

**DETERMINANTS OF HPV VACCINE HESITANCY AMONG PARENTS  
ATTENDING KENYATTA NATIONAL HOSPITAL OUTPATIENT CLINICS**



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## **ABBREVIATIONS AND ACRONYMS**

<b>BeSD</b>	Measuring Behavioral and Social Drivers of Vaccination
<b>CDC</b>	Centers for Disease Control and Prevention
<b>FDA</b>	Food and Drug Administration
<b>GAVI</b>	Global Alliance for Vaccines and Immunization
<b>GSK</b>	GlaxoSmithKline
<b>HIV</b>	Human Immunodeficiency Virus
<b>HPV</b>	Human Papilloma Virus.
<b>IARC</b>	International Agency for Research on Cancer
<b>KNH/UON-ERC</b>	Kenyatta National Hospital Hospital/University of Nairobi – Ethics and Research Committee
<b>LMIC</b>	Low and middle-income countries
<b>MOV</b>	Missed opportunity for vaccination
<b>PAP TEST.</b>	The Papanicolaou test
<b>QOL</b>	Quality of life
<b>SSA</b>	Sub-Saharan Africa
<b>STI</b>	Sexually-Transmitted Infections
<b>UK</b>	United Kingdom
<b>USA</b>	United States of America

## DECLARATION OF ORIGINALITY

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<b>Title of work</b>	Determinants of HPV vaccine hesitancy among parents attending Kenyatta National Hospital outpatient clinics

I, Kolek Chester Omondi, declare that:

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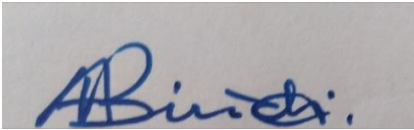
## APPROVAL BY SUPERVISORS

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## **OPERATIONAL DEFINITIONS**

**Adolescent** – Any person in the transitional phase between childhood and adulthood, or (WHO) any person between the ages 12 and 19

**Vaccination knowledge** – refers to the presence of facts and an understanding of topics around adolescent vaccines.

**Attitude towards vaccination**– These are feelings towards adolescent vaccines that have an effect on whether one decides to vaccinate or not.

**Feminization** -refers to the social construction of issues to focus on females with a view to influence perception of the public and government address.

**Preadolescent** – Any person in the stage of human development preceding adolescence, or (WHO) any person aged between the ages of 10 to 13.

**A parent**–These are the ones tasked to nurture or raise the child. A relative playing the role of a guardian is considered a parent.

**An adolescent**–These are persons aged between the ages of 10-19 years.

**Vaccine acceptance** – Willingness to participate in a vaccination exercise.

**Vaccine hesitancy** – Absence of motivation or willingness to participate in a vaccination exercise including the declining to be vaccinated when the vaccines are available.

**Willingness to vaccinate** - the readiness, quality or state of being prepared to vaccinate.

## **ABSTRACT**

**Background:** Cervical cancer is mainly caused by the oncogenic Human Papilloma Virus (HPV) infection which is prevented among pre-adolescent girls by prophylactic administration of the HPV vaccine prior to sexual debut. Kenya has recently rolled out the HPV vaccine in the national routine Immunization initiative. There are concerns that parents may be hesitant about taking their children for vaccination.

**Objective:** The purpose of this study was to identify the prevalence, reasons and risk factors for HPV vaccination hesitancy among parents attending Kenyatta National Hospital (KNH) outpatient clinics.

**Methods:** A prospective descriptive cross-sectional study was conducted in the Kenyatta National Hospital Medical clinics in the year 2020. The study participants included both male and female patients who were parents of adolescents. Participants were selected using quasi random sampling approach. Data collection was done using a structured questionnaire that was administered by face-to-face interviews. Data that was collected included participants' socio-demographic, their knowledge and beliefs about the HPV vaccine as well as their reasons for vaccination acceptance. STATA 13 was used to analyze the data. Descriptive, inferential statistics and logistic regression analyses were done. The levels of significance were set at 0.05.

**Results:** Cumulatively, 93.5% of the 195 parents recruited into the study were aged above 30 years. The largest age group were those aged above 40 years. Despite low knowledge levels about the HPV vaccine, and a high prevalence of negative beliefs (30%), parental willingness was high with 90% willing to have their children vaccinated. The main reasons given for hesitancy to have their children vaccinated were safety concerns (76%) and the feeling that the child was too young (48%). Positive beliefs, knowledge score and gender were positively associated with willingness to have the child vaccine. High education attainment was negatively associated and increasing age were negatively associated with willingness to have the child vaccinated.-Male parents had lower levels of knowledge about the HPV infection, cervical cancer and the HPV vaccine compared to their female counter parts. The most widely cited source of information on HPV vaccine was fellow workers in the work place followed by the television. Education status was positively associated knowledge levels. The beliefs on the HPV vaccine were noted to be average. More females than males believe the vaccine is effective. Beliefs were positively influenced by knowledge and occupation. We found that 59% of parents would consult their daughters before initiating the vaccination process and 77% recommended adolescents sex education.

**Conclusion:** Gender neutral interventions should be encouraged. Interventions that simultaneously involve both adolescents and parents should be designed and disseminated.

## **CHAPTER 1: INTRODUCTION**

### **1.1 Study Background**

The leading cause of death among women is cancer with a burden that is more pronounced in low-income countries (2). Of all cancers associated with the female reproductive system, cervical cancer has the highest incidence of causing mortality(1). As of statistics obtained in 2012, there were about 527,600 cases of cervical cancer that were diagnosed then making it the fourth most diagnosed cancer and resulted in about 265,700 deaths(2,3). In terms of cancer related morbidities cervical cancer ranks second after breast cancer, in terms of mortalities in developing countries it ranks third after breast and lung cancers respectively. (2,4). Low and middle-income countries (LMICs) (2,5) have cancer related mortalities rates of 90%. The high cervical cancer burden has been attributed to several factors which include attitudinal and knowledge barriers, inadequate health infrastructure and systems and unavailability of screening and treatment programs (5). Nations within East Africa have among the highest cancer mortalities globally. (6). Kenya being among them has high cervical cancer incidence, with cases diagnosed being about of 5000 women annually and mortalities estimated at 2500 women annually (6). These estimates are among the highest cervical cancer morbidity and mortality rates globally (7).

One of the leading risk factors for cervical cancer is prolonged exposure to the human papilloma virus. Early onset of sexual activity, engaging in unprotected sex and multiple sexual partners (8,9) also increase the probability of acquiring cervical cancer. Of all sexually transmitted diseases, the Human papilloma virus has the highest incidences (19). It is estimated that three quarters of all sexually active persons have had this virus at one point in their lives (18). It is estimated that about 35% of women get exposed to the virus with the first two years of their sexual debut (18). There is a link between HIV infection and higher rates of HPV acquisition (10). This is because of a decreased rate of clearance of HPV and precancerous lesions leading to an elevated risk of cervical cancer. Women with low CD4 counts and high viral load have increased risk of HPV infection (11) . Low CD4 counts cause a decreased HPV clearance. Therefore, immunosuppression related to HIV infection plays a role in the progression of HPV infection into carcinogenicity. Low-income countries that are associated with higher HIV risks also tend to have higher prevalence of cervical cancer (2,17).

The HPV vaccine is safe and has a 95% preventive efficacy against cervical cancer. It achieves maximal prophylaxis against precancerous cervical changes upon administration prior to sexual debut in the target adolescent population (6,12). Successful immunization against HPV requires most persons eligible to be immunized (13). Knowledge as well as attitudes concerning the vaccine affect uptake that further affects successful immunization.

A meta-analysis study assessing the global HPV vaccine coverage among 118 countries between 2008 and 2014, showed that middle-income countries (LMIC) that are at 18 % rate remain largely unprotected compared to the high income which are at 82% (14). Only 15.9 % are aware of the HPV vaccine and with knowledge levels of 17.5% (14). The levels of awareness in developed countries such as Britain and Australia were much higher ranging from 67-71.3%(14). A high HPV vaccine coverage rate of up to 73% among a considerable number of females in Australia was also mentioned in another study (15). A systematic review among a number of African countries indicated a high level of willingness in spite of low levels of knowledge and awareness was noted (16). Though a LMIC, Rwanda has achieved a high coverage surpassing some high-income countries. Rwanda is among the initial nations that were able to roll out a nationwide implementation of HPV vaccination for all people. It conducted a nationwide sensitization campaign facilitated by a robust Ministry of Health and education. They received three-year vaccine donations from Merck vaccine manufactures during their nationwide vaccine piloting program(12).

In a study among 147 women who had attained child bearing age, it is estimated that only 15% of them had heard of the HPV vaccine. The women's willingness rate to vaccinate their daughters was 95% (6). Schools remain the most relied upon method of acquiring information for the school going children in Kenya as per a study conducted in Eldoret Kenya(17). It also revealed that the HPV vaccine uptake was associated with higher knowledge of cervical cancer (17). In a study in Kitui it was noted that in spite of low levels of knowledge on the vaccine, there was a higher level of willingness to vaccinate(18).

## **1.2 Problem statement**

Cervical cancer has a very high prevalence in Kenya. Every year there are about 5000 incidences of cervical cancer recorded in Kenya and mortalities are estimated at 2500 women. The main risk factor for cervical cancer is HPV infection which is currently preventable

through prophylactic HPV vaccination. However, the knowledge and attitude towards HPV vaccine are potential risk factors for HPV vaccine acceptance.

Studies aimed at assessing determinant of vaccine hesitancy such as knowledge and attitudes towards the HPV vaccine have been done in Kenya. However, most of the studies were done among females. The male opinion is important since they are key decision makers in their households. Men can be indirectly affected by the consequences of cervical cancer. They also potentially transmit the vaccine. A study on vaccination hesitancy is required for males. This will identify whether there are gender differences in knowledge, beliefs and their vaccination willingness.

Potential barriers may threaten parental willingness to have their children vaccinated. This eventually impedes success of the HPV vaccination initiative. The targeted vaccine coverage won't be achieved and subsequently lead to high cervical cancer morbidity and mortality. Government needs data on levels of knowledge of the vaccine and beliefs and practical issues that may impede successful uptake of the vaccine. A limited number of studies have been commissioned to identify the barriers to HPV vaccination in the Kenyan context though other studies on barriers have been conducted in other countries. Beliefs and practices vary from culture to culture and therefore a Kenyan specific study is required. This study findings will help to meet the gap by identifying the knowledge levels of the HPV vaccine, beliefs and practical issues that may impede HPV vaccine uptake. The study will inform the design of communication strategies to promote vaccine uptake.

Parents in Kenya are key determinants of whether their pre-adolescents get vaccinated or not. Parents have a moral responsibility of educating their adolescents on health matters including getting vaccinated. They are involved in provision of finances for transport and motivate them by offering financial incentives. This study will focus on parental knowledge beliefs and willingness to vaccinate their children.

### **1.3 Study Justification**

Research surrounding the knowledge and attitude towards HPV vaccination is important for the success of immunization programs and improved uptake of the HPV vaccine. Following the recent roll out of HPV vaccine in Kenya, this study will generate baseline data on the HPV

vaccine initiative and be used to measure changes resulting from future interventions. The study identified risk factors related to vaccine hesitancy in Kenya for further action in informing, designing and modifying HPV vaccination communication strategies. The study demystifies speculations and myths surrounding the vaccine in this conservative population with religious and cultural restrictions.

Eventually, the HPV vaccine coverage will be accelerated. Scale up of HPV vaccination will lead to reduction in infection rates amongst men and women and the community at large. The conferred protection will benefit individuals with a better quality of life, reduced emotional pain and suffering. The all-inclusive treatment of cervical cancer is expensive. Therefore, the cost incurred in managing cervical cancer channeled to other priority areas which include HPV immunization services. There will also be a reduction in cervical cancer morbidity and mortality in the Kenyan set up with limited treatment availability.

#### **1.4 Research Questions**

1. What is the level of knowledge of the HPV vaccine among patients visiting KNH clinics?
2. What is the attitude and beliefs about HPV vaccine?
3. Are the parents willing to vaccinate their children with the cervical cancer vaccine?
4. What are the determinants for willingness to be vaccinated?

#### **1.5 Objectives**

##### 1.5.1 Main objective

The main objective to identify the determinants of vaccination hesitancy among parents attending KNH outpatient clinics.

