LOGISTIC REGRESSION TO DETERMINE THE RELATIONSHIP BETWEEN HIV TESTING, HIV KNOWLEDGE AND ATTITUDE AMONG ADULTS IN KENYA

A RESEARCH PROJECT SUBMITTED IN PART FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTERS OF SCIENCE IN MEDICAL STATISTICS AT THE UNIVERSITY OF NAIROBI

INSTITUTE OF TROPICAL AND INFECTIOUS DISEASES

(UNITID)

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JUNE, 2015

DECLARATION

I, the undersigned declare that this study is my original work and has never been submitted to

any school, college or university for an academic award.

Signature   …………………………………………..

Date   …………………………………………..

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SUPERVISORS' DECLARATION

This proposal has been submitted for examination with my approval as University supervisor;

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ACKNOWLEDGEMENT

DEDICATION

To my sons Muhammad, Ibrahim and Abdulla for their assistance and patience during the long hours of absence as I under took this study.

My late husband, Daud M. Opiyo

My late parents, Abdulla Ali and Rukia Abdulla for their encouragement since my early childhood.

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LIST OF ACRONYMS

ART: Antiretroviral treatment

CDC: Centers for Disease Control and Prevention

EPSEM: Equal probability selection method

IDU: Injecting drug user

HIV: Human immune-deficiency virus

MSM: Men who have sex with men

MTCT: Mother-to-child transmission

NGO: Non-governmental organization

KNBS: National Bureau of Statistics

PITC: Provider initiated testing and counselling

PMTCT: Preventing mother-to-child transmission

RRC: Risk reduction counselling

STI: Sexually transmitted infection

SW: Sex worker

VCT: Voluntary counselling and testing

NASSEP V: National Sample Survey and Evaluation Programme

Operational definitions

Informed consent:- is based on the principle that competent individuals are entitled to make informed decisions regarding their participation in or agreement to HIV tests, other HIV/ AIDS-related interventions, and to health providers disclosing their HIV status to others.

Non-sampling errors: -are those that result from mistakes done during planning, data collection and data processing

Partner notification (PN):- Also known as contact tracing or partner counselling, is the process of contacting sexual or injecting partners of a person with HIV in order to advise them of their potential exposure to HIV and to encourage them to come forward for counselling, testing and – where applicable – treatment.

People living with HIV:- People infected with the HIV virus and/or experiencing AIDS-related illnesses or infections. Also defined as HIV positive or sero-positive.

Primary prevention:- Activities with both infected and uninfected people to reduce primary (ie. initial or new) HIV infections

Sampling errors: - are due to using a sample instead of the whole population. KAIS made efforts to minimize bias in sampling.

Stigma: - Attitudes or perceptions of shame, disgrace, blame or dishonor associated with HIV/AIDS. [17]

Sampling errors are due to using a sample instead of the whole population. KAIS made efforts to minimize bias in sampling.

Stigmatization: - is a social process not just an individual attitude [18]. Several authors also divide stigma into felt or perceived stigma and enacted stigma. Felt stigma refers to real or

imagined fear of societal attitudes and potential discrimination related to having HIV, or

association with a particular group. This means, for instance, that sex workers (SWs) with

HIV can face 'double stigma'. Enacted stigma refers to the real experience of discrimination

Viral load: -The amount of HIV in an HIV infected person's body. Are used as an indicator

of how well a person with HIV's immune system is dealing with HIV [19]

Vulnerability:- refers to enhanced susceptibility to HIV infection or its consequences. The

concept of vulnerability recognizes the restricted behavioral choices that exist for many

people, and the different levels of risk for HIV infection that the same behaviors might carry

in different epidemiological, socio-economic, cultural and policy contexts. [20]

Abstract

HIV testing is a critical gateway to treatment care and support services. Knowledge of HIV status can empower individuals and couples to take measures to prevent HIV acquisition or onward transmission. For those already infected, a positive result is necessary to access treatment and, in the case of pregnant mothers, to access prevention of mother to child transmission (PMTCT) services. [2]

Across communities normalizing awareness of HIV status through increasing testing could reduce HIV related stigma and discrimination. (WHO,2003). Population based surveys with HIV testing provide national level prevalence estimates and the opportunity to link HIV status with behavioral, social and other biological information.

The 2012 Kenya aids indicator survey (Kais,2012), provides comprehensive information on trends in HIV infection ,behaviors that place persons at risk for HIV infection ,knowledge and attitudes around HIV aids , and population based coverage of HIV prevention, care and treatment programs to understand the status of the HIV epidemic . And impact of the natural response.

This study assessed of HIV/AIDS knowledge and attitude and its influence on the uptake of HIV testing among adults in Kenya. In addition the study looked at the socio-demographic factors and their contribution the uptake of HIV. A sample of 12,066 adults aged between 18-65 years were included in the study. Kenya AIDS Indicator Survey (KAIS, 2012) was utilized, which is a nationally representative population-based survey. Systematic review of literature from (KAIS 2012) on HIV knowledge, attitude and uptake of HIV test among adults where available were extracted. Data was also extracted for demographic characteristics. Extracted data was entered in excel and analyzed using Stata version 13.

Descriptive statistics was performed to determine the characteristics of the participants and univariate and multivariate logistic regression was used to determine the factors influence the uptake of HIV tests. On univariate analysis, results revealed significant association of knowledge, attitude, gender, level of education, socio-economic factors with ever testing for HIV.

CHAPTER 1: BACK GROUND INFORMATION

1.1 Introduction

Globally, an estimated 35.5 million people were living with HIV in 2012. Sub Saharan Africa is the region most affected by HIV, accounting for 25,000,000 people living with HIV and about 1,600,000 estimated new infections, and 1,200,000 estimated HHIV deaths in 2012.

In 2008, HIV was reported to be high in Nyanza region (13.9%) and low in north eastern (0.9%). Women were assumed to carry a higher burden of HIV infection compared to men. Significance difference was noted in HIV prevalence by age and gender, with rates peaking approximately 10 years earlier for women compared to men. Education and income were noted to be inversely related with HIV prevalence, with persons of higher education and income less likely to be HIV infected compared to their counterparts. [1]

HIV testing and counseling is a critical component in the control of HIV epidemic and essential in the reduction of HIV morbidity and mortality. Knowledge of HIV allows HIV infected persons to access life-saving HIV care and treatment. And provides an opportunity for HIV prevention counseling to reduce HIV transmission risk among both HIV infected and HIV non-infected persons.

The government of Kenya has established the goal of having 80% of adolescents and adults at least once by 2013.

Correct knowledge on HIV and perception of personal risk for HIV infection are essential for making behavioral choices that reduce risk of acquiring and transmitting HIV. Educational campaigns in Kenya are aimed to disseminate information about the disease, how it is acquired, and how to prevent infections.

However, progress towards universal knowledge of HIV status is inadequate [1]. In 10 population-based surveys conducted in sub-Saharan Africa in 2007–2009, the median percentage of people living with HIV who knew their status was <40% (WHO 2010). Among adults and adolescents aged 15-64 years, 71.3% had tested for HIV at least once and received a result, nearly reaching Kenya's national goal of 80% testing coverage by 2013. [1]

HIV testing and counseling are key elements in a comprehensive response to the HIV epidemic. Knowing ones HIV status is important for prevention strategies of people living with HIV, yet 90% of people living with HIV in developing countries do not know their status. And have no means of finding out. [3]. HIV testing is delivered through a voluntary counseling and testing model, a client initiated approach. VCT guidelines stress on the importance of confidentiality, voluntarism, and written informed consent. It relies on personal motivation to seek testing. This is influenced by a number of factors that may act as barriers to widespread testing. [4].

