) study also believed that the lubricant in condoms was a carrier for HIV/AIDS. Mufune et al. (2004) also found respondents that believed a person could get HIV from a mosquito, or get HIV if they share a meal with a person who was HIV-positive. He also documented that some Namibian learners did not want their HIV-positive peers to attend school.

The above myths and misconceptions may have emanated from the stigma associated with AIDS. However, these gaps in knowledge may also be rooted in the incorrect literature on HIV/AIDS. For example, a UNESCO (2004, p.100) document on the training of teacher educators in Sub-Saharan Africa stated that “adults diagnosed with AIDS die within 18 months of diagnosis”. Such an erroneous statement may have contributed to the number of learners in this study that thought a person with HIV/AIDS could not live for more than ten years. Another misleading fact stated in the same UNESCO (2004, p.100) document was that “children born to HIV-positive mothers will be HIV-positive themselves”. The two statements cited above were inaccurate because they did not reflect the role of antiretroviral treatment in prolonging the life of people living with AIDS and reducing mother-to-child-transmission of HIV/AIDS. Suffice to state that the poor knowledge of HIV/AIDS among learners was symptomatic of the meagre understanding of HIV/AIDS among their teachers, and this was partly due to the use of archaic literature.

According to the demographic and health survey of 2006 (Ministry of Health and Social Services & Macro International Inc., 2008), two-thirds of Namibian youths have comprehensive knowledge of HIV/AIDS. The results of this study showed that knowledge of HIV/AIDS basic facts was not yet universal among secondary school learners. The finding that learners believed only immoral people like prostitutes contracted HIV/AIDS, or one could not get HIV if they were faithful to one sexual partner, also confirmed the mistaken notions of invincibility among many learners because they may still have been infected with HIV even when they were neither prostitutes nor unfaithful to their sexual partners.

Despite the fact that circumcision was known to reduce HIV/AIDS infection in males, not all learners in this study knew this fact. This finding may have been a reflection of the low levels of male circumcision in the study sites. Peltzer, Niang, Muula, Bowa, Okeke, Boiro, and Chimbwete (2007) reported that the prevalence rate of male circumcision in Namibia was low. De la Torre et al. (2009) also reported that male circumcision was low in the Caprivi and rare in Omusati, Ohangwena, and Oshikoto regions. Since the link between male circumcision and HIV/AIDS had only been deciphered in the recent past, it was argued that learners were not yet aware of that knowledge. Many learners did not know the role of CD4 cells in immunity and HIV/AIDS. A much higher percentage of the learners did not know that HIV/AIDS could cause memory loss. These data implied that the current secondary school HIV/AIDS education did not deliver key and up-to-date scientific knowledge to the learners.

Regional disparities in HIV/AIDS knowledge suggest the need for understanding contextual circumstances in which HIV/AIDS education is delivered. Thus, HIV/AIDS education aimed at dispelling the myth that some traditional healers can cure HIV/AIDS should more especially target school and entire communities in the Omusati region. HIV/AIDS education aimed at dispelling the misconception that one cannot get HIV if they stick to one sexual partner should especially target learners and entire populations in the Caprivi, Khomas, and Omusati regions. Furthermore, the misunderstanding that people with tuberculosis already had HIV/AIDS was most prevalent in the Caprivi region. The apparent confusion between tuberculosis and AIDS could have even contributed to stigma of persons suffering from tuberculosis in the Caprivi region.

In theory, the regional, ethnic, and Grades 9-11 differences in knowledge about HIV/AIDS corroborated this study's post-modernistic arguments to reform the HIV/AIDS curriculum so that it was variegated according to learners' needs and contexts. In practice, the HIV/AIDS curriculum should have been reformed to include the needs and contexts of learners from different regional and ethnic backgrounds. The differences in knowledge gaps also mirrored the constraints of HIV/AIDS education in those settings. For example, learners from the Kavango region had low levels of HIV/AIDS knowledge because significantly low proportions of those learners belonged to AIDS awareness clubs. Learners that were Ovambo also thought antiretroviral drugs were the new cure for AIDS because most teachers from northern Namibia, especially Omusati region, stated the same.

5.4.2 Knowledge gaps among science teachers

The results showed that while many teachers provided correct answers to basic questions about HIV/AIDS (e.g. mosquitoes did not transmit HIV), they failed to correctly answer questions that pertained to modern developments in the field of HIV/AIDS (e.g. male circumcision, role of selenium in delaying onset of AIDS, charcoal-smoked foods and antiretroviral treatment, HIV and loss of memory, immune reconstitution syndrome, and HIV infection in discordant couples). This was most likely due to the lack of access to up-to-date literature on HIV/AIDS.

The lack of new and detailed knowledge of HIV/AIDS was also symptomatic of the fact that teachers were not specifically trained to teach HIV/AIDS. In this study, gaps in knowledge were more glaring among teachers with Diploma and Certificate level training. Furthermore, the gaps in knowledge demonstrated the need for reforming the curriculum for HIV/AIDS education at teacher training colleges and the University of Namibia. The Ministry of Education should have provided teachers with the necessary support services for HIV/AIDS education (e.g. up-to-date reading materials).

Rogers et al. (2010) reported that Namibian teachers failed to answer six or more basic knowledge questions related to HIV prevention. The same authors reported that Namibian teachers did not know that circumcision helps to prevent HIV infection in men, later on the fact that sexually transmitted infections increase the vulnerability to HIV infection. Many teachers had gaps in their understanding of HIV/AIDS because they lacked access to appropriate resources (UNESCO, 2008a). Teaching about HIV/AIDS required certain skills but many teachers were not adequately trained (UNESCO, 2008a). Elsewhere, Peltzer (2000) found that black school teachers in South Africa had poor knowledge about the transmission of HIV/AIDS. However, in California, Boscarino and DiClemente (1996) observed that teachers were very knowledgeable about AIDS.

The point that a knowledgeable cadre of teachers is critical to HIV prevention cannot be over-emphasised. In Tanzania, research showed that teachers who had good knowledge of HIV/AIDS provided effective HIV/AIDS education (Klepp, Ndeki, Leshabani, Hannan, & Lyimo, 1997). Thus, it was recommended that teacher-led interventions that provided education and support services helped to prevent HIV/AIDS transmission among learners and the community (Kaponda, Norr, Norr, Kachingwe, & Mbweeza, 2002). The results also illustrated that regional, rural-urban, male-female, and married-single differentiations of teachers' knowledge gaps would have helped to target such interventions to the relevant group of teachers.

5.4.3 Learners' attitudes to HIV testing

According to the TPB, attitudes to HIV/AIDS are an important cornerstone of prevention and treatment interventions (Ajzen & Manstead, 2007). Thus, the use of HIV testing and treatment services is dependent on individuals' good intentions, which intentions are only formed under the correct precedents. In this study, only one-thirds of the learners had ever tested for HIV/AIDS. Among the one million sexually-active Namibians aged 15-49 years, only 29.0% of females and 18.0% of males were tested for HIV (Ministry of Health and Social Services & Macro International Inc., 2008). Mufune et al. (2004) found that 23.4% of females and 21.9% of males were tested for HIV. Here, there were significantly more girls than boys that had tested for HIV. Living in rural areas, being a female, and in Grade 11, was significantly associated with a higher chance of HIV testing in this study. These results suggested that any behavioural interventions aimed at increasing HIV testing ought to have focussed on urban, male and Grade 9 learners. Campaigns to increase HIV testing among learners should have especially targeted regions where levels of tested learners were significantly low, namely, the Kavango, Khomas, Caprivi, Ohangwena, and Omusati regions.

Nuwaha et al. (2002) found that voluntary testing for HIV/AIDS was dependent upon the consequences of the test result, influences from a sexual partner, cost and access to test centre, awareness of the testing service, and sexual risks. HIV testing was probably low among Kavango and Khomas region learners because access to testing centres was difficult as testing centres were not located near the schools. Among learners, HIV testing declined between 20 and 21 years of age. This finding showed that as learners grew older, their sexual activity increased, and so did their reluctance to test for HIV/AIDS. The reluctance to test may have been related to risky sexual behaviours whereby learners were scared of the possibility of an HIV-positive test result.

The lowest percentages of learners that were ever tested for HIV were from the Kavango and Herero ethnic groups. Apart from long distances to testing centres, Kavango learners may have lacked the intention to test for HIV probably because they usually had sex with one partner. However, learners that were Herero failed to test for HIV most probably because they would not want to know their status as they usually had sex without condoms, and had multiple partners. On the other hand, when requested to state their intention to test for HIV/AIDS, the Herero learners recorded the highest will to test for HIV. However, intention to test did not translate into action to test, probably because of the above stated sexual risks. Learners from the Damara-Nama ethnic group also had the lowest intention to test for HIV probably because most of them had the fear of HIV infection which may have emanated from their multiplicity of sexual partners.

5.4.4 Norms that delayed sexual activity

According to the TPB, the norms held by individuals are important precedents of sexual behaviour (Ajzen & Manstead, 2007). In this study, the norms that dissuaded learners from sexual intercourse were elucidated. The results showed that waiting for marriage was a more important deterrent to sexual intercourse than the fear of HIV/AIDS. The fact that comparatively fewer learners were dissuaded from coital behaviour because of the fear of HIV/AIDS meant the perception of the risk to HIV was low among the study participants. Low perception of HIV risk was known to increase risky sexual behaviours. Hence, behavioural interventions meant to reduce sexual activity should also have focussed on raising the fear of HIV infection.

Delaying sex until one was older, the fear of pregnancy, religion, and parental strictness did not significantly discourage learners from sexual activity in this study. However, in Nigeria religious commitment (and not affiliation) delayed the sexual activity of adolescents (Odimegwu, 2005). Chinsembu et al. (2008) also found that parental supervision curbed the sexual activity of Namibian in-school adolescents. In future, behavioural interventions aimed at delaying age at coital debut or abstinence among learners should encourage the norms of delaying sex till one was older, increase the fear of pregnancy, encourage waiting till one met the right person, increase religiosity, and invoke parental strictness. For example, increasing the fear of HIV infection would have been an important intervention for learners from the Kavango region and Herero ethnic group. Waiting for marriage would also be a critical intervention for learners from the Damara-Nama ethnic group.

5.4.5 Attitudes to sexual behaviour

Other than contextual factors, personality and personal attitudes also shaped learners' sexual intentions and actions (Conner & Sparks, 1998). When learners were requested to state their personal attitudes in case they wanted to reorient their sexual behaviours, less than half of all respondents stated they would rather stop all sex, or have sex with condoms. Given the high sexual activity of learners in this study, the admission to stop all sex was 'easier said than done'. Råssjö and Darj (2002) wrote that many young people would in theory like to abstain from sex till marriage but in practice they failed to do so due to several emotional and contextual setbacks. In Kenya, in-school adolescents stated very conservative attitudes to premarital sex, yet they were highly involved in sex and risky sexual behaviours (Adaji, Warenius, Ong'ang, & Faxelid, 2010).

In retrospect, since only less than half of the learners cited "stop all sex", campaigns for abstinence would have been more demanding as they would have set out to change the attitude of slightly more than half of the learner population that did not aspire to abstain from sex. Further, only less than one-tenth of the learners preferred reduced number of sexual partners and sex with reduced number of partners with condoms. These findings suggested the need for more in-school interventions to reduce the number of sexual partners, in addition to increasing condom use. Evidently, a few learners had a risky sexual attitude as they preferred sex without condoms and sex with one partner without condoms. Such risk-takers were likely to become high frequent transmitters of HIV/AIDS in the learner population.

5.4.6 Behavioural and contextual norms to condoms

This study found that learners from the Caprivi, Kavango, and Khomas regions had difficulties using a condom with one regular sexual partner. These findings were similar to the observations by Iipinge (2003) that condoms were used in the first sexual encounter with a new partner, and thereafter, they were discarded even if both partners had not disclosed their HIV status. Mufune et al. (2004) also reported that condoms were usually used with casual sexual partners and not with a regular partner. The failure to use condoms with a regular sexual partner was a significant behavioural norm in Namibia. It was also evidenced by reports that learners in regular sexual relationships would be angry if they were refused sex because they did not want to use a condom. Anger at the suggestion to use a condom was especially rife in the Omusati region.

