

African University Students' Knowledge of HIV/AIDS and Mosquito Bites

Professor Tuntufye Selemani Mwamwenda

Nelson Mandela Metropolitan University

Doi:10.5901/mjss.2014.v5n20p1847

Abstract

The first objective of African university students' knowledge of HIV/AIDS, while the subsidiary objective sought to examine the extent to which African university students thought mosquito bites can lead to HIV/AIDS transmission. Descriptive statistics in the form of frequency, percentage and chi-square were used as method of data analysis. The sample comprised 366 participants drawn from three universities located in Kenya, South Africa and Tanzania. The results showed that the level of HIV/AIDS knowledge among the participants was overall high for most questions/statements. Responses to whether mosquito bites leads to HIV/AIDS transmission were statistically significant. Substantial participants thought that mosquito bites is related to HIV/AIDS transmission. Moreover, the magnitude of the misconceptions was cause for concern. It was concluded that such findings serve as reinforcement to the concerted effort for HIV/AIDS public education. Such effort ought to be kept in place, particularly for the fact that there are still some misconceptions about HIV/AIDS which call for timely intervention.

Keywords: HIV/AIDS infection, HIV/AIDS and mosquito bites, African university students, vulnerability to HIV/AIDS, misconception about mosquito bites, public education

1. Introduction

In many parts of the world, HIV/AIDS has attained the status of pandemic, which means large areas are affected, and HIV/AIDS continues spreading (Kibombo, Neema & Ahmed, 2007; Ebeniro 2010; Janckie, Garegae & Tshoko, 2011). In this regard, Facente (2001) warns that, whereas there has been a visible decline of the rate of HIV to AIDS, there has been an increase in the contraction of HIV/AIDS.

In Tanzania, there are i.6 million nationals living with HIV/AIDS, which is six per cent of the population (AVERT, 2014). In 2011, there were 150,000 Tanzanians who were infected with the disease, which means that, there were 400 new infections daily. During the same period, there were 83,528 Tanzanians who lost their lives, as a result of AIDS.

Most Sub-Saharan countries have a young population aged 10-24 years. Tanzania comprises one third of its population whose age falls within the age range of 10-24 years; during which period young people become sexually active. It is estimated that seven per cent of those aged 15-24 years are HIV positive (AVERT, 2014).

In Kenya, HIV is declared to be the greatest challenge Kenyans re confronted with (Gakahu & Kaguta 2011; (National AIDS Control Council (NACC) & National AIDS/STI Control Programme (NASCP, 2012). Despite concerted and enormous effort to bring it under control, the epidemic continues being a threat to lives of millions of Kenyans. By December 2011, 1.6 million Kenyans were living with HIV/AIDS, and it is predicted the number is likely to increase rather than decrease in the foreseeable future, and as the years go by (NACC & NASCOP, 2012). Of the 1.6 Kenyans living with HIV/AIDS, 59% are women. The number of HIV/AIDS infected Kenyans is higher than what would be considered reasonable. For example, in 2011 the increase in infection stood at 104,137. Since HIV/AIDS was detected in Kenya in 1984, 1.7 million Kenyans have lost their lives (NACC & NASCOP, 2012).

2. Literature Review

As early as 2001, Kelly (2001) investigated seven universities in East and Central Africa on the effect of HIV/AIDS with the conclusion that, HIV/AIDS ignorance prevailed regarding its presence in universities. This was characterised by secrecy, silence, denial and fear of stigmatization and discrimination. Since HIV/AIDS is not curable though manageable, prevention remains the only surety for combating it. Hence, the motivation for the numerous studies on HIV/AIDS knowledge, attitudes, beliefs and perceptions. Moreover, the present investigation is informed by the stated motivation, as well as the many studies undertaken in the quest for a relief, as far as HIV/AIDS is concerned. Macintyre, Rutenberg, Brown and Karim (2004) point out that HIV risk perception is considered an important antecedent for one's adoption of protective behaviour, in so far as contracting HIV/AIDS is concerned. Njogu and Martin (2003) argue that, given the

challenge of HIV/AIDS that adolescents encounter in their present and future life experience, it is vital that their awareness of the risks associated with sexual behaviour is made abundantly clear, and there and the corresponding transfer of such awareness to real life experience as expected.

