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Predictors and Determinants of HIV Proneness among University Pre-service Teachers at Two Selected Universities in East Africa: A Logistic and Multiple Regression Analysis

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Abstract

The study explored the impact of various factors, including age, university affiliation, religion, gender, self-efficacy, intimacy, and HIV risk perception, on the likelihood of university pre-service teachers being affected by HIV. The research aimed to identify which among the three critical independent variables—self-efficacy, intimacy, and HIV risk perception—most significantly predicts susceptibility to HIV. The investigation was carried out among pre-service teachers at two universities in Uganda and Tanzania, chosen through systematic random sampling. Participants were evaluated using demographic, Likert, and dichotomous scales. Through the use of indices, proportions, logistic regression, and multiple regression analyses, the study found that most pre-service teachers exhibited a low tendency towards HIV. The study revealed that female pre-service teachers and those from Ugandan universities were more prone to HIV, while religious affiliation did not significantly affect HIV risk. Age appeared to influence vulnerability to HIV, but this was not statistically significant. In light of these findings, it is recommended that tertiary education institutions educate their students about intimacy, HIV risk, soft skills, and self-concept through various non-academic departments. These elements are crucial for mitigating HIV risk and, if not managed effectively, could negatively impact students' health, education, and overall well-being.

Keywords: *Predictors, Determinants HIV Proneness, University Pre-service Teachers, Multiple Regression Analysis. East Africa*

1.0 Introduction

Issues concerning the susceptibility to HIV infection among emerging young adults, particularly those in higher education institutions like universities, are critically important in the 21st century. The ages of 18 to 21 years are pivotal for university students, as this is a time for forming friendships and interpersonal relationships. More importantly, it's a period of significant decision-making regarding their academic and social lives—factors that are interrelated and can have either positive or catastrophic consequences for their health and academic success. The HIV pandemic has affected individuals regardless of age, religious affiliation, or gender. The impact on those suffering from or vulnerable to HIV can be largely attributed to how they manage intimacy, their perceived risk of infection, and their self-concept, particularly in areas such as self-efficacy. Against this backdrop, this research aimed to analyse how such factors have predicted and determined HIV vulnerability among this young, burgeoning population, and to identify which of these factors has the most significant influence on HIV susceptibility among university students.

2.0 Review of Related Literature

One of the reasons why females are more prone to HIV is due to societal expectations (Weiss et al., 1996). They are often expected to comply with male sexual demands (Rao Gupta, 2008). Females continue to face social, economic, and health vulnerabilities, which ultimately increase their risk of HIV (Hallman, 2008). They are frequently unable to negotiate HIV-safe sex practices because society expects them to be “ignorant” of these options (Caravano, 1992). Culturally, from an African socio-cultural perspective, seeking knowledge about sex can lead to ridicule. Females are primarily seen as fulfillers of male sexual demands (Wood, 2000). Economic challenges often lead them to consider sex as a bargain in exchange for financial gains, a survival strategy that is prevalent among female university students in the region. The age at which young people enter university coincides with the initiation of sexual activity (EAC/EALP, 2010) due to the freedoms apparent in the university social environment. University students are generally sexually active (United Nations, 2004) and are often in a phase of sexual experimentation (Netting & Burnett, 2004), placing them at natural risk for HIV (Prince & Bernard, 1998). They engage not only in casual sexual practices but also in other risky behaviours linked to HIV, such as drug and alcohol abuse (Zebunisso, 2003), and some are unaware of how HIV is transmitted (UNICEF, 2002). Multiple concurrent sexual partners are common (UNAIDS, 2008).

Religious teachings have influenced HIV risk, either consciously or unconsciously (Tadele & Amde, 2013). Premarital sex is condemned in both Christianity and Islam, and religious teachings against condom use are associated with perceived sexual promiscuity (Francis-Chizororo & Natshalag, 2003). Intimacy has been linked to HIV risk, as it can lead to high levels of confidence for risk-taking (Santrock, 2008). Intimate partners may perceive HIV as a socially discriminating scourge, leading to low risk perception (Taylor, 2003). University students' sexual adventurousness and concurrent partnerships are clear risks (Barnett et al., 2002). Trust in relationships can also be a danger (Bauman, 1993), and the university environment is conducive to and for sexual activity (Taylor, 2003). The newfound freedom from parental oversight influences decisions about sex (Paul & Hayes, 2002). HIV risk perception also affects vulnerability (Kobusingye, 2017). Despite adequate knowledge, emerging adults in universities engage in risky sexual behaviours leading to new HIV infections (Summers et al., 2010). Intimate individuals often have low HIV risk perception

