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An Evaluation of the Effectiveness of Biomedical Intervention Strategies Employed towards the Mitigation of HIV Risky Sexual Behaviour among Students in Institutions of Higher Learning in Western Kenya

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Abstract
HIV has been a challenging health issue and a leading cause of ill health and demise at a global level. By the year 2017, 76.1 million people had contracted HIV worldwide, with around 38 million persons infected with HIV in the world during the year 2019 alone. The disaster furthermore stands among the top 10 deadliest epidemics throughout history and has had adverse effects on the human population since its discovery. Research studies have identified Institutions of Higher Learning, which host a significant proportion of youth, as fertile breeding grounds for HIV Risky Sexual Behaviour. As a consequence, this study assessed the effectiveness of biomedical intervention strategies employed towards the mitigation of HIV Risky Sexual Behaviour among students in Institutions of Higher Learning in Western Kenya. The study employed qualitative and quantitative approaches to ensure triangulation and crosschecking of the research process. Employed were probability and non-probability sampling techniques generally and specifically, cluster sampling then simple random sampling. Chosen was a sample size of 399 students from a population of 13,002 students at seven institutions. Key informants were sampled purposively as follows; 5 NGO officials, 6 county government officials, 6 officials working in health care centers and 6 dean of students and 1 student counsellor. Selection of four Focus Group Discussions was purposive with each FGD having eight purposively selected student leaders from four institutions. An interview administered semi-structured questionnaire was employed to collect data from students, an FGD guide for the FGDs and Key Informant interview guides for the key informants. Descriptive statistics, an index-score, qualitative analysis and chi-square and were done for analysis. The HIV Risky Sexual Behaviour index-score revealed that a majority 269 (67.4%) of the respondents are involved in HIGH HIV Risky Sexual Behaviours. From chi-square tests, regarding behavioural strategies, information provision and counselling and other forms of psycho-social support are found to be statistically significant with p-value = 0.007 and p-value = 0.080 respectively. The study concludes that HIV incidence and prevalence rates in these institutions are likely to double in the near future if stakeholders continue to apply mitigation strategies in the exact manner they are currently doing. The study recommends an enhancement of the provision of male and female condoms, HIV testing and counselling services, testing and treatment of STIs, provision of Needle and Syringe Programmes, provision of Opioid Substitution Therapy and promotion of VMMC.
Keywords: Effectiveness, Biomedical intervention strategies, mitigation, HIV, Risky Sexual Behaviour among students in Institutions of Higher Learning
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1.1 Introduction

Researchers have over time been trying to understand why HIV mostly affects the youthful population (UNAIDS, 2018) and it is HIV Risky Sexual Behaviour that has been found to be the largest impediment towards the control of the high HIV incidence rates among young people(UNAIDS, 2018).Risky Sexual Behaviour refers to behaviour that expose people to sexual and reproductive ill health which includes; contracting HIV, contracting Sexually Transmitted Illnesses, getting unwanted pregnancies, conducting unsafe abortions among other conditions (Halperin & Epstein, 2004; Leclerc-Madlala, 2008; Uchudi*et al*., 2012; Berhan & Berhan 2015; Shisana *et al*., 2009; Gonzales & Kadengye, 2019). Consequently, stakeholders have employed numerous strategies in an attempt to mitigate HIV among the youth. The concern nevertheless to researchers had been that despite numerous strategies existing to address SRH and HIV challenges, youth continue to engage in HIV Risky Sexual Behaviour (Chanakira *et al.*, 2015).

A study conducted on Institutions of Higher Learning on HIV in Africa by Wegner *et al*.(2018) discovered that campus life put students risked the life of students because of their lack of ability to negotiate for safer sex or no sex. Studies done in sub saharan African countries including Kenya, Ghana and Nigeria identified students of these institutions as a group high at risk for infection of HIV because of their involvement in HIV Risky Sexual Behaviours (Oppong & Oti-Boadi 2013; Osonwa *et al*., 2013; Adam & Mutungi, 2007; Mberia & Mukulu 2011).

During academic year, 2020/21 Kenyan universities admitted at least 546.7 thousand students and in 2019; the Country admitted at least 430.6 thousand students in Technical and Vocational Education Training colleges. Furthermore, 3.5% of the country' s population were found to have a university degree as the highest educational levelwhile another 7% percent had completed a middle level or technical training after secondary level (Faria, 2021). Institutions of Higher learning therefore offer a representative source of the Kenyan youth. That these institutions are formal also means that they help provide an organised source of the youthful population. To demonstrate the extent of the HIV crisis in Institutions of Higher Learning, Guserva (2016) revealed the HIV prevalence in the Kenya's public universities. Prevalence for University of Nairobi stood at 15% while for Kenyatta University stood at 13% and Egerton University at 11%. Kisii University reported a HIV prevalence of 10%, Jaramogi Oginga Odinga University of Science and Technology 9%, Maseno University 9%, Jomo Kenyatta University of Agriculture and Technology (JKUAT) 8%, Moi University 7%, Dedan Kimathi University (DKUST) 6% and Masinde Muliro University of Science and Technology (MMUST) 5%. The rest of the public Kenyan universities presented HIV prevalence of 5% each. All the universities had HIV prevalence above the national prevalence of 4.9% in that year (Guserwa, 2016).

Western Kenya has the highest rates of HIV in the Country. The top five HIV high-prevalent Counties in Western Kenya were Busia, Homa Bay, Kisumu, Siaya and Migori (MoH, 2020). Therefore, this study found that there was urgent need to evaluate the employed strategies towards the mitigation of HIV Risky Sexual Behaviour among students of Institutions of Higher Learning in Western Kenya in order to find out what and where the strengths and weaknesses may be.

1.2 Statement of the problem

HIV has been a challenging health issue and a leading cause of ill health and demise at a global level (WHO, 2020). By the year 2017, 76.1 million people had contracted HIV worldwide. The problem of HIV prevalent among students in institutions of higher learning in Kenya remains a concern of significant proportion. To demonstrate the extent of the HIV crisis in Institutions of Higher Learning, Guserva (2016) revealed the HIV prevalence in the Kenya's public universities. Prevalence for University of Nairobi stood at 15% while for Kenyatta University stood at 13% and Egerton University at 11%. Kisii University reported a HIV prevalence of 10%, Jaramogi Oginga Odinga University of Science and Technology 9%, Maseno University 9%, Jomo Kenyatta University of Agriculture and Technology (JKUAT) 8%, Moi University 7%, Dedan Kimathi University (DKUST) 6% and Masinde Muliro University of Science and Technology (MMUST) 5%. The rest of the public Kenyan universities presented HIV prevalence of 5% each. All the universities had HIV prevalence above the national prevalence of 4.9% in that year (Guserwa, 2016).

Most studies had focused greatly on causal factors of Risky Sexual Behaviour but there are limited studies on why youth are not taking up these strategies, and what challenges stakeholders are facing in the implementation of these strategies. Accordingly, this study sought to fill this information gap with specific focus on Institutions of Higher Learning that offer a representative source of the Kenyan youth and Western Kenya, which has the highest HIV rates in Kenya. The study therefore assessed the effectiveness of biomedical intervention strategies employed towards the mitigation of HIV Risky Sexual Behaviour among students in Institutions of Higher Learning in Western Kenya.

1.3 Research Objective

To Assess the effectiveness of biomedical intervention strategies employed towards the mitigation of HIV Risky Sexual Behaviour among students in Institutions of Higher Learning in Western Kenya;

1.4 Research Question

How effective are biomedical intervention strategies in HIV Risky Sexual Behaviour mitigation among students of Institutions of Higher Learning in Western Kenya?

1.5 Justification

Findings of this study stretch the frontiers of knowledge and congtribute to the ongoing debate on the Sendai Framework on Disaster Risk Reduction, the global Sustainable Development Goals (SDGs), the Kenya Government's Big Four Agenda specifically Universal Health Care; and Kenya's vision 2030. Information from this study will help various actors understand the breadth, vastness, depth and presentation of this situation that is presenting a challenge. These stakeholders include ministries of health and education within the national and county governments of Kenya, Institutions of Higher Learning, their students, HIV Non-Governmental Organizations and health care centers serving these students on HIV and Sexual and Reproductive Health issues.

1.6 Review of Related Literature

Literature related to the study is reviewed in this section.

1.6.1 HIV prevention biomedical intervention strategies

Auvert *et al*. (2005) describe the use of clinical and medical techniques to prevent HIV transmission in biomedical therapies Men's and women's condom distribution, sexual and reproductive health services, antiretroviral medication, pre-exposure prophylaxis and post-exposure prophylaxis, HIV counselling, and testing and treatment for sexually transmitted diseases are all included in the UK Consortium on AIDS and Interventions Development's (2013) list of recommended practises.

1.6.1 Male and female condoms promotion

Sanderson & Yopyk (2007) Students who had received one of two condom-promotion videotapes expressed stronger self-efficacy and intentions to avoid unprotected sex than those who had not received either videotape at follow-up. They were more likely to report using a condom during their last sexual encounter with their partner, and those who watched the female presenter were more likely to report using condoms consistently. To sum it up, the researchers discovered that both videos had an equally positive effect on participants' feelings of self-efficacy and intentions, although the film promoting condom use had a greater impact on men than women. The findings of this study show the necessity of educating young people about the benefits of using both male and female condoms.