Pre-natal VCT is critical in prevention of mother to child transmission of HIV. [4]

[5] With less than 10% of the key population, in low and middle income countries who may have been exposed to HIV accessing VCT and many opportunities to diagnose patients are lost. VCT is increasingly inadequate [6, 7].

Routine offer of HIV testing is now recommended known as provider initiated testing and counselling (PITC), which advocates for testing of all patients attending health facilities. This includes ante natal, tuberculosis and sexually transmitted infection services. [8].

1.2 Problem statement

In 2014, UNAIDS estimated that 36.9 million people are living with HIV in the world. [1] In the same year, 2 million people became newly infected with HIV and 89% of these were older than 14 years. Since 2000, an estimated 38.1 million have acquired HIV and there have been 25.3 million AIDS-related deaths. Finally, prevention strategies shown to be effective in the published literature are still not widely accessible. There is a massive scaling up of prevention services still to be carried out. Only 12% of people who want to be tested for HIV are able to access VCT services globally and only 6% have access in sub-Saharan Africa (Global HIV Prevention Working Group 2003).

1.3 Justification

One third men aged 15-64 years have never been tested for HIV. New strategies need to be explored. There is need to educate the masses on HIV by innovating new methods of creating awareness and education around the importance and benefits of knowing self-status as well as partners status.

1.4 Objectives

1.4.1 Main objective

The overall objective of the study is to determine the relationship between HIV knowledge, attitude and HIV testing among adults aged 18-65 years.

1.4.2 Specific objectives

- To assess knowledge and attitude on HIV among adults aged 18-65 years.

- To examine socio-demographic and behavioral characteristics associated with uptake of HIV testing among men and women aged 18-65 years in Kenya.

- To determine HIV VCT/PITC uptake among the adult population in Kenya

1.5 Research questions

Does knowledge and attitude influence uptake of HIV test?

Do demographic factors influence HIV testing?

1.6 Hypothesis

1.6.1 Null hypothesis

-There is no relationship between HIV knowledge and HIV testing among adult population.

-There is no relationship between attitude and HIV testing among adult population.

1.6.2 Alternative hypothesis

-There is a relationship between HIV knowledge and HIV testing among adult population.

-There is no relationship between attitude and HIV testing among adult population.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Significant progress has been made over the past five years by national HIV program to improve HIV coverage in the country overall. Implementation of revised guidelines on HIV testing and counselling in 2008, focused on bringing testing service to the clients.

Among adults and adolescents aged 15-64 years, 71.3% had tested for HIV at least once and received a result, nearly reaching Kenya's national goal of 80% testing coverage by 2013.Among women who visited an antenatal clinic (ANC) in the past years, HIV testing increased from 89.2% in 2008 to 94.4% in 2012.

Among women who were diagnosed with HIV at an ANC in the past 5 years or any time prior, 71.2% received maternal prophylaxis during their pregnancy, 67.1% at delivery, and 92.6% while breastfeeding for prevention of mother-to-child transmission of HIV. [1]

There has been increasing calls to expand access to HIV testing and promptly link those found to be HIV infected to care and treatment in settings with high prevalence [9, 10]. HIV testing can be an important strategy for primary prevention and an entry point to care, treatment and support for those found to be HIV infected. [11, 12]

The new strategies have greatly increased access and acceptance of testing. [1], these include, PITC (42.7%0, PMTCT (19.1%), home based testing and counselling.

2.1.1 Knowledge and attitudes on HIV

In a study, [13] on PITC testing and counseling for HIV in a resource –limited clinical setting, 98% of the women had heard of HIV/AIDS, and 60% had good knowledge on the risk factors associate with transmission of HIV.48% were not aware of the prevention of mother to child transmission .97% did not perceive themselves as at risk to HIV, an only 57% had taken the HIV test. 85% were willing to take up HIV test but were concerned about confidentiality and feared negative reactions from husbands, parents and community. Social cultural barriers confront pregnant women who opt for HIV testing.

A study, [14] on HIV testing rates and outcomes showed that, men and women who had never undergone HIV testing cited main reasons to include thinking they were not at risk of getting infected (37%), being nervous of getting results (17%) and not thinking of getting tested.

Similarly a study done by Ekanem. E, on VCT, HIV, acceptability by Nigerian women attending antenatal clinics to determine their knowledge and acceptability, [15] showed that majority of the women (89.9%) had good knowledge of the modes of transmission but poor knowledge on PMTCT. Nearly half of the women were unaware of the association between breast milk and HIV transmission and awareness on ARTS was poor.

Knowledge of HIV status among HIV-infected persons tripled from 16.3% in 2007 to 46.9% in 2012. Among HIV-infected persons who reported one or more sexual partners in the past 12 months, approximately two- thirds (65.4%) reported disclosing their HIV positive status to their last sexual partner in the past 12 months. [1]

2.1.2 Attitudes and HIV testing.

Perceived risks and benefits can determine acceptance, willingness to be tested of VCT. If VCT and PMTCT interventions are to be successful, urgent attention needs to be focused education, development of an innovative, culturally appropriate interventions, that will empower women to make decisions about HIV testing, addressing stigma and discriminatory attitudes towards people living with HIV.

Another study by (Zubairi, et al) on knowledge of HIV/AIDS and attitude towards VCT among adults in Kano and Tennesse, revealed that majority (59%) did not know the causative organism of AIDS. There was high knowledge of mode of transmission, female gender and formal education remained significant predictors of HIV /AIDS knowledge.

The proportion of adults and adolescents who had ever been tested for HIV increased from 34.3% in 2007 to 71.3% in 2012. Women were more likely to have ever been tested for HIV (79.8%) than men (62.5%). Of those that had ever been tested, one in five had tested in the past 3 months, and over half had been tested within the 12 months prior to the survey. Among persons who had visited a health facility in the past 12 months, only 34.5% were offered an HIV test. However, among those offered the test, the test acceptance rate high, at 91.5%.

Among participants who had never tested for HIV in the past, over 80% (83.2% of women and 81.3% of men) accepted home-based testing and counselling services in KAIS 2012. [1]

2.1.3 Socio- demographic and behavioral characteristics associated with HIV testing.

[14] 64% of the women and 28.9% of the men reported ever having been tested for HIV. Men and women, who had repeatedly heard of HIV, with increasing frequency and ART, were more

likely to report HIV testing. Men who had > 12 years of education and were of high socioeconomic status, and married women of low socio-economic status and who had children under their care had higher odds of testing. Women, older individuals and those with higher levels of education and with children under their care reported repeated testing. Behavioral characteristics associated with sex, men who had ever had vaginal sex, anal sex, and had sex in the last six months had higher odds of being tested for HIV as women who had history of sexual abuse by a sex partner.

CHAPTER 3: METHODOLOGY

3.1 Study design

The study design was a cross-sectional survey carried out in 2012 using a population-representative sample. The study utilized the latest Kenya AIDS Indicator Survey (KAIS) 2012 data.

3.2 Study area

The Kais study is a nationally representative of Kenya. As of 2014, country's population was 45 million. Majority of this population was less than 15 years (42.1%), 15-24 year olds represent 18.7% of the population, and 25-54 years represent 32.8%. Median age was 19.1 years, 18.9 years among the males and 19.2years among the females. The sex ratio was one male to one female on average. The life expectancy at birth was 63.52 years. In 2014, there were 1.6 million people living with HIV and 57500 AIDS-related deaths.