##### 1.5.2 Specific objectives

The specific objectives were:

1. Assess the levels of knowledge on the HPV vaccine among parents visiting medical KNH clinics.
2. Assess the attitude towards and identify beliefs about the HPV vaccine for adolescent girls.
3. Evaluate the willingness to vaccinate with regards to HPV vaccine.
4. Identify-the determinants of HPV vaccination hesitancy.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 The Human Papilloma Virus infection and Cervical cancer.**

The HPV infects all women age groups with high incidences occurring at age 20-24 years old. HPV is categorized as group one carcinogen as stated by (International agency of Research on Cancer (IARC) (19). A number of HPV genotypes are linked to cervical cancer The high-risk genotypes are HPV 16 and 18 with cervical cancer causation rate of 70% globally (8). The HPV infection is not limited to women. This infection is also associated with vaginal, anal, penile, and oropharyngeal cancers (19). The HPV infection is not a sufficient but a necessary cause of cervical cancer (3). Developmental phases of cervical cancer are as follows. Initially, the cervical epithelium is infected with high-risk HPV which may regress or progress with formation of precancerous lesions. This is followed by dysplasia of which the affected cells eventually invade the neighboring tissues (8). Progression of HPV to invasive cancer is thought to take 10 years (8). Cervical cancer is associated with physiological and physical morbidities that negatively impacts the quality of life. It results in deteriorated physical, emotional, social and economic aspects of life and support systems. Some of these include the treatment related side effects for example vaginal bleeding and chronic radiation enteritis. Reduced sexual function leads marital discordance, waning partner support, pain, depression, anxiety, suicidal ideation, poor sleep, impaired concentration (19). Some of the global primary preventive initiatives to aid lower acquisition and transmission of HPV infection include the delay of sexual debut, reduction of the number of sexual partners in a lifetime, the scale up condom use, and medical male circumcision (18).

Secondary preventive strategies in play include screening for early detection of precancerous lesions and early treatment. The cornerstone in screening for cervical cancer in high income countries is cervical cytology (the Papanicolaou test/ Pap smear). In low income setting visual inspection using VIA (acetic acid) or VILI Lugols iodine is performed. Cryotherapy is performed for treatment of cases detected ( (3,12,17)

Immunization remains a key public health strategy for infection risk reduction. Vaccination consequently leads to minimization of levels of etiological agents in the environment (18). Lots of work has been done that finally led to the development of the HPV vaccine. HPV vaccine was developed and approved in 2006 by FDA and recommended by CDC for both genders (19). The HPV vaccine is regarded as the first anticancer vaccine (15). It is a great milestone



in the immunization history biomedical and advancement towards cervical cancer burden mitigation (15,20). The importance of screening post immunization remains since the vaccine spectrum of coverage vaccine does not cover all cervical cancer-causing oncogenic HPV types (4)

Prophylactic HPV vaccines in the market include: the monovalent HPV 16 vaccine (Merck Sharpe and Dome, Merck USA), the quadrivalent vaccine that contains L1 proteins of HPV 6, 11, 16, 18 (GARDASIL)<sup>®</sup> and the bivalent vaccine that has L1 proteins of HPV 16 and 18 (CERVARIX)<sup>®</sup> by GSK Rixensart, Belgium) (8). These vaccines reduce morbidity and mortality in LMIC which have massive challenges in screening for early detection and treatment.

The vaccination campaigns as recommended by WHO targets girls of age 9-12 years ages prior to sexual debut. Boys' vaccination is also done to offer indirect protection to girls by HPV re-infection risk reduction. HPV related morbidities related to men are also reduced including penile, anal, oropharyngeal cancers (19).

Administration of these vaccines is done on a three-dose schedule, the second dose being done one to two months post the first dose and the third dose is given at least six months after the first dose (21). There is no need of restarting upon interruption of the vaccine series. Changes were later made by WHO from the previously recommended 3 doses to two dose vaccine on the basis of its immunogenicity and non-inferiority to the 3rd dose schedule (4). The 2-dose schedule maintains high immunogenic protection and confers reduced delivery costs. This is an added advantage to the low resource settings.

Studies done revealed that cost remained to be a serious encumbrance to HPV vaccine roll out and scale up in many sub Saharan Africa countries (18). On this basis, GAVI alliance announced a price cut down to USD 4.50 from a previous USD 120. WHO also advocated for incorporation of HPV vaccine in national immunization initiatives provided that it is a public health priority, there is feasibility of vaccine delivery and it is cost effective (19).

The first HPV immunization initiatives commenced in high income countries in the year 2007 (12). This led to achievement of significant decrease in HPV prevalence where a 50 percent

coverage was attained (9). The HPV vaccines were also made available for utilization in the middle- and low-income countries through donations by (GARDASIL)® access program, Bill and Melinda gates foundations, PATH and the vaccine manufacturers (6).

Studies reveal that through the HPV vaccination implementation process some barriers to were realized. Some are inadequate finance and infrastructure, limited training of healthcare workers and constraints in cold chain capacity (12). Providers are expected to raise awareness, effectively communicate, recommend the vaccine, though studies have shown provider related reservations and concerns about the vaccine (19).

## **2.2 The HPV vaccine program in Kenya**

In 2012, the Global Alliance for Vaccines and Immunization (GAVI) embarked on supporting vaccine demonstration projects on 53 GAVI eligible countries. GAVI supported and co-funded 2-year HPV vaccine demonstration projects with a view to eventually steer planning and implementation of a nationwide HPV vaccination programs in countries in SSA. GAVI support included formal evaluation of HPV vaccine delivery, coverage survey and cost analyses (5). Kenya became received GAVI support (12). The Kenyan HPV vaccine two-year (2013- 2015) demonstration project was conducted in February 2014 in Kitui county (7,18). The school-based approach was used and it achieved a coverage of 96% though it was resource intensive. HPV was eventually introduced into the national routine immunization schedule in 2019. The nationwide rollout began in 2019. The campaign was tailored to be executed in schools and facilities in partnership with counties as the needs dictated. The low numbers of personnel involved in the process necessitated the need for collaboration and partnerships. Intensive advocacy helped in achieving coverage of the program.

## **2.3 The link between HPV vaccination and socio demographic characteristics.**

### 2.3.1 Gender differences to knowledge, beliefs and vaccination willingness.

The HPV infection affects both men and women. Men remain to be carriers of the virus and can transmit the virus to their female sexual partners. Men can also present clinically with genital warts and penile cancer. The benefits of vaccinating boys include prevention of genital warts among them, preventing cancers among the males, and preventing HPV transmission to their sexual partners and thereby decreasing female related HPV associated cancers (22).

Women can be carriers of the HPV virus as well and may present clinically with cervical cancer. Immunization with the HPV vaccine will protect both men and women.

The Kenyan cultural norms and practices place family decision making authority on the man. Men's knowledge on the importance of HPV vaccine would therefore impact on the vaccine uptake through male involvement. A study conducted among teachers in Kitui and another one in Malaysia among teachers revealed that there was more knowledge on HPV and cervical cancer among the female counterparts compared to the males and that this is possibly contributed by a view that only women are affected by the HPV (18). There is potential male partner disapproval of HPV vaccination that increases vaccine hesitancy among women in Kenya (23). Limited studies on the knowledge, attitudes and HPV vaccination willingness that include men have been conducted in Kenya.

### 2.3.2 Parental knowledge, beliefs and vaccine willingness

The parental role in HPV vaccine uptake is pivotal. Their knowledge, attitude and intentions are key to vaccine uptake successes. Parental vaccine acceptance and hesitancy studies have been carried out worldwide.

Parents who have receive education on the HPV, in the short term, had improved knowledge level about HPV compared to the control group ( $p < .001$ ) according to an interventional study(24). The raised knowledge has minimal effect on the HPV acceptability for their children. This is so compared to the control group ( $p = .17$ )(24). The results suggest further influences to their attitude toward HPV vaccination that are non-information-based (24).

Among adolescent girls and their mothers in Hong Kong, (25) more daughters than mothers perceived a greater risk of HPV infection if not vaccinated (95.3% versus 87.1%,  $p = 0.011$ ) and developing cervical cancer at (95.3% vs 88.8%  $p = 0.022$ ). More mothers than daughters had stigmatization fears of the adolescents being considered as promiscuous if they were infected with HPV at about 13.5 % for both groups. There were also fears about adolescents' early sexual debut upon HPV vaccination at about 13 % for both groups (25). There was no statistically significant difference between the two groups on the stigma issue. More mothers were concerned about their daughter's stigmatization if they got the HPV vaccine at rates of

(11.8% versus 3.5 %,  $p= 0.004$ ). Both mothers and daughters considered the vaccine to be safe at about 65%. Vaccine acceptance rates were 38% and 36.3% for the mothers and daughters respectively (25). The mothers who accepted the vaccine had concerns that the vaccines had long term side effects, and that their daughters were too young for vaccination. The daughters believed that the vaccines are efficacious, yet had concerns about side effects being that it is relatively new. The adolescents also expressed concerns that their parents may not be able to afford the vaccine.

In Fiji, half of the parents with eligible daughters for HPV vaccine reported that the daughters had received the vaccine. The knowledge levels of cervical cancer among the correspondents were 80% since an information campaign for the HPV vaccine had already been conducted. The study showed that the campaign increased awareness about the HPV vaccine. The respondents who reported having heard of the vaccine prior to the campaign were 30%. Those who reported they got knowledge of cervical cancer through the vaccine campaign were 60.4%. About 85% were willing to consent to their daughters' vaccination. Only 87% of the consenting parents mentioned that they would vaccinate their other adolescent daughters. There was a fairly consistent attitude among parents regarding the age of the daughters receiving the vaccine. (9-11 years). About 69.3% respondents were willing to vaccinate their adolescent boys if the vaccine was offered in the future. Among the non-consenting parents, 52.3% had vaccine safety concerns due to negative media. This study demonstrated a strong association between information access and vaccine consent for vaccine decision making (26).

The pooled vaccine awareness and knowledge rates are 15.9% and 17.5% respectively in the Chinese population (24). The awareness rates exhibited among females, mixed population and the male populations are 17.3, 18.5 and 1.8 % respectively. These showed a low HPV vaccine awareness and knowledge among the Chinese population. Chinese males' role in the family is vital. The low awareness among the males contributed to the low acceptability and it also influenced its promotion. Safety and efficacy concerns were the primary obstacles in the study (24). Thirty-five studies assessed on adult's willingness to be vaccinated. The studies that addressed parental willingness to permit their daughters vaccination were 12. There was a 67.2% willingness among the general adult participants to be vaccinated. The prevalence of a parent's willingness to get their daughters vaccinated was 60.2% (24). The studies that were assessed for the reasons why the general adult participants were vaccination reluctant were 19.

Among the unwilling population, 33.6% of them believed they had low risk of getting cervical cancer. Only 36.1% were concerned about the vaccines limited use. Among the unwilling population, 30.8% and 50.46% were worried about the vaccine efficacy and safety respectively. Respondents who questioned vaccine source were 32.1 %. Those who had concerns on the vaccine cost were 23.7% (24). The studies that explored parental vaccination reluctance 7. The participants who had concerns about underuse in China were 32.6%. Those who had vaccine efficacy and safety concerns were 68.2 %. Only 17.2 % respondents questioned the vaccine source, whereas 28.37 % mentioned that their children were not old enough to be vaccinated (24).

Women residing in the metropolitan and rural Tanzania are aware of HPV vaccine. 9% of these admitted to having heard of the vaccine. HPV vaccination willingness among the women is at 93% (3). There is low vaccine related knowledge yet a high vaccine acceptance depending on vaccine availability. Such data correlates with that from other sub Saharan African countries. Though there is a high acceptance among the women, they are not confident to speak for their partners. It insinuates that women are critical parties in making health related decisions in Africa. These women also preferred the male involvement in making health decisions which includes the decision concerning their daughter's vaccination (3). Among the factors that influence their vaccine acceptance include financial barriers (at a rate of 47.8%), safety and short duration side effects concerns (at a rate of 19.7 %) and finally concerns about unknown future side effects (a prevalence of 40.7%). Among the women in the study, 6.3 % had concerns about conformity with religious beliefs.

Suboptimal levels of HPV vaccine uptake of 41.5% was noted amongst parents across 15 countries included in a meta-analysis study. There are significant moderator effects for sex of child with the uptake being lower among boys (20.3%) than for girls (46.5%). Some of the determinants to vaccine uptake were HPV vaccine recommendation by health provider, parental safety concerns ( $r=-0.31$ ), routine child preventive check-up ( $r=0.22$ ), parents' belief in vaccines ( $r=0.19$ ), health insurance coverage ( $r=0.16$ ), and out- of-pocket costs reduction ( $r=-0.15$ ). Addressing all these risk factors would improve HPV vaccine uptake (25).