Generally, the norm to use condoms was dependent upon the dictates of the partner that wielded more power. Anger against partners that demanded the use of condoms during coitus may explain the high prevalence of violence against girls in regular sexual relationships in Namibia. Namibian females were in a difficult position in so far as the use of condoms was concerned. This assertion was supported by Indongo (2008) who documented how Namibian women were stigmatized for the possession and use of condoms. Indongo (2008) found that persons that used condoms were regarded as promiscuous and of loose morals. Failure to use condoms in regular sexual relationships, not to mention the anger and violence that accompanied suggestions of condom use, were important contextual norms that may have influenced learners in this study not to use condoms. Non-use of condoms was also promoted by some Namibian churches. Rigillo (2009) observed that some churches in Namibia were in the fore-front of promoting doubts about the efficacy of condoms.

The current study further elucidated several contextual norms that were potential barriers to condom use among Namibian learners. The most cited contextual norm that undermined the use of condoms was that "condoms are not 100% safe". According to the construct of self-efficacy in the TPB (Ajzen & Manstead, 2007), learners were likely to negate the use of condoms if they believed that condoms were not 100% safe. The highest percentage frequency of learners that reported that condoms were not completely safe was from the Caprivi region, and this may partly explain why Caprivi region recorded the lowest levels of condom use in this study.

Evidence from this study also showed that learners were less likely to use condoms because they trusted their partner, and because their partner looked healthy. All educational regions except Omusati had significantly high proportions of learners that reported there was no need to use condoms if they trusted their partner, and if their partner looked healthy. It was apparent that the two contextual norms, lack of condom use because one trusted their partner and non-use of condoms because a partner appeared healthy, were common in this study. While such norms revealed the obvious gaps in knowledge, they were also a fertile ground for the spread of HIV/AIDS more especially because 'trust' and 'healthy' were nebulous entities which were not easily defined and guaranteed.

The results also showed regional and ethnic variations in the reported contextual norms which may have hindered condom use among learners in this study. Consequently, HIV/AIDS curricula and behavioural interventions aimed at increasing condom use among learners ought to have dispelled such widely held contextual norms within such regions or ethnic groupings. The regional and ethnic differences provided unequivocal evidence that Namibia's secondary school HIV/AIDS education should take into consideration the unique regional and ethnic gaps in knowledge, norms, and practices related to HIV/AIDS behaviour. UNESCO (2008a) also recommended that HIV/AIDS curricula were to be adapted for each local context because sexuality was culturally-specific. Since communities differed culturally within and across countries, it was important that HIV/AIDS education was fitted within broader cultural factors such as religious practices, gender issues, sexual norms, traditions, and beliefs (UNESCO, 2008a).

For example, in the Ohangwena region, the curriculum for HIV/AIDS education should have aimed at dispelling the following contextual norms, namely: there was no need to use condoms if a partner looked healthy, no need to use condoms if one trusted their partner, it was difficult to use condoms because of their smell, it was difficult to use condoms when a person was drunk, it was shameful to buy and carry condoms, and condoms subtracted from sexual pleasure. In the Caprivi region, HIV/AIDS education should have focussed on dismissing the following norms: condoms were not 100% safe, one got tired of using condoms for a long time, and there was no need to use condoms if the girl was using family planning pills. Moreover, HIV/AIDS education in the Kavango region should have dissipated the myth that condoms spread sexually transmitted diseases, and in the Oshikoto region, a policy shift to make condoms available in schools would have sufficed.

The curriculum for HIV/AIDS education and behavioural interventions aimed at encouraging condom use among learners should have also taken cognizance of their different ethnic groups. In that vein, among Herero learners, the curriculum for

HIV/AIDS education should have disputed the norm that it was difficult to use condoms when the weather was too hot. Among Damara-Nama and Lozi learners, interventions should have tackled the contextual norm of 'condom fatigue', which seemed to have stemmed from having multiple sexual partners. Finally, for the Kavango and Lozi learners, the HIV/AIDS curriculum should have countered the erroneous notion that condoms spread sexually transmitted diseases.

Knowledge of the contextual barriers to condom use is important in targeting behavioural interventions aimed at increasing condom use and reducing the risk to HIV/AIDS infection, in addition to strengthening the curriculum and educational/HIV policies. Based on the results of this study, condom use among rural teachers would have been improved by the use of messages that dispelled the erroneous notions that condoms smell and that there was no need to use condoms if a girl was using family planning pills. The latter point would have especially targeted female teachers. Unlike their urban counterparts, rural teachers should have also been more motivated to buy and carry condoms. Furthermore, this study found that the use of condoms among married teachers would have most likely met resistance from two behavioural barriers, namely, there was no need to use condoms if one trusted their partner, and condoms reduced sexual satisfaction.

5.4.7 Skills and practices of accessing condoms

The knowledge of where to find condoms and the ability to access condoms, either by buying them or getting them freely, was an important prerequisite to the intention to use condoms. In this study, most learners knew where or how to find condoms. In previous studies, learners obtained condoms from Shebeens and Cuca-shops (Global School Health Survey, 2004). Since beer-drinking was positively associated with sexual intercourse, condoms should have been distributed at places where beer was sold. Mufune et al. (2004) found that male adolescents and youths obtained condoms from hospitals, shops, and pharmacies.

The current study found that more females than males did not know how or where they would get condoms. Yet, due to cultural and gender limitations, females were unable to send someone else to buy or get condoms for them. The same cultural-gender stigma prevented girls from buying condoms at the stores, street vendors, Cuca-shops or Shebeens. Grade 9 learners also did not know how or where they would get condoms. This was probably because such Grade 9 learners were sexually inactive. Urban learners knew of other ways through which they could have accessed condoms. Urban areas offered more avenues through which to obtain condoms, including vending machines.

5.4.8 Local nomenclature and symptoms of HIV/AIDS

Selikow (2004) asserted that although there was much interest about the unique socio-cultural contexts in which HIV infection occurred, there was scanty evidence about the role of language in HIV/AIDS prevention. The same author found that South African youths had a specialist township language that was used to refer to sexuality. Within that prism, language used to describe HIV was reinvented so that healthier sexualities were encouraged. In line with Selikow's (2004) assertions, it was observed that the silence and taboos associated with AIDS in Namibia were often found in the language used to describe HIV infection and its related symptoms. In Oshiwambo, the language of the largest ethnic group in Namibia, AIDS was equated to a developmental disease (Rompel, 2001). Such caricatures of HIV/AIDS also found themselves in the local media and public discourse.

The results also showed that HIV/AIDS symptoms were perceived through typical and novel descriptions. It was reasoned that contemporary knowledge of the language and social constructions of HIV/AIDS may have helped learners and teachers to form localised meanings of the epidemic. The language used to describe persons living with HIV and the symptoms that people associated with AIDS were part of the informal curriculum through which AIDS was understood. In certain cases, local terminologies that were associated with HIV/AIDS were meant to protect individuals by way of instilling fear. Sometimes local descriptions of HIV/AIDS were meant to convey subtle messages, for example, when referring to a person perceived to have been infected with the virus. The use of certain metaphors very often reflected the learners' or teachers' worldviews of HIV/AIDS. Equally, local caricatures of HIV/AIDS often caused stigma and embarrassment to those that were infected or affected by the condition.

5.5 Constraints of incorporating HIV/AIDS into the science curriculum

5.5.1 Lack of examinations in HIV/AIDS education

This study revealed that the most notable constraint that faced the integration of HIV/AIDS education into Life Science and Biology subjects was the fact that teachers did not test or examine learners on HIV/AIDS. This was a universal problem of most HIV/AIDS curricula worldwide. UNESCO (2008b) also bemoaned that specific or relevant monitoring or evaluation strategies were seldom employed to assess learning outcomes or behaviour changes. Since HIV/AIDS content was not examined, most teachers and learners did not pay much attention to the teaching and learning of HIV/AIDS. The strong focus on examinations for the other school subjects reduced the priority to HIV and AIDS education (UNESCO, 2008b). Mufune (2008, p.147) also lamented that "in Namibia, SRH [Sexual and Reproductive Health] is not graded; consequently, teachers and students alike do not take it seriously". "There is need for students to be graded for sex education for them to value it more", he concluded (2008, p.156).

5.5.2 Lack of teaching resources

The second most frequently cited constraint was that teachers lacked appropriate resources to teach HIV/AIDS. Lack of teaching resources meant that teachers' delivery of HIV/AIDS education was below par. In fact, the scarcity of teaching resources may have contributed to the knowledge gaps and risky sexual behaviours among the learners. Mufune (2008) also found that teaching materials were scarce. "There are no teaching materials at schools…Teachers collect contraceptives from hospitals to demonstrate to students. *My Future is My* Choice distributes some pamphlets but they are inadequate" (Mufune, 2008, p.152). Where some teaching resources were available, they were not culturally-sensitive as demonstrated in the following quotation. “Some materials are not sensitive to our culture [Ovambo]. They [learners] get shocked by some materials and won’t listen thereafter” (Mufune, 2008, p.152).

5.5.3 Facts only but no life skills

The third most reported constraint was that Life Science and Biology teachers emphasized facts but not life-skills or behaviour change. This finding was also supported by a UNESCO (2008b, p.28) study on Namibia which documented that “only the most basic facts about HIV and AIDS material were taught in the curriculum, but that issues like means of infection were not discussed, effectively promoting the spread of HIV”. HIV/AIDS curricula that excluded detailed discussions on the sexual transmission of HIV/AIDS failed to reduce learners’ vulnerability (UNESCO, 2008b). The lack of emphasis on HIV/AIDS life-skills and behaviour change meant that HIV/AIDS education did not address learners’ risky sexual behaviours. Consequently, this may have contributed to some of the risky sexual behaviours found this in study. UNESCO (2008b) recommended that HIV/AIDS education needed to provide well-sequenced learning that reflected the emotional, physical and cognitive developmental stages of childhood and adolescence.

5.5.4 Few and over-worked teachers

The results showed that half of learner respondents thought that their Life Science and Biology teachers were few and already over-worked. Learners may have perceived that Life Science and Biology teachers were few and over-worked probably because of teachers' overt reluctance to teach HIV/AIDS content. Nonetheless, this finding implied that the teaching of HIV/AIDS content could have been considered as an extra burden that should have been assigned to another teacher. That was most likely the case because "teachers in Namibia enter the profession to teach subjects other than SRH [Sexual and Reproductive Health]" (Mufune, 2008, p.147). In fact, this may have been the reason why, despite the integration of HIV/AIDS into Life Science and Biology subjects, "HIV-related programmes were reported to be voluntary and extra-curricular, and respondents claimed these were seldom taken seriously" (UNESCO, 2008b, p.28).

5.5.5 HIV/AIDS curriculum

The shortcomings of Namibia's integration of HIV/AIDS into Life Science and Biology subjects were also evident from the finding that learners recognised that their Life Science or Biology teachers did not talk about sensitive topics such as sexuality, gender and socio-cultural contexts of HIV/AIDS. This scenario may have arisen because issues of sexuality, gender and socio-cultural contexts were not clearly delineated in the syllabi for Life Science and Biology subjects.

In fact, the Grade 11-12 Biology syllabus did not allocate much space to HIV/AIDS content. This omission was clearly evident in the Namibia Senior Secondary Certificate (NSSC) Biology Higher level syllabus for Grades 11-12 where HIV/AIDS was part of "sexually transmissible diseases", a sub-topic of "human reproductive system", under the topic "reproduction" (NIED, 2005). The syllabus did not have specific objectives on sexuality, gender and socio-cultural contexts of HIV/AIDS. Neither did it have content related to HIV/AIDS and antiretroviral treatment, nutrition, and circumcision.

The fact that HIV/AIDS content was covered only as part of a sub-topic highlighted the "failures to develop appropriate curricula to provide knowledge and understanding of HIV and AIDS…[because]…in school, the subject is treated flippantly", according to a UNESCO (2008b, p.5) report on Namibia. There "seemed to be some reluctance to fully integrating HIV and AIDS into the curriculum", lamented the same report on Namibia (UNESCO, 2008b, p.28).