(Harman et al., 2009). Self-efficacy is a crucial self-concept pillar that influences HIV risk (Conner & Norman, 2005; Kobusingye, 2017). It affects decision-making and behaviour, particularly in avoiding non-protective behaviours (Schwarzer, 2008). High self-efficacy leads to risk assessment and engagement in behaviours others may avoid (Bandura, 1977). Bandura further argues that self-efficacy is vital for HIV prevention (Bandura, 1977).

3.0 Research Methodology

This study was quantitative, cross-sectional, and survey-based, focusing on participants from two major universities: one in Uganda (MAK) and the other in Tanzania (DAR). These institutions are the largest and oldest in their respective countries. Convenience sampling was employed to select the universities, as the corresponding researcher was a student at DAR and an educational psychologist at MAK. A total of 557 respondents were chosen through systematic random sampling to ensure fair representation. The instruments used to measure self-efficacy, HIV risk perception, and intimacy were five-point Likert scales, ranging from Strongly Agree to Strongly Disagree. These included the Self-Efficacy Scale for HIV Risk Behaviors (Smith et al., 2004), the Perceived Risk of HIV Scale (Napper et al., 2012), and Sternberg's Triangular Theory of Love Scale (Sternberg, 1980). The scale for HIV proneness was dichotomous, self-constructed with options of True or False. Data analysis was conducted using logistic and multiple regression analysis methods.

4.0 Results

The scale used to measure HIV proneness was binary (true/false format). Consequently, the researchers employed Cox's Logistic Regression Analysis (1958) to estimate the likelihood that HIV proneness could be influenced by factors such as self-efficacy, HIV risk perception, and intimacy. These factors were assessed and scored on a five-point Likert scale with options ranging from Strongly Agree to Strongly Disagree. An overall score for each independent variable was calculated by summing the responses to various items designed to gauge university pre-service teachers' views on specific predictor variables. For instance, a pre-service teacher who scored high on self-efficacy was considered to have a high level of this attribute, and the same applied to the attributes of intimacy and HIV risk perception. A high score in HIV infection proneness indicated a greater likelihood of being prone to HIV infection. The total HIV infection proneness was determined based on the degree to which each pre-service teacher was prone or not, as illustrated in Table 1.

Table 1: HIV Proneness Index

Index	Percentage	Status of HIV proneness
2.0	2.0	Less HIV Prone =348 pre-service teachers (62%)
3.0	5.2	
4.0	7.9	
5.0	12.0	
6.0	16.2	
7.0	19.2	
8.0	12.7	
9.0	9.5	
10.0	7.4	
11.0	3.6	
12.0	2.3	
13.0	1.4	
14.0	.5	
Total	100	

From the analytical procedure, university pre-service teachers who scored 2-7 on the HIV proneness index were considered to be less HIV prone. However, pre-service-teachers who scored 8-14 were considered more HIV prone. There was no observed score on HIV proneness either above 14 or below 2 as shown in Figure 1.