## **2.4 Vaccine hesitancy in Kenya**

Hesitancy in uptake of vaccines has the ability to greatly hinder the adoption and uptake of a vaccine within specific settings. Therefore, it is crucial that all countries make effort to

continuously to comprehend the attitudes and reception of a vaccine at local levels by assessing hesitancy. Every nation ought to come up with a clear-cut strategy to handle acceptance of vaccines. Some of the practices that can be adopted include community engagements and trust building among the parties involved.

#### 2.4.1 Vaccine hesitancy in Kenya

The Kenyan population is strongly influenced by traditional and religious leaders. A study in the USA indicate that members of organized religions are less receptive to immunizations compared to the general public(26). In Kenya, some religious leaders have in the past sabotaged vaccination campaigns (27). The religious leaders and lack of adequate information may promote myths and beliefs among communities regarding the HPV vaccine and hence impact on uptake of the HPV vaccine (28).

#### 2.4.2 Vaccine Hesitancy among parents.

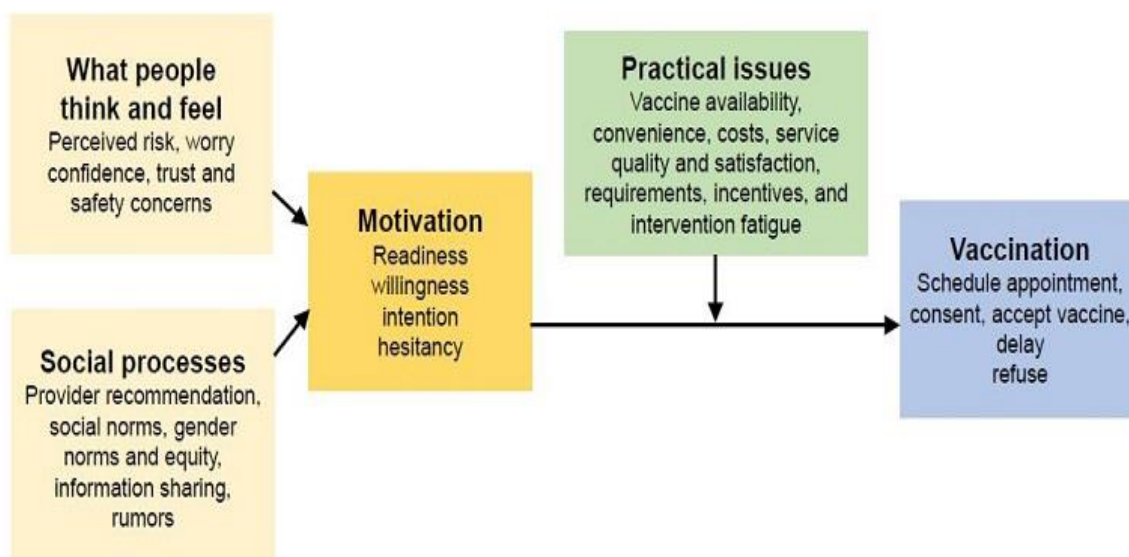
Parental knowledge and understanding of the importance of vaccinating their adolescents would improve their vaccine acceptance(22). Vaccine hesitancy tends to be more among the educated parents than those with lower educated levels (22).From literature the vaccine acceptance is experienced more among parents with limited knowledge levels. Most of these parents rely on the health provider recommendations rather than their specific knowledge on vaccinations (22). These parent's vaccination intention eventually reflects the health providers knowledge and attitudes. Therefore, the health provider should avail the information necessary for the parents to make decisions (22). Parents tend to prefer vaccinating older than younger adolescents (22). Parents tend to vaccinate their daughters than their sons with a belief that their boys are not at risk(22).There are parental concerns about their adolescents developing perceived protection from sexually transmitted infections (STIs) and promote promiscuity (17).Some of the other parental roadblocks may include risk and safety concerns about side effects, stigma associated misconceptions, perceived vaccine costs and reluctance in communicating to their children on sex matters (9).

### **2.5 The Increasing Vaccination Model**

In order to address vaccination hesitancy, adequate understanding of the causation of the problem is necessary and also tailor-made evidence-informed steps to ameliorate uptake.

Monitoring and evaluation are also necessary as they help track effectiveness of interventions (29). In 2018, WHO established the Measuring Behavioral and Social Drivers of Vaccination (BeSD) comprised of a group of global experts to develop tools for systematic and comprehensive assessment of reasons for under vaccination. They developed the Increasing Vaccination Model states that feelings, thoughts and social influence affect people’s motivation to vaccinate (29).

## Increasing Vaccination Model



Source: The BeSD expert working group. Based on: Brewer NT, Chapman GB, Rothman AJ, Leask J, and Kempe A (2017). Increasing vaccination: Putting psychological science into action. *Psychological Science for the Public Interest*. 18(3): 149-207

Figure 1: The Increasing Vaccination Model (29)

The model is adopted for use in this study though it has some limitations. This model does not consider that caregivers (parents) might be the ones making the decision to vaccinate. The model doesn’t capture socio demographic traits of caregivers (parents/guardians). It also has limitations of knowledge acquisition. It is therefore modified to comprehensively evaluate the knowledge, attitudes and HPV vaccine intentions in this study. Knowledge and psychosocial factors are the determinants while the vaccination intention is the dependent variable. Socio-demographic factors are the intervening factors in this study.

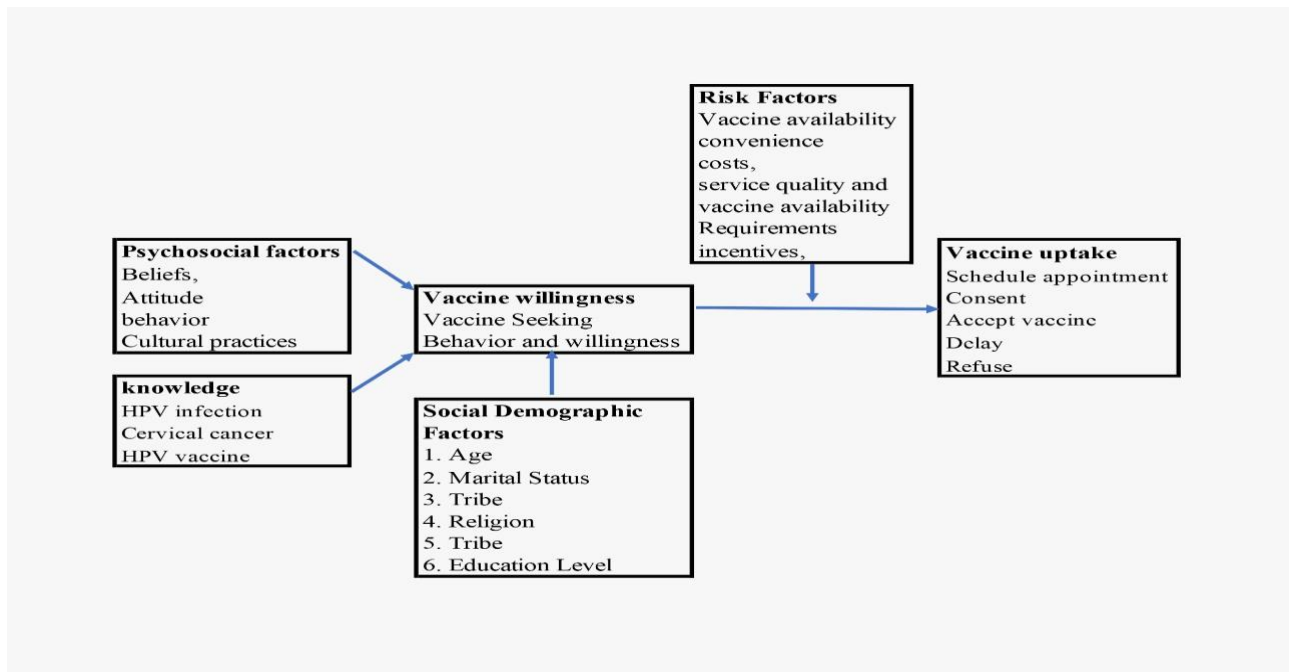


Figure 2: Conceptual framework – determinants of vaccine hesitancy adopted from the increasing vaccination model

## 2.6 Increasing uptake of the HPV vaccine

Addressing potentially low vaccination necessitates a proper understanding of the determinants of the problem hence this study. Multiple factors affect vaccine uptakes. To fully address them a multidimensional approach must be adopted (29). There is a need for the government to collaboratively engage health sector stakeholders. These persons involve not only the health workers but parents and community grass root leaders. The full spectrum of persons involved help in developing better quality health services, systems, and communication strategies that enable scale up of vaccine uptake (29). While there is need to strategize, missed opportunities can be covered for by the use of current existing sites even as attempts at expanding vaccination avenues are made(30). The government should also involve the Ministry of Education by use school-based interventions to implement the vaccination exercise (31)it reduces operational problems for parents(23). Whenever an eligible candidate has contact with government health facilities and is not immunized, such an opportunity is referred to as a missed opportunity. Missed opportunity for vaccination reduction not only improves immunization coverage but also improve health service delivery and promote synergy between programs. High-income countries have been able to achieve high levels of knowledge and awareness of the HPV vaccine due to public confidence build up through increased media coverage by use of key messages, adequate social mobilization(32).



## **2.7 Summary and research gap**

There is a global trend of insufficient knowledge levels yet a high vaccine acceptance amongst low resource settings. More knowledge, attitude and HPV vaccination willingness studies need to be conducted in the Kenyan setting to determine whether there is any trend variation. The recent vaccine roll out in Kenya made this study important since it generated baseline levels of knowledge and attitudes of the Kenyan population towards the HPV vaccine and can now be used to measure changes that result from future interventions. It also identified determinants of vaccine willingness for further action in vaccine campaigns communication strategies. Many studies conducted have mainly focused on adolescents and adult females. More studies should be done among parents of the vaccine eligible adolescents since they are involved in giving vaccine consent and communicate the vaccine related information to their daughters. Male involvement is key due to their important role in cervical cancer vaccination advocacy and decision making in the society. Hence more local studies on HPV vaccine hesitancy that include men should be conducted.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Introduction**

The chapter gives details on the outline of the research methods used in the study. Descriptions on the study design, study location, study population, inclusion and exclusion criteria, sampling techniques, research instruments, pretesting, data collection techniques and management and ethical and logistical considerations.

### **3.2 Study design**

This was descriptive cross-sectional study of patients attending Kenyatta National Hospital medical outpatient clinics. This study design was selected because it is cost effective and well suited to provide adequate and detailed phenomena as a snapshot.

### **3.3 Study site**

The study was conducted at Kenyatta National Hospital (KNH). KNH is a public tertiary care hospital located in Nairobi which is the capital and the largest city of Kenya, in the west of upper Hill area, 3.5 kilometers from the Central business district. It is the largest referral facility in east and central Africa (21). It serves also as a teaching hospital for University of Nairobi and Kenya Medical Training College. It has 50 wards with a total bed capacity of 1800. The hospital has 22 outpatient specialized clinics with over 6000 staff. The study was carried out in the KNH medical outpatient clinics. This site was selected because most patients are aged above 35 years and are more likely to have pre-adolescent children who qualify to receive the vaccine.

The average number of patients visiting the medical clinic on the clinic days is 30 per day. The medical clinics were suitable because they had a wide catchment for both men and women to get diversity in the sample and achieve the sample numbers.

The reproductive health clinics, the obstetrics and gynecology clinics were avoided as patient may have received sensitization on the vaccine and this would have biased the findings. Secondly it would have been difficult to access the male gender in these two sites.

### 3.4 Study population

The target population was both male and female Kenyan parents with pre- adolescent or early adolescent children. The study population a male and female Kenya parents with a pre-adolescent or early adolescent child attending the medical clinics in Kenyatta National Hospital at the time of the study. The study was conducted between the months of June and August of the year 2020.

#### 3.4.1 Inclusion criteria

#### 3.4.2 Inclusion and exclusion criteria

Participants who were eligible were:

1. Adults aged above 18 years.
2. Had a pre- or adolescent child aged 9-14 years.
3. Seen in the medical clinic of KNH during the period of study.
4. Provided informed consent.
5. Could communicate fluently either in Swahili or English.

The exclusion criteria was:

1. Women and men already diagnosed and treated for advanced stages of either cancer of cervix, penile cancer, genital warts.

### 3.5 Sampling considerations

#### 3.5.1 Sample size determination

The sample size was calculated using Fisher's formula applied as presented in Equation 1.