The failure by teachers to speak about sensitive topics was also reported by Mufune (2008). "The teachers, I don't know if they are shy, but they have this habit of not telling learners the whole truth. May be they think the learners are too young. Female teachers are even shyer" (Mufune, 2008, p.153). The same author found that the curriculum was inadequate in dealing with love and emotions, initiation ceremonies, sex between married couples, abortion, rape, transactional and recreational sex, behavioural change, and teenage pregnancy. Mufune (2008) also documented that in some Namibian schools, female learners were sent out of the classroom when the teacher was teaching about male reproductive organs, and likewise, male learners were sent out when it was time to learn about female reproductive organs.

The above revelations underscored the curricula rigidities and contextual sensitivities often encountered in the delivery of HIV/AIDS education in Namibian secondary schools. To remedy the situation, Gordon (2007) argued that a good curriculum should cover: facts and information, relationship and interpersonal skills, values, perceptions of peer norms, attitudes and intentions. The same author wrote that while some programmes continue to focus on human biology, reproduction, hygiene and marriage, others have expanded to include information on physical and emotional development and STIs and HIV and AIDS. More broad-based curricula also cover contraception, abortion and sexual abuse.

5.5.6 Lack of teacher training

According to the results, learners reported that their Life Science and Biology teachers lacked adequate training, and HIV/AIDS education was not covered comprehensively, respectively. The fact that almost half of the learners in this study were aware that Life Science and Biology teachers lacked sufficient training to thoroughly teach HIV/AIDS was a clear indication of the poor state of HIV/AIDS education in these schools. Yet, this indictment from the learners was not misplaced because most of Namibia's Life Science and Biology teachers were not trained to teach HIV/AIDS education.

Training of teachers for HIV/AIDS education relied on short courses and 2-3 day workshops (Mufune, 2008). However, the training workshops were irregular, and hence some teachers were ill-equipped (Mufune, 2008). Campbell and Lubben (2003) also reported that teachers for HIV/AIDS education were trained through in-service training (INSET). Such INSET courses were insufficient because they catered for few teachers and only covered content related to basic knowledge of HIV/AIDS (Campbell & Lubben, 2003). In essence, many teachers were not quite knowledgeable, as implied by this quotation: "in some schools, when it is time for the class, the teachers hide because they don't know what to tell the learners" (Mufune, 2008, p.152). Lawoyin and Kanthula (2009) also stated that there was need for teachers to be adequately trained in providing HIV/AIDS education to young people in their schools and more especially to promote HIV prevention within their socio-cultural context.

5.5.7 HIV/AIDS education not age-appropriate

A significantly higher proportion of Grade 9 learners stated that HIV/AIDS education was not appropriate for their age. This finding revealed that Grade 9 learners did not receive the HIV/AIDS education they envisaged would help them to deal with their sexual and reproductive health issues. This was probably because Life Science teachers did not want to go into certain details (sex and condoms) because Grade 9 learners were still too young. Many teachers faced difficulties in teaching sexual and reproductive health, including HIV/AIDS, to young learners. Such difficulties arose because teachers did not want to be explicit about sexual and reproductive health issues, and HIV/AIDS. Teachers' suppression of certain details (e.g. sexual matters) on the pretext that learners were still young may have led some curious learners to obtain incorrect information from friends. In this light, lack of age-appropriate HIV/AIDS education for Grade 9 learners may have increased their risks to HIV/AIDS.

The results clearly showed that the integration of HIV/AIDS education into the syllabi for Life Science and Biology subjects was fraught with many challenging constraints. These constraints were especially critical in the urban Kavango and Khomas regions, where they mostly weighed down on male and Grade 11 learners. In the Kavango and Khomas regions (as well as for the Grade 11 male learners), the above constraints may have contributed to the learners' risky sexual behaviours and low levels of knowledge, norms, attitudes, skills, and practices to HIV/AIDS.

The most important constraint reported by the teachers in this study was that there was no pre- and in-service training of teachers in HIV/AIDS education. The fact that this constraint affected eight out of ten teachers showed the dire need to re-train the current set of teachers in matters of HIV/AIDS education. In an earlier study, Campbell and Lubben (2003) found that only 60.0% of the schools had teachers trained in HIV/AIDS education. The second most important constraint in the integration of HIV/AIDS education to Life Science and Biology was that HIV/AIDS education was not covered comprehensively. Again, this was most likely a reflection of the fact that teachers were not well trained to teach HIV/AIDS education.

In terms of scarcity of resources for HIV/AIDS education, this challenge was more critical for urban and male teachers than their rural and female counterparts, respectively. This result indicated that rural and female teachers were probably more resourceful than urban and male teachers. Obviously, this entailed that the delivery of HIV/AIDS education was much poorer when placed under the charge of urban and male teachers. Although most teachers would have required in-service training, the case for urban and male teachers should have been prioritised.

Upon a deeper reflection, the researcher argued that the constraints faced by science teachers in delivering HIV/AIDS education were a typical example of the wider neglect and despair faced by teachers in most of Southern Africa. This argument was also evident from Coombe's (2002) observations that many teachers perceive that the system does not care about them. The author wrote that teachers' morale was low, not only because they were poorly paid, but because too often the system was unresponsive to their needs and concerns. Coombe observed that teachers worked in dire conditions, with little or no professional support. Enthused by the above excerpt, and given the constraints cited by learners and teachers in this study, it was reasoned that the constrained delivery of secondary school HIV/AIDS education may have contributed to the knowledge gaps and risky behaviours among the learners.

Given the enormity of the above constraints, this study contended that it was perhaps dismal (in the current format) to continue using Life Science and Biology subjects as a vector for HIV/AIDS education in Namibian secondary schools. This contention was also backed by the findings of UNESCO (2008b), Mufune (2008), and Campbell and Lubben (2003). To sum up, this study concurred with observations by the WHO that the constraints that affected school curricula-driven HIV/AIDS education in developing countries such as Namibia were at several levels.

The WHO (2006) observed that the choice and implementation of HIV/AIDS interventions in schools in developing countries is constrained by the availability of teachers and curricular materials as well as teacher training; access to other financial, material and technical resources; and the culture and norms of both the local communities and the schools themselves. Inadequate levels of training and the prevalence of didactic teaching methods meant that teachers were sometimes unable to use participatory and student-centred techniques that were effective for building skills. The WHO observations may have encapsulated the constraints and frustrations of both Life Science and Biology learners and teachers dealing with HIV/AIDS education in Namibian secondary schools. Therefore, unless the constraints highlighted in this study are adequately addressed, the integration of HIV/AIDS education into secondary school Life Science and Biology subjects needs a sober and careful rethink.

5.6 Organizational and professional dimensions of HIV/AIDS education

5.6.1 Modes of delivery for HIV/AIDS education

According to Griessel-Roux, Ebersohn, Smit, and Eloff (2005), understanding learners' preferences was important in formulating appropriate curricula for HIV/AIDS education in schools. Thus, learners in this study were requested to state how HIV/AIDS education should have been taught in secondary schools. The most preferred mode of teaching and learning HIV/AIDS education was that HIV/AIDS should have been taught as a separate subject by a specially-trained teacher. Learners from all the six regions were unanimous that HIV/AIDS education should be taught as a separate subject by a specially trained teacher. This finding signalled a paradigm shift in the teaching and learning of HIV/AIDS education in Namibian secondary schools.

According to the learners, HIV/AIDS education should have been a professional subject in its own right. In other words, the majority of the learners did not want HIV/AIDS education to be integrated into Life Science, Biology or any other subject. This result was also supported by UNESCO (2004, p.143) that: "first this subject area [HIV/AIDS education] must be properly professionalised, with the development of a corps of educators and teacher educators who are specialised professionals in this field". UNESCO (2004) was also unequivocal that HIV/AIDS education was neither an add-on nor an optional subject. Ghukasyan (2003, p.3), with reference to Armenia, maintained that "in general, Biology is not the best carrier subject, since it puts too much emphasis on biomedical aspects of HIV/AIDS/STD sacrificing preventive and behavioural aspects".

Schaeffer (1994) also bemoaned that integration of HIV/AIDS education into Biology was an exercise in futility because Biology teachers usually lectured pupils on the “science” of HIV instead of emphasising the broader societal issues around HIV/AIDS. Wrote Schaeffer (1994, p.11): “In a world fraught with AIDS and with an enhanced risk of HIV infection, the education system can no longer deliver a strictly health-based message about AIDS in traditional ways- the secondary school Biology teacher lecturing on the "science" of HIV”.

Although learners in this study desired that HIV/AIDS education should have been taught as a separate subject by a specially trained teacher, some education experts have dismissed stand-alone or disciplinary learning, and argued for integrative learning. In the United States of America, Chamany, Allen, and Tanner (2008) emphasised that science education reforms promoted the integration of social issues into the Biology curriculum. The “emphasis from disciplinary to integrative learning stems from research in cognitive science that demonstrates how students’ previous knowledge can influence how they recognize and link new information, constructing *schemas* that are deeply rooted in personal and cultural experiences” (Chamany et al., 2008, p.267). This pedagogical approach improved student learning because each concept had multiple points of entry, and therefore, multiple points of interest that served as avenues for retrieval of information (Chamany et al., 2008). The integrative approach also enabled students to grapple with the interdisciplinary nature of twenty-first century problems, hence integrative learning was listed as one of the four essential learning outcomes in the *Learning for the New Global Century* report (Chamany et al., 2008). Schaeffer (1994) also supported the idea of integrating HIV/AIDS education in several disciplines, and not just Biology. Notwithstanding the weight of evidence in support of integrative learning, the finding that learners in this study wanted HIV/AIDS education to be taught as separate subject by a specially trained teacher forms a major point of departure for future secondary school HIV/AIDS education in Namibia and beyond.

In this study, almost all the teachers reported that they felt confident to teach HIV/AIDS education. This was paradoxical considering that many of them cited their lack of training as a major constraint to the delivery of HIV/AIDS education. The high levels of confidence among teachers in this study were also contradictory with research results from Tanzania which showed that teachers that had received HIV/AIDS training and support felt more confident to teach HIV prevention to learners (Kaponda et al., 2002).

The majority of Life Science and Biology teachers in this study also preferred HIV/AIDS education to be a stand-alone subject taught by a specially-trained teacher. The idea that HIV/AIDS education should be taught as a separate subject by a specially-trained teacher was also buttressed by Bennell, Hyde, and Swainson (2002, p.143-144) when they stated that HIV/AIDS was "not something that can be picked up in spare moments of a Biology lesson. It is a crucial stand-alone area that necessitates separate timetabling, the support of appropriate materials, and the provision of all backup guidance, training, teacher support structures, monitoring and evaluation that other subjects received".

5.6.2 School characteristics in relation to HIV/AIDS education and prevention

5.6.2.1 Teaching materials

As was discussed in the previous section on constraints that affected the delivery of HIV/AIDS education, most schools in this study lacked teaching materials for HIV/AIDS. The scarcity of teaching resources for HIV/AIDS education was most severe in Kavango, Caprivi, Ohangwena, Khomas, and Omusati regions. The

Ministry of Education could have ameliorated the situation by supplying schools with teaching-learning materials and conducting training for materials development. Failure to provide schools with teaching-learning resources for HIV/AIDS education corroborated previous observations that in Namibia, "education on HIV is not taken seriously" (UNESCO, 2008b, p.27).

5.6.2.2 AIDS awareness clubs

According to Stephenson, Oakley, Charleston, Brodala, Fenton, Petruchekevitch, and Johnson (1998), the establishment of school AIDS awareness clubs, run by concerned students and sympathetic teachers, have resulted in improved knowledge and attitudes on HIV/AIDS. AIDS awareness clubs helped to lower risky sexual behaviours by promoting condom use and reducing the number of sexual partners. Despite the importance of HIV/AIDS awareness clubs in moderating sexual behaviours, no more than half of the learners belonged to an HIV/AIDS awareness club in this study. This was probably because many schools did not have such HIV/AIDS awareness clubs. The Ministry of Education could have provided incentives for the formation (or punishment for non-formation) of HIV/AIDS awareness clubs in schools. Further, school authorities could have ensured that more learners belonged to such HIV/AIDS awareness clubs.