Whiting *et al*. (2019) carried out a study with the purpose of identifying behavioural interventions that increased condom use behaviours and or intentions among college students. They found out that included modules to increase self-efficacy for condom use, taught participants where to get condoms and how to negotiate condom use with partners, or elicited positive associations toward condoms and saw increased condom use or intention to use condoms.

In Brazil,Moreira *et al*.(2020) reported that promoting condom use among university students may have relied on the availability of condoms, the empowerment of individuals to make decisions about their own sexual and reproductive health. Additionally there was continuous and comprehensive sexual education, as well as action against the myth of invulnerability to HIV and other Sexually Transmitted Diseases among university students of different age groups. They showed that the type of relationship that university students established with their partners had an influence on the adoption or not of condom use.

Knights*et al*. (2021) reported about "*The Kinsey Institute Home-Based Exercises for Responsible Sex* (KIHERS)" with the goal of reducing condom-related errors and issues, increasing self-efficacy and improving attitudes about condoms among young women using a pleasure-focused intervention. Testing whether or not an adapted version of KIHERS (Home-Based Exercises for Responsible Sex–UK) was effective, viable, and acceptable to young women aged 16–25 years in the United Kingdom was the goal of this study (HERS-UK). HERS-UK was successfully deployed in a college or university setting, and the recruitment approach was successful. As the authors point out, the preliminary feasibility study provided an early indication of the intervention's effectiveness and acceptability, and its positive effects on young women.

While condoms were readily available on campus, some female students lacked the confidence to use or accept them. The Department of Health also provided free, unscented 'Choice' condoms, which were not associated with any particular brand. The flavoured male condoms were a popular choice among students who took the 'Choice' condoms.

According to SIDA (2010), there was a high rate of condom use among university students in Kenya. The condom dispensers that were set up on the grounds of numerous colleges and institutions, on the other hand, were grossly inadequate. Condoms were only accessible in dispensers at several universities during the first two weeks of the semester in some cases. Students bought them as needed for the remainder of the semester. Some students didn't know how to properly use male condoms, so their use was deemed improper. Furthermore, some men complained that male condoms were occasionally undersized and of low quality. Most students had never seen a female condom because they weren't available at the universities where the research was conducted. Male condoms accounted for 96.5 percent of the condoms used during the most recent sexual encounter, whereas female condoms accounted for 2.8 percent. Only 0.6 percent of respondents (14 persons) used both. Two-thirds of respondents reported using condoms during their most recent sexual encounter. Last but not least, the majority of students surveyed were aware of where they could get condoms on campus (SIDA, 2010).

Immonje (2016) In Western Kenya, 61.6% of students said they used a condom the last time they had sex, and students were more likely to use condoms during casual and commercial sex/outside relationships. Despite this, the author discovered that even students in long-term relationships did not use condoms on a regular basis. Nzioka et al. (2007) also claimed that college administrators in Kenya were reluctant to sanction the distribution of condoms to students for fear that it would be interpreted as an encouragement of immorality. In one of the schools, there was a large supply of condoms in the dispensary that was ready to expire since the school's principal allegedly failed to offer clear instructions on how these condoms may be dispersed within the school. On the question of condom distribution in teachers training colleges, the Ministry of Education Sector Policy on HIV was considered to be agnostic (Nzioka *et al*., 2007).

In Sudan, Thorpe *et al.*(2021) reports stated that politicians and policymakers opposed condom use and

resisted condom distribution programmes at campuses. There is no doubt that religious leaders have a significant impact on students' attitudes on sexual activity outside of marriage, which is why they oppose condom use and distribution. Supporters of condom use included HIV counsellors and others in the healthcare field. Many students who were sexually active spoke about how they pushed their peers to use condoms whenever they engaged in sexual activity.

Ajayi *et al*. (2019) also showed that only 38.6 percent had used condoms consistently in the preceding year among sexually active individuals. A higher likelihood of using condoms consistently was found in individuals who had higher levels of condom self-efficacy, talked about HIV and STDs with their sexual partner, knew their partner's HIV status, attended school in an area with a high prevalence of HIV, and only had sex with a steady partner. The lack of condom availability, distrust, dislike of condoms, and a sense that condoms limit sexual pleasure were the most common reasons given for irregular condom use, according to researchers. Students in South Africa showed favourable attitudes toward condom use in a study conducted by Mbelle et al. (2018). For the most part, students said they felt comfortable taking a package of condoms from a shelf that was out in the open.

While condoms were readily available on campus, some female students lacked the confidence to use or accept them. The Department of Health also provided free, unscented 'Choice' condoms, which were not associated with any particular brand. The flavoured male condoms were a popular choice among students who took the 'Choice' condoms. That's what they were saying: if the Department of Health had been hoping to get young people to use condoms more often, they would have had to compete with the branded condoms, which were more appealing and offered more possibilities than the non-branded "Choice" condoms. Another issue was the lack of condoms for LGBTI students. Some LGBTI students reported feeling left out of HEAIDS campaigns because of the lack of access to protections like dental dams and lubricants, which they needed but were not always available on campus or during campaigns. They claimed that when it came to the distribution of condoms, government programmes failed to reach certain groups of people.

Meanwhile, Kanda & Mash (2018) indicated that the reasons young people do not use condoms are the desire to have children, an apparent lack of trust or loyalty, long-term relationships, the want to satisfy the partner, and decreased enjoyment. Other contributing variables include a lack of awareness of the advantages, a reduced fear of HIV infection due to the availability of treatment, the impact of tradition, alcohol and drug misuse, peer pressure, power and gender conflicts, and the reluctance of the partner. Because of its size and the idea that it was difficult to implant, the female condom was overwhelmingly rejected by young people in general and by women in particular. Anti-HIV prevention programmes should take into account the factors that influence the use of condoms by young adults, including a new belief that HIV is no longer a major worry.

In the study by Ochieng & Maiyo (2008), Also shown was how widely available condoms had been at Kenyan colleges, yet how poorly they were received by the student body. Female condoms had not been readily available compared to male condoms, and most males chose not to use condoms at all because they had to get their partner's permission to use them.

1.6.2 Provision of Sexual and Reproductive Health services

Gomez Camargo *et al*. (2014) investigated the state SRHof students was in at a public university in the Colombian Caribbean, with emphasis violence, STDs, pregnancy fertility and sexuality.In 2010, the researchers carried out a cross-sectional survey among respondents who completed a self-administered survey. The respondents were on average 20 years old, and from the urban areas. They were also predominantly heterosexual (89.7 %), with a sexual debut of less than 18 years old, promiscuity level of 11.8 % and 55% use of the male condom as a Family Planning Method. Furthermore, due to low education about HIV transmission routes, high risk behaviour (sex/alcohol/drugs), serological tests for sexually transmitted diseases, and despite their prior knowledge of sexual health, STDs, and FPMs, they failed to act in accordance with that knowledge. They found that 12.3 percent had been pregnant, 21.6 percent had engaged in physical violence, and 4.6 percent had been sexually abused, with the majority of victims remaining silent (61.8 percent).

Habel *et al*. (2018) reported that 70.6% of colleges in their study had reported having a health center of which 73.0% offered Sexually Transmitted Infections diagnosis, treatment and contraceptive services. They added that Health Centers less frequently offered Long-Acting Reversible Contraception (LARC), express Sexually Transmitted Infections testing and self-collection. They added that vaccination for Human papillomavirus (HPV) was also available at more colleges that had 4-year courses and non-Minority Serving Institutions. Regarding Men who have Sex with Men-targeted services, they stated that 54.6% of clinics in Institutions of Higher Learning offered pharyngeal and 51.8% offered rectal Sexually Transmitted Infections testing. The researchers concluded that 2-year colleges required additional support with providing sexual health care to students of which possible improvements entailed increasing express testing, extra-genital Sexually Transmitted Infections testing, and Long-Acting Reversible Contraception.

In Nepal Pandey *et al*. (2019) found that teenagers in Nepal suffer difficulties getting sexual and reproductive health treatments from adolescent-friendly health facilities. Using their data, the researchers

concluded that the features of health care providers, institutional health care hurdles, a lack of privacy and confidentiality, lack of information about adolescent-friendly health services, as well as socio-cultural norms and attitudes toward teenagers' use of adolescent-friendly health services, all contributed to the low use of these services by adolescents.

According to Odo et al. (2018), teenagers in Enugu State, Nigeria, have access to physical but not financial access to sexual and reproductive health care. Adolescents may have difficulty accessing sexual and reproductive health care if there are no clinics specifically for them, according to reports. Access to sexual and reproductive health care was found to be strongly correlated with both one's level of education and one's household income. The vast majority of young people (86.7%) said they had access to safe maternity services, and 67.5% said they had access to services for HIV/AIDS prevention and treatment. The vast majority stated that these programmes were easily available, but only a small percentage of teens could afford them financially. A closer look at the qualitative data revealed that there were no specific services for adolescents, only generic ones. Finally, the researchers found that having access to Sexual and Reproductive Health Services was strongly influenced by factors such as age, education, and wealth.