**Equation 1: the Cochran formula for sample size determination(33).**

$$n = Z^2 pq / d^2$$

Where n= the desired sample size

Z= the standard normal deviate at 95% confidence interval corresponding to 1.96

P= the proportion of the target population expected to have sufficient knowledge is 15%.The estimated prevalence as sufficient knowledge of the vaccine was estimated to be 15% this figure was obtained from a study that was conducted in Kisumu whereby only 15% of the participants had knowledge about the vaccine (6).

$$q=1-p$$

d= **alpha 0.05 for 95% CI**

$$n= 1.96^2 \times p \times (1-p) / 0.05^2$$

$$n=195$$

The Cochran correction for a finite population was not applied so as to improve the precision of the findings. Therefore, the calculated minimal sample size was 195 parents.

### 3.6.2 Sampling technique

The quasi-random sampling was the selected method to obtain a representative sample for this study. The researcher obtained permission from the responsible personnel at the medical clinics to conduct study participants selection process. About 30 patients were booked daily in the medical clinics. The sampling target was at least 4 patients per day. Therefore every 3 patients were sampled in order to have 10 patients checked for eligibility to obtain a minimum of 4 patients per day. This procedure was done repeatedly till the desired sample size was achieved.

### 3.6.3 Participant recruitment, consenting process

The researcher or the research assistants approached every third patient exiting the medical clinics on the clinic day with a prescription headed to the pharmacy. Their aim was to introduce the study to the patients. Patients who were willing to learn about the study were invited to the Medicines Information Center office which is a private room located in pharmacy 15. In this room, the researcher or his assistant would screen the potential participants for eligibility using the eligibility check list in **Appendix I**. Patients who were not eligible were not taken through the consenting process. The patients who accepted to participate in the study were taken through the voluntary consenting process as guided in **Appendix 11**. In the consenting process the patient were informed about their rights and that refusal to participate would not result in any form of discrimination. Those who provided informed consent were then be formally recruited into the study.

## **3.7 Research instruments**

The administered questionnaire was adopted and modified from a study conducted in Kitui(18). Questions from previous studies were also be incorporated in the data collection tool. (34). Its questionnaire was designed to capture information on willingness to have the child vaccinated. The structured questionnaire is presented in **Appendix II**. The questions were divided into two

parts. The first part was used to obtain information on socio demographic characteristics and the second part contained a set of questions to solicit information on: knowledge and beliefs towards the HPV infection and vaccine acceptance of the study participants. In addition, it would capture information on factors considered in the decision process involved in getting an adolescent or preadolescent child vaccinated. The responses were in the form of a 5-point Likert scale. The questions were closed ended.

### **3.8 Pretesting of the research instrument**

To improve and confirm validity of the questionnaire, the questionnaire was pretested on 20 study participants to ensure no modifications were required. The internal consistency of the instrument was sufficient, as indicated by a Cronbach's alpha value of 0.78. Any problematic questions were identified and modified.

### **3.9 Data collection techniques**

The questionnaires were administered by face-to-face interviews in the drug information center with privacy and confidentiality by trained research assistants. Administration of the questionnaire took an average of 10 minutes.

### **3.10 Quality assurance**

In order to minimize bias, the research assistants were carefully selected on the basis of their integrity and qualification. The data collection was done by final year pharmacy students and one pharmacist. The assistants underwent a one-day training on the purpose of the study, type of questions and the need to minimize body language. Judgmental body language that could influence the findings. They were involved in the pretesting process. The questionnaire had one red herring question that was used to establish the reliability of the patient. To test inter-rater reliability the questionnaire was administered by each of the research assistant separately to the selected patients in the pretest and Cohen kappa was computed.

### **3.11 Data management**

All data collection tools entailed use of codes instead of patient identifier information such as the name. Within 24 hours of data collection, the responses to the structured questions were

entered into and Epi Info version 7 database. The data was cleaned to ensure consistency in the format of the responses. Missing entries were identified and an attempt made to identify sources of error in data collection and rectify them as far as possible in order to ensure data completeness. Data entry was done within 24 hours of data collection. The hard copies were stored under lock and key and only the principal investigator and lead supervisors had access to the document. The database was password protected and backed up daily in order to minimize accidental data loss. The database was locked at the end of data collection so that future fraudulent entries can be tracked. All data is archived for 10 years in line with Kenyan law on archiving of research data.

### **3.12 Data analysis**

The study was conducted to determine the determinants of vaccination hesitancy. STATA 13 was used to aid the handling and analysis of the data. Categorical variables were summarized as frequencies and percentages. The continuous variables were then tested for normal distribution by Shapiro Wilk test and histograms were plotted to examine the distribution. The normal distributed variables were summarized as mean, standard deviation and or standard error of the mean and those which was not normally distributed was summarized as median and interquartile range. The Chi square test was done for assessing the differences in socio-demographic variables between genders. It was also be used to determine differences in knowledge and beliefs, and vaccination willingness between genders. Both bivariable and multivariable logistic regression analyses were conducted. Model building was done using a forward stepwise approach. Logistic regression analysis was used to test the association between knowledge and vaccination willingness and other potential predictor variables. The level of significance was set at 0.05.

### **3.13 Dissemination plan**

The study findings will be shared with the KNH/UON/ERC, Kenyatta National Hospital, the Ministry of Health division of Vaccines and Immunizations (DVI) in the Ministry of Health immunization and vaccine program in Kenya. The results will also be published in local and international journals.

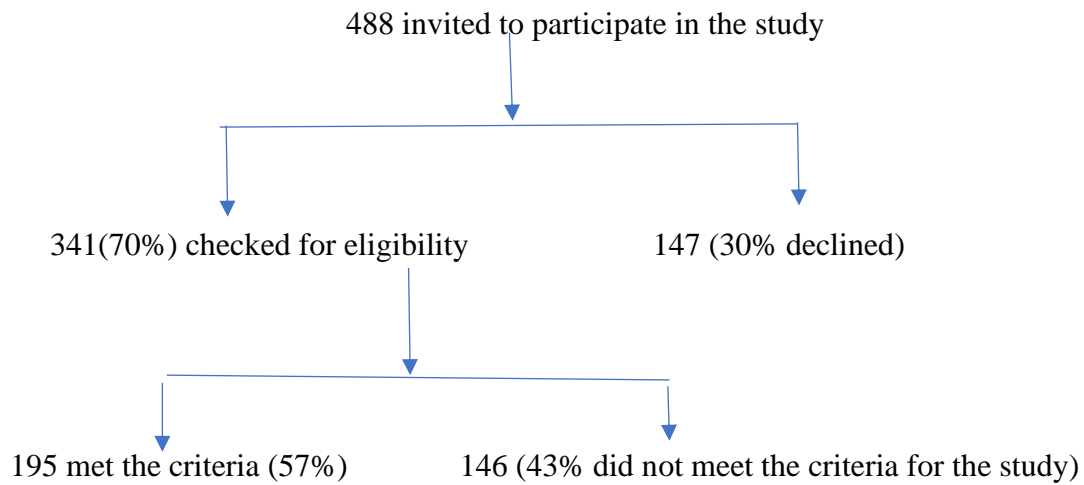
### **3.14 Ethical and logistical considerations**

This proposal was submitted to Ethics and Research Committee of Kenyatta National Hospital and University of Nairobi (KNH/UON). Approval to conduct the study was obtained from KNH/UON research and ethics review committee before commencing the study. The reference number of the approval letter is KNH-ERC/A/178 and it is attached on **Appendix V**.

The Kenyatta National Hospital administration and Head of department of the medical clinics were involved and contacted through an official letter requesting for permission to conduct the study. Once authorization was granted, voluntary consent was sought from the study participants. This was done by presenting all information regarding study participation. The concerns of the study participants were also fully addressed. Participation was voluntary and with confidentiality. The questionnaire was filled anonymously and freely.

## CHAPTER 4: RESULTS

### 4.1 Participants recruited and reasons for exclusion



**Figure 3: The consort diagram**

The recruitment process is summarized in figure three.

We were approached a total of 488 people. Thirty percent (n=147) declined to participate. The rest 341 (70%) were checked for eligibility for the study. 195 (57%) met the criteria leaving behind 146 (43%) who did not meet the criteria.

### 4.2 Baseline socio-demographic characteristics of parents with adolescent children seen in the medical clinic of Kenyatta National Hospital

Cumulatively, 93.5% of parents recruited into the study were aged above 30 years. The largest age group were those aged above 40 years as presented in **Table 1**.



**Table 1: Baseline socio-demographic characteristics of parents with adolescent children seen in the medical clinic of Kenyatta National Hospital**

	Frequency	Percentage
<b>Age distribution (years)</b>		
18-30	12	6.2
31-40	79	40.5
>40	104	53.3
<b>Sex</b>		
Male	84	43.1
Female	111	56.9
<b>Occupation</b>		
Formal employment	54	27.7
Self-employment	122	62.6
Other	19	9.7
<b>Education Level</b>		
No formal education	1	0.5
Primary level	26	13.3
Secondary level	87	44.6
Tertiary	81	41.5
<b>Marital status</b>		
Married	165	84.6
Singlehood*	30	15.4
<b>Religion</b>		
Christian	192	98.5
Muslim	2	1
Other	1	0.5
<b>Age of children</b>		
9-11 years	70	35.9
12-14 years	125	64.1

**Singlehood\*** (Divorced/never married/ widow/widower)

There were more female than males and most were self-employed. Secondary education was the highest level of attainment for most (44.6%) of the participants. Cumulatively, 86.1 % had attained secondary and tertiary education. Nearly all were married (84.6 %). All participants

were Christians with the exception of two participants. Slightly above two thirds had children aged between 12-14 years

### 4.3 Knowledge of HPV infection, cervical cancer and its prevention

#### 4.3.1 Knowledge about the Human Papilloma Virus (HPV)

Figure 4 summarizes proportions of participants who had knowledge about various aspects of HPV infection.

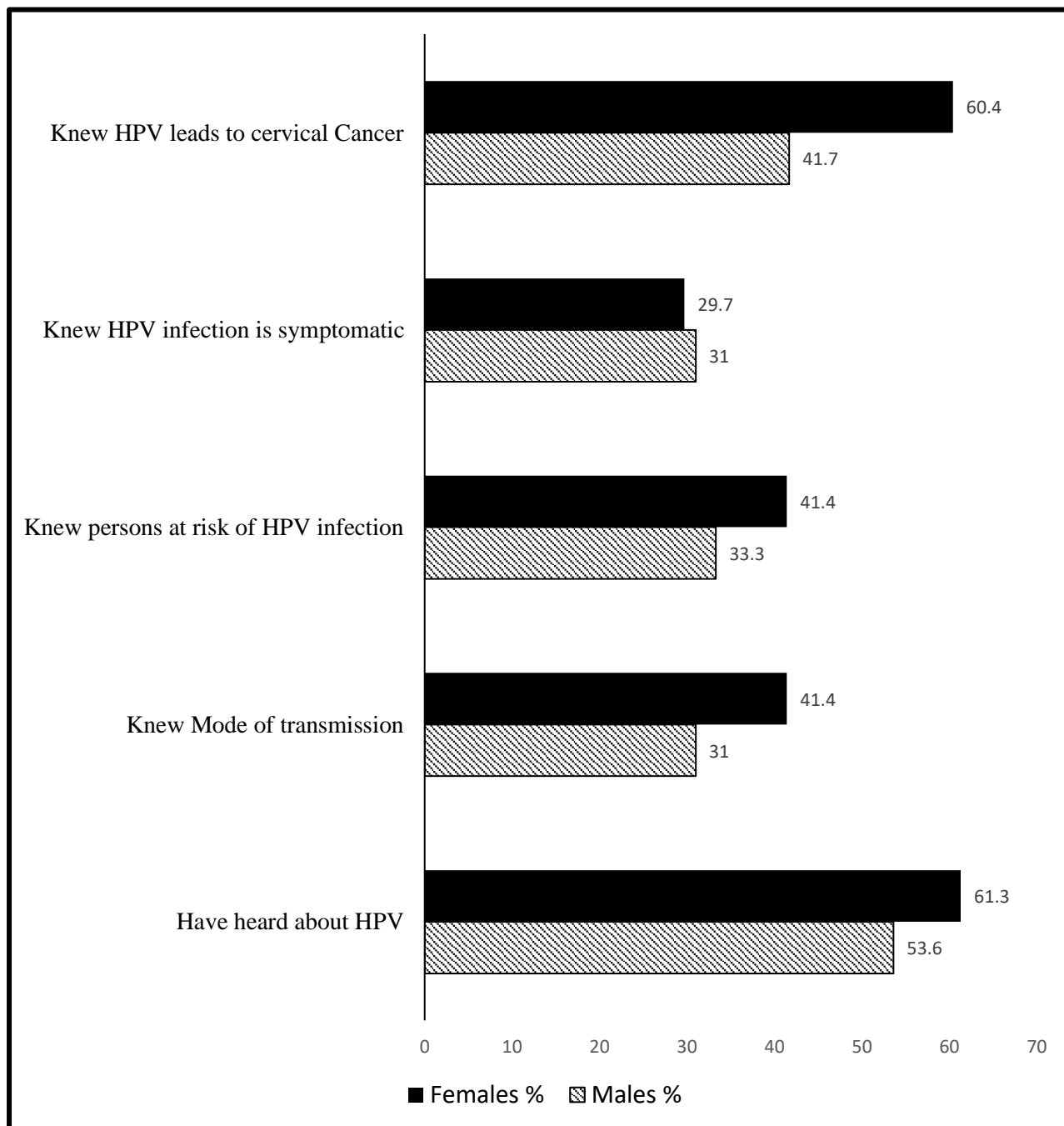


Figure 4: Knowledge about the Human Papilloma Virus (HPV)

Females generally had more knowledge than the males except on symptoms. For most responses the differences in proportions of males and females who were knowledgeable ranged from 5-9%. A notable exception to this observation was knowledge of the fact that HPV infection may lead to cervical cancer where the inter gender knowledge difference was about 20%. About 60% of women were aware of the fact that HPV is linked to cervical cancer as opposed to only 41.7% of the male participants. The chi square test revealed that disparities across gender were statistically significant with regards to the link between HPV and cervical cancer with a (p=0.035). Knowledge about the virus was wanting because only slightly more than 50% had heard of HPV. Females fared better and only 6 out of every 10 had heard of HPV. Generally, there was poor knowledge about the mode of transmission, risk factors and symptoms because less than 40% of participants gave the correct response.