The number of learners that belonged to HIV/AIDS awareness clubs was dependent upon the location of the school. For instance, northern regions had significantly higher proportions of learners that belonged to HIV/AIDS awareness clubs. These results demonstrated that educational authorities in Omusati, Ohangwena, and Oshikoto regions provided better school health-promoting environments than those in Caprivi, Khomas, and Kavango regions. The significantly high levels of risky sexual behaviours and knowledge gaps among learners from the Caprivi, Khomas, and Kavango regions was most likely linked to the fact that most learners in these three regions did not belong to HIV/AIDS awareness clubs. The poor health-promoting environment in the Kavango region was also documented by Campbell and Lubben (2003). It was observed that the size of the school was directly related to the level of its health-promoting environment. Small schools had better health-promoting environments than bigger schools (Campbell & Lubben, 2003).

5.6.2.3 Condoms

This study found that significantly more schools in the Ohangwena, Caprivi, and Oshikoto regions distributed condoms to learners than schools in the Kavango, Khomas and Omusati regions. There was also overwhelming evidence that most learners wanted condoms to be distributed at their schools. However, school authorities in the Khomas and Omusati regions did not openly allow the distribution of condoms at schools. These differences stemmed from the observation that there was no clear-cut national educational policy that spoke to the distribution of condoms in schools.

The distribution of condoms in schools was a contentious issue in Namibia and Southern Africa (Campbell & Lubben, 2003). Despite evidence that Namibian learners were sexually active at a very young age, some churches (Rigillo, 2009), donors such as PEPFAR (Kamwi et al., 2006), parents and teachers (Campbell & Lubben, 2003) were against the distribution of condoms in schools, apparently because learners should be encouraged to abstain from sex. In Namibia, the debate about condom distribution in schools was underlined by moral and ideological undertones, largely uninformed by empirical considerations. This was in spite of the fact that condoms were effective in preventing unintended pregnancies and sexually transmitted diseases, including HIV/AIDS.

Teachers from the Caprivi, Kavango, and Oshikoto regions were more enthusiastic about the distribution of condoms at schools than teachers from the Khomas and Omusati regions. Yet, most teachers in Khomas region reported that condoms were not available at their schools. The reasons why teachers from the Khomas and Omusati regions were less inclined to support condom distribution at their schools were not clear. However, the lack of a clear national policy on condom distribution in schools may have contributed to this situation.

Stryker, Samuels, and Smith (1994) delved into the socially-divisive debate of whether condoms should be distributed in schools. Many health, educational, and civil authorities have wondered whether schools should be in the business of handing out condoms. Stryker et al. (1994) argued that teenagers that failed to use condoms blamed practical factors such as confidentiality, cost, and availability of transportation to places where condoms can be purchased. Thus, condoms were made available through specially designated resource rooms, health education classes, or school nurses. School systems with health clinics also made condoms available as part of a wider array of health services related to contraception. Yet the widespread availability of condoms, including their distribution in schools, often prompted criticism that school-based efforts to promote condom availability increases sexual activity of the learners. The extent of parental involvement was the most significant bone of contention in school condom availability debates (Stryker et al., 1994).

In South Africa, Han and Bennish (2009) asserted that the new Children's Act which came into effect in 2007 gave to children 12 years and older a host of rights relating to reproductive health, including access to contraceptives and to information on sexuality and reproduction, and the right of consent to HIV/AIDS testing and treatment. As a result, most South African schools hesitated to distribute condoms, and those few that distributed condoms did so discreetly. The authors stated that the Children's Act preserved the schools' right to choose to distribute condoms. The above scenario shed some light on the policy challenges that the free distribution of condoms may face in Namibian secondary schools.

5.6.2.4 Location of Voluntary Counselling and Testing services

Schools in northern Namibia (Oshikoto, Omusati, and Ohangwena regions) were located nearer to Voluntary Counselling and Testing (VCT) centres than schools in the Khomas, Kavango and Caprivi regions. In particular, there was a direct relationship between the location of a VCT centre to the school and the number of learners that had tested for HIV. Oshikoto, Omusati, and Ohangwena regions had significantly high proportions of learners that were tested for HIV. In Caprivi, Khomas, and Kavango, the three regions where VCT centres were located far away from the schools, significantly low proportions of learners had tested for HIV.

The findings of this study were similar to those of a Tanzanian study which found that secondary school students failed to attend VCT services because their school was located far away from the VCT centre (Sukari, 2008). Apart from the location of the VCT centre, other factors also hindered VCT among young people. In Malawi, many adolescents had not tested for HIV because VCT centres lacked space and confidentiality, and because HIV testing was done at awkward times (Daire, 2007). In Ethiopia, low levels of VCT among High School students were associated with low perceptions of susceptibility to HIV/AIDS (Abebe & Mitikie, 2009).

Access to youth-friendly health services was important in preventing the spread of HIV/AIDS among young people (WHO, 2006). However, few Namibian learners had gone for VCT despite the various media campaigns. During the National Testing Day in 2008, for example, only 2,432 teenagers aged 15-19 years in the whole country were tested for the first time (GRN, 2008d). Access to VCT was cardinal in the successful implementation of antiretroviral therapy and behavioural interventions to avoid HIV infection. This study clearly showed that the uptake of HIV testing by learners can be increased if VCT centres were located near the schools.

5.6.2.5 School–community linkages

In this study, the level of school-community interaction was higher in the Oshikoto and Ohangwena regions than in the Khomas and Kavango regions. The level of school-community interaction was moderate in the Omusati and Caprivi regions. Overall, the involvement of local communities by urban schools was low. HIV/AIDS education and prevention were not the sole responsibility of schools. Effective school HIV/AIDS education and prevention required the synergy of many role players, including the community and non-Governmental Organizations. In this regard, the low levels of interaction between schools and communities in the Khomas and Kavango regions may have undermined HIV/AIDS education and prevention in these regions.

According to Campbell and Lubben (2003), the link between a school and the community (e.g. learners' parents and family members, or non-Governmental Orgaizations) was an important part of the health-promoting environment. Thus, learners together with teachers, parents, and non-Governmental Organizations were supposed to be involved in any HIV/AIDS education programme. Regular meetings with the community can help to gauge sexual behaviours and perceptions about HIV. Such knowledge could be used to shape the school's HIV/AIDS curriculum and materials.

Specifically, gatekeepers in the community could have helped to make HIV/AIDS education culturally-sensitive and acceptable. Community engagement could have also created 'buy-in' for divisive issues such as the distribution of condoms at schools. The WHO warned that "community backlash may occur if the content of an intervention is considered inappropriate for young people" (WHO, 2006, p.249). Kelly (2000) also documented community backlash when teachers were accused of being the source of HIV infection in a rural area in Zambia. Altogether, the low level of community engagement in the Kavango and Khomas regions meant that any school HIV/AIDS education programmes in these regions were most likely not viable because they lacked the participation and ownership of key stakeholders.

5.6.2.6 Extra-curricular activities for HIV/AIDS education

Extra-curricular activities were an important tool for HIV/AIDS education in schools (Campbell & Lubben, 2003). Extra-curricular interactive drama performances by peers were shown to be effective in reducing stigma against people living with HIV/AIDS (Harvey, Stuart, & Swan, 2000). Fawole, Asuzu, Oduntan, and Brieger (1999) illustrated that a series of weekly after-school extra-curricular sessions with volunteer teachers and public health officials that used films, role-plays, debates, and story-telling improved learners' knowledge of and attitudes to HIV/AIDS. The intervention also changed learners' sexual behaviours.

Extra-curricular activities and the involvement of other stakeholders help to improve school HIV/AIDS education and prevention. In this study, most schools offered *My Future is My Choice*. Other extra-curricular activities that were offered, in decreasing order of frequency, were AIDS awareness clubs, drama, debates, films, story-telling, films, talks from parents, talks from social workers, talks from health officials, Voluntary Counselling and Testing, visits from the church, and Lironga Eparu (a non-Governmental Organization for people living with HIV/AIDS). Campbell and Lubben (2003) also found that schools had visits from several agents such as

Teenagers Against Drugs and Alcohol (TADA), health workers, and HIV-infected persons. They also had debates, competitions and fairs, community visits, school counselling sessions, peer leader training, puppet shows, drama, and videos on HIV/AIDS.

According to the teachers' results, schools in the Khomas and Kavango regions offered less after-school activities for HIV/AIDS education. A similar trend was also reported by the learners in this study. Lack of after-school activities for HIV/AIDS may have contributed to the risky sexual behaviours and knowledge gaps among learners and teachers in the Kavango and Khomas regions. In the light of such evidence, it was argued that schools located in urban areas cared less about HIV/AIDS prevention for their learners. This claim was supported by the findings that significantly more rural than urban schools provided out-of-school activities for HIV/AIDS education; considerably more rural than urban schools provided condoms or wanted condoms to be available at their premises; and comparatively more rural than urban schools held HIV/AIDS meetings with their communities.

Ghukasyan (2003) stated that extra-curricular school-based AIDS education programmes helped students and teachers to think about HIV/AIDS in their own communities, contributed to changes in their attitudes and behaviours, and increased their preventive skills. However, there were a number of limitations pertinent to extracurricular activities as compared to AIDS education that was part of the national curriculum. Ghukasyan (2003) observed that extra-curricular AIDS education programmes were poorly implemented and had little overall effect on the knowledge of students. In particular, extra-curricular classes were irregular and generally unscheduled, and teachers were reluctant to tackle controversial and unfamiliar topics for fear of antagonizing parents (Ghukasyan, 2003).

5.6.3 Sources of HIV/AIDS information

Among learners, the main sources of information on HIV/AIDS, in decreasing order of scale, were: *My Future is My Choice*, television, radio, doctors/health staff, posters, newspapers, science teachers, booklets, parents/guardians, friends, AIDS awareness clubs, church, relatives, non-science subject teachers, and non-Governmental Organizations. These results are important because school authorities and parents need to carefully weigh the authenticity of HIV/AIDS information from certain sources. This is necessary because the accuracy of HIV/AIDS information from sources such as friends, newspapers, radio, and television, was not always guaranteed.

Although learners received HIV/AIDS information from friends, some of the information may have been incorrect. For instance, Mufune (2008, p.151-152) documented that "one boy explained that a friend advised him not to use condoms as jogging and exercise could enable him to sweat out diseases". Certain Namibian churches were also reported to be against the use of condoms (Mufune, 2008; Rigillo, 2009). The circulation of incorrect myths and misconceptions among learners suggested the need for credible sources of information especially from peer-educators, teachers, parents, and medical doctors. In Namibia, the information learners received was also inadequate as exemplified by observations that 14-19 year old focus group participants in the Oshana region did not know the difference between gonorrhoea and syphilis (Mufune, 2008). Teachers did not also educate learners on moral issues and life skills, especially how female learners could refuse sexual advances from male teachers (Mufune, 2008).

Very few learners received HIV/AIDS information from their parents or guardians. This revelation was typical of parents and guardians that were, for whatever reasons, detached and aloof to the HIV/AIDS education of the children placed under their charge. Although access to television and radio can improve HIV/AIDS education and prevention, some of the content carried by these media may induce HIV/AIDS risky behaviours in children. Kempadoo and Dunn (2001) warned that while the media educated learners about sexual health, safe sex and inter-personal relationships, they also incited adolescents into sexual activity through erotic visual images, music, soap operas and pornographic (blue) movies.

In fact, it was argued that the non-involvement of parents in their children's HIV/AIDS education may have been associated with the risky sexual behaviours among learners in this study. This argument was founded in the knowledge that family communication resulted in increased use of condoms among Ghanaian secondary school students (Adu-Mireku, 2003). The role of parents in HIV/AIDS education in Namibia was also stressed by Lawoyin and Kanthula (2010).