Van Wyk (2006) reports of an investigation whose objective was to examine university students' perceptions, attitudes and awareness towards HIV/AIDS at a South African University in the Northwest Province. The study was based on a sample of 290 students whose age ranged from 18-23 years both males (41%) and females (59%). The results showed that the majority of participants were knowledgeable about HIV/AIDS. While the majority of participants had a knowledge that was quite detailed regarding HIV/AIDS transmission and prevention, a small number of participants were not that well informed moreover there were others who denied the existence of HIV/AIDS

Tagoe & Aggor (2009) advanced the argument that many university students in Africa are not that well informed about HIV/AIDS (Kaljavivi & Otaala (2003) As a matter of fact, many university campuses provide an environment that is conducive to the contracting and transmission of HIV/AIDS (Tagoe & Aggor, 2009) Such assertion is supported by the following factors: The age at which students are at university ranges from 19-49 which is the cohort for the large age group contracting HIV/AIDS both in Africa and other parts of the world; Rise in the students population comprising African and international students; Transactional sex among male and female students; Use of alcohol and drugs among students which predisposes them to engage in sexual activity that might lead to HIV infection.

In Namibia, De Beer, Gelderblom, Schellekens, Geeb, Van Roy, MacNally, Wit & Tobias (2012) investigated the extent of HIV/AIDS prevalence, knowledge and attitudes among university students. The participants were drawn from the University of Namibia as well as the Polytechnic constituting a sample of 5,000 participants. The end results showed that the HIV/AIDS knowledge was good, though there were some misconceptions regarding HIV/AIDS transmission and perception of one's possible risk of contracting HIV was rather low. Some of the participants tested were HIV positive, and yet they had not been aware of such status, which is the more reason for improvement in awareness campaigns.

In the assessment of HIV/AIDS knowledge, attitudes and behaviours among students in higher education in Tanzania, Mkumbo (2013) expressed the view that, there is lack of adequate knowledge of university students about HIV/AIDS in both Tanzania, as well as in sub-Saharan Africa. In his investigation of 400 University of Dar es Salaam students, he administered a questionnaire on their HIV/AIDS knowledge, attitudes and behaviour. Close to one third of the participants fell short of adequate knowledge of HIV/AIDS, whereas two thirds of the participants had a comprehensive knowledge of HIV/AIDS. Similarly, the majority of participants had positive attitudes towards people living with HIV/AIDS. On the other hand, it was observed that, their sexual behaviour was rather risky similar to what is generally the case with the general youth population in the country.

Kwigizile et al. (2013) undertook a similar investigation at another University in Tanzania, in which they sought to establish the extent to which, there was a gap between knowledge and the application thereof in sexual behaviour. In their introduction, they correctly point out that, knowledge of HIV/AIDS is vital as an available option for combating the spread of HIV/AIDS. This, nevertheless, can only be true, if such knowledge is transferred to one's sexual behaviour (Mwamwenda, 2013a). The participating sample comprised 547 students and a handful academic staff. While their HIV/AIDS knowledge was good, there was no correlation between their level of knowledge and application in their sexual behaviour.

Maswanyana, Brown and Merriman (2009) made a study of services and attitudes to people living with HIV/AIDS among college students in Dar es Salaam, Tanzania. Specifically, they were interested in examining the extent to which respondents accepted voluntary testing, counselling, treatment and attitudes towards people living with HIV/AIDS. The results showed that testing and counselling were rather unsatisfactory, and stigma was common against HIV/AIDS infected persons.

There was also inadequate knowledge of HIV/AIDS. They were afraid of voluntary testing and counselling, on account of being stigmatised once known to be HIV/AIDS positive, and getting to be identified as having HIV/AIDS status. The researchers concluded with recommendation to the effect that, there is need for VCT programmes; HIV/AIDS knowledge/education for understanding people living with HIV/AIDS; as this will lead to education of stigma against HIV/AIDS infected persons.