#### 4.3.2 Knowledge about cervical cancer

The parental knowledge about cervical cancer was are summarized in Figure 5.

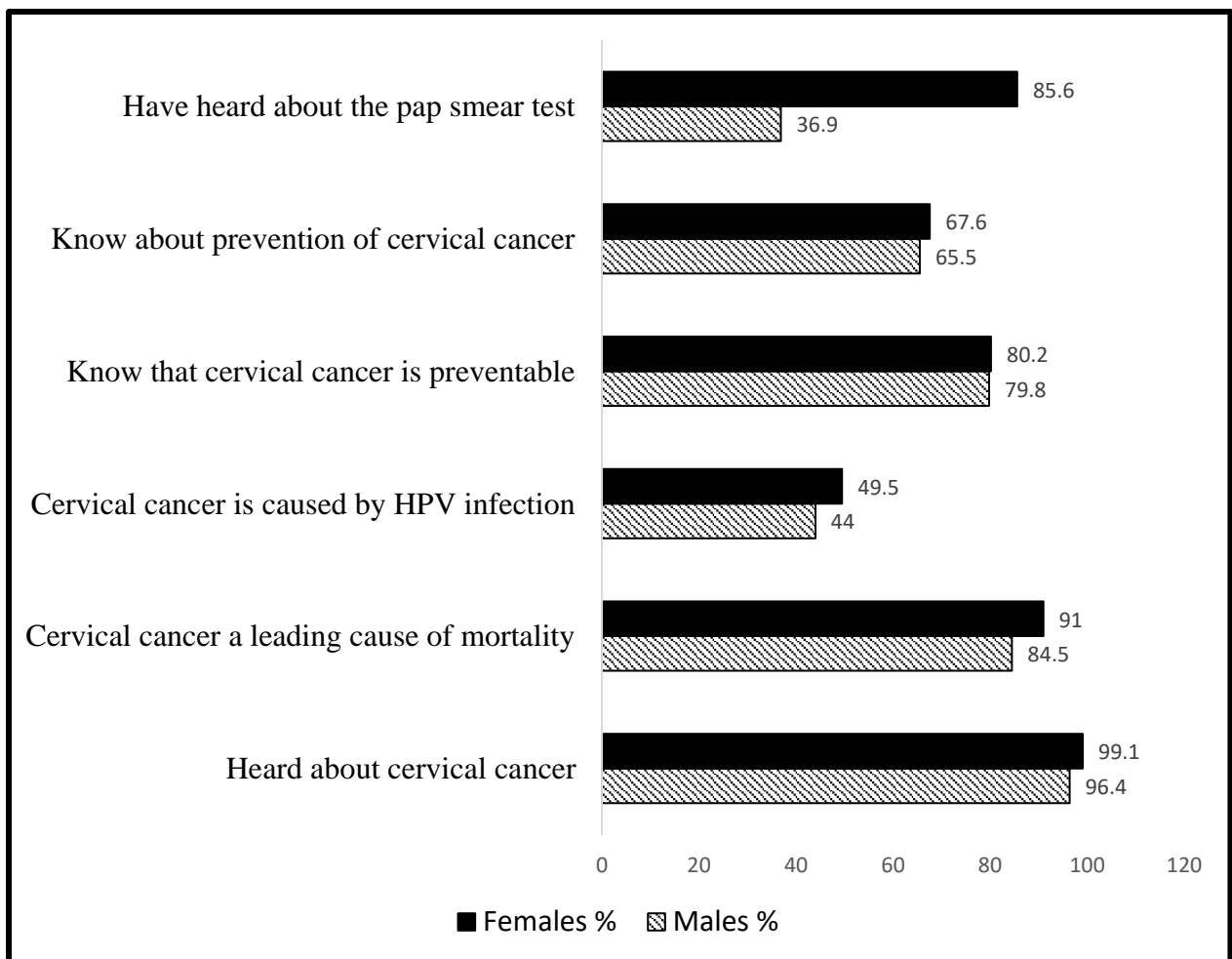


Figure 5: Knowledge about cervical cancer.

Generally, knowledge about cervical cancer was better than knowledge about HPV infection. Eighty to 90% had heard about cervical cancer and only about 60% had heard about HPV. Females were generally better informed than males on cervical cancer. Encouragingly, almost all had heard about cervical cancer, (95%). Fewer parents knew that it can be diagnosed using the pap smear test. There was a significant gender difference with regard to how many respondents knew about the pap smear test, (85% females vs 36.9% males). There was a statistically significant difference ( $p < 0.001$ ) with regard to knowledge about the pap smear test. Encouragingly, about 80% knew that cervical cancer is preventable. Less than 50% knew the cause of cervical cancer and this was the worst performed parameter. All of them appreciated cervical cancer is one of the leading causes of death among women.

#### 4.3.3 Knowledge about the HPV vaccine.

The Table 2 is a summary of the findings on the knowledge of HPV vaccine

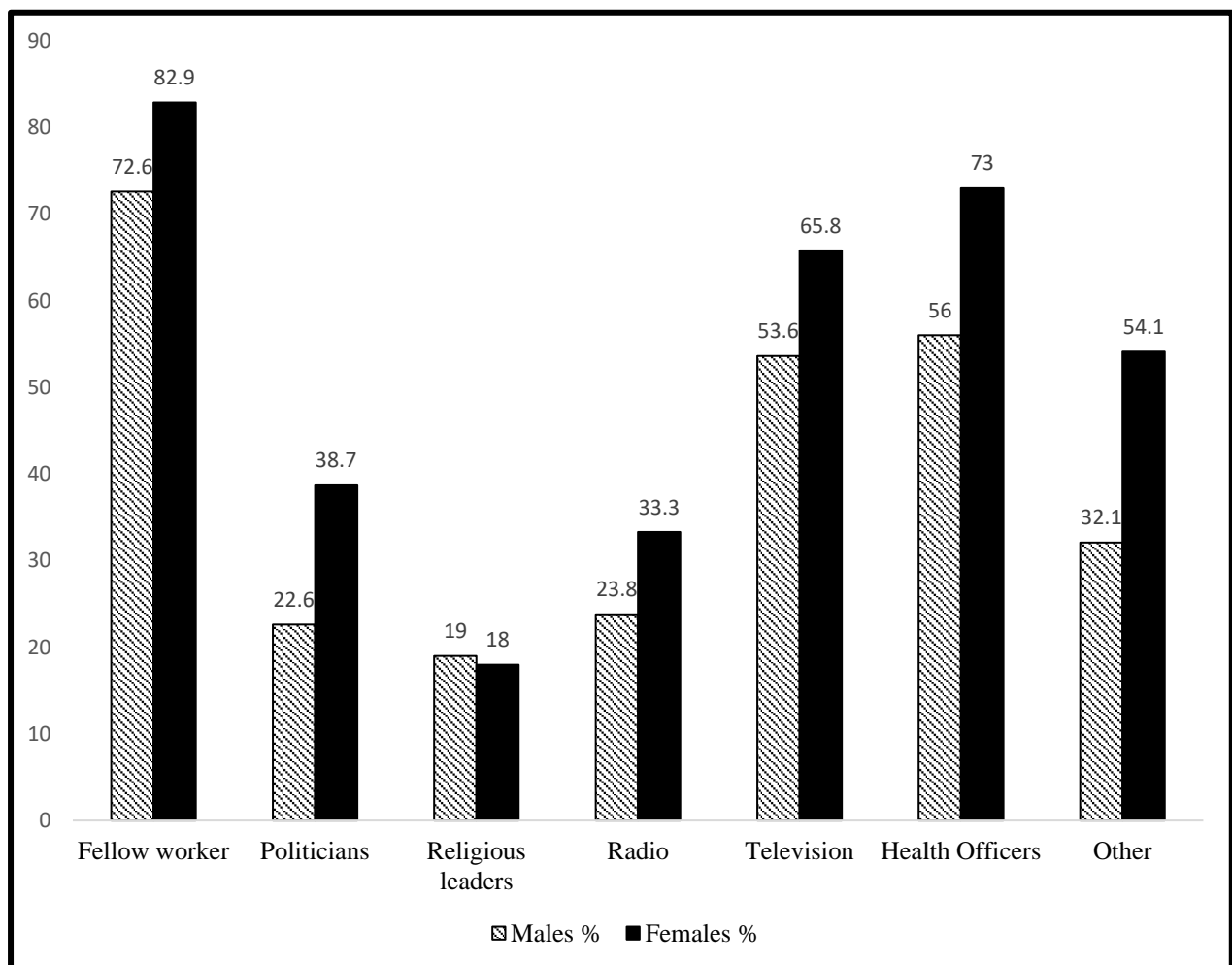
**Table 2: Parental knowledge of HPV vaccine**

<u>Knowledge of HPV vaccine</u>	<b>Males</b> N (%)	<b>Females</b> N (%)	<b>P - value</b>
Are you aware that all girls aged 10 years are being offered a Human Papilloma Virus (HPV) vaccine?	61 (72.6%)	92 (82.9%)	0.062
<b>What is the HPV vaccine used for?</b>			
Prevention of HPV infection	45 (53.6%)	72 (64.9%)	0.222
Prevention of cervical cancer	50 (59.5%)	79 (71.2%)	<b>0.04</b>
Prevention of genital warts	30 (35.7%)	32 (28.8%)	0.563
What is the age group eligible for the HPV vaccine 9–26 years?	48 (57.1%)	84 (75.5%)	0.021
Are you aware that all girls aged 10 years are being offered a Human Papilloma Virus (HPV) vaccine?	61 (72.6%)	92 (82.9%)	0.062
There is no need for Pap smear screening after receiving HPV vaccination	24 (28.6%)	66 (59.5%)	<b>&lt;0.001</b>

Compared to other aspects the gender disparities were significant. Generally, females performed better than males in their knowledge concerning the HPV vaccine. About 82.9% of females compared to 72.6 % of their male counterparts knew that HPV vaccine was available and that girls were being offered the vaccine freely 71% of the females knew the vaccine was for prevention of cervical cancer ( $p=0.040$ ). Out of all the female participants, 65% were accurately able to state it is for prevention of HPV infection. For both genders, less than 36% knew that the vaccine is useful for prevention of genital warts in this aspect, male performed better than females. More women (75.5% versus 57.1% males), knew that apart from adolescents, young adults can also be vaccinated ( $p=0.021$ ). Of concern there were misleading beliefs; 40.1% falsely thought that there was no need for a Pap smear after getting the vaccine.

#### 4.3.4 Sources of parental information on the HPV vaccine

One of the objectives was to identify parental sources of information of HPV vaccine and these sources are summarized in Figure 6.