In the study by Alomair *et al*. (2021), sexual and reproductive health was described as a multifaceted issue influenced by individual, familial, environmental, sociocultural, religious, and institutional variables. Unmarried status was also identified as a significant obstacle to getting sexual and reproductive information and services, with ignorance representing modesty and chastity. In addition, parental control was seen as a barrier to obtaining knowledge and gaining access to needed healthcare treatments. According to reports, schools contribute to a lack of understanding by having teachers remove sexual and reproductive health-related topics and avoid addressing related queries.

According to Ndayishimiye *et al*. (2020), there are three primary degrees of impact, which involve altering the Sexual and Reproductive Health experiences, decisions, and behaviours of young women. These were identified as interpersonal influences, communal impacts, and macrosocial effects, according to the respondents. In the study, health care providers reported that adolescents had satisfactory access to Sexual and Reproductive Health Services, including accurate Sexual and Reproductive Health information, contraceptive methods, prevention and management of Sexually Transmitted Infections and HIV services, and counselling. However, it was claimed that access to certain services remained limited. Some items, such as female condoms, were less in demand and frequently expired before being supplied, according to research respondents. In addition, they discovered that 94.3 percent of health facilities supplied teenagers with information about accessible Sexual and Reproductive Health services, and that 51.6% of facilities claimed to offer low-cost treatments. Only 57.2% of respondents indicated that adolescents participated in the design of feedback mechanisms at their facility.

In the other categories, the number of sexual and reproductive health products that were out of reach for most people ranged from 2 to 9. Furthermore, the accessibility of Sexual and Reproductive Health commodities was low throughout the countries, with Kenya's and Zambia's public sectors having six commodities fulfilling the accessibility requirement, while the private sector of Uganda had only one. Ampt et al. (2020) observed that among Kenya's female sex workers (FSWs), unintended pregnancy and HIV infection rates were both high, but there were little health promotion activities to address FSWs' contraceptive requirements or other SRHR concerns. "WHISPER" mobile phone intervention was created and implemented using a participatory development strategy and behaviour change theory to address these high-priority concerns of female sex workers in Mombasa, Kenya.

The intervention framework specified six Sexual and Reproductive Health and rights Female sex workers saw these domains as extremely important. Social cognitive techniques for improving knowledge, outcome expectations, skills, and self-efficacy were well-received by workshop participants, according to their reactions to the intervention's content. Most participants claimed they would spread the word about the positive effects of the content. On-demand contraceptive information and motivational messages were part of a 12-month SMS (Short Message Sending) initiative that included stories of behaviour change among female sex workers and role models.

1.6.3 Promotion of Voluntary Medical Male Circumcision

According to Salud (2015) it was projected that 3.4 million new Voluntary Medical Male Circumcisions could stop the spread of HIV from 2015 to 2025. According to the author, communities that had successfully implemented Voluntary Medical Male Circumcision (VMMC) had lower rates of HIV infection. International guidelines now include the delivery of male circumcision as part of the usual practice, according to WHO (2017). To put it another way, this may be observed for example in the World Bank's Disease control priorities as a vital surgical procedure and in WHO's evidence-based interventions for adolescents in high HIV load areas (WHO, 2017). Complementing UNAIDS 2020's goal of 73 percent viral suppression with a 90 percent coverage rate of voluntary medical male circumcision among men aged 10–29 years, the Fast Track HIV prevention targets have been claimed to necessitate 90 percent coverage of medical male circumcision.

Atkins*et al*. (2020) indicated that the limited evidence on interventions that improved access and

acceptability showed promising results, but that there were still gaps in the evidence because the interventions were not always defined and delivered the same way. This was partly because the context was not always clear and there wasn't enough information on how old the people were. More than twenty-three articles from 10 of the 14 priority countries studied by Carrasco and colleagues (2019) were included. Negative impressions of Voluntary Male Circumcision, fear of pain, and misunderstandings about its usefulness or necessity were the most common reasons mentioned for the lack of interest in Voluntary Male Circumcision. According to most countries, Voluntary Medical Male Circumcision lowered health risks and improved personal hygiene, as well as increased sexual satisfaction for both men and their families.

In spite of this, the data suggested that the quality of procedures in Voluntary Medical Male Circumcision initiatives in low-resource settings was substandard, and more crucially, that the pursuit of ambitious public health goals may undermine service delivery and protocol adherence. Thus, it was necessary to design new or alternative approaches to achieve a balance between the goals of boosting service adoption and conducting Voluntary Medical Male Circumcision responsibly (Gilbertson et al., 2019). Between 2011 and 2016, the incidence of HIV in Siaya County, Kenya decreased significantly due to the expanding use of antiretroviral medication and male circumcision for medical purposes. It was hypothesized that Voluntary Medical Male Circumcision, but not antiretroviral therapy, has a direct protective effect, possibly because antiretroviral therapy is typically administered to those with advanced HIV infection. However, HIV incidence was reported to be still high and far from the elimination goal of one per 1000 people (Borgdorff *et al*., 2018).

1.6.4 Provision of antiretroviraldrugs

In 2012, the U.S. FDA approved the first HIV Pre-Exposure Prophylaxis (PrEP) drug, which is reported to be approximately 99 percent effective when taken as prescribed (Grov et al., 2021). Despite the fact that the primary aim of PrEP is to prevent HIV infection in the event of exposure, it has also been reported that the medicine has had a major impact on a variety of sexuality-related factors. PrEP is reported to strengthen sexual autonomy, boost sexual self-esteem, enhance sexual enjoyment, and lessen sexual anxiety in individuals who use it. For many, PrEP has also functioned as a gateway to enhance regular health and increase utilisation of sexual health care.

PrEP is not meant to minimise condomless anal intercourse or sexually transmitted infections, but rather to prevent HIV transmission, according to some contradictory research (Grov et al., 2021). In the United States, the American College Health Association (ACHA) underlined that the ongoing HIV epidemic was an important health priority that its members were required to embrace. The American College Health Association supported widespread access to HIV pre-exposure prophylaxis (PrEP) in college and university health services. By giving PrEP as a regular health care service, college health was uniquely positioned to have a substantial impact on the health of young adults in the U.S., they argued (ACHA, 2021).

In a study by Shrestha et al. (2018) evaluating PrEP delivery programmes at colleges and universities, PrEP acceptability ranged from 30.6% to 86.3%, with a mean of 56.2% across eight hypothetical PrEP programme scenarios. The PrEP programme scenario with the highest acceptability had the following levels of attributes: insurance coverage, daily dose, 95% efficacy, no side effects, treatment at an HIV clinic, and HIV testing required every six months. The cost of PrEP was the most relevant characteristic, followed by its efficacy and adverse effects; other characteristics were insignificant. Their findings indicated that PrEP is very acceptable in response to several PrEP programme situations with varying attribute profiles. Even with poor PrEP effectiveness, test-and-treat and PrEP were anticipated to be cost-effective HIV prevention strategies for men who engage in sexual activity with other men, according to the results of a study. Using a combination of these biological approaches, eradication of HIV is reportedly possible within the next two decades.

PrEP for HIV prevention should be evaluated for implementation among high-risk Chinese men who engage in sexual activity with other men (Li et al., 2018). According to Ajayi et al. (2018), Nigerian university students had low levels of awareness, knowledge, and usage of pre-exposure and post-exposure prophylaxis. Awareness of pre- and post-exposure prophylaxis was connected with recent HIV testing, awareness of a partner's HIV status, condom use, and the exchange of nude photographs. In addition, according to Kumar & Ratnaprabha (2019) in India, nursing students in central Karnataka had poor awareness of HIV and post-exposure prophylaxis.

SIDA (2010) disclosed that university HIV and AIDS programmes in Kenya were linked to a variety of organisations and entities for financial support, information sharing, and quality assurance. With MoPHS, NACC, and NASCOP, ties and alliances have been formedștiințiin Universities supplied monthly reports to the MoPHS including trends, types of diseases treated, number of patients, and HIV Counseling and Testing data. Reporting to these national authorities was required since it facilitated the procurement of antiretroviral medications and testing kits for HIV Counseling and Testing. Individual Universities had also forged unique alliances. Moi University, for example, had partnerships with AMPATH, ICL (I choose Life Africa), Walter Reed, ACCESS – Canada, the Red Cross, CIDM PEACE, and the Rotary club. Access –Kenya, APHIA II, KANCO, Association of African Universities, African Union/Agriculture Water Use Survey, UNESCO, CHE, and FKE were all

affiliated with Baraton University. At Moi and Maseno Universities, as well as the University of Nairobi, it has been reported that antiretroviral medications are provided to infected individuals.

Nzioka *et al*. (2007) regarding the dispensing of antiretroviral medications, campus pharmacies were reportedly hampered in two ways. First, the dispensary employees lacked the necessary qualifications. In one of the colleges they visited, the officer in charge of the clinic was a certified nursing assistant. According to reports, this officer lacks the skills necessary to provide basic treatments for HIV-related disorders. Second, the dispensaries lacked the necessary materials and equipment to treat HIV-related infections. The continued existence of these restrictions was attributed by colleges to the Ministry of Education's low budget allocations. Nzioka et al. (2007) advised that such organisations provide services such as mobile HIV Counseling and Testing and a clear referral system so that persons diagnosed with HIV might receive antiretroviral medications and counselling services in a more anonymous setting. In two of the three visited institutions, collaboration with non-governmental organisations and government health services was observed, although researchers reported that this link might be reinforced.