This study also noted significant regional, rural-urban, Grade, and ethnic differences in the sources of HIV/AIDS information used by the learners. These findings can be useful in improving the supply of HIV/AIDS information by sources that were redundant in those locations, Grades, and learners' ethnic groupings. For example, interventions to increase parental involvement in HIV/AIDS education would have been more critical for learners in the Omusati, Kavango, and Oshikoto regions. Similarly, *My Future is My Choice* would have been especially targeted for learners in the Kavango and Khomas regions. HIV/AIDS education via AIDS awareness clubs, posters, Non-Governmental Organizations, and *My Future is My Choice* should have been more targeted at urban than rural learners. Grade 9 learners could also be targeted using radio, posters, television, churches, Non-Governmental Organizations, relatives, and trained peer educators. Further, learners that were from the Herero ethnic group could have been warned to be more judicious when receiving information from friends. Alternatively, trained peer educators should have targeted learners from the Herero ethnic group.

5.6.4 Teachers that talked to learners about HIV/AIDS

In Namibia, Campbell and Lubben (2003) reported that 28.0% of the schools in their study had no teacher assigned to HIV/AIDS education. These authors also reported that in most schools, there was only a single teacher responsible for HIV/AIDS education. The results of this study were indicative that in most schools, only Life Science and Biology teachers, and to a lesser extent Guidance and Counselling teachers, were responsible for HIV/AIDS education. This scenario reflected syllabus requirements whereby HIV/AIDS education was included in Life Science at junior secondary school level and Biology at senior secondary level (Campbell & Lubben, 2003). The finding that other subject teachers in this study occasionally talked to learners about HIV/AIDS was due to the fact that HIV/AIDS was included as a topic in Geography, English, and Mathematics (Campbell & Lubben, 2003). Equally, some sympathetic teachers may have talked about HIV/AIDS as a moral duty.

There were significant regional and rural-urban differences in the proportions of learners that reported the participation of various subject teachers in HIV/AIDS education. Again, such knowledge was useful in pin-pointing the location and subject teachers that ought to scale-up their contribution to HIV/AIDS education. For instance, Biology teachers in the Omusati and Khomas regions should have been encouraged to offer more HIV/AIDS education. Likewise, Life Science teachers in the Oshikoto, Omusati, and Ohangwena regions could have been advised that their involvement in HIV/AIDS education was significantly less than what their colleagues in the Caprivi, Kavango, and Khomas regions were offering. Although Life Science and Biology teachers talked to learners about HIV/AIDS, some medical doctors were not impressed by some learners' knowledge of HIV/AIDS: "We talk to our adolescent patients about what they learn at school, but it is clear that very little information on HIV and AIDs comes through the education system", lamented a Namibian medical doctor (UNESCO, 2008b, p.30).

5.7 Summary

This chapter discussed the main findings of the study according to themes from the learners' and teachers' questionnaires. The discussion was done in the light of available local and international literature. It focussed on the following themes: perceptions of the impacts of HIV/AIDS on science education; risk factors to HIV/AIDS; gaps in knowledge, norms, attitudes, practices and skills to HIV/AIDS; constraints of incorporating HIV/AIDS into the Life Science and Biology curricula; and views on the organizational (school characteristics in relation to HIV/AIDS education and prevention) and professional (mode of delivery for HIV/AIDS education) dimensions of HIV/AIDS education. School characteristics included the availability of teaching materials, AIDS awareness clubs, condoms, Voluntary Counselling and Testing services, school–community linkages, and extra-curricular activities for HIV/AIDS education.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

Although previous studies alluded to the eminent threats of HIV/AIDS on Namibia's education sector in general, such studies did not specifically focus on the linkages between HIV/AIDS and secondary school science education. This study was a modest effort to understand the HIV/AIDS impacts, risk factors, and knowledge gaps among Namibian secondary school science teachers and learners. It also elucidated the constraints of integrating HIV/AIDS education into the syllabi for secondary school Life Science and Biology subjects in Namibia. In addition, the study explored the different organizational and professional features which affected the delivery of HIV/AIDS education in Namibian secondary schools. Mindful of the above objectives, this closing chapter presents the key conclusions and recommendations of the study.

6.2 Key conclusions

6.2.1 Impacts of HIV/AIDS on science education

The main putative impacts of HIV/AIDS on science teachers were absenteeism, poor performance, and stress. Overall, the impacts of HIV/AIDS on science teacher losses due to deaths and attrition were low. However, losses of science teachers were more apparent in the Omusati and Kavango regions. In the constituencies and towns, the putative impacts of HIV/AIDS on science teacher losses were more noticeable in Outapi, Rundu, Tsandi, and Ohangwena constituencies/towns. The reported impact of HIV/AIDS on the loss of science learners was also low.

Absenteeism was the major impact of HIV/AIDS on science learners. Learner absences were more prevalent in some locations and ethnic groups. Most science learners were absent from school because they were sick. Learner absenteeism in the Caprivi region was significantly attributable to illness in family, death in the family, and funeral attendance.

Overall, the findings showed that secondary school science learners were more significantly affected by psychological (stress) than physical (illness) impacts of HIV/AIDS. Putative HIV/AIDS-related stress and poor concentration in class were significant qualitative attributes that reduced the quality of science education.

6.2.2 Risk factors to HIV/AIDS

Several factors placed science learners at the risk of HIV infection. Early age of coital debut, high sexual activity, multiple sexual partners, and non-use of condoms were the main factors that placed learners at the risk of HIV infection. The earliest age of coital debut was 8 years. Sexual activity varied according to geographical location of the school and learners' ethnic groups. Determinants of sexual activity were also elucidated. Multiple sexual partners were also common among learners that were male, in the Khomas and Caprivi regions, and those from the Herero ethnic group.

Further, learners were at a high risk of HIV contagion because of low condom use. The mean number of times that learners failed to buy condoms was significantly high in the Oshikoto region. In contrast, the odds to use condoms were increased in learners that were willing to test for HIV, those that had ever tested for HIV, learners that belonged to AIDS awareness clubs and *My Future is My Choice*, learners whose parents were strict, and learners that were willing to buy or get condoms. Condom use was low among learners from the Herero ethnic group.

Intergenerational and transactional sexual relations were significant HIV/AIDS risk factors for learners in the Khomas, Caprivi, and Kavango regions. A high rate of pregnancy was found to be a prominent risk factor for learners in the Kavango region.

In all the regions, teachers' demographic features increased their risks to HIV/AIDS infection. Science teachers in the Caprivi region were perceived to be at a high risk of HIV/AIDS.

6.2.3 Gaps in knowledge, norms, attitudes, practices, and skills to HIV/AIDS

Gaps in the understanding of HIV/AIDS were identified among secondary school science learners. Few learners thought that: traditional healers cure AIDS, only immoral people like prostitutes contract HIV/AIDS, one can tell by looks that a person is HIV-positive, persons suffering from tuberculosis also have AIDS, and one can get HIV from a mosquito that fed on blood from an HIV-positive person.

Many learners did not know that male circumcision can reduce HIV infection in males, and that AIDS is associated with dementia (loss of memory). Thus, it was concluded that knowledge of HIV/AIDS basic facts was not yet universal among science learners, in addition to their low knowledge of new insights about HIV/AIDS. Knowledge gaps varied significantly according to learners' education regions, ethnic groups, and Grades.

This study ascertained that teachers lacked detailed and up-to-date knowledge of HIV/AIDS. This was evident from the fact that several teachers did not know the relationship between HIV/AIDS and discordant couples, male circumcision, and loss of memory. Teachers' knowledge of HIV/AIDS in relation to antiretroviral treatment and nutrition was also scanty. Most older, female, and married teachers believed that antiretroviral drugs were the new cure for HIV/AIDS. About one in ten teachers had misconceptions and myths about basic facts of HIV/AIDS. Teachers' attitude to HIV testing was excellent as almost all of them were willing or were already tested for HIV/AIDS.

However, teachers' knowledge of HIV/AIDS and attitudes to treatment varied according to their qualifications and subjects of specialization. Teachers with Diploma did not understand the linkage between HIV/AIDS and selenium whereas those with higher qualifications knew that selenium helped to delay the onset of AIDS. Biology teachers also had more knowledge and compliant attitude to antiretroviral therapy than Life Science teachers.

Among the learners, the attitude to test for HIV was low because only few of them had ever tested for HIV/AIDS. Notwithstanding, learners in rural areas, and learners that were female and in Grade 11, had a better attitude to HIV testing than their counterparts in urban areas, and learners that were male and in Grade 9, respectively. There were also regional and age differences in the uptake of HIV testing.

Learners had difficulties using a condom with one regular sexual partner. The failure to use condoms with a regular sexual partner was a major gap among the learners. Another gap was that many learners did not use condoms because their partners would be angry at the suggestion to use condoms. Among learners, the norm to use condoms during sexual intercourse was impeded by ethnic and contextual barriers. However, the fact that most learners knew how and where to obtain or buy condoms showed that they had the potential for correct practices and skills to enact compliant HIV/AIDS behaviour.

The two most important norms that discouraged learners from sexual intercourse were waiting for marriage, and the fear of contracting a sexually transmitted infection such as HIV/AIDS. Teachers in rural areas, and those that were female and married, were less likely to use condoms due to several contextual barriers.

Although local jargon, names, and caricatures used to describe persons perceived to be infected with HIV/AIDS helped to reinforce local meanings and severity of the HIV/AIDS epidemic, this study argued that the use of such names or caricatures may have perpetuated stigma, discrimination, and rights abuse. Interestingly, both teachers and learners possessed a wealth of indigenous knowledge about HIV/AIDS symptoms, some of which needed verification.

6.2.4 Constraints of integrating HIV/AIDS education into Life Science and Biology subjects

According to the learners, the constraints that affected the integration of HIV/AIDS education into the syllabi for Life Science and Biology subjects, in decreasing order of importance, were: lack of examinations in HIV/AIDS education; inadequate teaching resources; emphasis on facts and not on life skills behaviour; few and over-worked teachers; lack of emphasis on sensitive topics such as sexuality; inadequate teacher training; and lack of age-appropriate HIV/AIDS education.

Based on the findings from the teacher respondents, the most significant constraints of integrating HIV/AIDS education into Life Science and Biology subjects were the lack of pre- and in-service preparation of teachers, followed by the fact that HIV/AIDS content was not covered comprehensively under the current curriculum.

The constraints of integrating HIV/AIDS education into Life Science and Biology subjects differed according to education regions, with Kavango region having the most constrained scenario. The delivery of HIV/AIDS education was also more constrained via Biology and female teachers, and in urban areas.

6.2.5 Professional and organizational dimensions of HIV/AIDS educationand prevention

Scarcity of teaching materials greatly affected the professional dimension of HIV/AIDS education. The scarcity of teaching materials was acute in the Kavango, Caprivi, Ohangwena, Khomas, and Omusati regions. The professional dimension of HIV/AIDS education was also affected by its integration to Life Science and Biology subjects. In this regard, learners from all the six educational regions were unanimous that HIV/AIDS education should be de-linked from science subjects and instead be taught as a separate subject by a specially-trained teacher. This evidence was a major point of departure to the integration of HIV/AIDS education into Life Science and Biology subjects.

Despite the fact that most Life Science and Biology teachers lacked prior HIV/AIDS training, the same teachers stated that they felt confident to teach HIV/AIDS education. This finding did not only contradict the need for further training but also raised some illogical difficulties as to how teaching confidence could be attained without professional training. There were considerable regional differences in the delivery of HIV/AIDS education by Life Science and Biology teachers. Biology teachers in the Khomas and Omusati regions did not usually talk to learners about HIV/AIDS. Likewise, Life Science teachers in the Oshikoto, Omusati, and Ohangwena regions did not often talk to learners about HIV/AIDS.

There were no clear Ministry of Education guidelines for the distribution of condoms at schools. Thus, schools in the Khomas and Omusati regions did not allow distribution of condoms at their schools. Few learners in the Caprivi, Khomas, and Kavango regions belonged to AIDS awareness clubs. Schools in the Caprivi, Khomas, and Kavango regions were located far away from HIV/AIDS Voluntary Counselling and Testing centres, and the levels of school-community interactions were low in the Khomas and Kavango regions. This differentiation of the various school characteristics meant that future interventions would have to be more specific in addressing local school challenges in HIV/AIDS education and prevention.