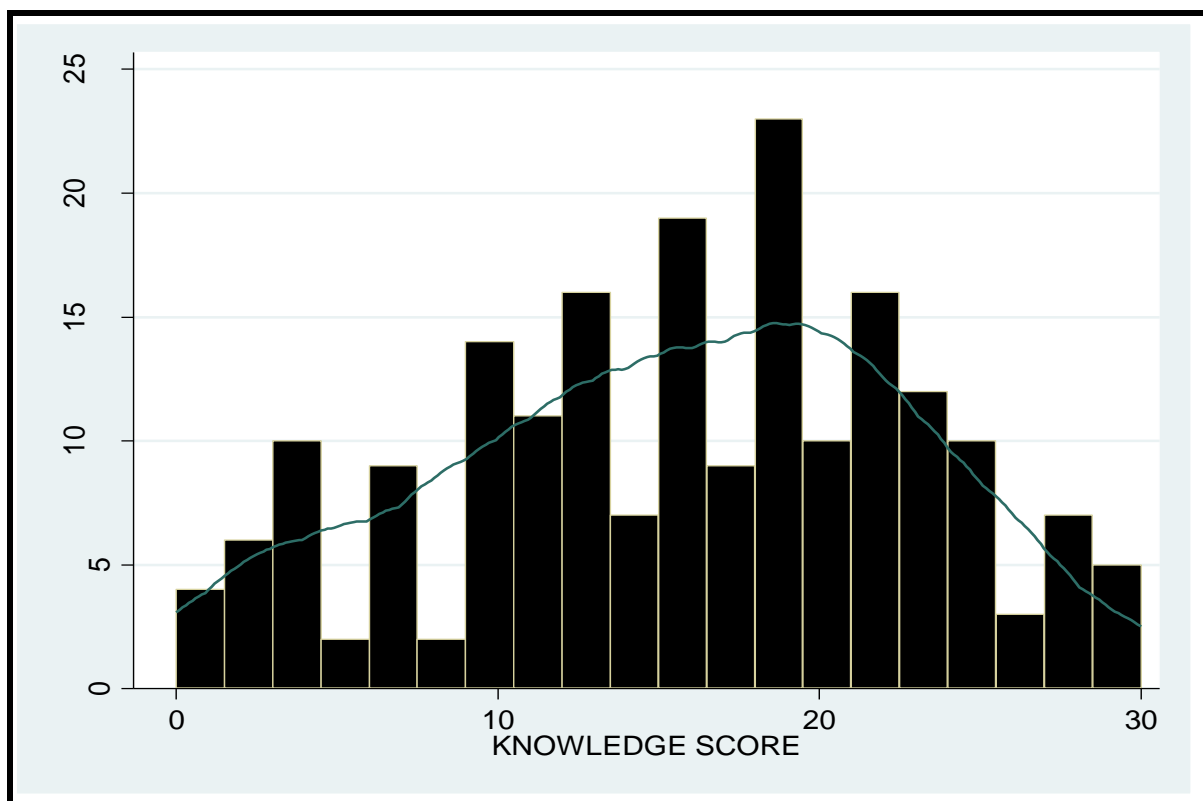
Others\* social media

**Figure 6 : Sources of parental information on the HPV vaccine**

The most effective communication means turned out to be information shared among fellow workers. This was followed by television and health officers. The least source of communication was from religious leaders. Generally, women had a greater variety of various information outlets compared to the men. Radio and TV were the leading sources of information particularly for females. More females than males got information from the health officers and the difference was statistically significant ( $p=0.025$ ). There was also a statistically significant gender difference when it came to other sources of information like social media ( $p= 0.005$ ).

#### 4.3.5 Parents knowledge score and determinants of knowledge

The knowledge score for each individual was obtained by computing the sum of all the correct responses. The maximum score was thirty. The histogram summarizing the performance of the participants is presented in Figure 7.



**Figure 7 : Histogram on the knowledge score of parents of adolescent children with regard to the HPV vaccination**

The knowledge score was not normally distributed. The scores were skewed to the right. The median was 16 and the interquartile range was between 17 to 21.

The knowledge score rating is tabulated in Table 3.

**Table 3: Table on the knowledge score rating**

<b>Knowledge score out of 30</b>	<b>Frequencies</b>	<b>Percentage (%)</b>	<b>Rating</b>
0-5	22	11.3	Extremely poor
6-10	25	12.8	Poor
11-15	44	22.6	Average
16-20	51	26.2	Good
21-25	38	19.5	Very good
26-30	15	7.7	Excellent

Eleven percent had extremely poor knowledge with a score of less than five. Cumulatively, 24% (about 1 in every 4 respondents) had a poor knowledge score of less than 10 out of 30. Slightly above half (53.3% of the participants), scored above 50%. There were extremes with 7.7% attained very high scores of above 26. Most of the participants about 45.6% scored between 16 and 25 therefore knowledge was assessed to be generally good as reflected by the positive skew of the histogram.

#### 4.3.6 Linear regression analysis for determinants for knowledge

The determinants of the knowledge score were identified using bivariable and multivariable linear regression analyses. The covariates were the sociodemographic characteristics of the participants. The results of the analyses were presented in Table 4.

**Table 4: Determinants of knowledge of HPV infection cervical cancer and HPV vaccination.**

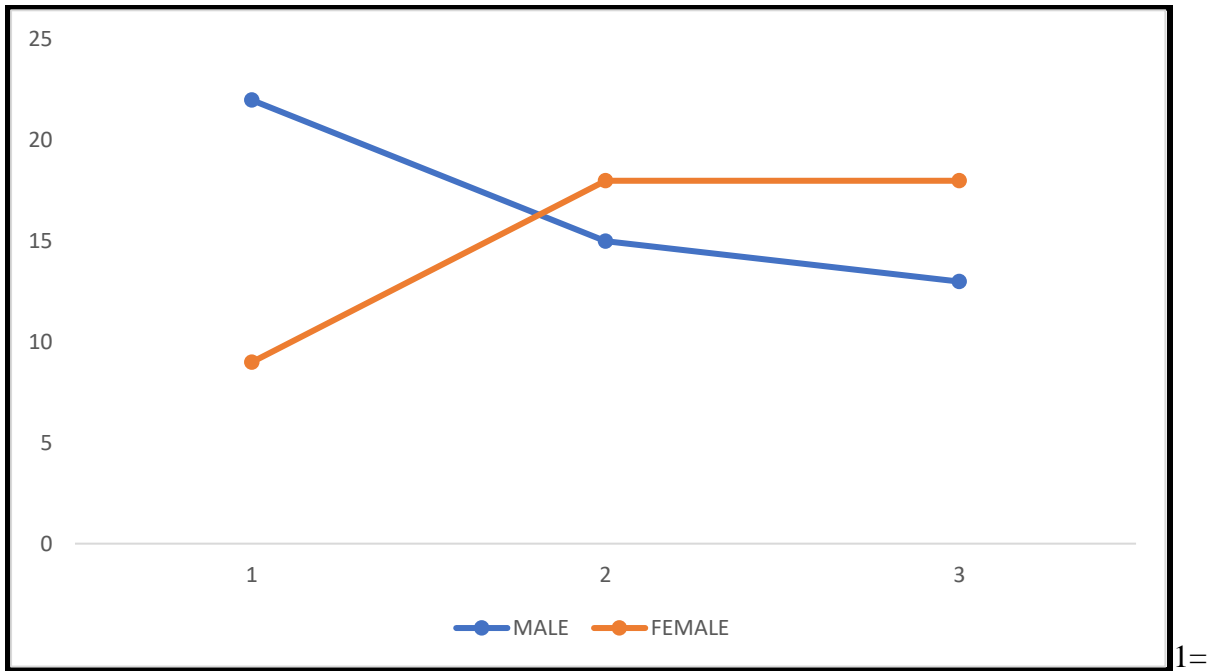
Variable	Crude		Adjusted	
	Beta (95% CI)	p-value	Beta (95% CI)	p-value
<b>Age</b>	0.014 (-1.683, 1.711)	0.987	2.522 (0.672, 4.373)	<b>0.008</b>
<b>Gender</b>	-3.524453 (-5.593, -1.456)	<b>0.001</b>	7.621 (-0.3887, 15.630)	0.062
<b>Occupation</b>	-1.013451 (-2.814, 0.787)	0.268	-	-
<b>Education</b>	.067541 (-.0346, 0.170)	0.194	2.530 (1.220, 3.841)	<b>&lt;0.001</b>
<b>Marital</b>	-.8909091 (-3.545, 1.763)	0.509	-2.955 (-5.500, -0.410)	<b>0.023</b>
<b>Religion</b>	.1256831 (-.5340, 0.791)	0.710	-	-
<b>INTERACTION (AGE AND GENDER</b>	-	-	-4.959531 (-8.082, -1.837)	<b>0.002</b>

On bivariate analysis there was no association found between occupation, religion and the parents knowledge score and therefore these variables were excluded from the multivariable model. There were only two non-Christians and therefore it was not possible to attain significant association between religion and knowledge. As expected, there was a positive association between the education status of parents and their knowledge score with an adjusted beta coefficient of 2.5 (95% CI: 1.220, 3.841). There was a negative association between marital status and knowledge score. The respondents who were married had a lower knowledge score with an adjusted beta coefficient of -2.955 (95% CI: -5.500, -0.410) that was statistically significant (p=**0.023**).



#### 4.3.6.1 The interaction effects of age and gender on knowledge score

A significant finding was a statistical interaction between age and gender as noted in Table 4. ( $p=0.002$ ). On bivariable analysis, age did not seem to affect knowledge. This can be attributed to the fact that its effect was modified by gender. On controlling for the modifying effect of gender on multivariable regression analysis, age had a significant effect on participant's knowledge levels. The modifying effects of gender is illustrated in Figure 8. As older males had less knowledge compared to younger ones.



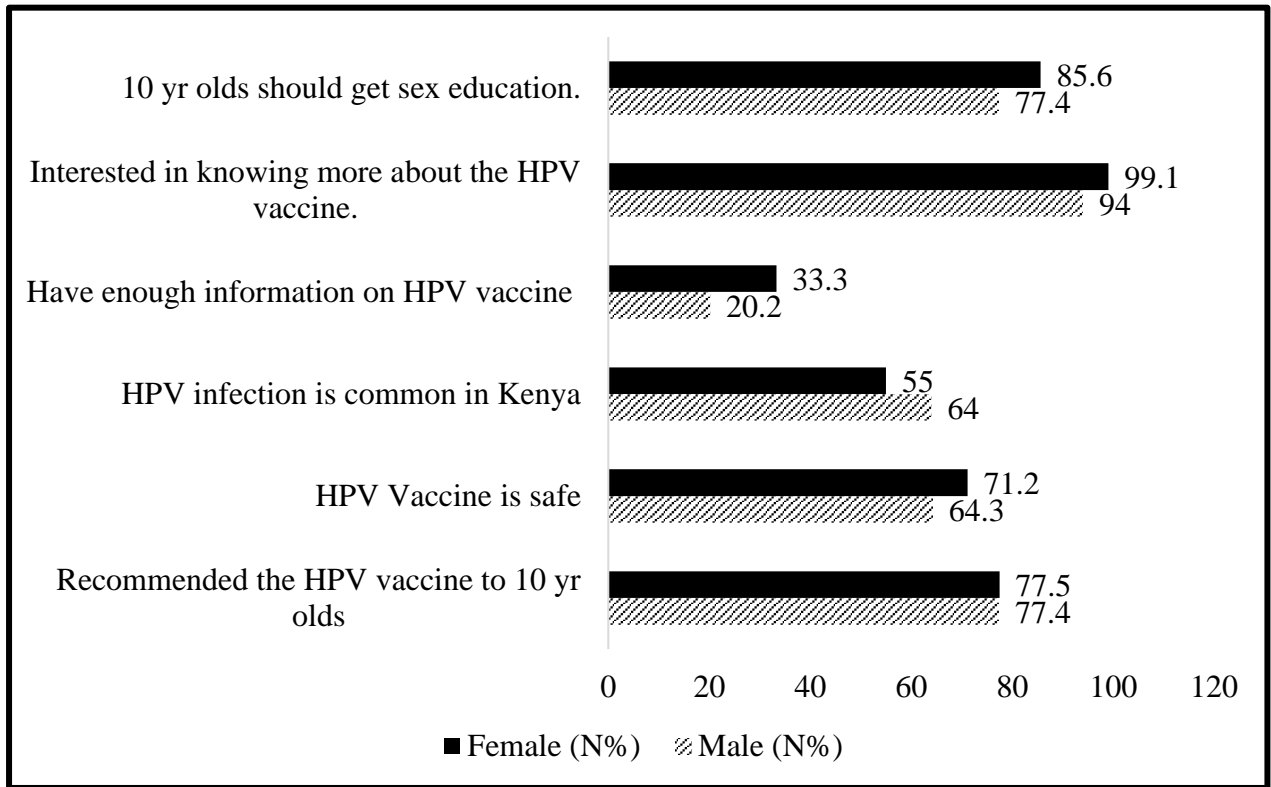
1=18-30; 2= 31-40; 3= 40 and above

**Figure 8 : The effects of age and gender on knowledge score**

As shown in the graph, amongst the young parents aged between 18-30 years, the males had a higher knowledge score than the females. After the age 31 years the females had a higher knowledge score than the males. Older males aged above 40 tended to score worse than their female counterparts. There was a negative association between age and knowledge score in males and a positive association among the females.