1.6.5 Provision of HIV Testing and Counseling services

According to Logie *et al*. (2017), student participant narratives revealed social-ecological barriers and facilitators to HIV testing. Mistreatment by healthcare providers, breaches of confidence, and HIV-related stigma were among the difficulties they encountered. Furthermore, healthcare providers' discrimination and judgment in HIV testing providing resulted in participants concealing their sexual orientation and/or gender identity as a result. According to Sileo *et al*. (2018), confidentiality concerns typically included clinic physical arrangements that divided HIV testing from other health services, as well as the fear that healthcare workers might disclose the client's status publicly. They also mentioned that they were worried that their classmates would find out they were getting tested at lesbian, gay, bisexual, and transgender-friendly clinics. HIV-related stigma also led to the anxiety of testing HIV-positive, which collided with the "gay sickness" stigma of HIV. HIV-positive participants also feared abuse from healthcare providers. A combination of individual, social, and structural variables were cited by participants as contributing to an increase in HIV testing uptake. According to their findings, there was a low prevalence of HIV testing among college-age men who engage in sexual activity with other men. There was a lot of trust between the men who had sex with men in college and their partners, so they didn't get tested for HIV. They also had a smaller pool of sexual partners. It was discovered that 42.3% of them had never been tested for HIV (Marshall *et al*., 2020).

Meanwhile, He*et al*. (2019) conducted a study to discover additional HIV-effective test and intervention methods and to meet the first 90 of the 90–90–90 goal. Researchers in China aimed to create and test a novel HIV anonymous urine test vending machine at university campuses. 11 vending machines were installed in seven (7) trial colleges between June and December of 2016, mostly in the regions of Sichuan, Yunnan and Heilongjiang. 957 HIV urine collection kits were given out free and through vending machines; 378 (39.5 percent) urine samples were returned and 376 (99.5 percent) qualified for testing in professional laboratories. Using an ID code, participants were able to access confidential test results online. Only seven (1.86%) of the urine samples tested positive for the presence of bacteria. More than two-thirds of participants (255/376) checked for test results online, 72.2% of kits were purchased in dormitories and 27.8% in teaching buildings, and 88.9% were purchased between 21:00 and 24:00, providing direction for stakeholders on where to give HIV testing and at what time of the day.

In Ethiopia, biomedical strategies for Institutions of Higher Learning were organised at a National scale by National Alliance for State and Territorial AIDS Directors (NASTAD). Eight HIV testing campaigns allowed more than 8,000 students to be tested, and six institutions received HIV counseling/testing and one syndromic training (NASTAD, 2021). The University of Pretoria, according to (Grundling & Pillay, 2003), used a peer education model in which trained student volunteers provided counselling. Through Memorandums of Understanding with the Universities of Botswana, Lesotho, Namibia, and Swaziland, the "Future Leaders @ Work" initiative was exported and implemented in the aforementioned Southern African Democratic Community countries. The South African Department of Health recognised this facility as an official site for HIV Counseling and Testing. A study by Asante (2013) found that more than half of the private university students in Accra, Ghana, had never been tested for HIV, despite the fact that nearly all of them were aware of where to get HIV counselling and testing.

Cheruiyot *et al*. (2019) revealed that the utilisation of institutional HIV Counseling and Testing services among sampled university students was 45 percent in a population where 84.4 percent were aware that these services were available on their campuses. Additionally, more men than women were found to have utilised the services. The survey revealed that participants utilised the services for a variety of purposes. Accessibility to the testing site, testing hours, the fear of being observed at the testing site, and the fear of the test results were also found as factors influencing service uptake. When questioned about the ideal attributes of an HIV Counseling and Testing centre on campus, students similarly cited these factors.

1.6.6 Provision of testing and treatment of Sexually Transmitted Infections

Habel *et al*. (2018) reported that 70.6% of colleges in their study had reported that they had a health centre of which 73.0% of these health centres offered Sexually Transmitted Infections diagnosis and treatment, express Sexually Transmitted Infections testing and self-collection. Human papillomavirus vaccination was also available at colleges that offered 4 year programmes and non-Minority Serving Institutions. Regarding Men who have Sex with Men-targeted services, 54.6% of clinics in institutions offered pharyngeal and 51.8% offered rectal Sexually Transmitted Infections testing.

In a different study by Martin-Smith *et al*. (2018), which was carried out among 1294 sexually active students with a mean age of 23.61 years, it was discovered that amongst the participants, knowledge of Sexually Transmitted Infections and testing was relatively high, and students held generally favourable attitudes about testing. Additionally, 52% reported ever having a Sexually Transmitted Infections test while 13% intended to have one in the next month. The researchers discovered that being female, older, a postgraduate, longer UK residence, Sexually Transmitted Infections knowledge, perceived susceptibility, subjective norms, attitudes and self-efficacy all positively predicted past Sexually Transmitted Infections testing behaviour. Furthermore, the study discovered that perceived susceptibility to Sexually Transmitted Infections and social norms positively predicted intentions to have a Sexually Transmitted Infections test in the next month while perceived susceptibility also predicted past high-risk sexual behaviour.

Moreover in a study by Denison *et al.* (2018) five drivers for Sexually Transmitted Infections testing were identified as crisis, partners, clinicians, routines, and previous knowledge. The final driver, previous knowledge, intersected with the previous four, particularly in relation to routines. Many participants acknowledged that the more they knew about Sexually Transmitted Infections the more likely they were to undertake routine tests. However, at the same time, many participants felt they did not have a good knowledge base and that their school-based sex education had been lacking. Alhassan *et al*. (2019) also conducted their study in one public university in the Greater Accra region.They determined factors associated with adolescents and young adult population's usage of mobile phones in the education and prevention of Sexually Transmitted Infections and found that male young adults and young adults who owned a smart phone were more likely to use mobile phones for education and prevention of Sexually Transmitted Infections.

According to Nzioki *et al*. (2007), all the colleges they looked at in Kenya had clinics where the students could get health care. They observed, however, that the dispensaries lacked essential drug supplies, equipment, and skilled personnel. According to them, this rendered them unable of successfully addressing college health issues, especially opportunistic infections. According to reports, the Shanzu Teachers Training College dispensary was in a particularly dismal state, lacking basic facilities and managed by unqualified employees with no HIV training. According to reports, the surge in instances of Sexually Transmitted Diseases and HIV-related opportunistic infections has exceeded the capacity of institutional facilities, particularly at the Migori and Shanzu Teachers Training institutions. Researchers suspected that many students with Sexually Transmitted Diseases (STIs) or opportunistic infections avoided campus facilities out of fear of disclosure. In addition, the college dispensaries relied mostly on district and private hospitals in the vicinity of Teachers' Colleges for referrals.

1.6.7 Provision of Needle and Syringe Programmes

Adimora & Auerbach (2014) Explain that syringe exchange programmes are an intervention aimed at reducing the risk of disease transmission in the setting of ongoing drug use. Typically established by community-based organisations and advocates, these initiatives have showed efficacy in lowering HIV transmission, cost-effectiveness, and do not promote injection drug use (Hurley et al., 1997; National Institutes of Health, 1997; Lurie *et al*., 1998; Holtgrave & Pinkerton, 1997; Centers for Disease Control and Prevention, 2005). Platt *et al*. (2017) identified an additional 28 studies, 13 of which were from North America. Opioid Substitution Therapy was related with a 50% reduction in Hepatitis C Virus acquisition risk, constant across regions and with low heterogeneity, according to a meta-analysis of five studies from the United Kingdom, Europe, Australia, and China. The policy–legal reform in the United States that permits government funding of syringe exchange programmes and the guideline documents created by federal agencies for the use of such monies comprise a structural intervention that should have a considerable influence on the drug use–driven HIV and hepatitis epidemics in the United States. This should reduce certain racial discrepancies in HIV infection rates (Adimora &Auerbach, 2010).

1.6.8 Provision of Opioid Substitution Therapy

Fernandes *et al*. (2017) In their investigation, thirteen systematic reviews and 133 relevant, unique papers published between 1989 and 2012 were included. Needle and Syringe Programmes were found to be efficient in reducing HIV transmission among People Who Inject Drugs, whereas the reduction of Hepatitis C Virus infection had mixed results. Full harm reduction interventions offered at the structural level and through multi component programmes, as well as a high level of coverage, were found to be more advantageous. Additionally, Platt *et al*. (2017) discovered that current use of Opioid Substitution Therapy lowered the probability of Hepatitis C Virus infection acquisition by fifty percent compared to no intervention. The intervention impact was found to

be substantial, but the evidence was of poor quality because it was collected from observational studies with a high risk of bias (Van Den Berg *et al*., 2007; Crofts *et al*., 1997; Nolan *et al*., 2014; Thiede *et al*., 2000; Tsui *et al*., 2014). Despite the recent drop in the proportion of new HIV cases directly attributed to injection drug use, injection drug use remains a significant cause of HIV, particularly among sexual partners.