Kikuyu ethnic group makes up 22% of the Kenyan population followed by Luhya (14%), Luo (13%), Kalenjin (12%) and Kamba (11%). Christianity is the predominant religion in Kenya with approximately 47.4% being protestants, 23.3% are catholic and others 11.8%) Eleven percent (11%) of the population is Muslim while 1.7% of the total population are traditionalists. English and Kiswahili are the official languages. The school life expectancy is 11 years.

Data was collected from 9 out of 10 National AIDS and STI Control Programme (NASCOP) programmatic regions. These included Central, Coast, Eastern North, Eastern South, Nyanza, Nairobi, Upper Rift, Lower Rift and Western regions. North Eastern region was excluded due to regional insecurity.

3.3 Study population

This study was targeting adults of ages 18-65 years in Kenya.

3.4 Inclusion Exclusion criteria

3.4.1 Inclusion criteria

The KAIS 2012 inclusion criteria:

- All household residents aged 18 months to 64 years who had been present at the survey-eligible household the night before the survey

- Emancipated minors (married, pregnant or with children) also included

Study inclusion criteria:

All participants aged 18-65 years

3.4.2 Exclusion criteria

KAIS 2012 exclusion criteria:

- Adults or children with cognitive or hearing disabilities

Study exclusion criteria:

Persons aged less than 18 years and above 65 years were excluded from the study.

3.5 Data source

This was a secondary data analysis which was extracted from the KAIS database .It included information of all individuals interviewed including all the variables e.g. age, sex, education level among other variables required for this analysis.

3.6 Sample size

There were a total of 12,066 adults aged 18-65 years.

3.7 Kenya AIDS Indicator Survey (KAIS)

The KAIS is a nationally representative population-based survey of children, adolescents and adults aimed at providing a standardized tool for monitoring HIV programs in the country. Aim of the KAIS is to collect data on knowledge, attitudes, and behaviors regarding HIV/AIDS; estimate HIV prevalence and incidence and; estimated the coverage and unmet needs of HIV services.

KAIS 2012 utilized National Sample Survey and Evaluation Programme (NASSEP V) sampling frame which is a household-based sampling frame developed and maintained by the Kenya National Bureau of Statistics (KNBS).

3.7.1 Sampling

The sampling design was a conventional two-stage cluster sample survey which is representative at the national level and for both urban and rural areas. In the first stage, 372 KAIS clusters were selected from 5630 clusters using equal probability selection method (EPSEM). The second stage entailed a random selection of an average of 25 households per cluster from the list of households in that cluster using systematic random sampling method.

3.8 Data collection

Data collection personnel had been trained for the KAIS 2012 through didactic presentations, small group discussions, and practical sessions such as mock interviews. Research assistants were trained on eligibility criteria, ethics and informed consent, completion of questionnaires, interviewing techniques and use of notebooks to collect data.

The KAIS 2012 data was collected using household questionnaires, individual female and male questionnaires for adults and adolescents aged 15-64 years, and a child questionnaires for

children between 10 and 14 years. Questionnaires were administered in Kiswahili, English and 11 local languages. Collected was collected via one-on-one interviews and captured via portable netbook computers. Data has since been made publicly available.

3.9 Variables

Outcome variable:

Ever tested for HIV

Independent variables:

Age: age at last birthday recorded as a continuous variable

Sex: Recorded a binary variable and was recorded as either Male or Female

Highest level of education was categorized into Nursery/Kindergarten, Primary, Post-primary/Vocational, Secondary 'O' level, Secondary 'A' level, College (middle level, certificate or diploma), University, Postgraduate or Do not know

Religion was categorized as Roman Catholic, Protestant/Other Christian, Muslim, No religion or others.

Marital status was categorized as either Ever-married or Never-married

Age at first sex: recorded as a continuous variable in years

Knowledge of HIV: was assessed using various questions asked during the survey

1. Ever heard of an infection, the virus that causes AIDS: recorded as either Yes or No

2. If a man/woman has HIV, their partner always has HIV: recorded as either Yes, No or Do not know

3. Is it possible for a healthy-looking person to have HIV: recorded as Yes, No or Do not know

4. A HIV positive mother can transmit HIV to baby during pregnancy: recorded as Yes, No or Do not know

5. A HIV positive mother can transmit HIV to her baby during delivery: Yes, No or Do not know

6. A HIV positive mother can transmit HIV to her baby during breastfeeding: Yes, No or Do not know

7. Awareness that there are drugs that a HIV positive woman can be given to reduce transmission to her baby: Yes, No or Do not know

8. Awareness that there are drugs people living with HIV can take to help them live longer: Yes, No or Do not know

Risk perception was categorized as No risk, Small risk, Moderate risk or Great risk. Risk perception was recoded to a binary outcome. Those who felt they were at no risk and low risk were grouped together while moderate and great risks were grouped together.

HIV/AIDS TESTING

1. Knowledge of the place(s) where people can get tested for HIV? Yes-1 No-2

2. Location of VCT facility, mobile VCT, at home, Hospital outpatient clinics, TB/STI clinic, hospital inpatient ward, blood donation center.

3. If ever been tested for HIV?   Yes/No

4. Reason for not testing

5. Last HIV test.

6. If exact date provided then calculate time in months or years

3.10 Data management

Cleaning and analysis of data was done using Stata version 13. Cleaning involved the checking

and cleaning of the data in terms of missing values, duplicate records, internal inconsistencies,

and recording, renaming and generating new variables.

3.11 Data analysis

3.11.1 Descriptive statistics

Descriptive statistics were used to indicate the number and percentage of adults in the various

categories of the explanatory variables. Chi square was performed to compare the variables.

3.11.2 Univariate and Multivariate logistic regression model

To determine the factors influencing uptake of HIV test, logistic regression was used. Initially

the relationship between ever being tested for HIV and each of the explanatory was assessed

using the simple logistic model. Further analysis was performed using a multivariate Logistic

regression model. An adjusted Logistic model was also used where only the variables found to

be significantly associated during univariate analysis were included.

3. 11.2.1 Logistic regression

Logistic regression is used to model dichotomous outcome variables. It is called the logit model

where the log odds of the outcome are modelled as a linear combination of the explanatory

variables. Binary logistic regression is a type of regression where a response variable with two categories is related to a set of explanatory variables which can be discrete and/or continuous. In this study, the binary response variable was 'Ever been tested for HIV' which was either Yes or No.

A simple logistic regression model with only one predictor

$$logit \, p_i = \ln \left[\frac{p_i}{1 - p_i}\right] = \beta_0 + \beta_1 x_i$$

This model gives the following curve:
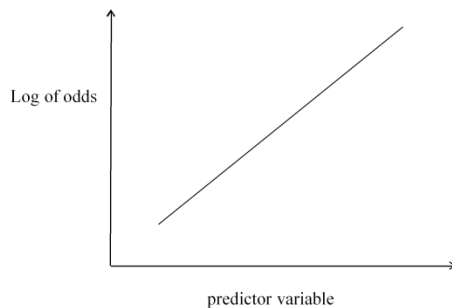
Figure 1

The model is equivalent to

$$p_i = (e^{\beta_0} + \beta_1 x_i)/(1 + e^{\beta_0 + \beta_1})$$

Equation 1

This model gives the curve:
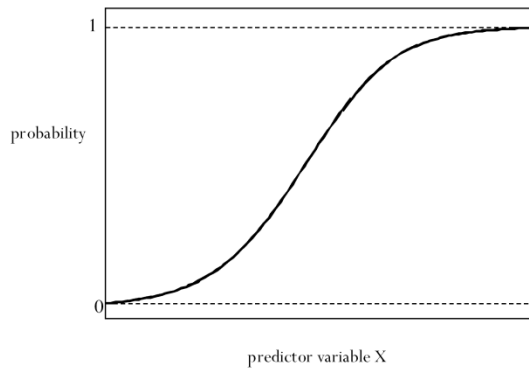
Figure 2

This curve is not linear. Therefore to get a linear model we model the odds of an event occurring where

$$\log of\ event = \frac{p}{1-p}$$

Binary logistic regression

It is a generalized linear model that is used to analyze the relationship between a response variable measured on a binary scale; and a set of predictor variables. Examples of the response include: either patient is alive or dead; either a disease is present or absent; a proportion of women using contraceptives (for grouped data) . "Success" and "failure" are used as generic

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terms of these two categories; where "success" represents the event of interest. This model is a generalized linear model, defined in three components:

Random component:

Response in two ways:

(i)For un-grouped data; since the response variable is a binary categorical variable; assign it a numerical value using a dummy variable.