#### 4.3.7 Parental views on knowledge empowerment

With regards to knowledge empowerment parents were asked questions and the results were summarized in Figure 9.



**Figure 9: Parental desire for more knowledge**

More men than women believed that HPV infection is common in Kenya (64% vs 55%). Women considered the vaccine as safe as compared to men with significant statistical difference of ( $P=0.041$ ). Otherwise, all differences across gender were not statistically significant. About 77% of both genders recommended the vaccine to a 10-year old. Less than 33 % claimed to have enough information for decision to vaccinate their daughters. Whereas, more than 90% expressed their interest in knowing more about the vaccine. More than 75 percent of parents recommend that 10-year-old girls should get sex education. More women than men were in favor of adolescent children receiving sex education, 85.6% women vs 75.4% men.

#### 4.4: Beliefs about the HPV vaccines

##### 4.4.1 Parental beliefs on the vaccine

The respondents' beliefs on the HPV vaccine were summarized on Table 5.

**Table 5: Beliefs about the HPV vaccines**

Belief held by the parent	Males	Females	Total (overall cohort)	P value
	N (%)	N (%)	N (%)	
Child is at risk of HPV infection	58 (69.0%)	79 (71.1%)	137 (69.70%)	0.472
HPV infection is severe	60 (71.4%)	74 (63.9%)	134 (68.70%)	0.790
HPV vaccine is effective	48 (57.1%)	73 (65.7%)	121 (62.10%)	0.321

Beliefs about the HPV effectiveness is critical. Unexpectedly the differences across gender were not statistically significant. Females tended to have positive beliefs towards the HPV vaccine. More females than males believed that the vaccine is effective though this finding was also not statistically significant. Only 65% of women felt the HPV vaccine is effective.

##### 4.4.2 Linear regression analysis for determinants of beliefs

The influence of sociodemographic characteristics and knowledge on beliefs about the HPV vaccine was presented on Table 6. The belief score was got by the simple sum of beliefs and were coded as negative beliefs ,1', not sure ,2', and positive beliefs, 3'.

**Table 6: Determinants of beliefs about the HPV vaccine**

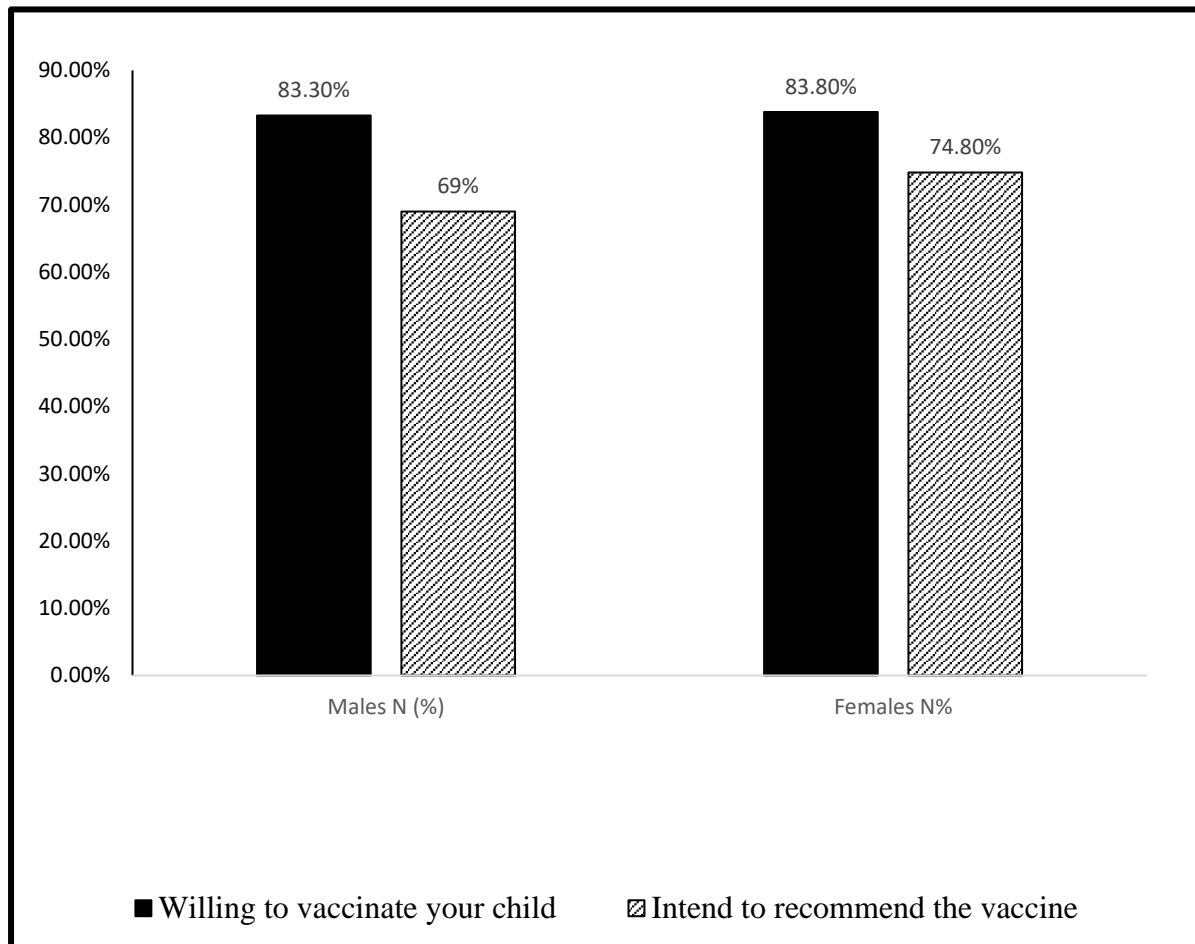
<b>Variable</b>	<b>Crude Beta co-efficient (95%)</b>	<b>P value</b>	<b>Adjusted Beta co-efficient (95%)</b>	<b>P- value</b>
Age	-0.021 (-0.277, 0.236)	0.874	-	-
Sex	0.005 (-0.323, 0.333)	0.975	0.255 (-.0492, 0.558)	0.100
Occupation	0.168 (-0.088, 0.424)	0.196	0.256 (0.007, 0.505)	<b>0.044</b>
Level of education	0.146 (-0.072, 0.364)	0.187	-	-
Marital status	-0.306 (-0.759, 0.147)	0.184	-	-
Religion	0.412 (-0.307, 1.131)	0.260	-	-
Adequate versus inadequate knowledge	0.054 (0.033, 0.076)	<b>&gt; 0.001</b>	0.060 (0.039, 0.081)	<b>&lt;0.001</b>

\*Knowledge binarized: participants were binarized based on their knowledge score above and below 15)

Of note was that beliefs were influenced by knowledge and occupation. Those who were more knowledgeable were more likely to have positive beliefs. Those with formal employment had low scores on beliefs. Marital status, level of education and religion had no association with beliefs.

#### 4.5 Parental willingness to have their children vaccinated.

The results on willingness of the parents to vaccinate their children was summarized in Figure 10.



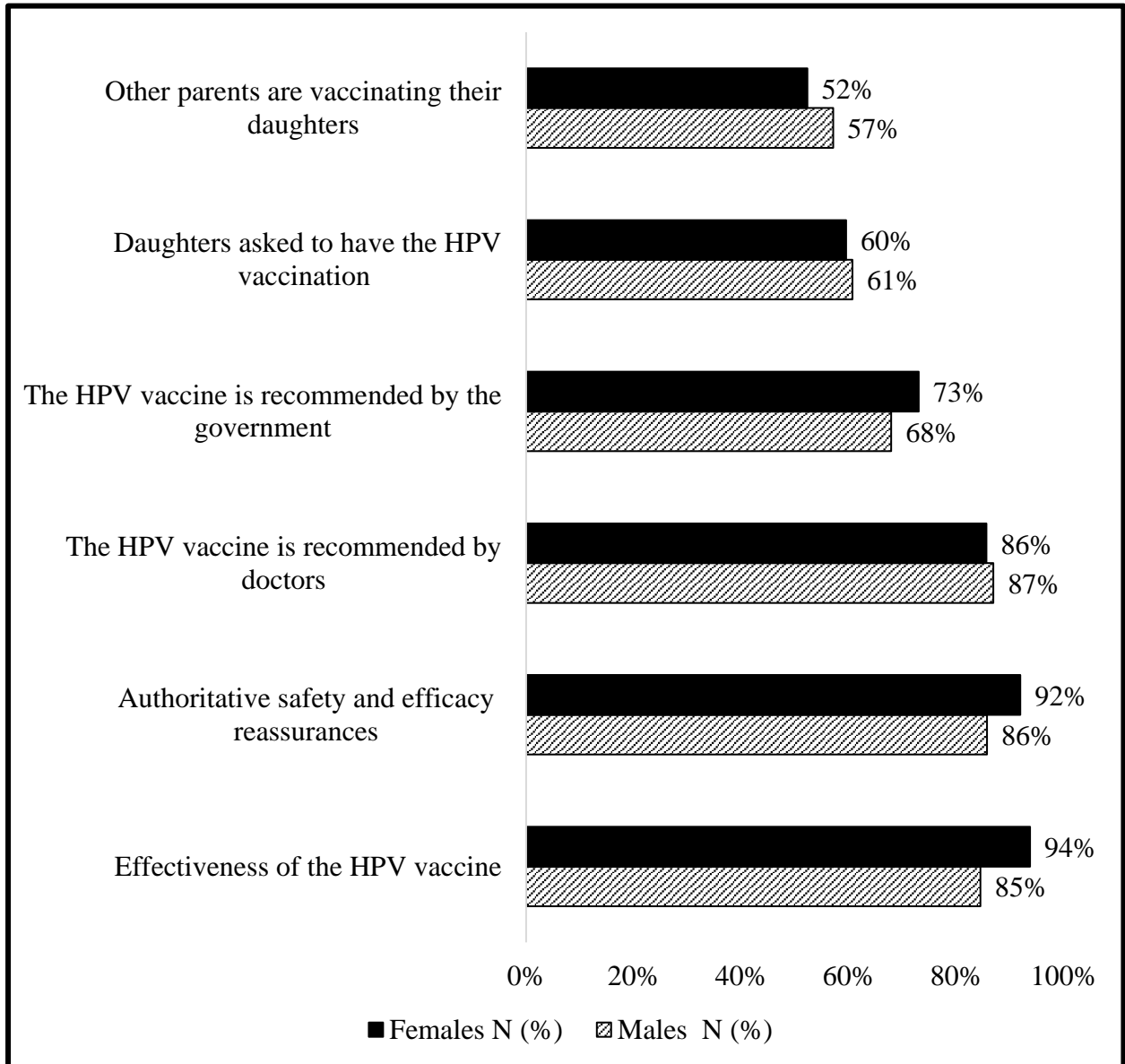
**Figure 10: HPV vaccination willingness**

Both genders showed a high level of willingness (83%) to vaccinate their children (Figure 9). More women than men were willing to vaccinate their children. More females than male parents were willing to recommend the vaccine to their friends, though this was statistically insignificant. The difference in willingness to vaccinate their children across gender was statistically significant (**P=0.004**).

#### 4.6 Reasons for vaccine acceptance and hesitancy.

##### 4.6.1 Reasons for HPV vaccination acceptance.

The parental reasons for accepting the vaccine are displayed in Figure 11.