Awareness and its practicality on HIV/AIDS in higher learning institutions was the focus of investigation at the University of Dodoma, Tanzania (Madan, Laddunuri and Mwaka, 2012). The outcomes showed that, respondents had a good knowledge of HIV/AIDS. There were a few respondents who had no knowledge of HIV/AIDS. Those identified as commanding a good knowledge of HIV/AIDS did not apply such knowledge to their sexual behaviour.

In summary, the review of literature shows that the majority of African university students have a sound knowledge of HIV/AIDS transmission, infection and prevention. It is also clear that the transfer of such knowledge applies to some studies, while to others it was not observed. There is therefore both correlation and no correlation between knowledge

and application in their sexual change of behaviour. It must also be noted that, although the level of HIV/AIDS knowledgeability is good, there are a considerable number of university students whose knowledge of HIV/AIDS is unsatisfactory. Hence the need for more HIV/AIDS public education to eliminate the existing knowledge deficit. Thus the motivation for the present undertaking.

2.1 HIV/AIDS and Mosquito Bites

One of the major misconceptions that has prevailed is that mosquito bites is responsible for HIV/AIDS transmission more or less in the same way that, such mosquito bites is instrumental in the spread of malaria. When HIV/AIDS emerged some years ago, there was a belief that, mosquitoes were responsible for HIV/AIDS. While many people have discarded such misconception regarding the spread of HIV/AIDS, there are still people who still continue believing that HIV/AIDS is transmitted by mosquitoes (Obina 2013).

The media used to spread the news that, mosquitoes were responsible for the spread and transmission of HIV/AIDS. Nevertheless media releases perpetuated the concept that Mosquitoes transmitted AIDS, and many people still feel that Mosquitoes may be responsible for transmission of this infection From one individual to another (Evans, 2014).

It is argued that insects can transmit disease through two ways namely, biologically and mechanically (Day, 2014). Mechanically transmission may occur when the insect's mouth parts are covered with fresh blood, and the virus is still alive, as the carrier proceeds to attack the next person. Though this is likely to lead to transmission, the possibility may be most unlikely. This is because it is not that frequently that, mosquitoes have fresh blood on their mouth pieces. Horseflies have such effect on horses (Day, 2014). With mosquitoes, by the time they are ready to suck blood from another person, the first intake is already stored in the midgut. Biologically, the moment the virus enters the gut, the virus is destroyed and therefore cannot get to grow to be stored and grown for transfer to another person.

Entomologists and medical practitioners do not share the belief that mosquito bites is a source of HIV/AIDS transmission. This is not the case because, when a mosquito draws blood from a person, it is placed in its gut where the HIV cannot survive, as it is destroyed by chemical acids stored in the gut way. Moreover, even if it were not destroyed, the blood would not get out of the body of mosquitoes to do harm to other person. There are two tubes at work; one used for sucking blood, and the second is used for injecting out the blood.

Mosquitoes digest the virus which causes AIDS; therefore, transmission would take place if the virus was alive and carrier to when being transmitted to another person. According to the UDS Centers Disease Control, "The body of scientific literature has shown no evidence of HIV transmission from mosquitoes" (Palmer 2012). This is explained on the basis that a mosquito does not inject its own blood of the last meal before it bites the next person. The first intake is already stored in the midgut. In the next person, In place of injecting its own blood, its saliva is used to facilitate its digestion of the new intake of the meal, in the form of lubrication. However, the saliva carries mosquito borne diseases such as yellow fever and malaria (Palmer 2012). Other reasons for rejecting the role of mosquitoes in HIV/AIDS transmission are: 1) The passage used for drawing blood is separate from the one used by saliva; 2) It is not possible that the mosquito would carry sufficient HIV to infect a person; 3) Another reason for mosquitoes' incapability of transmitting HIV is that they digest the virus.