Other organizational characteristics that had a negative effect on the delivery of HIV/AIDS education and prevention in various educational regions were: insufficient school-community interactions on matters of HIV/AIDS education and prevention; inadequate number of extra-curricular HIV/AIDS activities; and the lack of participation by other subject teachers in HIV/AIDS education.

6.3 Major contributions of the study

Secondary school science education is a crucial foundation for building a knowledge-based society and industrialized economy. The study provided a critical juncture to understand the threats of HIV/AIDS on Namibia's secondary school science education. The study made new contributions to the body of knowledge for HIV/AIDS and science education, including:

1. Impacts

The study showed that with the advent of antiretroviral therapy, the impacts of HIV/AIDS on science teachers and learners had been transformed from quantitative losses of mortality and attrition to more qualitative attributes of stress and poor performance at school.

2. Risk factors

(a) The study revealed that secondary school science education was threatened by HIV/AIDS because of the learners' early ages of coital debut. The finding that learners initiated sex at the age of 8 years was a significant contribution to our understanding of the HIV/AIDS epidemic in Namibia and beyond. Further, the evidence that Grade 9 learners had a significantly lower mean age of coital debut than Grade 11 learners provides a useful insight when designing and targeting interventions for HIV/AIDS prevention in schools.

(b) The study showed that Voluntary Counselling and Testing for HIV/AIDS increased the odds of sexual activity among learners. This finding meant that Voluntary Counselling and Testing for HIV was at the crossroads of AIDS prevention and transmission among in-school adolescents.

(c) The study revealed that learners whose parents were strict were more likely to use condoms during coitus. It remains to be seen how parental strictness could have been promoted as an intervention for increased condom use.

3. Knowledge gaps

The study elucidated that both science teachers and learners had shallow understanding of HIV/AIDS. They lacked detailed and up-to-date knowledge of HIV/AIDS. It was difficult to imagine how science teachers with so many knowledge gaps were able to deliver correct content to the learners. Yet, the poor delivery of HIV/AIDS education had much to do with the severe constraints that characterized the integration of HIV/AIDS education into Life Science and Biology subjects.

4. Implications for curriculum and educational policy reform

(a) The study clearly showed that secondary school learners wanted HIV/AIDS education to be taught as a separate subject by a specially trained teacher. This finding entailed a paradigm shift from the current integrative system where Life Science and Biology subjects were used as vectors for HIV/AIDS education.

The results of the study highlighted regional and ethnic differences for HIV/AIDS impacts, risk factors, and KNAPS. These findings are important because they provide baseline information upon which to form variegated and tailor-made interventions. In this respect, the results of the study point towards ‘the harvesting of low-hanging fruits’, thus maximising the use of resources, including time and money.

6.4 Limitations of the study results

The results of the study did not reveal the numbers of science teachers and learners that could have been lost to putative HIV/AIDS illnesses. The results also failed to capture the numbers of replacement teachers. Having said that, numbers that were presented as means only depicted the level or extent of the perceived variable in question, for example, absenteeism, pregnancy, and condom use. The limitation was that the perceived numbers did not represent absolute quantities of such variables. Perceptions may have been misleading and unfounded.

Looking back, a critical point that emerged from this study was that numbers can sometimes be inadequate in estimating the impacts of HIV/AIDS. It was clear that although many science teachers and learners coping with HIV/AIDS still attended school, the quality of their work was compromised by HIV/AIDS-related stress and poor concentration in class. These two morbidity factors would have been difficult to capture, even with the technology of Education Management Information Systems (EMIS).

One of the challenges to studying sexual behaviour is the question of the validity of the data due to recall and social desirability biases. Such biases may have posed limitations on the accuracy of the results of this study. The design of the study was cross-sectional, and although some associations between variables were logical, cross-sectional designs limit causal conclusions.

6.5 Recommendations

This study was powered towards the spirit to suggest guideposts for reforming the HIV/AIDS curriculum and educational policies. With this mind, recommendations from the study were grouped into three categories:

(a) Curriculum;

(b) Educational policy; and

(c) Future research.

The recommendations under curriculum and educational policy were meant to be the guideposts and roadmap to reforms.

6.5.1 Curriculum

6.5.1.1 Impacts of HIV/AIDS on science education

The Ministry of Education should revise the HIV/AIDS education curriculum in order to include life skills that help secondary school learners and teachers to deal with the impacts of HIV/AIDS.

6.5.1.2 *Risk factors*

Education authorities and other stakeholders should embark on an HIV/AIDS education curriculum that fosters behaviour change and reduction of the risks to HIV/AIDS infection. Specifically, such programmes should:

(a) encourage condom use among learners in regular sexual relationships or learners that are faithful to one sexual partner;

(b) discourage school boyfriend-girlfriend relationships as a strategy to reduce sexual activity among learners.

(c) impart life skills to help rural teachers to obtain and carry condoms.

6.5.1.3 Knowledge, norms, attitudes, practices, and skills to HIV/AIDS

1. Government should provide more financial, material, and human resources to secondary schools in order to strengthen HIV/AIDS education.
2. NIED should revise or update the HIV/AIDS education curriculum in order to include new knowledge of HIV/AIDS. Such a revision of the HIV/AIDS curriculum should now:
   (a) reflect secondary school science learners' and teachers' needs and gaps in knowledge;
   (b) dispel the contextual norms, myths, and misconceptions about condoms;
   (c) encourage abstinence by way of inculcating the fear of sexually transmitted infections including HIV/AIDS;
   (d) include content on the local names and caricatures of HIV/AIDS, as well as the indigenous knowledge of HIV/AIDS symptoms. To qualify this recommendation, the inclusion of such content should be aimed at increasing local meaning about the HIV/AIDS epidemic, and discourage stigma, discrimination, and rights abuses.

6.5.1.4 Constraints of integrating HIV/AIDS education into Life Science and Biology subjects

1. The Directorate of National Examinations and Assessment should make HIV/AIDS content examinable or graded in national secondary school examinations and tests.
2. The Ministry of Education and schools should support secondary school teachers in the delivery of HIV/AIDS education. Such support should include the provision of teaching-learning resources, life skills about topics such as sexuality, and how to offer age-appropriate HIV/AIDS education to learners.

6.5.1.5 Organizational and professional dimensions of HIV/AIDS education

1. NIED should de-link HIV/AIDS education from Life Science and Biology subjects and should instead make HIV/AIDS education be taught as a separate subject by a specially trained teacher.
2. Government should strengthen HIV/AIDS education in schools by providing teaching-learning resources. In particular, the Ministry of Education should provide teachers with teaching guides for HIV/AIDS education.
3. Authorities should implement a policy of rewards (and punishments) for schools that have (and do not have) AIDS awareness clubs, schools that encourage learners to belong to AIDS awareness clubs, schools that offer extra-curricular HIV/AIDS education, and schools that engage the community in HIV/AIDS education. Such rewards may be in the form of promotions of school principals, or increased monetary and material support to the school. Punishments may be in the form of demotions for non-performing school principals.

4. In order to encourage teachers to participate in teaching HIV/AIDS education to learners, schools should implement a policy of rewards or bonuses (and punishments) for teachers that offer (and do not offer) HIV/AIDS education to learners.
5. Education authorities and stakeholders must review the HIV/AIDS curriculum to make it reflect learners' and teachers' disaggregated needs and challenges.

6.5.2 Educational policy

6.5.2.1 Impacts of HIV/AIDS on science education

1. Education authorities and other stakeholders should devise policies to reduce absenteeism among learners affected by HIV/AIDS. Such policies should support interventions for the provision of treatment for learners infected by HIV/AIDS and economic support to learners whose parents are infected or affected by HIV/AIDS.
2. The Ministry of Education should devise policies and interventions to reduce stress and increase the performance of learners affected by HIV/AIDS.
3. Government should formulate policies and interventions to reduce absenteeism and increase performance of teachers affected by HIV/AIDS.

6.5.2.2 Risk factors

1. ABC (Abstinence, Be faithful, use Condoms) campaigns should be stepped up in schools in order to delay age of coital debut, reduce sexual

activity, discourage multiple sexual partners, and promote condom use among learners.

2. Campaigns to curb beer-drinking and cigarette smoking should be promoted as as a way of discouraging sexual activity among the learners.
3. Stakeholders, including the Ministry of Education, should create policies and strategies to reduce pregnancy among learners.
4. Stakeholders, including the Ministry of Education, should implement policies and interventions to curb transactional and intergenerational sex among learners.
5. Schools, in consultation with stakeholders including parents, should socially market HIV testing, participation in AIDS awareness clubs, and parental strictness as interventions for increased use of condoms among learners.
6. The Ministry of Education and stakeholders should have a targeted policy to socially market condoms to rural teachers.

6.5.2.3 Knowledge, norms, attitudes, practices, and skills to HIV/AIDS

The Ministry of Education and stakeholders should have policies and interventions that encourage Voluntary Counselling and Testing for HIV/AIDS, especially among learners that are male, living in urban areas (particularly in the Kavango region), and those in Grade 9.

6.5.2.4 Constraints of integrating HIV/AIDS education science subjects

1. The Ministry of Education should provide in-service HIV/AIDS training to Life Science and Biology teachers. This training should first be given to Diploma holders.

2. Since secondary school teachers lack training in HIV/AIDS, the University of Namibia should to provide pre-service HIV/AIDS training to student-teachers.

6.5.2.5 Organizational and professional dimensions of HIV/AIDS education

1. The Ministry of Education should have a clear policy on the free distribution of condoms in schools because some schools allowed the free distribution of condoms while others did not.
2. The Ministry of Education and stakeholders should review the HIV/AIDS policy so that it reflects learners' and teachers' disaggregated needs and challenges.

6.6 Future research

1. More detailed and qualitative research is required to understand the putative impacts of HIV/AIDS on science teachers, learners, and quality of secondary school science education. Specifically, there is an urgent need to understand the apparently high perception of science teacher losses due to putative HIV/AIDS-related illnesses in the Omusati and Kavango regions.

2. There is need to study why significantly more urban than rural learners were absent from school. In addition, there is need to explain the high levels of absenteeism among learners from the Damara-Nama ethnic group and the Ohangwena constituency.

3. Further research is needed to elucidate factors that cause early coital debut and unravel the traditional customs and values that increase sexual activity, number of

sexual partners, and non-use of condoms for learners from various ethnic backgrounds.

4. Finally, more research to understand why learners that were tested for HIV had increased sexual activity should be conducted.

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APPENDIX 1

HIV/AIDS AND SCIENCE EDUCATION IN NAMIBIAN SECONDARY SCHOOLS

BIOLOGY/ LIFE SCIENCE LEARNER QUESTIONNAIRE

Thank you very much for making time to complete this questionnaire. The information supplied in this questionnaire is for research purposes only. It is completely confidential, anonymous and unlinked to the respondents. Please complete the questionnaire truthfully by writing in the spaces provided, or tick **(√)** either **YES** or **NO**, or tick (√) the corresponding box on the right or left hand side of the statements/responses.