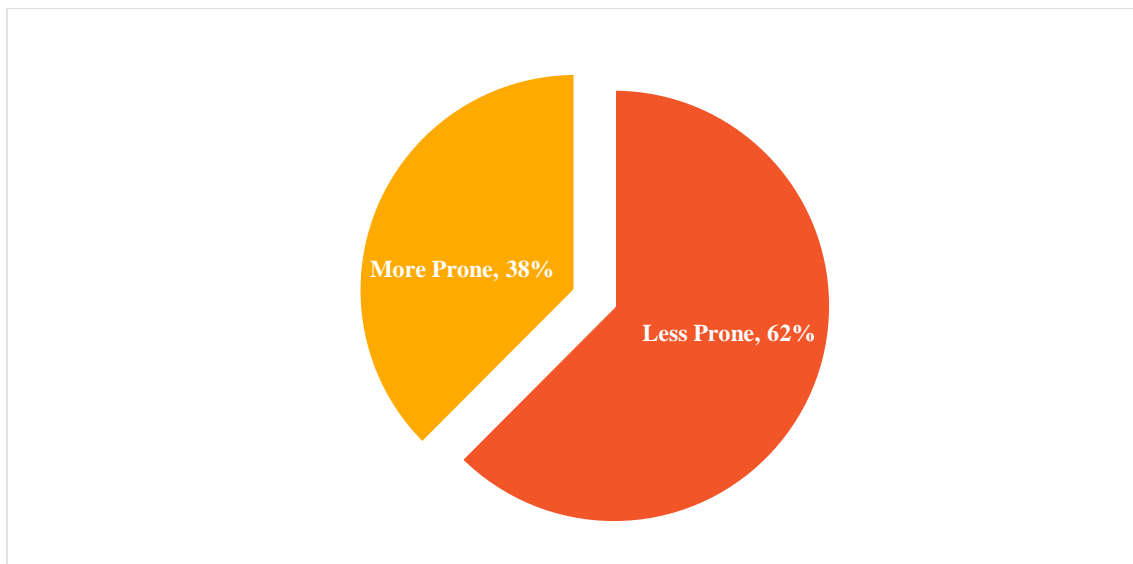
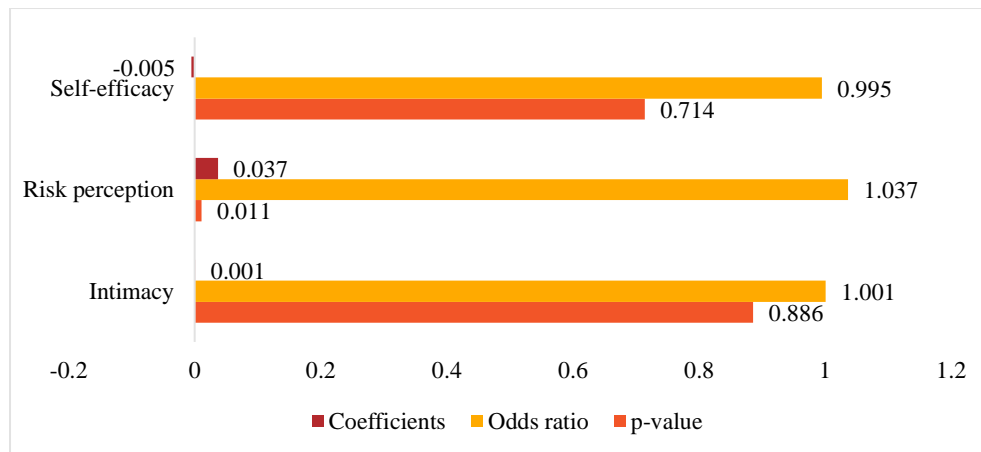


Figure 1: Proportion of University Pre-Service HIV infection Proneness

From the Pie Chart, 62 percent of the university pre service teachers turned out to be less HIV prone, whereas 38 percent were discovered to be more HIV prone. This implies that in general, the biggest percentage of the pre-service teachers were less HIV prone, basing on HIV knowledge and HIV-related behaviours as measures and indicators of proneness. Additionally, the researchers carried out a binary logistic regression analysis to establish if the attributes of self-efficacy, intimacy and HIV risk perception predict university pre-service teachers’

likelihood of HIV proneness significantly. The bar chart in figure 2 provides the findings' summary.



S.E=Standard Error

KEY: β=Beta coefficient

Figure 2: Logistic Regression Summary on Factors that Predict University Pre-service teachers' HIV proneness

In examining the influence of self-efficacy, HIV risk perception, and intimacy on HIV vulnerability, logistic regression analysis revealed a positive beta coefficient of 0.001. This suggests that an increase in intimacy correlates with a slight rise in HIV infection risk, although the change is not statistically significant (p=0.886). The odds ratio further indicated that a higher level of intimacy corresponds to a 1.001-fold increase in HIV vulnerability. Consequently, university pre-service teachers with higher intimacy scores were found to be more susceptible to HIV. The beta coefficient for perceived risk of HIV infection was also positive, at 0.037, signifying that pre-service teachers with a heightened perception of HIV infection risk were likelier to be vulnerable to HIV compared to those with a lower risk perception. This relationship was statistically significant (p=0.011), with the odds ratio suggesting that those with higher HIV risk perception were approximately 1.037 times more likely to be prone to HIV. Conversely, the beta coefficient for self-efficacy was negative (-0.005), indicating that an increase in self-efficacy is associated with a decrease in HIV vulnerability, reducing the likelihood by a factor of 0.995. However, this finding was not statistically significant (p=0.714). The study also aimed to determine the impact of various background and demographic factors, such as gender, religion, age, and university affiliation, on HIV vulnerability. These findings are presented in figure 3.