Iqbal (1999) argued that mosquito bites is not capable of HIV transmission on the ground that: 1)The virus cannot replicate inside the mosquito; 2) not likely that HIV can be transmitted by insects; 3) The biological and mechanical transmission is most unlikely to occur. Sterbenz (2013) points out that mosquitoes have no capability of injecting chemical and extracting blood, a capability referred to as hypodermic needles. Despite such capability it is most unlikely for a mosquito to transmit HIV.

As the mosquito bites a person the sucked blood enters the gut which has acids which attacks whatever the germ/virus it may be carrying. If the acids did not kill the virus it would not exist from the mosquito body. This is because different tubes are used for injecting and sucking up blood. The saliva is used for facilitating digestion; it is also used to stop the blood from clotting while it is feeding on it.

On the other hand, the malaria parasites are able to resist the great acids, and therefore thrive and move into the body capacity, then enter the salivary glands for injecting into something else, including humans.

Thanks goodness HIV doesn't have that ability. If mosquitoes Spread HIV the way they spread malaria, we'd have a million more Deaths every year on our hands" (Sterbenz 2013).

While there are questionnaires that have included mosquitoes' bites in relationship to HIV/AIDS, there is paucity of

literature on studies that have had mosquito bites and HIV/AIDS as their focus of their investigation. As such only those that have made mention of the questionnaire are cited here.

Aylıkci, Bamise, Hamid, Turkal & Colak (2013) in Turkey carried out a study among 475 high school students with the objective of assessing their HIV/AIDS knowledge. In response to the relationship between mosquito bites and HIV/AIDS, 57.5 per cent of them thought HIV/AIDS can occur through mosquito bites. In an American college students assessment of their HIV/AIDS knowledgeability, participants agreed that mosquito bite was associated with HIV/AIDS transmission (Mwamwenda, 2013b). This was in contrast with Kenyan high and university students where 86 per cent and 61 per cent university and high school students respectively provided the correct answers (Mwamwenda, 2014). In a study of a qualitative assessment of HIV/AIDS related to knowledge in Chicago, USA respondents on an HIV/AIDS questionnaire, incorrectly responded that mosquito bites were potential paths for HIV transmission (Thippeswamy & Gorvine 2012). Only 12.5 per cent got the answer correctly.

In summary, the review of literature shows that the majority of African university students have a sound knowledge of HIV/AIDS transmission, infection and prevention. It is also clear that the transfer of such knowledge applies to some studies, while to others it was not observed. There is therefore both correlation and no correlation between knowledge and application in their sexual change of behaviour. It must also be noted that, although the level of HIV/AIDS knowledgeability is good, there are a considerable number of university students whose knowledge of HIV/AIDS is unsatisfactory. Hence the need for more HIV/AIDS public education to eliminate the existing knowledge deficit. Thus the motivation for the present undertaking.

3. Method

3.1 Sample

Participants who took part in this investigation were drawn from three African universities geographically located in Kenya, South Africa and Tanzania. Their distribution was as follows: 100 students from Tanzania; 102 from Kenya and 164 from South Africa, making a sum of 366 respondents.

3.2 Procedure

For each university, the lecturers offering a module in education administered the questionnaire to the participants. This was preceded by briefing students on what the questionnaire was all about, and that responding to the questionnaire was voluntary. As such, they were free to either respond to the questionnaire, or choose not to respond to the questionnaire. There was no report of some of the potential participants refraining from responding to the questionnaire, for all the three universities.

3.3 Measuring Instrument

A questionnaire comprising 25 statements and questions commonly used for testing respondents' HIV/AIDS knowledge, perceptions, attitudes, beliefs was used. Each statement and question had three options, namely "Yes, No Don't know". Participants were asked to tick whatever option they thought was true of their HIV/AIDS knowledge. For confidentiality purposes, respondents were advised not to write their names or name of the university affiliated to. They were, however, requested to indicate their gender and date of birth.

While the questionnaire comprised 25 statements and questions, only 19 for Kenya and South Africa and 17 for Tanzania were included in the statistical analysis. This was so, because there was lack of clarity in the six statements/questions they responded to, so that either way they answered would mean the answer was correct. With the Tanzania additional questions being excluded was because, there was no response for the two questions for all the participants. It is unknown why this was so.