Section 1: Demographical data

1. CONSTITUENCY/TOWN (where your school is located)

2. REGION (where your school is located)

CAPRIVI	
KAVANGO	
KHOMAS	
OHANGWENA	
OMUSATI	
OSHIKOTO	

3. SEX

MALE	
FEMALE	

4. AGE

5. GRADE

6. ETHNIC GROUP (TRIBE)

Section 2: Impacts

7	In the past 2 years, have you lost a science teacher due to illness?	YES	NO
8	In the past 2 years, have you lost a science learner due to illness?	YES	NO
9	Have you ever received a replacement teacher because your science teacher was sick?	YES	NO

10. Which of the following characteristics would you associate with a science learner trying to cope with HIV/AIDS? (tick √ the boxes on the right)

Poor class performance	
Withdraws from other learners	
Bullied and teased by other learners	
Absent from school most times	
Looks tired	
Poor concentration in class	
Looks stressed	
Looks hungry	
Fails to attend after-school activities	
Completely stops attending school	
Looks sick	
Often comes late to school	
Other characteristic: (explain)	

11. This term, how many times have you been absent from school?
12. What is your main reason for being absent from school? (select <u>one</u> only)

- □I was sick
- □Death in family
- □Illness in family
- □Needed at home
- □Lack of uniform
- □Lack of food
- □Attending funeral
- □Other (explain): --

Section 3: Risk factors

13. How old were you when you had sexual intercourse for the first time?

□8 years	□9 years	□10 years	□11 years
□12 years	□13 years	□14 years	□15 years
□16 years	□17 years	□18 years	□19 years
□20 years	□21 years	□22 years	□23 years

□I have never had sexual intercourse

14	I have never had sexual intercourse before	YES	NO
15	Have you ever had sexual intercourse?	YES	NO
16	During the past 12 months, have you had sexual intercourse?	YES	NO
17	Are boyfriend-girlfriend relationships common in your school?	YES	NO
18	Do you have a girlfriend or boyfriend?	YES	NO
19	Will your friends laugh at you if they know you are a virgin?	YES	NO
20	Are you aware of girls that have older men as boyfriends?	YES	NO
21	Are you aware of boys that have older women as girlfriends?	YES	NO
22	Are you aware of learners that engage in sex for money or gifts?	YES	NO
23	Have you ever been physically forced to have sexual intercourse when you did not want to?	YES	NO
24	Do you drink beer or any other alcoholic drink?	YES	NO
25	Do you smoke cigarettes?	YES	NO

26. In the past 12 months, how many people have you had sexual intercourse with?
27. The last time you had sexual intercourse, did you or your partner use a condom?
28. In the past 12 months, how many times have you had sex without condoms?
29. In the past 12 months, how many times did you fail to buy condoms?
30. In the past 12 months, how many girls in your class became pregnant?
31. In the past 12 months, how many boys in your class made girls pregnant?

32	Do you think science teachers are at a higher risk of contracting HIV?	YES	NO
33	Are you worried that your science teacher could be infected by HIV?	YES	NO
34	Do you think some of your fellow learners may be infected by HIV?	YES	NO

Section 4: Knowledge, norms, attitudes, practices and skills

35	Some traditional healers can cure HIV/AIDS	YES	NO
36	Only immoral people like prostitutes get HIV/AIDS	YES	NO
37	You cannot get HIV if you stick to one sexual partner	YES	NO
38	Circumcision can reduce HIV infection in men	YES	NO
39	You can tell by looks that a person is HIV positive	YES	NO
40	An HIV-positive person can live for more than ten years without showing signs of AIDS	YES	NO
41	High CD4 count means one's immune system is good	YES	NO
42	One can get HIV from a mosquito that fed on blood from an HIV-positive person	YES	NO
43	People suffering from TB also have HIV/AIDS	YES	NO
44	Antiretroviral (ARV) drugs are the new cure for HIV/AIDS	YES	NO
45	HIV/AIDS can cause loss of memory	YES	NO
46	I have been tested for HIV	YES	NO
47	I would like to be tested for HIV	YES	NO

48. What is the main reason you have NOT had sexual intercourse?

□I want to wait until I am older
□I want to wait until I am married
□I am afraid of getting pregnant
□I am afraid of getting a sexually transmitted infection such as HIV/AIDS
□I have not had a chance to have sex
□I have not met the right person
□It is against my religious belief
□My parents are very strict
□ Other reason:…………………………………………………………………………

49. If you were asked to change your sexual behaviour, what would you prefer?
□stop all sex
□sex with condoms
□sex without condoms
□sex with one partner without condoms
□sex with many partners with condoms
□reduce the number of sexual partners
□sex with reduced number of partners with condoms

50	It is difficult to use a condom with one regular sexual partner	YES	NO
51	Will your girlfriend/boyfriend be angry with you if you refused to have sex without a condom?	YES	NO

52. What reasons do people give for not using condoms?
□ No need to use condoms if my partner looks healthy
□Condoms smell
□Condoms are small
□No need to use condoms if you trust your partner
□Condoms are not 100% safe
□It is difficult to use condoms when the weather is too hot
□It is difficult to use condoms when a person is drunk
□I am tired of using condoms for a long time
□No need to use condoms if the girl is using family planning pills
□No need to use condoms if they want to have a baby
□Condoms spread sexually transmitted diseases
□Condoms are expensive
□Condoms are not available locally
□I feel shy to buy and carry condoms
□Condoms are not available at the school
□They want more sexual satisfaction
□other reason:
………………………………………………………………………………

53. If you wanted to get a condom, how would you most likely get it?
□I do not know
□I would get it some other way
□I would send someone else to get it for me from a pharmacy, clinic, hospital or shop
□I would give someone else money to buy it for me
□I would get it from a pharmacy, clinic or hospital

I would get it in a store or shop or from a street vendor, Cuca shop or shebeen
other ways of getting condoms:……………………………………………..

54	What names do people associate with AIDS? (write answer in space below):
55	What symptoms do people associate with AIDS? (write answer in space below):

Section 5: Constraints of integrating HIV/AIDS content into Biology/ Life Science subjects

56	Biology/ Life Science teachers are few and are already over-worked	YES	NO
57	Biology/ Life Science teachers lack adequate training	YES	NO
58	HIV/AIDS education is not covered comprehensively by Biology/ Life Science teachers	YES	NO
59	Biology/ Life Science teacher emphasises facts but does not impart life-skills or encourage behaviour change	YES	NO
60	Biology/ Life Science teacher does not talk about sensitive topics such as gender issues, sexuality, and socio-cultural contexts	YES	NO
61	Biology/ Life Science teachers do not test or examine learners on HIV/AIDS	YES	NO
62	HIV/AIDS education is not appropriate for my age	YES	NO
63	Biology/ Life Science teachers have no access to appropriate resources to teach HIV/AIDS content effectively	YES	NO

Section 6: Organizational and professional dimensions that affect the delivery of HIV/AIDS education

64	HIV/AIDS education should have separate timetable slots	YES	NO
65	HIV/AIDS should be taught as an after-school activity in clubs	YES	NO
66	I would like HIV/AIDS to be taught as part of Biology lessons	YES	NO
67	I would like HIV/AIDS to be taught by Guidance and Counselling teachers	YES	NO
68	I would like HIV/AIDS to be taught as a separate subject by a specially trained teacher	YES	NO
69	I would like learners to sit for an examination in HIV/AIDS education	YES	NO
70	The school has got enough materials for HIV/AIDS education	YES	NO
71	I belong to an HIV/AIDS awareness club	YES	NO
72	The school provides out-of-school activities for HIV/AIDS education	YES	NO
73	Condoms are available at the school	YES	NO
74	School authorities allow the distribution of condoms at the school	YES	NO
75	Condoms should be distributed freely at the school	YES	NO
76	There is a Voluntary Counselling and Testing (VCT) centre near the school	YES	NO
77	The school involves the community and Non-Governmental Organizations (NGOs) in HIV/AIDS education	YES	NO

78. Which after-school HIV/AIDS education activities are offered at the school?

□Films
□Drama
□Debates
□Story-telling
□Talks from health workers
□Talks from parents
□VCT
□Talks from social workers
□*My Future is My Choice*
□Talks from church organizations
□Lironga Eparu
□AIDS awareness club
□other out-of-school HIV/AIDS education activities:…………………….

79. What is your <u>main</u> source of HIV/AIDS information?

□booklets
□posters
□newspapers
□Other subject teachers
□relatives
□church
□ AIDS awareness club
□Science teacher
□NGOs
□doctors/health staff
□TV
□Friends
□parents/guardians
□*My Future is My Choice*
□radio

80. Among your teachers, which ones usually talk to you about HIV/AIDS?

□Religious/moral Education	□Biology
□Physical Science	□Environmental science
□Geography	□History
□English	□Mathematics
□Guidance and Counselling	□Life Science

Section 7: Policy interventions

81. In your own opinion, what should government do to protect science teachers and learners from HIV/AIDS?

-End of Questionnaire-

-----Thank You Very Much for Completing this Questionnaire-----

APPENDIX 2
HIV/AIDS AND SCIENCE EDUCATION IN NAMIBIAN SECONDARY SCHOOLS

BIOLOGY/ LIFE SCIENCE TEACHER QUESTIONNAIRE
Thank you very much for making time to complete this questionnaire. The information supplied in this questionnaire is for research purposes only. It is completely confidential, anonymous and unlinked to the respondents. Please complete the questionnaire truthfully by writing in the spaces provided, or tick (√) either **YES** or **NO**, or tick (√) the corresponding box on the right hand side of the correct statement.

Section 1: Demographic data

1. DISTRICT (where you work)

2. REGION (√ region where you work)

CAPRIVI	
KAVANGO	
KHOMAS	
OHANGWENA	
OMUSATI	
OSHIKOTO	

3. SEX

MALE	
FEMALE	

4. MARITAL STATUS

SINGLE	
MARRIED	

5. ETHNIC GROUP

6.	AGE	
7.	YEARS OF SERVICE	
8.	HIGHEST QUALIFICATIONS	

9. What subject(s) do you teach?

Life Science	
Biology	

Section 2: Impacts

10. Which of the following characteristics would you associate with a science learner trying to cope with HIV/AIDS? (tick √ the boxes on the right)

Poor class performance	
Withdraws from other learners	
Bullied and teased by other learners	
Absent from school most times	
Looks tired	
Poor concentration in class	
Looks stressed	
Fails to attend after-school activities	
Easily drops-out of school	
Looks sick	
Other characteristics: (explain)	

11. Which of the following characteristics would you associate with a science teacher trying to cope with HIV/AIDS? (tick √ the boxes on the right)

Seeks treatment elsewhere	
Transfers to a school in town	
Seeks early retirement	
Absent from work most of the time because of sickness	
Retired on medical grounds	
Poor performance at school	
Produces poor results in student examinations	
Easily gets annoyed	
Looks stressed	
Looks thin	
Coughing	
Looks absent-minded	
Is very forgetful	

Other characteristic(s) (explain): --

Please, tick (√) either YES or NO

12	Is absenteeism due to illness a big problem among science learners at your school?	YES	NO
13	Is absenteeism due to illness a big problem among science teachers at your school?	YES	NO

14. What reasons do science learners mostly cite for being absent from school? (tick correct choices)

- Learner was sick
- Sickness in the family
- Funeral
- Raising money
- Looking after younger siblings
- other reasons (explain):---

Section 3: Risk factors

Please tick (√) either YES or NO

15	Boyfriend-girlfriend relationships are common among the learners	YES	NO
16	Learners have easy access to condoms?	YES	NO
17	Some learners smoke cigarettes	YES	NO
18	Some learners drink beer	YES	NO
19	Some of the learners can engage in sex for money and gifts	YES	NO

20. In the past 12 months, how many of your female learners became pregnant?

21. In the past 12 months, how many times have you traveled outside your duty school?

Section 4: Knowledge, norms, attitudes, practices and skills to HIV/AIDS

Please tick (√) either YES or NO

22	In some co-habiting couples, one spouse may be HIV positive while the other is HIV negative even though they always have unprotected sex	YES	NO
23	Depletion of CD4 cells leads to the onset of AIDS	YES	NO
24	HIV/AIDS is higher in northern Namibia because of mosquitoes	YES	NO
25	Circumcision can protect men against HIV infection	YES	NO
26	People with HIV do not live for more than 10 years	YES	NO
27	HIV/AIDS can lead to loss of memory	YES	NO
28	Antiretroviral (ARV) drugs are the new cure for AIDS	YES	NO
29	Antiretroviral drugs can prevent mother-to-child transmission of HIV	YES	NO
30	Persons that have tuberculosis (TB) are also infected with HIV	YES	NO
31	Charcoal-smoked (or braai) foods are not good for people on ARV treatment	YES	NO
32	I have heard about immune reconstitution syndrome during ARV treatment	YES	NO
33	Selenium-rich mushrooms can delay the onset of AIDS	YES	NO
34	Sexually transmitted Infections (STIs) help to spread HIV	YES	NO
35	I am willing to go to my nearest health centre to collect ARVs	YES	NO
36	If answer to question number 35 is NO, would you consider a transfer to a school in town where you could get ARVs?	YES	NO