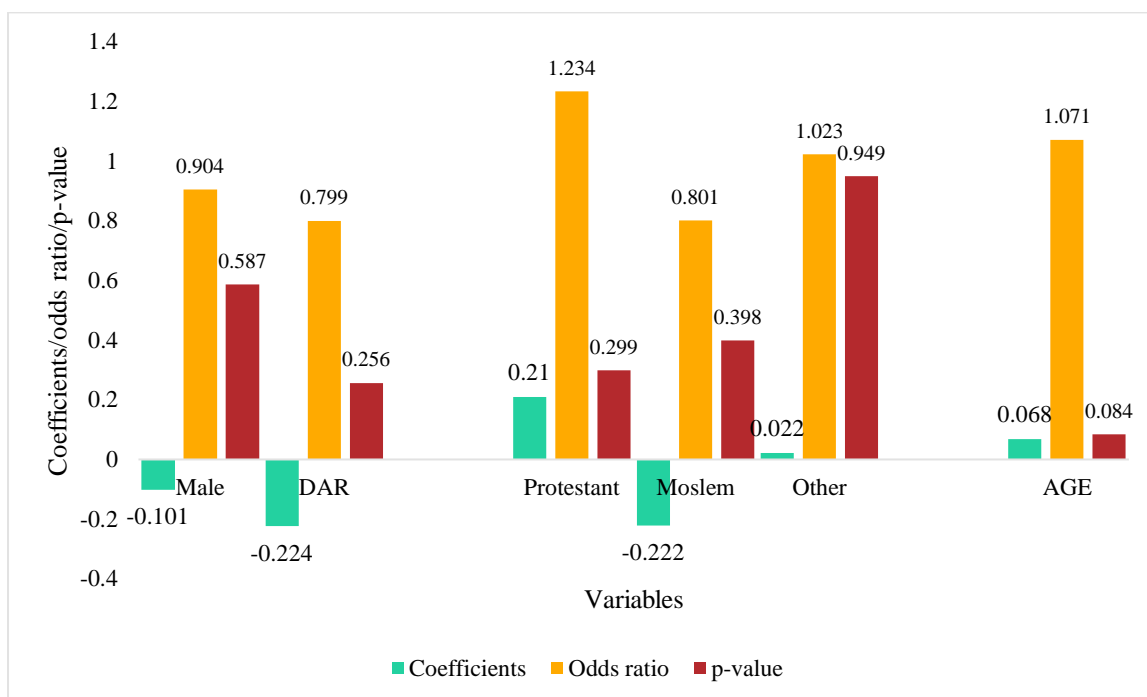


Figure 3: Logistic Regression on the Influence of University Teacher-Trainees’ Demographic Information on their HIV Proneness

From Figure 3, in the reference category, male university pre-service teachers are seen as less HIV infection prone ($\beta = -0.101$) compared to their counterparts from the opposite gender. Even though the results are non-significant ($p=0.587$), the outcome of the odds ratio indicates a scenario where males from the two institutions are 0.904 times less HIV prone than the females. This implies that the female pre-service teachers are more HIV infection vulnerable. Regarding university as a demographic, university pre-service teachers at DAR turned out to be less HIV infection prone than their MAK counterparts. This is attributed to the negative beta coefficient (-0.224). The dummy coefficient’s p value for pre service teachers at DAR was 0.256, a value that is greater than the 0.05 level of significance. This therefore means that despite the fact that the DAR pre-service teachers are 0.799 times less prone than their MAK counterparts, the level of proneness is the same for all the pre-service teachers at the two institutions of higher learning. Religious affiliation as a demographic turned out to have non-statistically significant impact on HIV infection proneness. This is because all p-values turned out to be greater than the 0.05 level of significance. This is suggestive of the fact that the level of proneness was similar across all the university pre-service teachers belonging to the varying religious beliefs and inclinations. Last but not least, it was observed that age as a demographic attribute increased the probability of HIV infection proneness among pre-service teachers at the two universities. However, this increase was not to a significant level ($p=0.084$). As a consequence, the proneness level was in general similar among all the age groups. Therefore, the demographic attributes of age cohort, university, religion and gender were found to be non-significant predictive factors in the pre-service teachers’ HIV infection proneness.