4. Results

Following the scoring of the questionnaire, descriptive statistics in the form of frequency, percentage, chi-square and probability were used as displayed in Table 1. In response to sharing a cigarette with someone who has AIDS, the correct responses for the three universities was: Kenya 79%, South Africa 90%, Tanzania 85% all of which were significant at $p < 0.001$. In response to the statement of drinking water from the same cup with an AIDS person, the response was 85% for

Kenya, 93% for South Africa and 84% for Tanzania. In both countries, the χ^2 was significant at $p < 0.001$. Similar outcomes held true for sharing food, using the same toilet seat and sharing clothes with an HIV/AIDS person. The respondents did not think that interacting with such persons would lead to the transmission of HIV/AIDS.

In response to kissing someone with HIV/AIDS, the response was as follows: Kenya 42%, South Africa 81% and Tanzania 61%. While South Africa and Tanzania participants did not think one would contract HIV/AIDS by kissing an infected person, Kenyans were of the view that such behaviour would lead to being infected. Taking care of an HIV/AIDS person was rejected as being a source of HIV/AIDS transmission by 96% Kenyans, 77% South Africans and 68% Tanzanians, all of which was statistically significant at $p < 0.001$. Receiving blood transfusion from an HIV/AIDS person was accepted as a source of HIV/AIDS transmission. The same held true for having sexual relationship with an infected person. All participants did not think that shaking hands with an infected person would lead to contracting HIV/AIDS.

Responding to the statement that there is a cure for AIDS was rejected by 80% Kenyans, 70% South Africans and 88% Tanzanians, and the rejection was statistically significant. HIV/AIDS being God's punishment for engaging in sex out of wedlock was rejected by 51% Kenyans, 56% South Africans and 71% Tanzanians. The rejection by both Kenyans and South Africans was marginal, implying that those accepting the statement was close to those who disagreed with statement. Avoidance of HIV/AIDS persons as much as possible, as a means of prevention from contracting infection was rejected by all the three sets of participants. The scores in percentage were: 92% Kenyans, 70% South Africans and 80% Tanzanians.

Participants were asked whether they thought there was a chance of their being infected with HIV/AIDS, to which a large number from South African and Tanzanian participants responded negatively. This means that they did believe that it was possible for them as individuals to contract HIV/AIDS. The response from Kenyan participants was marginally positive. In response to whether participants on the basis of their HIV/AIDS awareness or knowledge were careful in their relationship with members of the opposite sex, the positive responses were as follows: Kenya 96%, South Africa 88% and Tanzania 73%, all of which were statistically significant. Statements and questions relating to sleeping with and sitting next to a person with HIV/AIDS, as a source of infection were rejected by all participants. HIV/AIDS children going to the same school was accepted by South African participants and rejected by both Kenyan and Tanzanian participants.

Table 1: Participants' Correct Responses Frequencies, Percentage, Chi-squares and Probability N= 366