Simultaneously, the scale-up of Opioid Agonist Therapies (OAT), Syringe Services Programmes (SSPs), and antiretroviral therapy (ART) have remained low, contributing to an unstable HIV epidemic among persons who inject drugs (PWID). Despite the recent drop in the proportion of new HIV cases directly attributed to injection drug use, injection drug use remained a significant cause of HIV, particularly among sexual partners. Simultaneously, scale-up of OAT, SSPs, and ART had remained modest, contributing to a dynamic HIV epidemic among injection drug users (PWID) (LaMonaca *et al*., 2019).

1.8 Findings

Research findings are presented in this section.

1.8.1 Overall effectiveness of biomedical strategies

Table 1 presents biomedical strategies used to Mitigate HIV Risky Sexual Behaviour and students' level of HIV Risky Sexual Behaviour in Institutions of Higher Learning in Western Kenya.

Table 1: Biomedical strategies used to mitigate HIV Risky Sexual Behaviour

Biomedical interventions Impact on students' sexual and reproductive choices/decisions	**Low sexual risky behaviours (n=130)**	**High sexual risky behaviour (n=269)**	**X^2**	**P-value**
Promotion of sex and reproductive health services	53.4	46.6	16.870	0.000***
Male and Female Condoms promotion	57.0	43.0	9.943	0.002***
Provision and testing of STIs	61.9	38.1	6.986	0.008***
Provision of ARVs	60.5	39.5	18.048	0.000***
Accessibilityof ARVs for the students				
Health care service providers away from the institution	78.3	21.7	4.969	0.026**
NGOs/CBOs around the institution	22.2	77.8	8.959	0.003***

**p>0.1 **p>0.05 ***p> 0.01 statistically significant between strategies and level of HIV Risky Sexual Behaviour*

Source: Field data, (2020)

The p values were used to show the level of significance/differences between the waves. Null hypothesis was rejected if p-values were $p<0.1$ at 90 % confidence level; $p<0.05$ at 95 % confidence level; and $p<0.01$ at 99 % confidence level (meaning there was statistically significant evidence or difference between the low and high Risky Sexual Behaviours among students in reference to background information, and the study objectives.

This implies that this mitigation strategy applied is successful in mitigating HIV Risky Sexual Behaviour. In addition, following the Chi-square test in table 1, regarding male and females condoms promotion the study shows that there is a statistical significance with p-value = 0.002 among the two categories of HIV Risky Sexual Behaviour (High Risky Sexual Behaviour and Low Risky Sexual Behaviour). This implies that the mitigation strategy applied is successful in mitigating HIV Risky Sexual Behaviour. Moreover, following the Chi-square test In table 1, regarding Provision and testing of Sexually Transmitted Infections the study shows that there is a statistical significance with p-value = 0.008 among the two categories of HIV Risky Sexual Behaviour (High Risky Sexual Behaviour and Low Risky Sexual Behaviour). This implies that the mitigation strategy applied is successful in mitigating HIV Risky Sexual Behaviour. Moreover, following the Chi-square test in table 1, regarding provision of ARVs the study shows that there is a statistical significance with p-value = 0.000 between the two categories of HIV Risky Sexual Behaviour (High Risky Sexual Behaviour and Low Risky Sexual Behaviour). This implies that this mitigation strategy is successful in helping students in mitigating HIV Risky Sexual Behaviour. In this regard, the strategies employed were successful in linking the students to ARVs at a p-value = 0.026 level with Health care service providers away from the institution at a p-value = 0.003 with NGOs/CBOs around the institution.

The most successful biomedical interventions were found to be the provision of ARVs along with promotion of sex and reproductive health services and provision of HIV counseling and testing services. These were followed by the promotion of male and female condoms and finally the provision and testing of Sexually Transmitted Infections. The other biomedical interventions such as promotion of Voluntary Medical male Circumcision, provision of needle and syringe programmes and provision of opioid substitution therapy were found to be lacking.

1.8.2 Male and female condoms promotion

Majority 272 (68.2%) of students in Institution of Higher Learning shared that promotion of male and female condoms were effective while 74 (18.5%) shared that they were somehow effective. A few 53 (13.3%) shared that the male and female condoms promotion was not effective. As much as majority of respondent opinion was that the promotion of male and female condoms was effective, there was still an over 30% gap in achieving maximum condoms promotion effectiveness, which stakeholders need to look into.

In a study carried out by Mbelle *et al*. (2018) done in South Africa, Students exhibited favourable sentiments concerning the use of condoms. The majority of respondents responded that they felt comfortable taking a pack of condoms posted in public locations of campus. However, the issue was on female students who lacked the confidence to take or accept condoms displayed on campus. In addition, the Department of Health's unbranded 'Choice' condoms were odourless and easily accessible. While students accepted the 'Choice' condoms, many preferred and favoured the flavoured brand-name condoms. They stated that if the Department of Health had wished to increase the use of condoms among young people, supplied condoms would have had to compete with branded condom ranges, which appeared more appealing and offered more options than the generic 'Choice' condoms. The lack of condoms for minority groups such as Lesbian, Gay, Bisexual, Transgender, and Intersexual (LGBTI) students was also noted as a problem. The majority of Lesbian, Gay, Bisexual, Transgender, and Intersexual (LGBTI) students reported feeling excluded from Higher Education and Training HIV and AIDS (HEAIDS) campaigns due to the limited availability of protection techniques such as dental dams and lubricants. Concerning the distribution of condoms, they argued that government programmes had neglected critical communities.

The Key Informants who admitted to having programmes that provided male and female condoms specifically targeting first year students included deans of students of; Tom Mboya University College, Rongo University, Great Lakes University of Kisumu, Alupe University College, Lugari Diploma Teacher Training College; The County Government of Kakamega; Homabay Hospital, Bondo Hospital-Siaya, *Medicines Sans Frontieres* in Migori, Mbita Community Based Organisation, and Compassion International Kenya in Busia County. A Key Informant from Ampath PLUS-Siaya County reported that:

> We have *Freshers* comprehensive health talk where HIV is the main topic.
> We teach students how to use condoms and how to access condoms

Stakeholders can be seen to be putting effort towards creating awareness on the use of condoms and these efforts should further enhanced. Some Key Informants admitted that they did not have programmes specifically targeting first year students at all. At Ampath PLUS Siaya there was a complaint of condoms usually stocking out. In studies conducted by other researchers, Higher Education and Training HIV Programme(2010) in South Africa reported that HIV prevalence increased with age. According to Blignaut *et al.* (2010), these figures highlighted the importance of specifically targeting first-year students to help ensure that they did not become infected with HIV.The onset of tertiary education is reported to be an especially vulnerable stage for young peopleby (Selikow *et al*., 2009; Mutinta, 2012; Blignaut *et al*., 2015) who confirmed the immense pressure on the students to engage in HIV Risky Sexual Behaviours at this time. Blignaut *et al*. (2015) added that to compound the issue many students come from schools where they had not received adequate and accurate information about HIV.A Key Informant from the Tom Mboya University College clinic reported thata high population of students does not use condoms therefore they are at risk of getting HIV. In the Focus Group Discussions held with students from Rongo University, a female participant reported that condoms were distributed in hostels on campus but were only spotted once or twice per semester, which was insufficient. Once they were placed in the morning, by evening they were finished. The students were nevertheless happy with the type of condoms they were given.In the Focus Group Discussion held with participants from Lugari Diploma Teachers Training College, a male participant expressed that there were free condoms available on campus within the hostels and they were happy with the service through he expressed that he felt that the availability of condoms increased immorality. Meanwhile in the Focus Group Discussion held with students from Kenya Medical Training College in Bondo and the one held with participants from Great Lakes University of Kisumu, condoms were reported to be available on campus and that they were sufficient in supply. Furthermore, a participant from Great Lakes University of Kisumu expressed that he liked the provided condoms at his College.

The dean of students of Lugari Diploma Teachers Training College reported that there was provision of condoms in strategic places within the campus while the official at Alupe hospital confessed that they had condoms provision for the students along with health talks. At the Kisumu National Polytechnic and official reported that there is a health director whose committee is given condoms for distribution to the students. He also added that they also put condoms in the washrooms for students.

1.8.3 Provision of Sex and Reproductive Health Services

The provision of Sex and Reproductive Health services in Institutions of Higher Learning was also considered. Majority 275 (67%) of the respondents admitted that sex and reproductive Health Services were provided to them while a low number 56 (14%) shared that these services were not provided for them. Another 67 (17%)

was uncertain about these provisions. Figure 1 demonstrates the extent to which students in Institutions of Higher Learning accessed Sexual and Productive health Services.