Definition: A dummy variable is a binary variable for which all cases falling into a specific category assume the value of 1 and all cases not falling into that category assume the value of 0. Let Y be the response variable Y =1, if the outcome is a success 0, if the outcome is a failure

Y is a random variable with probability distribution

$$f(y,p) = p^y (1 - p)^{1-y} \quad y = 0,1 \quad 0 < p <$$

(b) Systematic component: The predictor variables can either be quantitative (continuous) and/or qualitative (categorical). For the qualitative variables, assign numerical values are assigned to the levels of the variable using dummy variables. For a categorical variable with m categories then we create m−1 dummy variables by selecting one of the categories arbitrary as a reference (base) level. The reference level is assigned value 0 for all the m − 1 dummy variables; and each of the other m−1 levels are assigned the value 1 for respective dummy variable created for the level.

(c) Link function: The logit function links the random component to the systematic component.

Odds and odds ratio:

(i) Odds is a ratio of the probability that an event will occur versus the probability that the event will not occur.

Odds =probability of event occurring/ probability of event not occurring

If p is the probability of event occurring and $1 - p$ is the probability of event not occurring then

odds $= p /1 - p$

(ii) Odds ratio is a measure of the odds of an event happening in one group compared to the odds of the same event happening in another group. With respect to an event of interest occurring; for two groups, say A and B, the odds ratio is given by

O.R =odds of events occurring for group A odds of events occurring for group B

Or O.R =odds of events occurring for group B odds of events occurring for group A

Interpretation of odds ratio: the values of an odds ratio range from zero to infinity. For interpretation we can classify the possible values into three categories: values less than one; the value one and values greater than one.

(i) An odds ratio of less than one means that the event of interest is less likely to occur for the group in the numerator compared to the group in the denominator

O.R =odds of events occurring for group A odds of events occurring for group B

OR < 1 implies that odds of event for group A <odds of event for group B, hence the event is less likely to occur for those in group A compared to those in group B.

(ii) An odds ratio of one means that both groups had the same odds of the event of interest occurring.

(iii) An odds ratio of greater than one means that the event of interest is more likely to occur for the group in the numerator compared to the group in the denominator.

O.R =odds of events occurring for group A odds of events occurring for group B

OR > 1 implies that odds of event for group A >odds of event for group B, hence the event is more likely to occur for those in group A compared to those in group B.

The multivariate logistic model where we have more than one explanatory variable is

$$logit\ p_i = \ln \left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 X_{i1} + \beta_2 \beta_{i2} + \cdots \beta_{ik}$$

Where X_1, X_2, ….., X_k are the predictor variables like age at last birthday, sex, religion, highest level of education etc. β_0, β_1, …., β_k are the unknown regression parameters determined running a model using the statistical software. The β indicates the amount of change in the outcome variable expected for each unit change in the explanatory variables when all the other predictors are held constant. Interpretation is similar to that of the simple logistic regression model. The odds ratio obtained from the multivariate logistic regression is an adjusted odds ratio because when assessing effect of one explanatory variable all other variables are kept constant.

Checking significance of the model

To determine whether the fitted model is a good fit, the fitted model to either the null model or the saturated model.

Comparing the fitted model to the saturated model, we test the hypothesis

H_0: the fitted model is a better fit

H_1: the saturated model is a better fit

We use the deviance statistic as the test statistic. Large values of the deviance statistic indicate a poor fit. A small p-value also indicates a poor fit because we are aiming to fail to reject the null hypothesis.

Comparing the fitted model to the null model, we test the hypothesis

H_0: the null model is the better fit

H_1: the fitted model is the better fit

The null deviance statistic is the test statistic used in this case. Large values indicate a good fit. We are aiming at rejecting the null hypothesis.

3.12 Ethical considerations

Secondary data from the KAIS 2012 which is currently in public domain, was utilized and therefore informed consent was not obtained. However, participants in the survey, had to provide verbal informed consent before being included in the study. For those who were less than 18 years, parental or guardian consent and minor assent were required.

This study was approved by University of Nairobi Institute of Infectious and Tropical Diseases (UNITID). A copy of this report will be submitted to UNITID in accordance with Institutional Review Board guidelines for conducting health research.

3.13 Limitations

This study was based on the KAIS 2012 which is the latest KAIS. Another limitation is that the

variables and information contained in this data set are limited. Other variables not collected

during the KAIS could have added value to the study. Estimates obtained from sample surveys

are affected by both sampling and non-sampling errors. KAIS made numerous efforts to

minimize this error during the survey.

CHAPTER 4: RESULTS

4.1: Socio -demographic factors
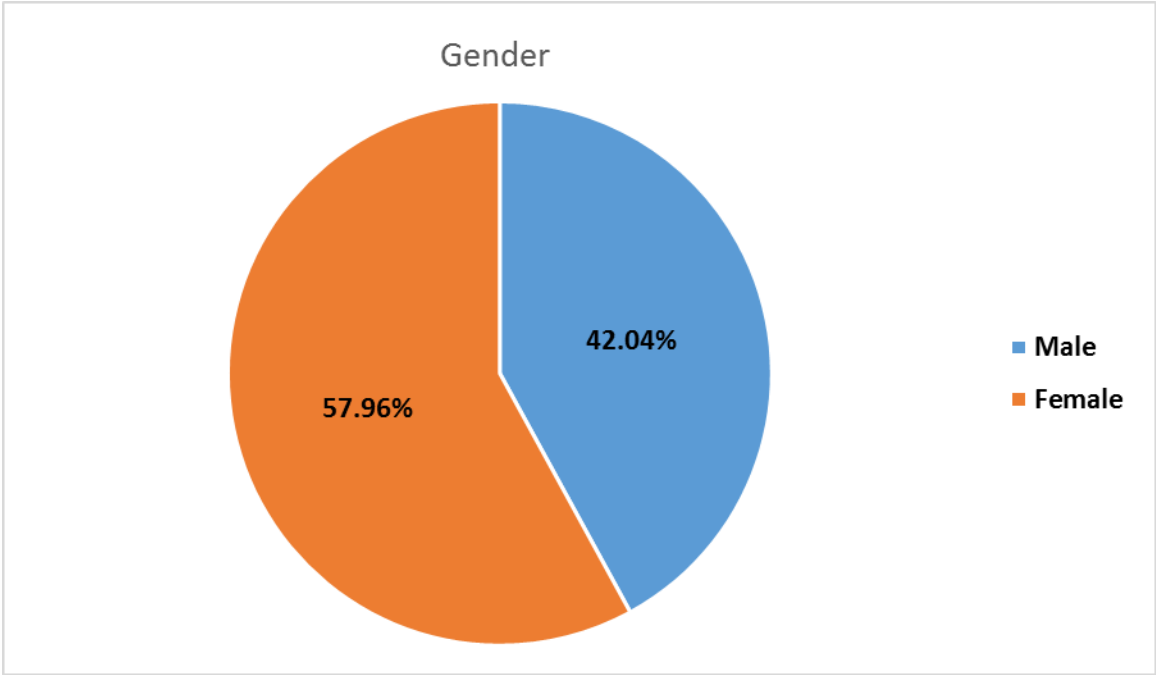
Figure 3: Gender

A total of 12,066 adults aged between 18-65years were sampled for the study. There were 6,993 females (58.6%) compared to 5,073 males (42.04%).