No.	Statement	Kenya N = 102				South Africa N =164				Tanzania N = 100			
		Freq.	%	χ^2	P	Freq.	%	χ^2	P	Freq.	%	χ^2	P
2	Sharing cigarette with AIDS person	81	79	97.5	0.001	148	90	245	0.001	85	85	115	.001
3	Sharing a cup with AIDS person	87	85	123.6	0.001	150	93	253.7	0.001	84	84	121	.001
4	Sharing food with infected person	100	98	121.6	0.001	156	95	290.7	0.001	87	87	135.5	.001
5	Using same toilet seat AIDS person	88	86	125.7	0.001	143	87	207	0.001	85	85	121.7	.001
6	Kissing an AIDS person	43	42	32	0.001	133	81	173	0.001	61	61	43	.001
7	Taking care of AIDS person	98	96	81	0.001	127	77	185.6	0.001	68	68	47.6	.001
9	Sharing clothes with AIDS person	93	91	153.9	0.001	138	84	201	0.001	77	77	102.7	.001
10	Blood transfusion from AIDS person	102	100	136	0.001	150	91	264	0.001	100	100	136	.001
11	Having sex an infected person	102	100	120.5	0.001	149	91	255	0.001	100	100	136	.001
12	Shaking hands with AIDS person	98	96	152.5	0.001	149	91	252.5	0.001	-	-	-	-
14	There is no cure for AIDS	82	80	94.8	0.001	114	70	125.7	0.001	88	88	76.7	.001
No.	Statement	Kenya N = 102				South Africa N = 164				Tanzania N = 100			
		Freq.	%	χ^2	P	Freq.	%	χ^2	P	Freq.	%	χ^2	P
16	AIDS is punishment for engaging in sex outside marriage	52	51	14.5	0.001	92	56	43.5	0.001	71	71	68	.001
17	AIDS persons should be avoided	94	92	113.4	0.001	115	70	117	0.001	80	80	102	.001
21	Stand a chance of Contracting AIDS?	56	55	21	0.001	33	20	42.7	0.001	22	22	8.6	.001
22	Careful in relationship with gender counterpart to avoid AIDS	98	96	80.5	0.001	144	88	240.9	0.001	73	73	74.5	.001
23	Should AIDS children be in the same school with those who do not have AIDS?	73	72	73	0.001	105	64	86	0.001	67	67	70	.001
24	Would you sleep with an AIDS person?	43	42	44.4	0.001	92	56	77	0.001	49	49	23	.001
25	Would you sit next to an AIDS person?	83	81	207	0.001	143	87	219	0.001	67	67	57	.001

Table 2 shows the participants' responses to whether mosquitoes' bites is instrumental for HIV/AIDS transmission. Of the three countries, Kenya had the highest score of 86 per cent which was statistically significant χ^2 (1df, n101)=108, <0.001 . It was

followed by Tanzania with a score of 70 per cent which was also significant $\chi^2 (1df, n99)=56.6, < 0.001$. South Africa performed rather poorly, since the majority of respondents held the view that mosquito bites are associated with HIV/AIDS transmission.

Table 2: HIV/AIDS & Mosquitoes Bites: Participants' Responses Frequencies, Percentage, Chi-squares and Probability N= 366

		Freq	%	χ^2	P
1	Kenya N=102	88	86	108	0.001
2	South Africa N=164	76	46	59.6	0.001
3	Tanzania N=100	70	70	56.6	0.001

In summary, the analysis of data has shown that the majority of participants from the three universities had a good knowledge of HIV/AIDS transmission, infection and prevention. Though this does not rule out the misconceptions observed among those who were successful and those who did not do so well on the questionnaire. The

5. Discussion

This investigation sought to establish the extent to which African university students in Kenya, South Africa and Tanzania are familiar with knowledge relating to HIV/AIDS. The investigation further sought to establish whether knowledgeability of HIV/AIDS would lead to a correct response, as to whether mosquitoes' bites would lead to HIV/AIDS transmission. Both aspects of the investigation were confirmed, in so far as the majority of African university students had a good knowledge of HIV/AIDS. Similarly, the investigation showed that the majority of respondents rejected the statement that mosquito bites would lead one to contracting HIV/AIDS. The word "majority" is used in reference to participants from Kenya and Tanzania, whereas South African respondents scored below 50%, indicating that they were in agreement with the statement that mosquito bites is linked to HIV/AIDS transmission. Such findings are both comparable and in contrast with what has been reported in the literature review. In terms of comparability, there are researchers who have reported similar findings, as what has been observed in this investigation. For example, Van Wyk (2008) studied undergraduate students' knowledge, perceptions and attitudes in the North-West Province of South Africa and concluded that, participants were quite detailed in their knowledge of HIV/AIDS transmission and prevention. In Ghana, Tagoe & Aggor (2009) presented a contrast in that the sample used did not show that they were that well informed about HIV/AIDS. In the present investigation, there were evidence of both those who performed well as well as those who did not perform that well. It is nevertheless gratifying that the majority of participants performed well.