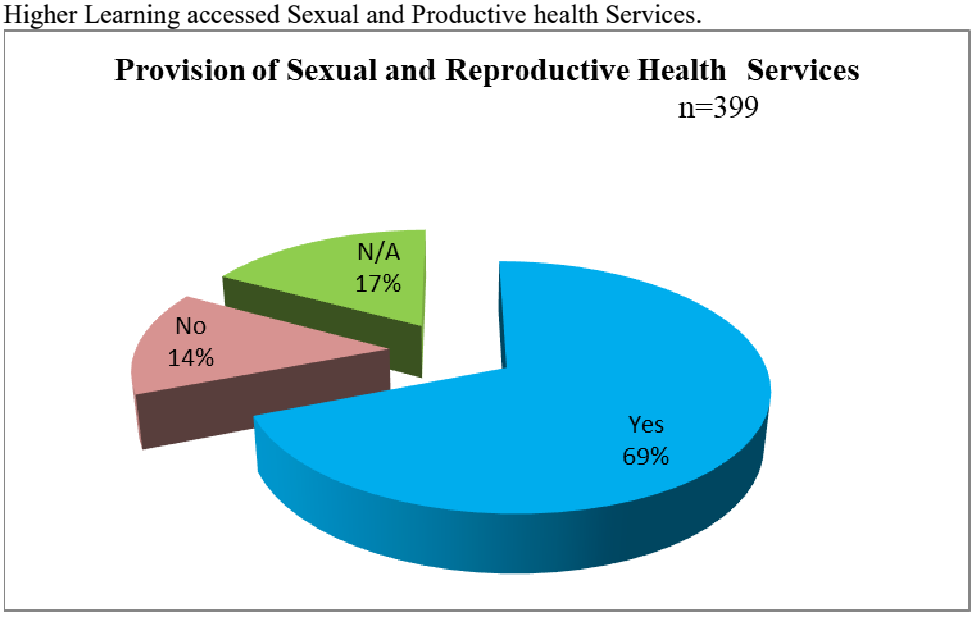

Figure 1: Extent of respondentsaccess toSRH Services
Source: Field data, (2020)

Figure 1 demonstrates motivation for students when accessing Sexual and Reproductive Health and HIV health care centers within or outside the College or University.

Table 2: Motivation for respondents in accessing SRH and HIV health care centers

Students' motivation	Male (n=202)	Female (n=197)	Total (n=399)
Time spent to be served	6.9	4.6	23 (5.8)
Access to medication	45.0	50.3	190 (47.6)
Competency of staff	5.4	8.6	28 (7.0)
Professionalism of staff	28.2	21.3	99 (24.8)
Other please specify	14.4	15.2	59 (14.8)

Source: Field data, 2020

It was discovered that time spent to be served affected 23 (5.8%) of the respondents of whom 14 (6.9%) were male while 8 (4.6%) were female. Access to medication affected 190 (47.6%) of the respondents of whom 99 (50.3%) were female while 91 (45.0%) were male. Competency of staff affected 28 (7.0%) of the respondents of whom 11(5.4%) were male while 17 (8.6%) were female. Professionalism of staff affected 99 (24.8%) of the respondents of whom 42 (21.3%) were female while 57 (28.2%) were male. There were other factors that motivated students when making a decision to access Sexual and Reproductive Health and HIV health care centers within or outside the College or University and these affected 59 (14.8%) of the respondents of whom 30 (15.2%) were female while 29 (14.4%) were male. These included; Privacy, confidentiality, anonymous location, to know HIV and health status, get more information on Sexual and Reproductive Health /HIV.

The majority 243 (60.9%) of students reported that there were dedicated spaces for students where they could access HIV and Sexual and Reproductive Health provisions. Just over one fifth, 90 (22.6%) reported that there were no dedicated spaces while 66 (16.6%) did not know whether these spaces existed or not. The majority 118 (59.9%) of female students reported that there were dedicated spaces for students where they could access HIV and Sexual and Reproductive Health Knowledge. Over one fifth 93 (23.4%) reported that there were no dedicated spaces while 67 (16.8%) did not know whether these spaces existed or not. The majority 125 (61.9%) of male students reported that there were dedicated spaces for students where they could access HIV and Sexual and Reproductive Health Knowledge.

One fifth 87 (21.8%) reported that there were no dedicated spaces while 65 (16.3%) did not know whether these spaces existed or not. From the Key Informants the following officials of organizations admitted to having set aside dedicated spaces where students of Institutions of Higher Learning could have access to Sexual and Reproductive Health information; Compassion International Kenya in Busia County, Tom Mboya University College at their clinic, County Government of Kisumu, County Government of Homabay, County Government of Migori-in nearby health facilities, Bondo Kenya Medical Training College, The Kisumu National Polytechnic, Lugari Diploma Teacher Training College, Alupe University College-at Kenya Medical Training Institute, Great Lakes University of Kisumu and AMPATH PLUS Bondo-Siaya County.

For those officials who reported that these dedicated spaced did not exist, they were; Homabay Hospital, Rongo University, Jaramogi Oginga Odinga Teaching and Referral Hospital Kisumu County, Alupe Hospital Busia, AMPATH PLUS, Bondo Siaya, County Government of Busia, Mbita Community Based Organization Homabay,Medicines Sans Frontiers Migori.Government of Kisumu official also said that they offered Sexually Transmitted Infections and Family Planning programmes to the students. The official from Medicines Sans Frontiers Non-Governmental Organisation in Migori reported that they offered safe abortion, contraceptives, and menstrual hygiene programmes.On the other hand, A Key Informant from Bondo Hospital mentioned that they provided the *Linda Mama* programme for pregnant students and he reported that:

> *Linda Mama* provides a package of Basic Health Services accessed on the basis of need and not ability to pay. It ensures that pregnant women and infants have access to quality and affordable health services

A health official gave a dissimilar report from Alupe Sub-County Hospital who reported that they had no Sexual and Reproductive Health programmes for the students. Officials of Jaramogi Oginga Odinga Teaching and Referral and Homabay Hospitals reported to also offer the "*Linda Mama*" programme, and the "*Afya Halisi*", programme that provides Ante Natal Care and Outreach programmes to students of Institutions of Higher Learning.

The County Government of Kakamega official reported that all mothers, students of Institutions of Higher Learning included could access Maternal Child Health care, Prevention of Mother to Child Transmission and Ante Natal Care. The County Deans of students also reported as follows; Tom Mboya University College said that they offered family planning and guidance and counselling; while Rongo University said they provided Reproductive Health Care in partnership with Marie Stopes and the Rongo Referral Hospital. According to the male respondents, 17 (8.3%) had gotten their partners pregnant while for the female respondents, 16 (8%) had ever been pregnant. For female students, 5 (2.3%) had experiences a miscarriage/abortion while studying at the University/College.

There are female respondents who had ever been pregnant at University/College. These were 32 (16%) of the female respondents. Half, 16 (50%) were from Rongo University; 1(3.1%) from Tom Boya University College, 5 (15.6%) from The Kisumu National Polytechnic, 1(3.1%) from Great Lakes University of Kisumu, 3 (9.3%) from Lugari Diploma Teacher Training College, none from Alupe University College and 6 (18.7%) from Bondo Kenya Medical Training College. Table 3 displays pregnancies among respondents while figure 2 presents miscarriages and or abortions among respondents.

Table 3: Pregnancies among respondents

	Female students: Have you ever been pregnant?							**Total**
	Rongo University	**Tom Mboya University College**	**The Kisumu National Polytechnic**	**Great Lakes University of Kenya**	**Lugari Diploma TTC**	**Alupe University College**	**Bondo KMTC**	
No	77	9	46	19	3	7	4	165
Yes	16	1	5	1	3	0	6	32
Total	**93**	**10**	**51**	**20**	**6**	**7**	**10**	**197**

Source: Field data, (2020)

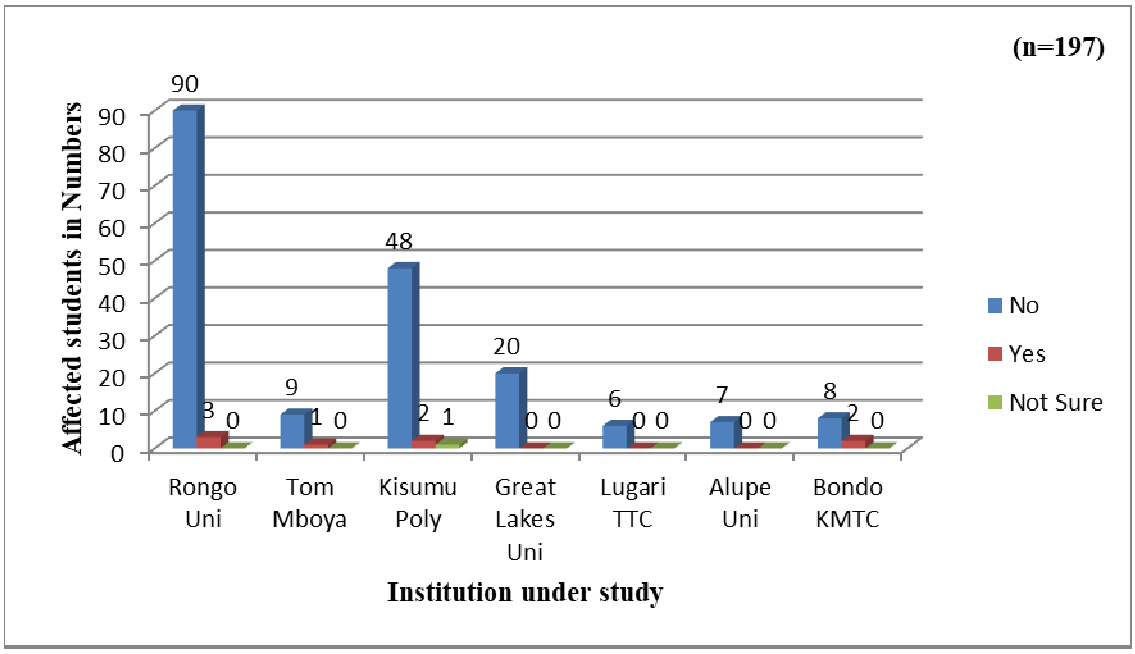

Figure 2: Miscarriages/Abortions among respondents
Source: Field data, (2020)

A female participant in the Rongo University Focus Group Discussion reported that Emergency Contraception was readily available at a cost to them in the chemists around campus but were not provided within campus. Nevertheless, contraceptive pills were available on campus at the clinic. In the Lugari Teachers Training College Focus Group Discussion, a female participant expressed that no contraceptives were available on campus. She expressed that availability of contraceptives would encourage promiscuity. Contraception use is one of the HIV risk-reduction measures considering that complications after unsafe abortions were responsible for causing 13% of maternal deaths in Kenya (Nduvi, 2015).