Marital status

- Never married — 21.26%
- Single — 2.23%
- Widowed — 4.93%
- Separated/divorced — 5.27%
- Married /cohab/polygamous — 7.55%
- Married /cohab monogamous — 58.69% / [VALUE]
- Unknown — 0
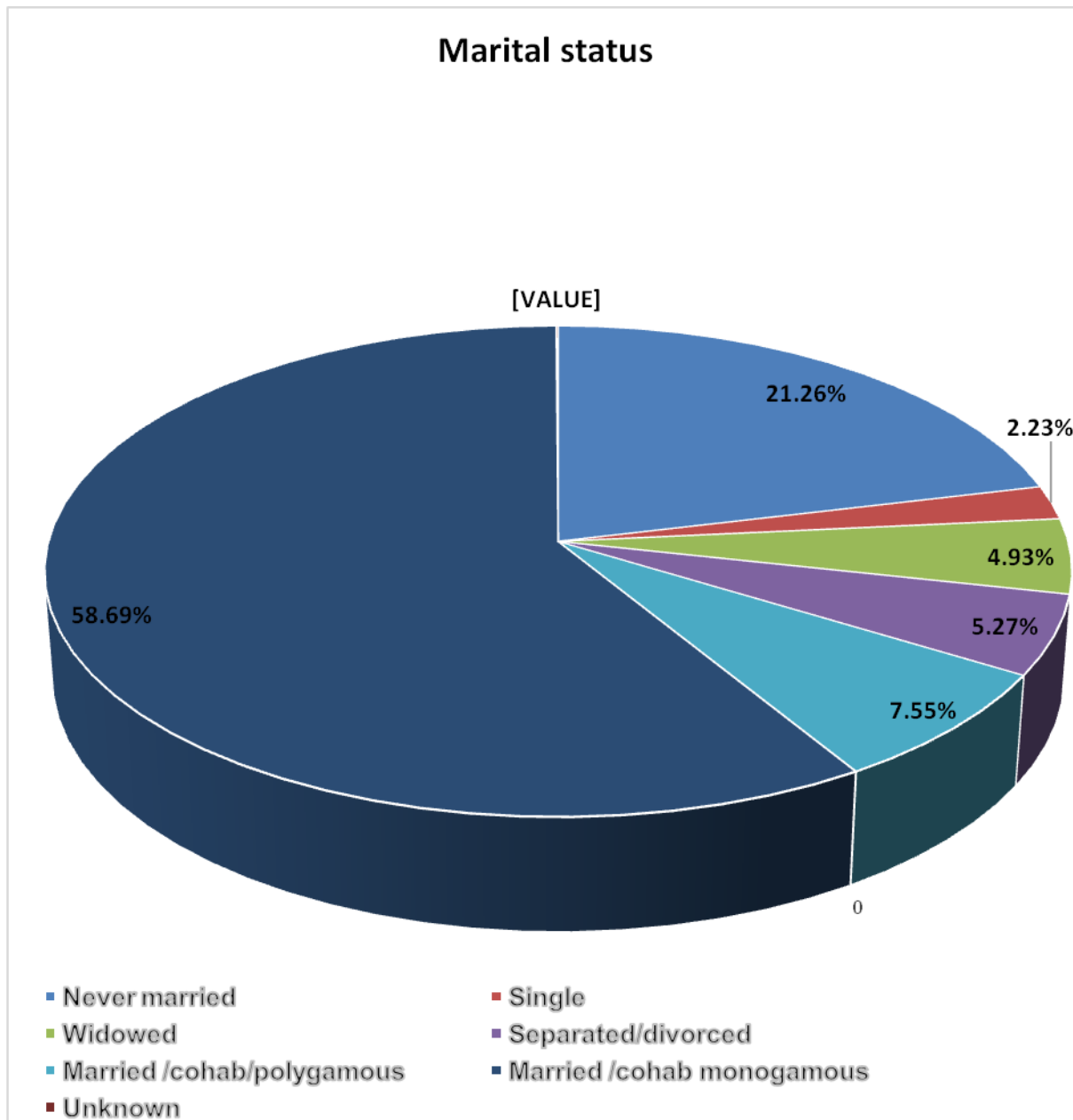
Figure 4: MARITAL STATUS

Figure 4, above represents the marital status of the participants Majority of the participants were

married/cohabiting monogamous,58.7%,followed by never married who were 21.3% ,separated

5.27 %,widowed 4.93% ,single 2.23% and unknown 0.07% .

Figure 5, below shows the percentage of the participants who ever attained education .87.67 % had attended school while 12.33% had not.