De Beer et al.(2012) reported the at Namibian University students were considered good in their HIV/AIDS knowledge, though there were some misconceptions among some of them. Ebeniro (2010) made a study of university students from three Nigerian universities and concluded that, their knowledge of HIV/AIDS was very high. Similar results were reported in an investigation carried out by Odu et al. (2008) in Western Nigeria, Mwamwenda (2013a) in Kenya, Mkumbo (2013), Liddururi and Mwaka (2012), Maswanya et al. (2009) in Tanzania. While this was the overall results, it is important to note that there were questions in which performance was excellent or good; whereas there was also the negative aspect, where the performance was unsatisfactory. Such results call for further vigilance in the fight against the spread of HIV/AIDS.

Similar argument can be used in the relationship between mosquito bites and HIV/AIDS transmission. In similar investigations as reported by other researchers (Aylikci et al. 2013; Mwamwenda, 2013b; Obina, 2013), there were respondents who held the view that mosquito bites is li9nkable to the HIV/AIDS transmission. Those who held the contrary view were in agreement with entomologists, medical practitioners and other researchers who have categorically denounced the belief that, there is a relationship between mosquito bites and the HIV/AIDS transmission (Erans, 2014; Sterbenz, 2013; Palmer, 2012; Iqbal, 1999).

6. Conclusion

The objective of this investigation was to establish the extent to which African university students are knowledgeable about HIV/AIDS. The results of this investigation has several implications in the efforts for the prevention of the spread of HIV/AIDS. With such knowledge, it is anticipated that African university students and many others will guard against being infected. This is particularly so in view of the fact that there is so far no cure for AIDS, and the only option left is that of prevention. Such findings offer hope to those engaged in HIV/AIDS public education that, their effort is not in vain, as it

does bear fruit, notwithstanding the research which has reported to the contrary. The findings further draw attention to the fact that, though the level of knowledge is high, there are still bottlenecks, where there are misconceptions, for which there is need for more refined effort and strategies for halting the spread of HIV/AIDS.