In a similar study carried out by Kara *et al.* (2019), there was relatively low utilization of contraception among female students in Institutions of Higher Learning in Dodoma, Tanzania, despite majority of the participants having knowledge of contraception. This seems to be a trend around Sub-Saharan Africa seeing, that a similar study carried out in Namibia by Mutsindikwa *et al.* (2019) also showed poor practices towards contraception from majority of the student population. It is therefore an issue of concern that in this study, the use of non-condom contraception was low among the respondents with majority 195 (61.2%) not ever having used any modern contraceptive method. To make the situation direr, over one third of respondents 99 (31.1%) had not discussed contraception methods with any of their sexual partners. For those who used contraception, condoms were the most preferred with 285 (89.3%) of users followed by the Emergency Contraception with 173 (54.3%) of users.

Oral pills were used by 102 (32%) and *depo provera*/injection by 81 (25.3%). Implants were used by 55 (17.3%) while the Intra Uterine Device was used by 26 (8%) of respondents. That the Emergency Contraception as opposed to longer term methods being more popular is a cause for concern as researchers point out the risks of using the Emergency contraception more than once or twice yearly. It also presents a negative picture on preparedness for sexual encounters by the students. Considering the high numbers of sexually active respondents, the uptake of contraception should be much higher. Regarding Key Informants on provision of contraception; The Dean of students at Bondo Kenya Medical Training College mentioned that his office provided condom distribution and family planning programs for both men and women. Figure 6.3 presents contraception provision among sexual active students in Institutions of Higher Learning in Western Kenya.

An official from the Jaramogi Oginga Odinga Teaching and Referral hospital expressed that they provided Ante Natal Care for pregnant mothers, which could also be accessed by the students around the hospital.They also held community outreach programs for the students of sexual and reproductive health. They additionally ran the Linda mama and Afya Halisi programmes through which students also benefitted. Meanwhile the Tom Mboya University College Dean of students confessed that they provided Family planning services distributed condoms. An official of The Kisumu National Polytechnic confessed that they provided Sexually Transmitted Infections programmes, birth Control, cervical cancer screening and that free WIFI is available to ease access to Sexual and Reproductive Health information. At Rongo University, the clinic head shared that Sexual and Reproductive Health outreaches were done within the institution by the organisation Marie-Stopes (AMUA).

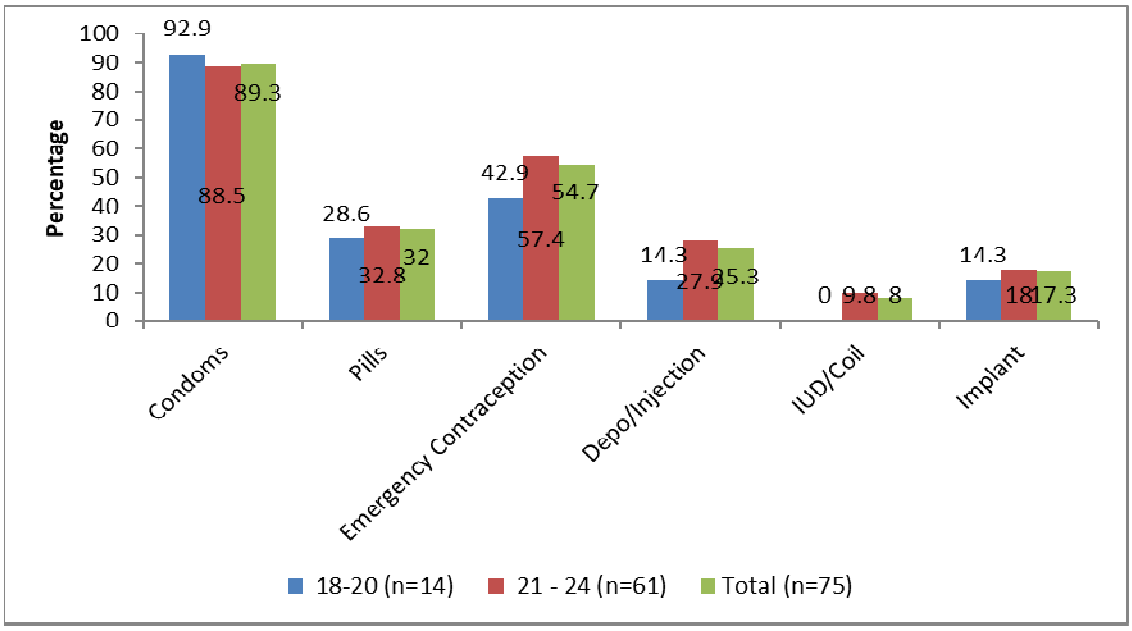

Figure 3: Contraceptive provisions among sexual active respondents
Source: Field data, (2020)

1.8.4 Promotion of Voluntary Medical Male Circumcision

Unfortunately, according to the survey, Focus Group Discussions and Key Informants, none of the institutions or organizations that took part in the research promoted Voluntary Medical Male Circumcision. This study poses a challenge to stakeholders to commit to strategies that will promote Voluntary Medical Male Circumcision among students in Institutions of Higher Learning in Western Kenya. This is particularly for pure scientists who are trained to provide majority of biomedical HIV prevention strategies.

1.8.5 Provision of Antiretroviral Drugs

A majority, 195 (96.5%) of males and 190 (96.4%) of females had knowledge of Antiretroviral Drugs were while 3 (2.5%) of females and an equal percentage of males did not have knowledge about Antiretroviral Drugs were. Similarly 2 (1.0%) of males and a similar percentage of females did not know what Antiretroviral Drugs were. Figure 4presents the knowledge of Antiretroviral Drugs among students and provision of Antiretroviral Drugs by Institutions of Higher Learning.

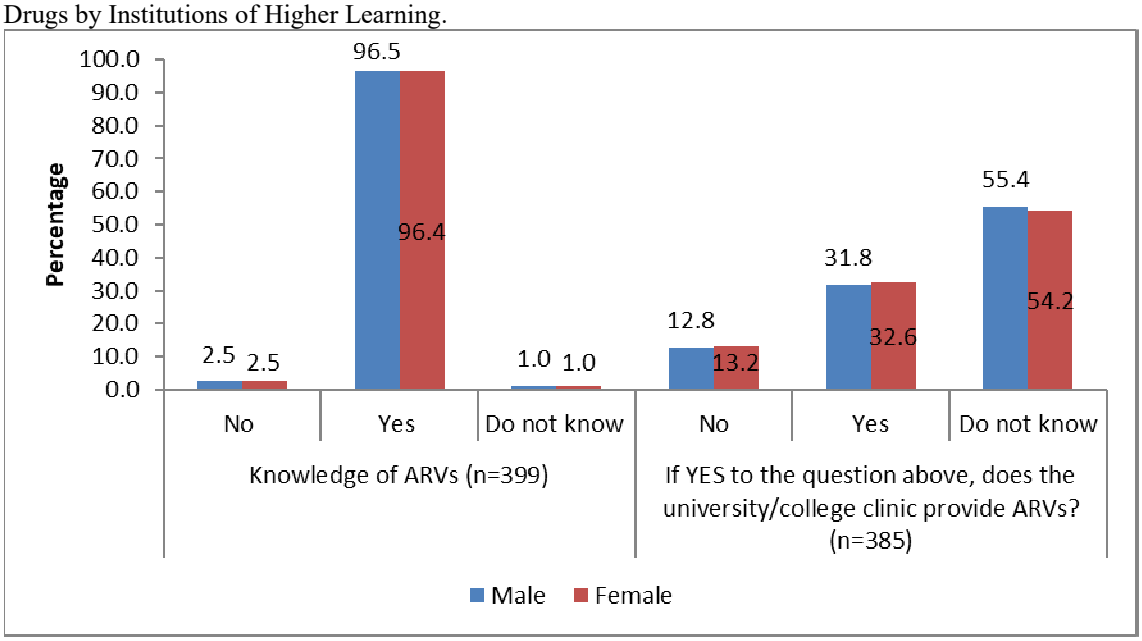

Figure 4: Sources of Antiretroviral Drugs
Source: Field Data, (2020)

Just over one quarter 26 (12.8%) of males and 26 (13.2%) of females reported that their Institutions of Higher Learning did not provide Antiretroviral Drugs; 64 (31.8%) of males and 64 (32.6%) of females reported that their Institutions did provide Antiretroviral Drugs. Meanwhile 112 (55.4%) of males and 107 (54.2%) of

females did not know whether their institutions provided these Antiretroviral Drugs or not. Majority of students 270 (67.6%) reported Health Care providers around their Institutions as being sources of Antiretroviral Drugs. Over one third 143 (35.9%) mentioned their University or College clinic as a source of Antiretroviral Drugs. A fifth 83 (20.9%) mentioned health Care providers outside their Institutions of Higher Learning. A few 9 (2.3%) cited Non-Governmental Organizations and or Community Based Organizations while much fewer 3(0.8%) cited Faith Based Organizations.