Attended school

12.33%

87.67%

■ Yes   ■ No
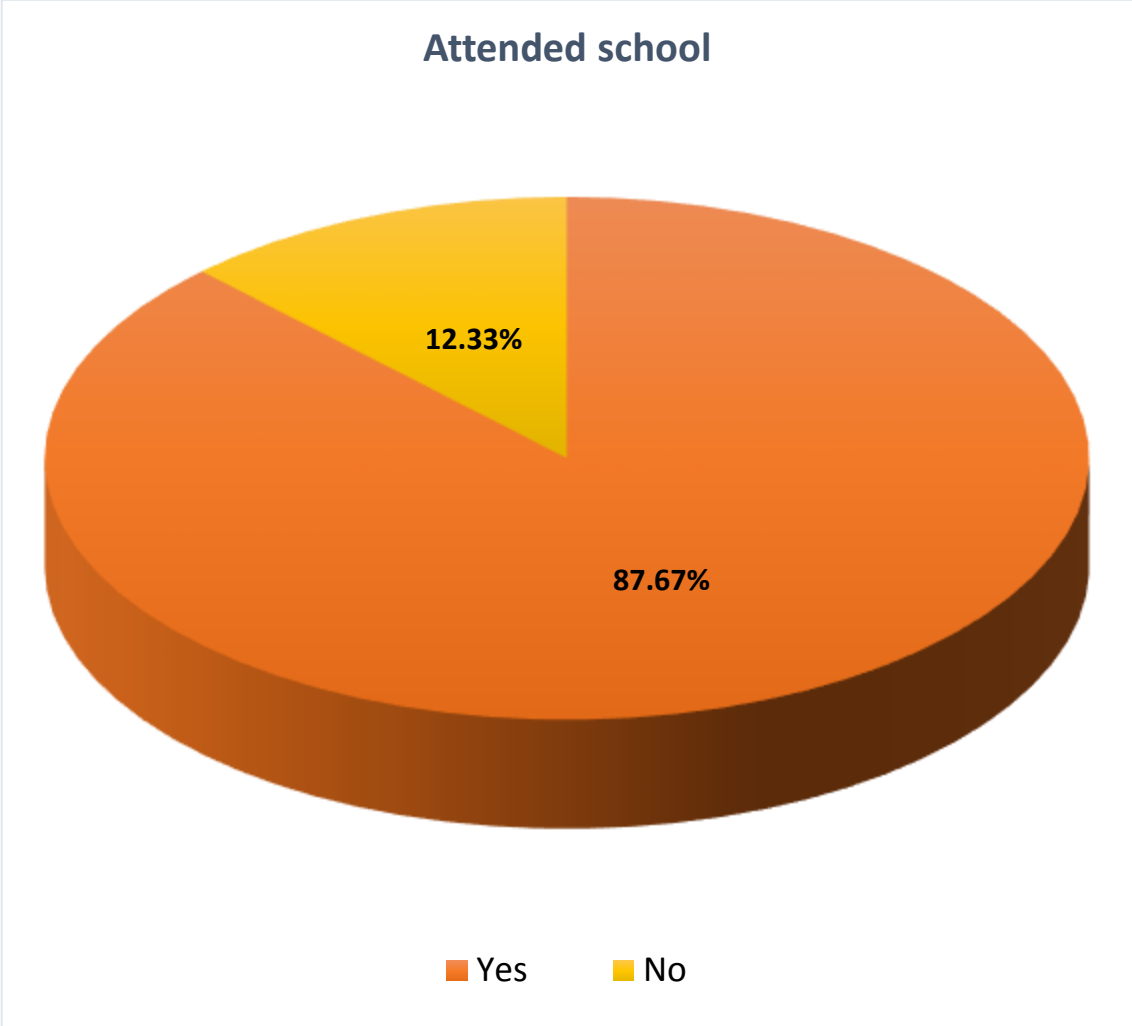
Figure 5: EDUCATION

Figure 6, below represents the Highest Level of School education of the participants , Most of

the participants ever went to school with majority having attained primary education 3,717

(34.50%), followed by post primary/vocational level of education 2,684(24.91%), 65 (0.60%)

had attained O-level, while 919(8.53%) A - level 35 % had university education.
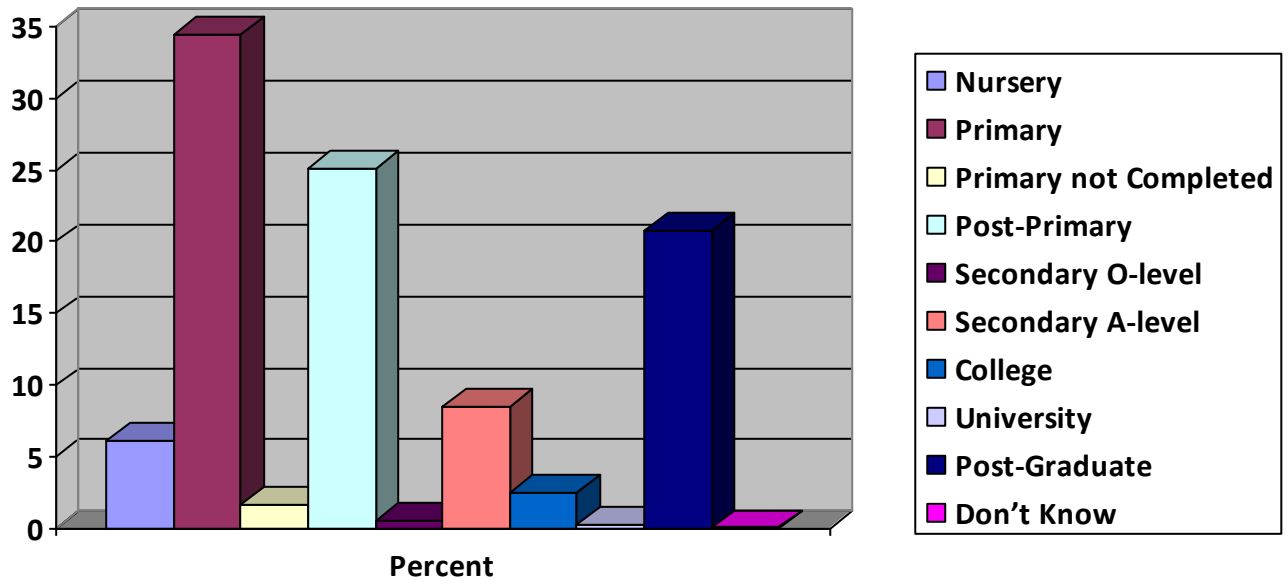
Figure 6: HIGHEST LEVEL OF EDUCATION

Windex

■	Lowest
■	Second
■	Middle
■	Fourth
■	Highest

20.94%   20.16%
19.36%
19.45%   20.08%

Religion

- Roman catholic — 22.71%
- Protestant/other Christian — 62.25%
- Muslim — 10.24%
- No Religion — 3.14%
- Other — 1.65%
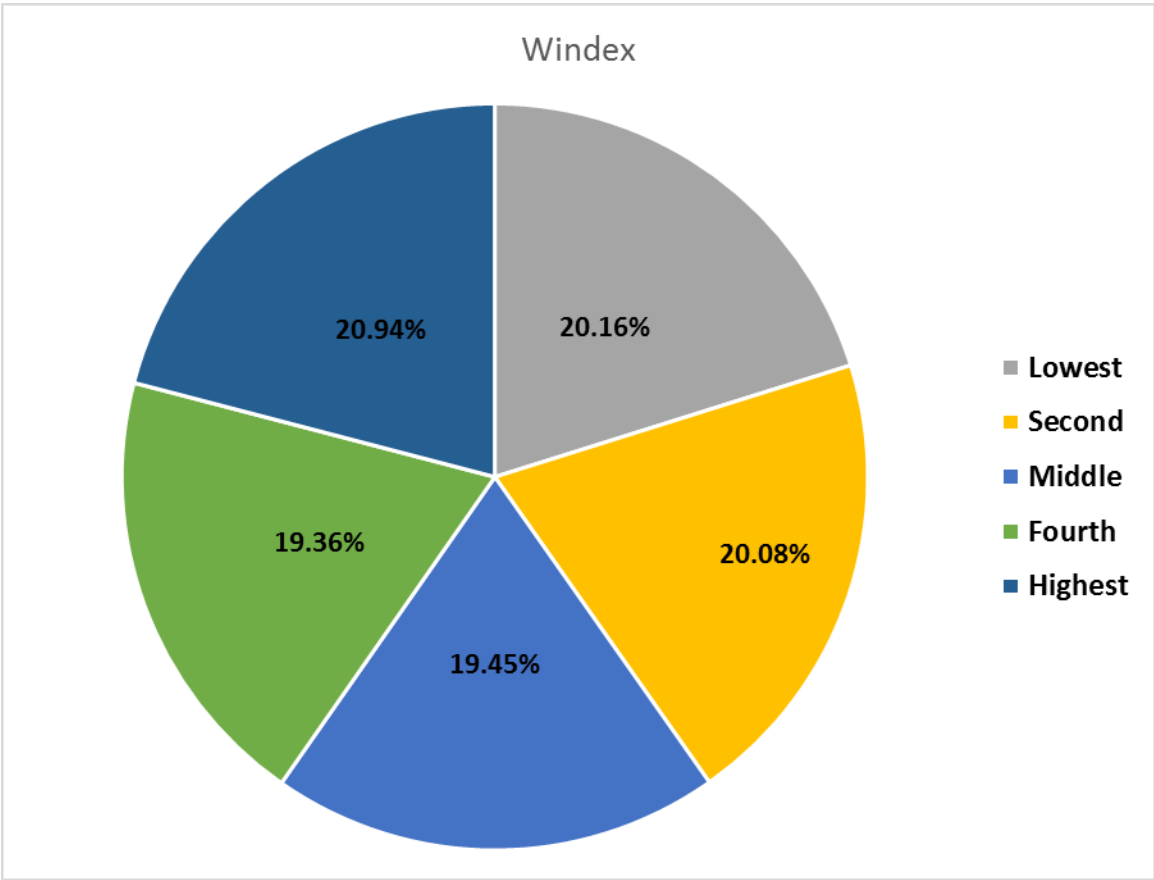
Figure 7: RELIGION