A multiple regression analysis was also carried out to establish the extent to which self-efficacy, HIV risk perception and intimacy determined HIV infection proneness. The results of this analysis are presented in Figures 4 and 5.

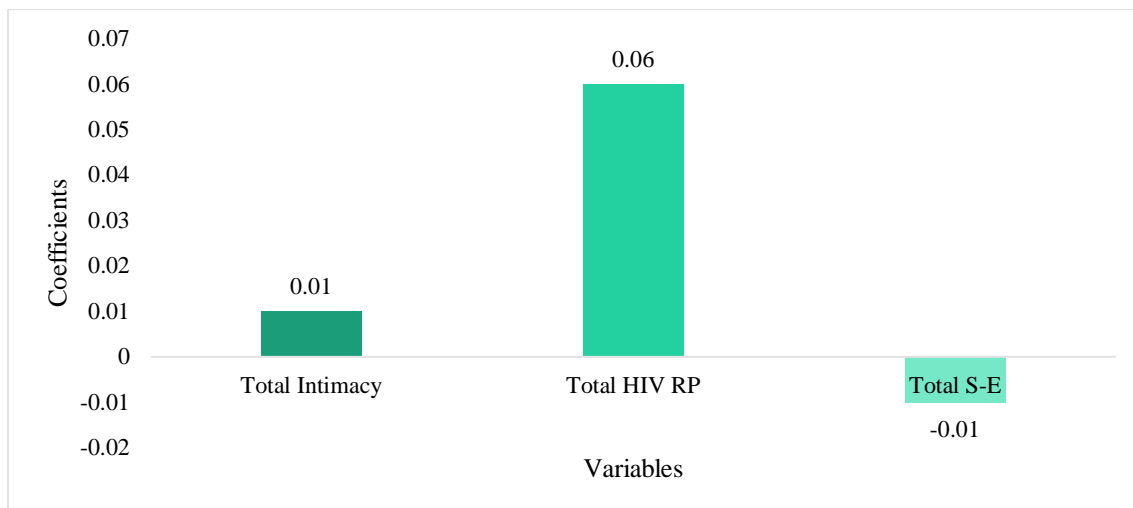


Figure 4: Determinants of HIV infection Proneness among University pre-service teachers

From figure 4, it is observed that the expected level of HIV proneness that is independent of self-efficacy (S-E), HIV risk perception (HIV RP) and intimacy variables, is represented by the value of the 5.40 constant and is statistically significant at 0.01. In the figure/bar chart, the findings reveal that a one-unit increase in total intimacy leads to 0.01 increase in HIV proneness, holding other factors constant. But it should be noted that this relationship did not reach significance since the p-value 0.196 was above 0.05 level of significance. This also implies that HIV proneness may not be dependent upon intimacy. Regarding HIV risk perception, the 0.06 beta coefficient value implies that university pre-service teachers that perceived themselves as prone to HIV were also significantly more HIV infection prone ($0.001 < 0.01$). The multiple regression analysis also indicates that there exists a negative association between self-efficacy and HIV infection proneness. This means that university pre-service teachers that scored high on self-efficacy were less HIV prone and the reverse is true for those that scored low on the same attribute. However, despite the quality of this relationship, the p-value for self-efficacy’s coefficient did not reach significant levels ($0.529 > 0.01$), a finding indicative of the fact that self-efficacy does not significantly determine HIV proneness among university pre-service teachers.