Table 4: Sources of Antiretroviral Drugs

Access to Antiretroviral Drugs	Male (n=202)	Female (n=197)	Total (n=399)
University/College Clinic	32.2	39.6	35.9
Health care service providers around the institution	72.3	62.9	67.6
Health care service providers away from the institution	17.3	24.4	20.9
NGOs/CBOs around the institution	2.0	2.5	2.3
FBOs around the institution	1.5	0.0	0.8

Source: Field Data, 2020

Furthermore the extent to which respondents had received information on the value of the use of PReP towards the reduction of HIV exposure was noted. Pre-exposure prophylaxis (or PrEP) is a way for people who do not have HIV but are at a very high risk of getting HIV to prevent HIV infection by taking a pill every day (Stutts *et al*., 2020). Of all the respondents, 49 (12.3%) of the respondents had not received information on the value of the use of PReP in the reduction of HIV exposure, while one-third 120 (30.1%), and had received a low level of information. Just over one third 125 (31.3%) had received a moderate level of information while just over one quarter 105 (26.3%) received a high level of information from their University or College.

Table 5: Information on the use of PReP

Level on use of PReP	Rongo University	TM Univ. College	Kisumu Poly	GLUK	Lugari TTC	Alupe	KMTC Bondo
Nil	11	10	21	1	2	2	0
Low	27	62	40	9	2	4	1
Moderate	36	3	21	10	7	7	9
High	26	3	21	15	1	4	12

Source: Field Data, (2020)

Additionally, the extent to which respondents had received information on the value of the use of PEP was noted. Post-exposure prophylaxis (or PEP), is a short course of HIV medicines taken very soon after a possible exposure to HIV to prevent the virus from taking hold in one's body while (Liu *et al.*, 2014). Access to information on the value of PEP towards reduction of HIV exposure was realized to be high in a quarter 103 (25.8%) of the respondents, low in about one third 117 (29.3%) of respondents, moderate in just over one third 128 (32.1%) of respondents and nil in 23 (5.8%) of respondents.

1.8.6 Provision of HIV testing and counselling services

Just more than a tenth 45 (11.3%), of the students had not received counseling when they went for a HIV test yet professional HIV counseling greatly helps in the reduction of HIV risk and transmission as emphasized by Noll *et al*. (2020). In Focus Group Discussion held with Bondo Kenya Medical Training College students, counseling services were reported to be wanting on campus.

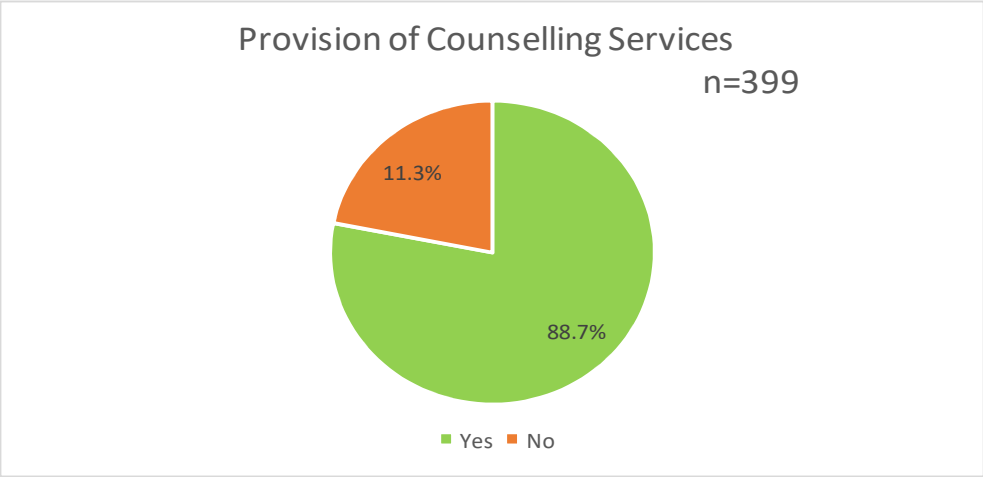

Figure 5: Provision of counselling services
Source: Field data, (2020)

Knowing one's status is one of the measures used in the prevention against the spread of HIV as through knowledge of one's status, a person can take control to prevent the spread of the disease to others if tested positive and or maintain a negative HIV status if tested negative . Mbugua & Karonjo (2018) who affirmed that lack of testing posed high risk in the spread of HIV echoed this thought. In the Focus Group Discussion held with

At Rongo University students reported that testing kits for HIV were sufficient and that students were comfortable with the location of the testing center according to a male participant. Nevertheless, familiarity with staff at the centre-discouraged students from being tested for HIV within the campus facility according to a female participant. Some of the staff was harsh when they saw students frequenting the clinic as they accused frequenters of engaging in HIV Risky Sexual Behaviour according to a female participant. Some of the staff were also unfriendly thus discouraging the students from visiting the facility for Sexual and Reproductive Health Services according to a male participant.

In the Focus Group Discussion held with participants from Lugari Diploma Teacher Training College, a male respondent said that HIV testing was weak as students had to go outside the College to a nearby Hospital for testing. A female student added that there was no facility within the institution providing HIV testing services. Among the respondents in this study, 16 (4%) had never tested for HIV. Close to half 180 (45.1%) of students mentioned that knowing their status did not change their behaviour suggesting that testing alone or knowing one's status did not significantly reduce HIV risk. This is a significant percentage of students who seem not to be affected by knowledge of their status weather positive or negative. Regarding HIV testing, a Key Informant from the Health Department County Government of Busia reported that:

> Initially we had planned to be carrying out HIV testing services as outreaches to the Universities and Colleges but the experience was not good. Only those who frequently test themselves come for testing but majority of students shy away from the service and therefore the yield was so poor

It is therefore vital that relationships among stakeholders are strengthened for the benefit of students. An official at the Kenya Medical Research Institute shared that they provided HIV Testing Services for Alupe University College students. Officials of the County Government of Homabay and Kakamega also confessed to providing HIV testing for students in Institutions of Higher Learning within their County. The dean of Students of The Kisumu National Polytechnic reported that his office offered HIV testing for students. All the officials representing the Health Care centers outside the Institutions of Higher Learning reported that they provided HIV testing for the students. Li *et al*. (2017, 2020) found that the rate of active HIV test was low, probably due to the ongoing impact of stigma and discrimination associated with HIV infection. On the contrary just as was found in this study, according to Mokgatle & Madiba (2017) the uptake of HIV testing was high among the students, with almost three-quarters indicating that they had been tested in the past year.

1.8.7 Provision oftesting and treatmentof Sexually Transmitted Infections

An official from The County Government of Migori shared that they conducted Sexually Transmitted Infections screening of which students in Institutions of Higher Learning were beneficiaries. The Bondo Hospital Siaya official also shared that they held Sexually Transmitted Infections prevention awareness. Meanwhile the official from Compassion international Kenya Busia reported that they held trainings on STIs and how these affected the education and health of the students. The official from the County Government of Kisumu also shared that they held Sexually Transmitted Infections programmes for students in Institutions of Higher Learning. The official from Migori County said that they offered Family Planning programmes and Sexually Transmitted Infections screenings and treatment.

1.8.8 Provision of Needle and Syringe Programmes

Unfortunately, none of the institutions or organizations that took part in the research provided Needle and Syringe Programmes. This study poses a challenge to stakeholders to commit to strategies that will provide Needle and Syringe Programmes for students in Institutions of Higher Learning in Western Kenya.

1.8.9 Provision of Opioid Substitution Therapy

Unfortunately, none of the institutions or organizations that took part in the research provided Opioid Substitution Therapy. This study poses a challenge to stakeholders to commit to strategies that will provide Opioid Substitution Therapy for students in Institutions of Higher Learning in Western Kenya.

1.9 Conclusion

Regarding Regarding the HIV Biomedical intervention strategies promotion of sex and reproductive health services and provision of ARVs are the most effective followed by promotion of male and female condoms and then followed by provision and testing of Sexually Transmitted Infections. Provision of needle and syringe programmes and opioid substitution therapy are found to be extremely scanty in Institutions of Higher Learning in Western Kenya.

1.10 Recommendation

Regarding study objective three, as much as Majority 275 (67%) of the respondents admitted that sex and reproductive Health Services are provided to them, this provision is not sufficient and has to be increased. Stakeholders need to create a safer environment within Institutions of Higher Learning for students to access ARVs as opposed to feeling they have to access them off-campus. Opportunities for HIV counselling interventions also need to be increased. This study poses a challenge to stakeholders to commit to strategies that will provide Needle and Syringe Programmes, Opioid Substitution Therapy and Voluntary Medical Male Circumcision among students in Institutions of Higher Learning in Western Kenya.

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