Figure 8, above, majority of the participants were of Protestant /other Christian faiths 7,511(62.25%), followed by Roman catholic 2, 40(22.62%) then by Muslim1, 236(10.24 %). No religion 379(3.14%) and other religion 199 (1.65%)

Figure 9: below most of the participants were from the Kikuyu community 2,457(20%) while the least were from the Swahili community 61 (0.50%).
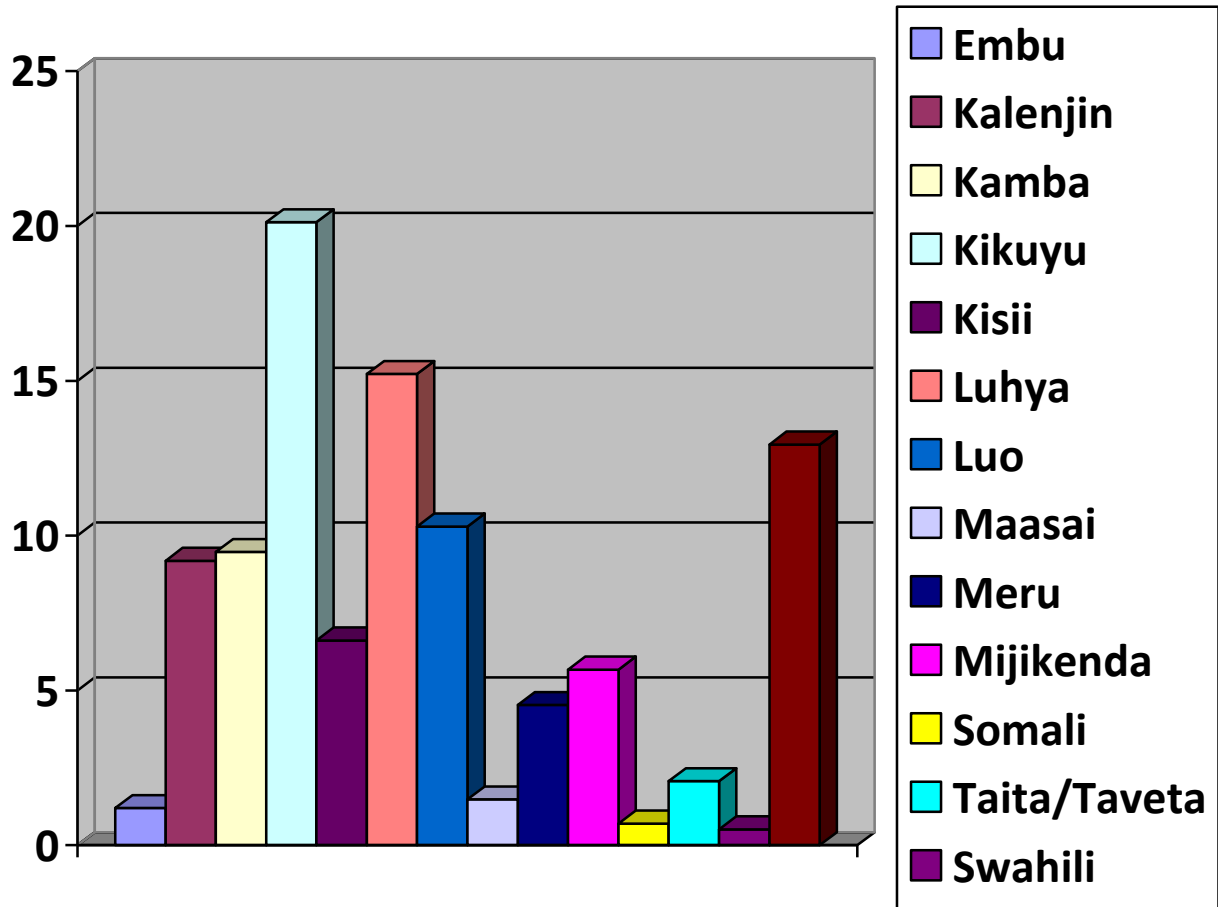
Figure 8: ETHNIC GROUPS

Ever Tested for HIV

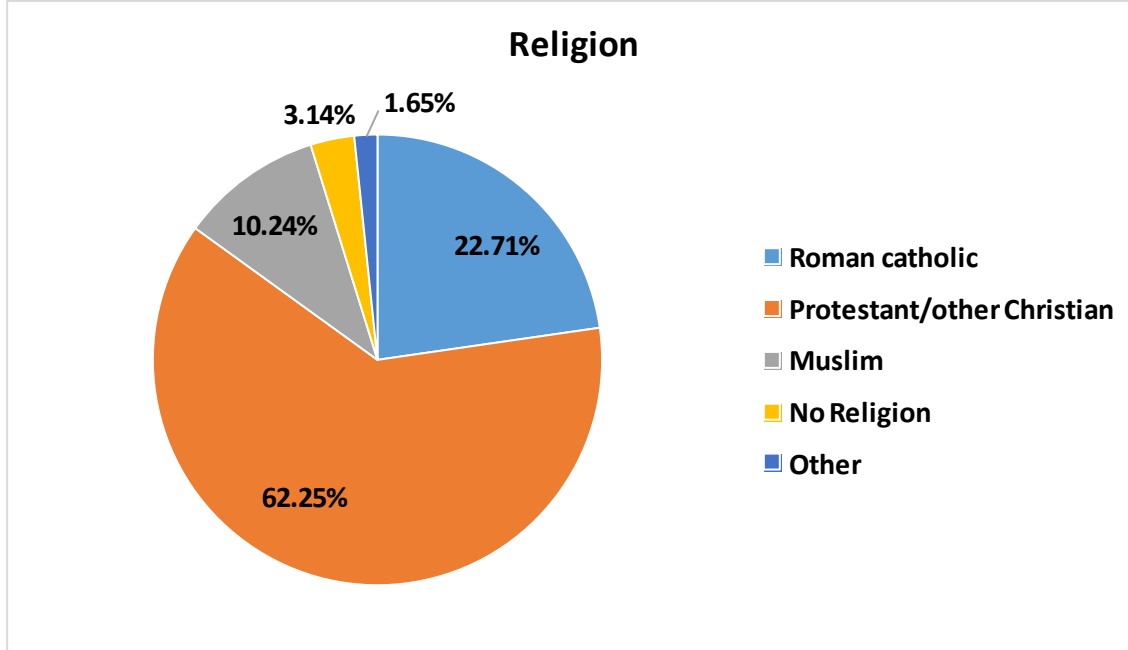| Sex	Yes	No	Total
Male	3,359	1,714	5073
	36.79	58.40	42.04
Female	5,772	1,221	6993
	63.21	41.60	57.96
Total	**9,131**	**2,935**	**12,066**
	100	**100**	**100**

Table 1

Pearson chi2 (1)=425.7415 Pr<0.0001

In the table 1 above, 63.2 % females had ever tested for HIV compared to 36.79% of males. The

female participants tested are approximately 2 times compared to the males. The p-value is

<0.0001 this shows significant relationship between gender and uptake of HIV test.