References

- AVERT (2014). HIV & AIDS in Tanzania. Available at: www.avert.org/hiv-aids-tanzania.htm [Accessed 29 May 2014].
- Aylikci, B. U., Bamise CT, Hamid MM, Turkal, M & Colak H (2013). HIV/AIDS knowledge among high school students in Kirikkale province, Turkey. *Journal of Natural; science, Biology and Medicine*, 4(1), 81-86.
- Day, J. (2014). Can mosquitoes transmit AIDS? Available at: www.lowestvector.org/can-mosquitoes-transmit-aids.htm [Accessed 27 June 2014].
- De Beer, I, Gelderblom, H. C., Schellekens, O, Geeb, E, Van Roy, G, MacNally, A., Wit FW and Tobias F (2012) University students and HIV in Namibia. *Journal of International AIDS Society*. 15(9)
- Ebeniro CD (2010) Knowledge and beliefs about HIV/AIDS among male and female students of Nigeria universities. *Journal of Comparative Research in anthropology and Sociology*. 1(1), 121-131.
- Erans, W. (2014). Mosquito cannot transmit AIDS Available at: www.rci.rutgers.edu/insects/aids.htm [Accessed 27 2914].
- Facente, A. (2001) Adolescents and HIV: knowledge, behaviours, influences, and risk perceptions. *The Journal of School Nursing* 17(4), 198-203.
- Gakahu N & Kaguta J (2011) Communicating HIV & AIDS among students in Kenya' institutions of higher learning: A challenge for the 21st century. *Journal of Economics and Sustainable Development*, 2(4).
- Iqbal, M. M. 1999). *Can we get AIDS from mosquito bites?* JLA state Med Soc, 151(8), 429-33.
- Janckie, D., Garegae K. and Tsheko, G. (2011) Beliefs and perceptions of sex, sexuality, HIV and AIDS in educational settings: Methodological successes and challenges. *International Journal of Scientific Research and Education* 4(2). 131-141.
- Katjavivi, P. H. & Otaala, B. (2003) African higher education institutions responding to the HIV/AIDS pandemic. Available at: hrh.uwc.ac.za/index.php?module=hrhlibraryBlaaction=viewauthorid=phrh_76. [Accessed 15 April 2013].
- Kibombo, R, Neema, S. and Ahmed, F. (2007). Adolescents and their perceptions of HIV/AIDS. *African Journal of Reproductive Health* 11(3), 168-181.
- Kwigizile E, Shao E, Mtango, G., Sonda, R., Moshi, J. & chilongola, J. (2013). The gap between knowledge and practice of risky sexual behaviours for HIV among university students and staff in Moshi Town, Tanzania. *Journal of Public Health in Africa*, 4(1).
- Laddumuri, M. & Mwaka, M. (2012). Awareness and its practicality on HIV/AIDS in higher learning institutions: A case of Dodoma University, Tanzania. *The International Journal's Research Journal of Social Sciences Management*, 1(11), 46-51.
- Macintyre K, Rutenberg H, Brown L and Karim A (2004.) Understanding perceptions of HIV risk among adolescents in KwaZulu-Natal. *AIDS and Behavior*, 8(3), 237-250.
- Maswany, E. S., Brown, G. & Merriman, G. (2009). Services and attitudes to people living with HIV/AIDS among college students in Dar es Salaam, Tanzania. *East Africa Journal of Public Health*, 6(3), 244-7.
- Mkumbo, K (2013). Assessment of HIV/AIDS knowledge, attitudes and behaviours among students in higher education in Tanzania. *Global Public Health: An International Journal for Research Policy and Practice*, 8(10), 1168-1179.
- Mwamwenda, T. S. (2013a) African University Students' Knowledge of HIV/AIDS and Knowledge Transfer. *Journal of AIDS and HIV Research*, 2013, 5(9), 341-346.
- Mwamwenda, T. S. (2013b). American college students and HIV/AIDS and knowledgeability and sexual behavior change. *Journal of AIDS and HIV Research*, 5(9), 410-414.
- Mwamwenda, T. S. (2014). Education level and HIV/AIDS knowledge in Kenya. *Journal of AIDS and HIV Research*, 6(2), 28-32.
- National AIDS Control Council (NASCC) & National AIDS/STI Control Programme (NASCOP) (2012). *The Kenya AIDS epidemic update 2011*. Nairobi: Office of the President
- Njogu, W. & Martin, T. C. (2003). The persisting gap between HIV/AIDS knowledge and perception among Kenyan youth. *GENUS* 62(2), 135-168
- Obina, C. (2013). Why mosquito cannot transmit HIV_ experts. Available at: www.vanguardngr.com/2013/09/why-mosquitoes-cannot-transmit-hiv-experts [Accessed 27 June 2014].
- Odu, B. K. and Akanle, F. F. (2008). Knowledge of HIV/AIDS and social behaviour among the youths in South West Nigeria. *Humanity and Social Sciences Journal*, 3(1), 81-88.
- Palmer, W. (2012). Why you cant get AIDS from mosquitoes. Available at: www.ibtimes.com/why-you-cant-get-aids-mosquito-702681 [Accessed 27 June 2014].
- Sterbenz, C. (2013). Here is why mosquitoes can't transmit HIV. Available at: www.businesssence-insider.com/mosquitoes-cant-sspread-hiv-2013-8 [Accessed 27 June 2014].
- Tagoe, M. and Aggor, R. A. (2009). Knowledge, behaviour, perceptions and attitudes of University of Ghana students towards HIV/AIDS: What does behavioural surveillance survey tell us? *Journal of Health and Human Services Administration*, 32(3).
- Thippeswamy, G. & Gorvine, B. (2012). A qualitative assessment of HIV/AIDS-related knowledge in inner city minority students. *Journal of AIDS and HIV Research*, 4(3), 85-93.
- Van Wyk, C. (2006) HIV/AIDS perceptions, attitudes and awareness of undergraduate students. *The Journal for Transdisciplinary Research in Southern Africa*. 2(1), 165-180