A closer look at the standardised coefficient of beta comes with a revelation that among self-efficacy, HIV risk perception and self-efficacy, total perception of HIV risk carries the strongest value at 0.15. This means that total perception of HIV risk has the greatest impact on total HIV proneness, succeeded by total intimacy at 0.06 and the weakest influence is carried by total self-efficacy at -0.03 as determinants and predictors of total HIV proneness. The R^2 total value for pre-service teachers at both educational institutions turned out to be 0.024 meaning that the magnitude at which self-efficacy, HIV risk perception and intimacy predict HIV proneness is about 2.4 percent. This also implies that other factors outside self-efficacy, perceived risk of HIV and intimacy contribute the remaining 97.6 percent to HIV proneness. Therefore, about 97.6 percent of HIV proneness may be attributed to variables outside self-efficacy, perceived risk of HIV and intimacy. Through multiple regression analysis, individual universities were also tackled, as portrayed in Figure 5.

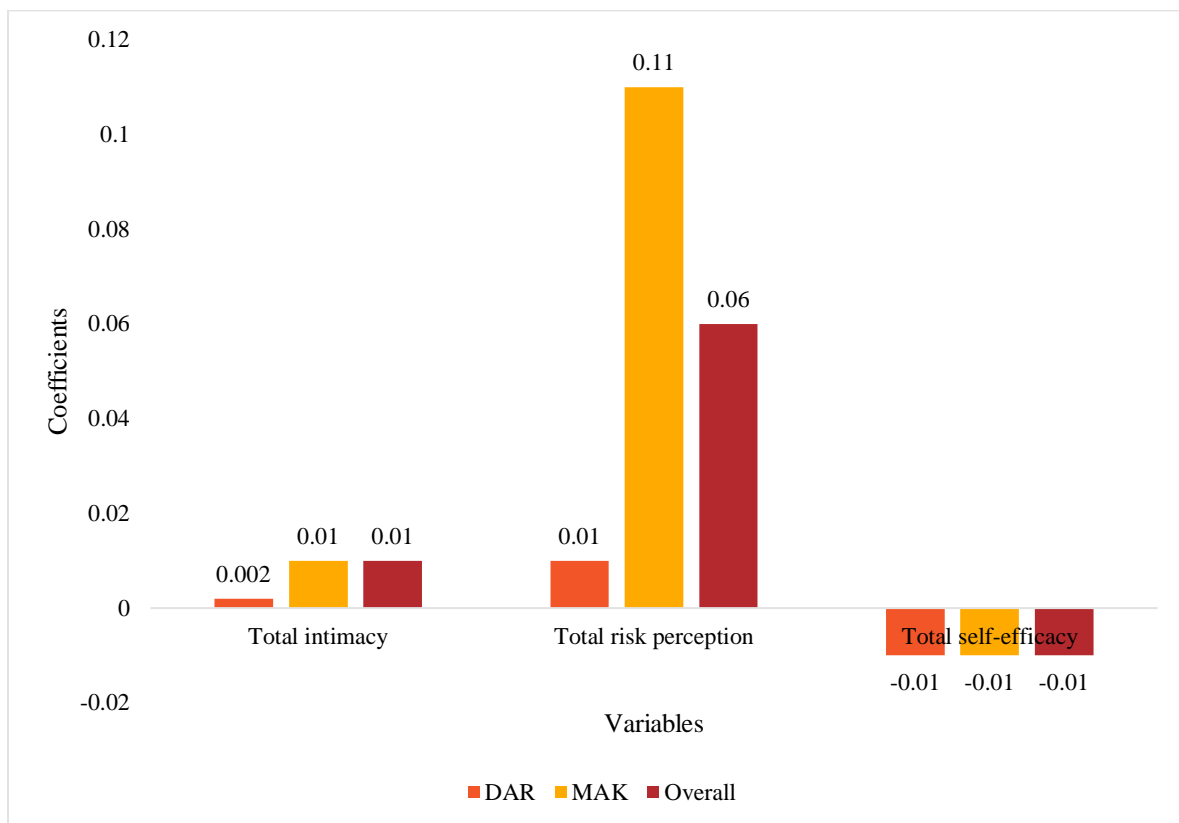


Figure 5: Determinants of HIV Proneness among University Pre-service teachers

With each university analysed separately, coefficients’ directions for all the three variables was the same as the ones obtained from general regression with the two universities combined. Specifically, the coefficients for total HIV risk perception and total intimacy turned out to be positive in nature, and indication that an increase in each of the two independent variables led to an increase in total HIV infection proneness. But, total self-efficacy’s coefficients were negative, an indication that an increase in the attribute of self-efficacy instead decreases the likelihood of getting infected with HIV among pre-service teacher in universities. However, regardless of these outcomes, the three independent variables did not reach statistically significant levels as far as the DAR university pre-service teachers’ HIV proneness is concerned since all p-values were greater than the 0.05 level of significance. For pre-service teachers at MAK, save for self-efficacy which had a non-significant coefficient ($0.579 > 0.05$), HIV risk perception and intimacy turned out to be significant in explaining HIV proneness. At MAK, total HIV risk perception was statistically significant at 1 percent level while total intimacy turned out to be significant at 10 percent. Therefore, in explaining MAK’s university pre-service teachers’ HIV proneness, the key variables to focus on are total HIV risk perception and total intimacy.

5.0 Discussion, Conclusions and Recommendations

The study aimed to analyse the predictive and determinant potential of factors such as age, gender, university affiliation, religion, self-efficacy, HIV risk perception, and intimacy on the likelihood of HIV vulnerability among university pre-service teachers. The findings, derived

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from indices and proportions, indicated that 62 percent of the pre-service teachers at the two universities were less prone to HIV infection, while 38 percent were more prone, based on HIV-related behaviours and knowledge. Logistic regression analysis revealed that increases in intimacy and perceived risk of HIV predict a rise in HIV vulnerability by factors of 1.001 and 1.037, respectively. Conversely, an increase in self-efficacy is associated with a decrease in HIV vulnerability by a factor of 0.995. Being male and a