Ever Tested for HIV

Windex5	Yes	No	Total
Lowest	1,588	854	2,422
	17.39	29.10	20.24
Second	1,748	679	2,427
	19.14	23.13	20.11
Middle	1,802	549	2,351
	19.73	18.71	19.48
Fourth	1,857	460	2,317
	20.34	15.67	19.20
Highest	2,136	393	2,529
	23.39	13.39	20.96
Total	**9,131**	**2,935**	**12,066**
	100	**100**	**100**

Table 2

Pearson chi2 (4) =300.3654 Pr <0.0001

Highest Level of | Ever Tested for HIV

School Completed	Yes	No	Total
Nursery/Kindergarten	470	176	646
	5.69	7.61	6.11
Primary	2,834	806	3,640
	34.29	34.83	34.40
Primary Not Completed	150	31	181
	1.81	1.34	1.71
Post-Primary/Vocation	2,089	561	2,650
	25.27	24.24	25.05
Secondary 'O' Level	50	50	64
	0.60	0.61	0.60
Secondary A level	790	790	901
	9.56	4.80	8.52
College	224	40	264
	2.71	1.73	2.50
University	27	7	34
	0.33	0.30	0.32
Post-Graduate	1,627	566	2,193
	19.68	24.46	20.73
Don't-Know	5	2	7
	0.06	0.09	0.07
Total	**8,266**	**2,314**	**10,580**
	100	**100**	**100**

Table 3

Pearson chi2 (9) =89.4210 Pr<0.0001

Table 3 above, depicts significant relationship between level of education and ever testing for

HIV. P value <0.0001

Knowledge and gender

HIV or AIDS	Sex		
Yes	Male	Female	Total
	3,590	6,082	9,672
	70.60	84.47	78.73
No	1,495	1,118	2613
	29.40	15.53	21.27
Total	**5,085**	**6,981**	**12,066**
	100	**100**	**100**

Table 4

Pearson chi2 (1) = 342.4895, P-value = < 0.0001

Table 4 above, 84% of females had heard of HI/AIDS as compared to 70.60 % of the males.

.there is a statistically significant relationship between knowledge and gender, (chi –square with

two degrees P value of< 0.001) on analysis on gender and uptake of HIV testing, it showed that

the more knowledgeable one is about HIV and modes of transmission the more likely on would

take up the test. On analysis females seemed to be more aware about HIV as compared to males

4.2 Knowledge of HIV

Most of the participants had heard of HIV/ AIDS (79%) and 90% had heard of ARVs. Majority

(98%) had heard that HIV virus causes AIDS, 89% of those interviewed agreed that it is possible

that a healthy person can have HIV. Participants interviewed felt they had no, small and

moderate chance of on acquiring with reasons given as follows. 34.9% did not indulge in sex,

37.9% used condoms, 9.27% had few sex partners, and 3.9% had a partner who had no other sex

partners. , 2.2% cited other reasons. Of those interviewed 54 .5 % felt they had no risk of getting

HIV, as they have only one partner. Half (49%) of the participants had heard of anal sex whereas

31

half had not (50%).Majority of the participants (81.9%) had heard about MSM. Among the

participants 70% were willing to test self with an HIV kit and 94.5% were aware of HIV testing

facilities

4. 3 Gender and attitude

63.21 % of females had ever tested for HIV/AIDS as compared to 36.79 % of the males, there is

a statistically significant relationship between attitude and gender. On analysis there was a

significant relationship between attitude and uptake of HIV. Females are perceived to have a

more positive attitude towards HIV testing.

4.4 HIV testing

75 % of the participants had ever tested for HIV whereas 24% had not. Of those who were never

tested 96% did not know where to get a test done, 98.5%, said the cost for the test was too much

and 99% felt they could not acccess treatment in case they were positive on testing.Among those

interviewed majority 82 % of those ever tested had attained post primary education , whearas the

least was 72.7% who had completed nursery education.

Factors influencing hiv testing among adults aged 18-65

	β	S.E	SIGNIFICANCE	[95% CONF. INTERVAL]
Constant				
Age at last birthday				
Socio-economic				
Gender				
Highest level of education				
Nursery/Kindergarten	0			
Primary	0.698115	0.891683	0.434	-0.49522 2.445782
Post-primary/vocational	2.206241	1.838883	0.72	-.2979047 6.910386
Secondary/ O level (Form 1-4)	1.614406	-9338189	0.84	-.215845 3.444658
Secondary/A level (Form 5-6)	-			
College (middle level, certificate or diploma)	1.421271	1.534881	0.354	-1.587041 4.429583
University	-			
Do not know	2.548321	1.026566	0.013.5	.536288 4.560353

Do not know	β	S.E	SIGNIFIC ANCE	[95% CONF. INTERVAL]	
Religion					
Roman Catholic	0				
Protestant/other Christian	.1319716	.665464	0.843	-1.172314	1.436257
Muslim	1.375208	1.045543	0.188	-.6740175	3.424434
No religion					
Other	.5857716	1.096737	0.593	-1.563794	2.735337
	-0179885	1.828681	0.992	-3.56616	3.602137
Heard of HIV					
Ever had sex					
Ethnic tribe					
Embu	0				
Kalenjin	-17.41067	2944.161	0.995		
Kamba	-16.55683	2944.161	0.995		
Kikuyu	-14.64356	2944.161	0.995		
Kisii	-15.8297	2944.161	0.995		

Luhya	-17.3487	2944.161	0.995		
Luo	-15.28657	2944.161	0.995		
Maasai	-18.756	2944.161	0.995		
Meru	-	2944.161	0.995		
Mijikenda	-17.69834	2944.161	0.995		
Somali					
Taita/Taveta					
Swahili	-17.78734	2944.161	0.995		
Marital status Ever married Never married					
Ever used a condom Yes No					
History of abnormal discharge from the penis/vagina in the last 12 months Yes No	0 -13.51675	1410.631	0.992	-2778.303	2751.269

35

If the man/woman has HIV, his/her partners always has to have HIV					
Yes	0			0	
No	.1257209	.0758159	0.001	.0385559	.4099435
Do not know	.7510977	1.032079	0.835	.0508236	11.10012
A healthy looking person can have HIV					
Yes	0				
No	-.8045555	1.130337	0.477	-3.019976	1.410865
Do not know	.1025608	1.575732	0.948	-2.985817	3.190938

Table 5

On univariate analysis, gender, age, religion, marial status , education,socio-economic status,ever had abnormal discharge had no significant effect on ever testing for HIV. On further analysis using multivariate only who if the man/woman had HIV, his/her partners always have HIV was significant.

CHAPTER 5: DISCUSSION

Studies done to determine HIV knowledge and attitude with its association with HIV testing have similar results cutting across different countries [6,7,13,15], in that HIV knowledge and attitude play an important part in HIV testing .

Similarly the above study has shown that HIV knowledge, and attitude does play an important role in the uptake of HIV testing. HIV testing has been seen to be influenced by gender, socio-economic status, level of education, number of partners, sexually transmitted diseases. The results of the study seems to concur with a study done in Nigeria which showed that majority of the women (89.9%) had good knowledge of the modes of transmission but poor knowledge on PMTCT. Nearly half of the women were unaware of the association between breast milk and HIV transmission.

In a study, [13] on PITC testing and counseling for HIV in a resource –limited clinical setting, 98% of the women had heard of HIV/AIDS, And 60% had good knowledge on the risk factors associate with transmission of HIV.48% were not aware of the prevention of mother to child transmission .97% did not perceive themselves as at risk to HIV, an only 57% had taken the HIV test. 85% were willing to take up HIV test but were concerned about confidentiality and feared negative reactions from husbands, parents and community. Social cultural barriers confront pregnant women who opt for HIV testing.

5.1 Conclusion

The study has revealed that there is need to create awareness and to enlighten the population on

HIV/AIDS and to enlighten on facts and myths on the same. There is need to encourage PITC

and home-based testing. The services should be made easily available and cost effective for the

population. Less than half of the male population aged 18-65 years have ever been tested for

HIV, reasons need to be explored. New strategies need to be created to create awareness around

the importance of knowing ones HIV status.

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