37	Are you able to recognize someone that is infected with HIV?	YES	NO
38	Have you ever been tested for HIV?	YES	NO
39	Would you like to be tested for HIV?	YES	NO

40	What names do people give to those that are suspected to have AIDS or are HIV positive? (write answer in space below):
41	What symptoms do people with HIV/AIDS show? (write answer in space below):

42. What reasons do people cite for not using condoms? (tick (√) all your choices)

 No need to use condoms if my partner looks healthy
Condoms smell
Condoms are small
No need to use condoms if you trust your partner
It is difficult to use condoms when the weather is too hot
It is difficult to use condoms when a person is drunk
I am tired of using condoms for a long time
No need to use condoms if the girl is using family planning pills
No need to use condoms if they want to have a baby
Condoms spread sexually transmitted diseases
Condoms are expensive
Condoms are not available locally
I feel shy to buy and carry condoms
I want more sexual satisfaction
 other reasons (please explain):--

Section 5: Constraints of integrating HIV/AIDS education into Biology and Life Science subjects

43	Biology/ Life Science teachers are few and are already over-worked	YES	NO
44	Biology/ Life Science teachers lack adequate training	YES	NO
45	HIV/AIDS education is not covered comprehensively	YES	NO
46	HIV/AIDS content emphasises facts but does not impart life-skills or encourage behaviour change	YES	NO

47	HIV/AIDS content does not include sensitive topics such as gender issues, sexuality, and socio-cultural contexts	YES	NO
48	There are no evaluation and monitoring systems for HIV/AIDS content	YES	NO
49	HIV/AIDS content is not age-appropriate	YES	NO
50	There is no systematic assessment of learning outcomes	YES	NO
51	There is no pre- and in-service training of Biology/ Life Science teachers in HIV/AIDS education	YES	NO
52	Biology/ Life Science teachers have no access to appropriate resources to teach HIV content effectively	YES	NO
53	HIV content does not address high risk behaviours	YES	NO
54	There is no provision for psycho-social and economic support	YES	NO

Section 6: Organizational and professional dimensions that affect the delivery of HIV/AIDS education

55	Do you feel confident to teach HIV/AIDS?	YES	NO
56	Current HIV/AIDS content effectively covers the issues of nutrition and immune system	YES	NO
57	Current HIV/AIDS content effectively covers the issue of ARVs	YES	NO
58	Free distribution of condoms among learners is allowed at my school	YES	NO
59	The school has an HIV/AIDS policy document	YES	NO
60	The school implements the HIV/AIDS policy document	YES	NO
61	HIV/AIDS education should have separate timetable slots	YES	NO
62	The school provides out-of-school activities for HIV/AIDS education	YES	NO
63	Condoms available at my school	YES	NO
64	Condoms should be distributed freely at the school	YES	NO
65	I would like HIV/AIDS to be taught as an after-school activity in clubs	YES	NO
66	There is a Voluntary Counselling and Testing (VCT) centre near the school	YES	NO
67	The school involves the community and Non-Governmental Organizations (NGOs) in HIV/AIDS education	YES	NO
67	I would like HIV/AIDS to be taught by Guidance and Counselling teachers	YES	NO
69	I would like HIV/AIDS education to be taught as a separate subject by a specially trained teacher	YES	NO

70. This year, how many school-community meetings have been held to discuss issues of HIV/AIDS?

71. Which out-of-school HIV/AIDS education activities are offered at the school?

☐Films ☐Drama
☐Debates ☐Story-telling
☐Talks from health workers ☐Talks from parents
☐VCT ☐Talks from social workers
☐My Future is My Choice ☐Talks from church organizations
☐Lironga Eparu ☐AIDS awareness club
☐Other (explain):---

72	I have received in-service training in HIV/AIDS education	YES	NO
73	I have a teaching guide for HIV/AIDS education	YES	NO

74. What teaching methods do you use for HIV/AIDS education?

□Debates □Drama/theatre
□Question and answer □Film/video
□Story telling □Discussions
□Group work □Community work
□Exercises □Note-taking
□Talks from invited speakers
□Other teaching methods (explain):---

Section 7: Policy interventions

75. In your own opinion, what should government do to protect science teachers and learners from HIV/AIDS?

-End of Questionnaire-

-----Thank You Very Much for Completing this Questionnaire

REPUBLIC OF NAMIBIA

MINISTRY OF EDUCATION

PROGRAMMES AND QUALITY ASSURANCE

Tel: 264 61 2933200
Fax: 264 61 2933922
E-mail: mshimho@mec.gov.na
Enquiries: MN Shimhopileni

Private Bag 13186
Windhoek
NAMIBIA
18 March 2009

File: 11/1/1

Prof. C.D. Kasanda
Faculty of Education
UNAM
Private Bag 13301
Windhoek

Dear Prof. Kasanda

SUBJECT: REQUEST FOR PERMISSION TO CONDUCT RESEARCH ON HIV & AIDS AND SCIENCE IN NAMIBIAN SECONDARY SCHOOLS

Your letter requesting permission for a PhD student, Mr K.C. Chinsembu, to conduct a research as part of his post-graduate studies for a PhD proposal has reference.

Kindly be informed that the Ministry of Education recognises the effort and the contribution the research initiative can make towards providing information on and broad understanding of the scientific knowledge of how the HIV & AIDS impact and science education are related.

The Ministry is in support of your research work; nevertheless, you are advised to contact the Regional Offices and/or Directorates you intend to visit for permission to do your research in the schools.

By copy of this letter regional directors are made aware of your request.

Yours faithfully

MINISTRY OF EDUCATION
Office of the Permanent Secretary
20 MAR 2009
Windhoek, Namibia

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I V Ankama
PERMANENT SECRETARY

OHANGWENA REGIONAL COUNCIL

TEL: 065 264300 Private Bag 88011
FAX: 065 263033 Eenhana

Enquiries: ***MLN Nakwafila***
Email: enaimbondi@ohangwena.gov.na/mnnakwafila@ohangwenarc.gov.na

INTERNAL MEMORANDUM

OHANGWENA REGIONAL COUNCIL
Private Bag 88011
Office of
17 NOV 2009
REPUBLIC OF NAMIBIA

TO: **HONOURABLE COUNCILLORS**
EENHANA CONSTITUENCY
OHANGWENA CONSTITUENCY
ENDOLA CONSTITUENCY
OHANGWENA REGION

FROM: **DANIEL VH KASHIKOLA**
CHIEF REGIONAL OFFICER

DATE: **17 NOVEMBER 2009**

SUBJECT: **PERMISSION TO CONDUCT RESEARCH ON HIV/AIDS AND SCIENCE IN SECONDARY SCHOOL OF OHANGWENA REGION.**

This letter serves to inform your good and busy office, that a delegation headed by Mr Kazhila C. Chinsembu a lecture at the University of Namibia, will be in the region to conduct a study research on HIV/AIDS and Science in the above mentioned Constituencies during November 2009. They will be visiting specific secondary schools of Haimbili Haufiku SS; Ongha SS and Ponhofi SS.

The research is aimed at providing information on and broad understanding of the scientific knowledge of how the HIV/AIDS impact and science education.

The Ministry of Education is in support of the said research work.

Should you have any queries regarding the nature of the study in the region, or their identity, please contact me at the office. A letter of recommendation from the Regional Director is attached.

Please accord them your assistance and cooperation.

Kind Regards!

REPUBLIC OF NAMIBIA

MINISTRY OF EDUCATION
KHOMAS REGION

Private Bag 13236, Windhoek Tel. 264 61 2934329/231948 Fax 264 61 248251

Enq: Josia S Udjombala
Ref: SP

Mr Kazhila Chinsembu
PhD Student, UNAM
Fax. 061 – 206 3791

November 25, 2009

Dear Mr Chinsembu

RE: REQUEST FOR AUTHORIZATION TO CONDUCT RESEARCH IN SECONDARY SCHOOLS WITHIN THE KHOMAS REGION

I write to refer to your letter of request with regard to the above subject matter, dated November 23rd istant.

Kindly be informed that authorization is hereby given for you to conduct research on HIV and AIDS Science Education in the target schools of A Shipena, Goreangab, Ella du Plessis and Immanuel Shifidi. This authorization is granted on the understanding that normal school programmes will not be disrupted, and also that the participation into the research by either teachers or learners is voluntary.

You are advised to liaise with the respective school principals to agree and arrange the times which are most convenient to their programmes.

Thank you

25/11/09
....
JOSIA S UDJOMBALA
DIRECTOR: MoE
KHOMAS REGION

MINISTRY OF EDUCATION
P/BAG 13236 WINDHOEK
2 5 NOV 2009
DIRECTOR OF EDUCATION
KHOMAS REGION

REPUBLIC OF NAMIBIA

MINISTRY EDUCATION:OSHIKOTO REGION

Tel: (065) 281909
Fax: (065) 240315

Private Bag 2028
Ondangwa

2009-11-17

Enquiries: Mr A. Strüwig

To: Mr. K C Chinsembu
UNAM
Private Bag 13301
Windhoek

RE: REQUEST TO VISITS SCHOOLS IN THE OSHIKOTO REGION.

Your letter from the Ministry of Education, dated 18 March 2009 provided to my office in which you request our office to allow you to carry out research at schools in our region has reference, therefore be informed that permission is duly granted to visit schools in the Oshikoto Educational Region under the following conditions:

1. You have to make an appointment in time with the principal of the proposed to be visited schools.
2. This research should be conducted in such a way that it does not interfere with the normal school programme.
3. Any interviews to be conducted will be on a voluntary base.

Sincerely,

..........17/11/2009

17 NOV 2009

Mr. André Strüwig
Acting Director

REPUBLIC OF NAMIBIA

MINISTRY OF EDUCATION
OMUSATI REGION
TEAMWORK AND DEDICATION FOR QUALITY EDUCATION

Tel: (065) 251700
Fax: (065) 251722

Private Bag 529
Outapi
NAMIBIA

19 November 2009

Enq: Mrs. Loide Shatiwa

To: Tsandi Circuit
Outapi Circuit

SUBJECT: REASEARCH ON HIV/AIDS AND SCIENCE EDUCATION in NAMIBIA SECONDARY SCHOOLS

Permission is granted to **Mr. Kazhile C Chinsembu** to carry his research. The schools are **David Sheehama sss** and **John Pandeni Cs** in **Outapi Circuit** and **Mwaala sss** and **Shikongo Iipinge sss** in **Tsandi Circuit**.

MINISTRY OF EDUCATION
OMUSATI REGION
19 -11- 2009
OFFICE OF THE REGIONAL DIRECTOR
PRIVATE BAG 529 OUTAPI
REPUBLIC OF NAMIBIA

Yours faithfully

pp. ……………………………………

MRS. ESTER A. NGHIPONDOKA
REGIONAL DIRECTOR

Teamwork and dedication for quality education

All official correspondence must be addressed to the Regional Director.

KAVANGO REGIONAL COUNCIL

DIRECTORATE OF EDUCATION

PRIVATE BAG 2134, RUNDU, NAMIBIA

Enquiries	:	Alfons M. Dikuua	Telephone No.	:	+264-66-258 9111
Email	:	dikuua@iway.na	Fax No.	:	+264-66-258 9213/258 9320
Ref. No.	:				

Tuesday, April 6, 2010

TO: The Principals of
Dr. Romanus Kampungu Secondary School
Dr. Alpo Mbamba JS
Rundu Senior Secondary School
Noordgrens Secondary School

SUBJECT: PERMISSION TO VISIT SECONDARY SCHOOLS

1. Kindly be informed that permission has been granted to a PhD student, Mr. K.C. Chinsembu, to conduct a research as part of his post-graduate studies in this region.

2. Please give him your support as it will be required.

NB: Teaching and learning process should **NOT** be disturbed in the process.

Thank you

....

Alfons M. Dikuua
REGIONAL DIRECTOR

MINISTRY OF EDUCATION
KAVANGO REGION
2010 -04- 06
OFFICE OF THE REGIONAL DIRECTOR
PRIVATE BAG 2134, RUNDU
REPUBLIC OF NAMIBIA

Cc. Inspector of Education
Rundu Circuit

All official correspondence must be addressed to the Regional Director