university student in Tanzania are factors that reduce HIV vulnerability by factors of 0.904 and 0.799, respectively. Age and religion were not found to significantly influence HIV vulnerability. These findings align with previous research that identifies age as a factor in the initiation of sexual activity, active sexual behavior, and experimentation with both sexual and non-sexual activities, such as drug and alcohol use. Religion has been identified as influencing HIV vulnerability due to its stance against premarital sex and condom use, which are unrealistic and non-practical expectations among young adults such as those at university. Females are more prone to HIV due to social and economic vulnerabilities, sexual coercion, cultural factors, and weaker negotiation skills—factors that are less apparent among males of the same age group due to inherent disparities.

Multiple regression analysis determined that intimacy and HIV risk perception are more significant in explaining HIV vulnerability among university pre-service teachers, with HIV risk perception being the most influential, followed by intimacy, while self-efficacy is the weakest predictor. These findings either support or contradict previous studies. Intimacy is inversely related to risk-taking and can lead to misconceptions about who can be affected by HIV. University students are prone to HIV due to multiple and concurrent sexual partners and low HIV risk perception, which leads to unsafe behaviours and the use of defence mechanisms to justify risk-taking. The study found that female university students and those at Ugandan universities are more vulnerable to HIV. Religion and age do not significantly affect HIV vulnerability. Among the factors studied, HIV risk perception is the strongest predictor of HIV vulnerability, followed by intimacy, with self-efficacy being the least influential.

Based on these findings, it is recommended that universities implement measures to mitigate HIV vulnerability among students. These measures should include student-friendly HIV policies that are implementable, safe sex facilities, HIV workshops, peer education, behaviour change strategies, and life/soft skills programs. HIV policies should promote realistic strategies such as the ABC (Abstinence, Be faithful, and Condom use) approach and providing students with options for safe sexual practices. Condoms should be readily available, and students should be trained in their proper use to prevent health consequences from incorrect usage. HIV workshops should aim to provide comprehensive knowledge that goes beyond basic understanding, fostering a mature mind-set and behaviour modification. Peer education can enhance empathy and relatability, making HIV and behaviour messages more impactful. Life skills and soft skills programs are essential for imparting psychosocial skills that improve behaviours and reduce HIV vulnerability. Behaviour modification programs are crucial, as behaviour change is a key component in HIV prevention. Religious leaders should focus on promoting practical and achievable behaviours, and parents should nurture the self-esteem of children from a young age to empower them to make healthy choices and make informed decisions regarding their health. Both genders should be included in these efforts, as HIV affects individuals regardless of gender. The male child should not be ignored in the HIV fight, as matters regarding the scourge are matters that involve both genders.

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