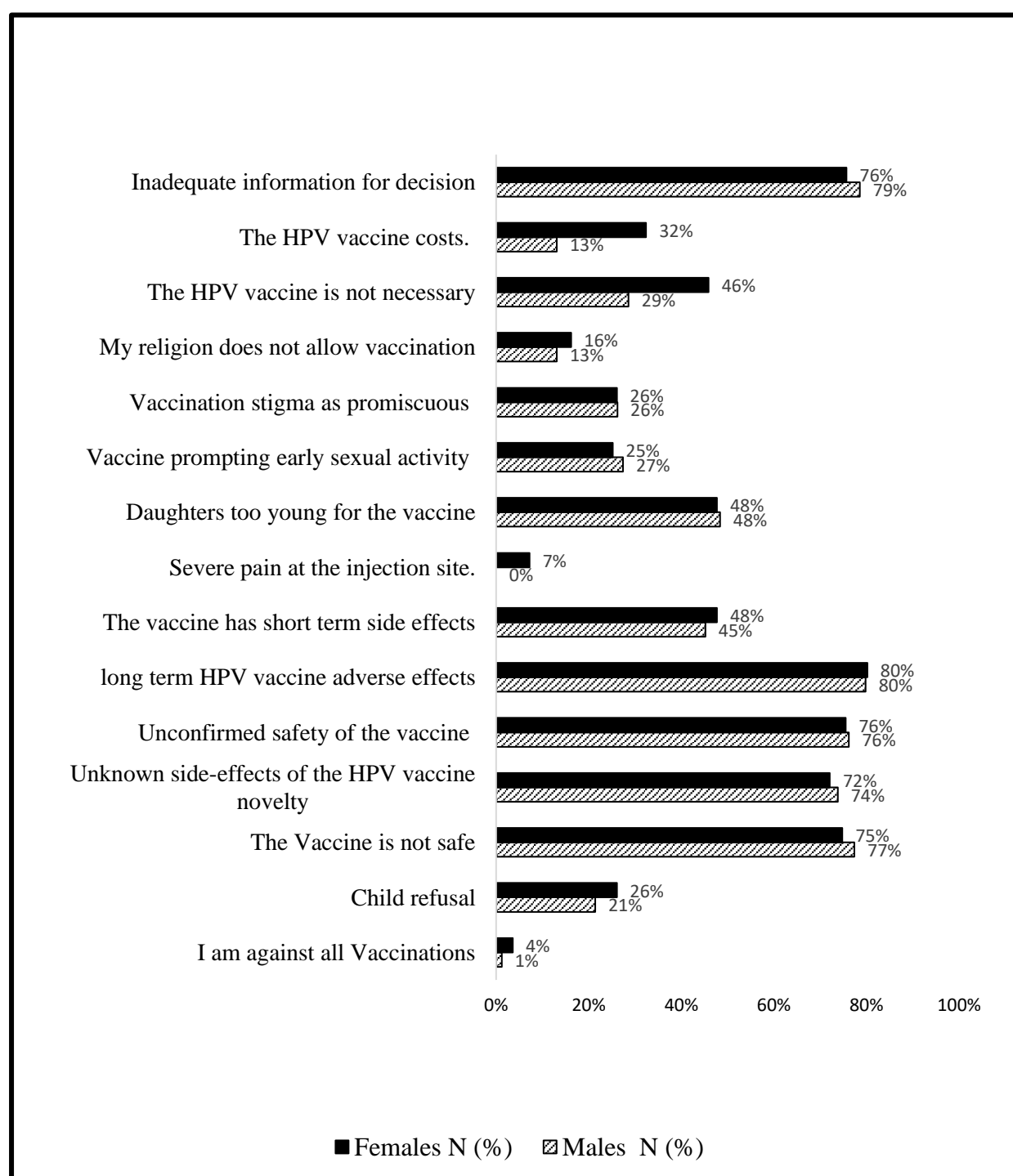
**Figure 11: Reason for HPV vaccination acceptance.**

Generally, the differences across gender were not significant. More than 52% of parents would accept the vaccine due to positive peer pressure. About 60% of both genders would vaccinate their children if their adolescents brought up the idea. Government and school's recommendation of the vaccine would influence vaccination acceptance of about 68% of parents. Around 86% of parents would be willing to vaccinate their adolescents following doctor's recommendations. Around 90% of parents would vaccinate their daughters upon

obtaining authoritative safety and effectiveness reassurances. About 94% of the female parents were willing to accept the HPV vaccine because of its effectiveness compared to their male counterparts at 85%.

4.6.2 Reasons for HPV vaccination hesitancy.

Figure 12 summarizes the reasons of parental vaccine hesitancy



**Figure 12: Reasons for HPV vaccination hesitancy.**

More than 70 % of parents felt that they had inadequate information for decision making concerning vaccinating their children. None of the males were empathetic about pain at the injection site. About 7% of women of women had empathy for their daughters. Less than 26% of parents would reject the vaccine because of their child refusal. Encouragingly, less than 4% of the women and 1% of men were against all vaccination. Similarly, across gender, above 74% would reject the vaccine due to safety concerns. Short term side effects were considered a hindrance by about 45 % of the parents. About 45% to 48% of parents felt that their daughters were too young to be vaccinated. Similarly, about 25 % of parents across genders would reject the vaccine due to considerations that their daughters would be stigmatized due to accusations of promiscuous behavior after vaccination. Of note was that 16% of females and 13% of males would reject the vaccine because their religion does not allow vaccination. More females than males considered the vaccine to be unnecessary. More females than males would reject the vaccine because of the cost implications.

#### **4.7: Relationship between socio-demographic factors, knowledge of the HPV vaccines and vaccination willingness.**

The comparative analyses of the socio demographic traits, knowledge and beliefs of participants who were willing to have their children and who were not willing to have them vaccinated is summarized in the Table 7.



**Table 7: Comparison of determinants of willingness among the participants**

<b>Variable</b>	<b>Not willing</b>	<b>Willing</b>	<b>P-value</b>
<b>Age</b>			
< 40	22 (21.2%)	82(78.9%)	<b>0.042</b>
>40	10 (10.9%)	81(89.0%)	
<b>Gender</b>			
Male	14(16.7%)	70 (83.3%)	0.542
Female	18(16.2%)	93(83.8%)	
<b>Occupation</b>			
Formal	23(16.3%)	118(83.7%)	0.553
Informal	9(16.7%)	45(83.3%)	
<b>Education</b>			
Lower	16(14.0%)	98(85.9 %)	0.193
Higher	16(19.8%)	65(80.3%)	
<b>Marital status</b>			
Married	25(15.2%)	140(84.9%)	0.195
Single	7(23.3%)	23 (76.7%)	
<b>Religion</b>			
Christian	32(16.6%)	161(83.4%)	0.698
Non-Christian.	0 (0.0%)	2 (100%)	

**Single\***- Divorced/widow/widower/never married

Differences in willingness across the variables were not statistically significant for the variable's occupation and religion. Age was a significant determinant for willingness. The older the person is the more likely to vaccinate. This was a significant finding (**P=0.042**). There was no real difference in the prevalence of willingness to vaccinate across genders. There was no statistical significance across the groups.

Parents without tertiary education were more willing to have their children vaccinated compared to those don't have tertiary education. The married were more willing to vaccinate their adolescents (84.9% vs 76.7%).

4.7.1 Logistic regression analysis for determinants of willingness to vaccinate child against HPV.

The bivariate and multivariate analysis for determinants of willingness was tabulated as below in **Table 8**. The religion variable could not be used because nearly all participants were Christians.

**Table 8: Determinants of willingness to vaccinate child against HPV.**

Variable	Unadjusted OR		Adjusted OR	
	OR (95% CI)	P values	OR (95% CI)	P values
Age	0.512 (0.252, 4.043)	0.065	0.431 (0.194, 0.961)	<b>0.040</b>
Gender	0.96 (0.451, 2.078)	0.933	2.369 (0.911, 7.643)	0.074
Occupation	0.922 (.482, 1.762)	0.806	-	-
Level of education	0.663 (0.310, 1.419)	0.290	0.392 (0.188, 0.818)	<b>0.013</b>
Marital status	0.587 (.227, 1.512)	0.270	-	-
Knowledge total score (%)	0.969 (0.951, 0.988)	0.002	1.133 (1.050, 1.222)	<b>&lt;0.001</b>
Belief total	2.673 (1.859, 3.845)	<.001	2.395 (1.604, 3.577)	<b>0.001</b>

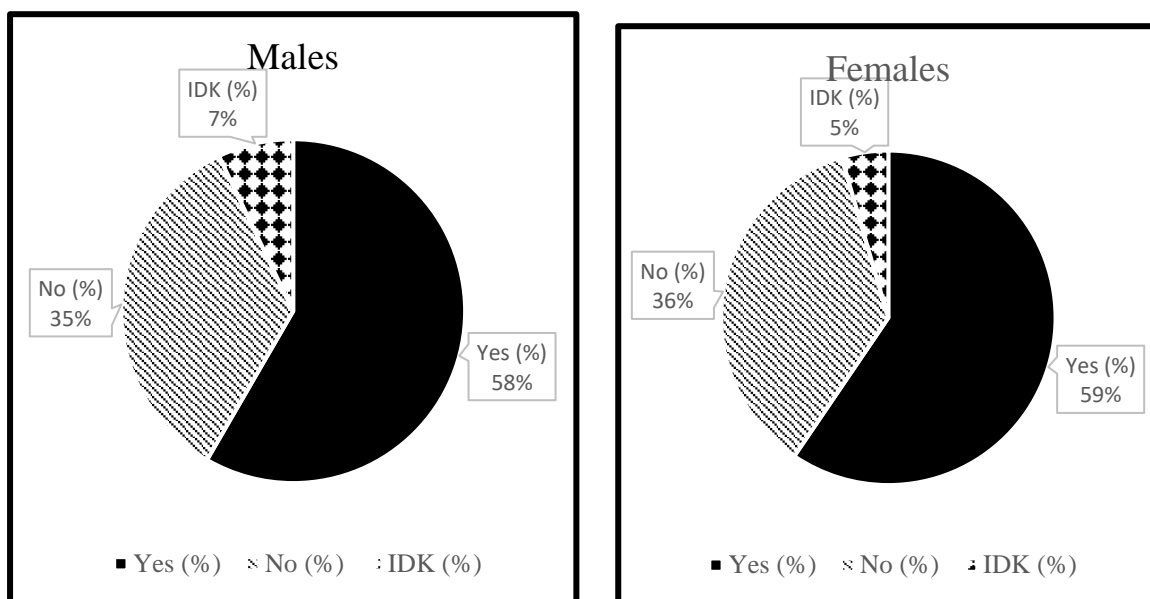
There's a positive association between willingness and beliefs, knowledge levels and gender. Males were more willing than females to have their children vaccinated even though they had less knowledge. Generally, as expected the more the knowledge levels and having positive beliefs the more they were willing to vaccinate.

There was a significant negative association between age and willingness to have their child vaccinated (P=0.040). There was a negative association between parental education level and

willingness to vaccinate. The more the education levels, the less willing to vaccinate their children. Occupation levels and marital status had no association with willingness to vaccinate their children.

#### 4.11: Involvement and empowerment of adolescents

The participants were asked whether they would ask their child for permission before taking them for vaccination. This was done to determine the decision process for HPV vaccination. The results were summarized in Figure 13.



**Figure 13: Parental decision process – parents’ consideration of child’s refusal of the vaccine.**

The findings were not different across gender. Nearly 58% would consult their children before taking them for vaccination. About 35% would coerce their children to get vaccinated.

## **CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Discussion**

The aim of this study was to evaluate parental willingness to vaccinate adolescent children, the determinants were also evaluated. The main key finding was that despite low knowledge levels about the HPV vaccine, and a high prevalence of negative beliefs (30%), parental willingness was high with a cumulative 90% willing to have their children vaccinated. To the best of my knowledge this study was the first in Kenya to be conducted on parents of either gender particularly the males. Previous studies conducted in Kenya did not evaluate gender specific beliefs and perceptions and the parental perspectives has not been reported yet. Parents, particularly males play a key role in initiating vaccine visits to clinics. A third aspect of this study is the willingness of parents to involve their adolescent children in the decision-making process. In this regard, we found that 59% of parents would consult their daughters before initiating a visit to the clinic to have their child vaccinated. This finding therefore highlights the need to sensitize both parents and adolescent children simultaneously in order to improve HPV vaccine coverage. A positive finding was that over 77% of the parents were in favor of their children obtaining sex education and this would help in a joint decision involving both the parents and the child.

The main objective of the study was to establish the prevalence of parents who were willing to have their children vaccinated, and we found a high prevalence of 90% with very minimal difference in specific numbers across genders. This is corroborated by a similar study in China that found a lower level of knowledge among junior students and a higher willingness to be vaccinated (35). In another study in Brazil, a high willingness level was noted among parents citing successful HPV vaccination campaigns (36). A similar study in Sweden indicated a high willingness to vaccinate their children but this was pegged on cost (37). Older parents were more willing to vaccinate their daughters compared to the younger in this study. This finding corroborates a study on vaccine complacency conducted in United States (38). The gravity of mortality and morbidity associated with cervical cancer could explain the high willingness to vaccinate in spite of the little knowledge in this case. Research shows that the mortality rate of a condition is likely to increase the willingness to vaccinate (38). The high willingness is a positive finding for the HPV vaccination program in Kenya as the willingness to vaccinate their children can be used in promotion campaigns where parents can be seen as partners.

About 10% of parents across gender were hesitant to have their children vaccinated. We explored reasons for hesitancy and some of the reasons given were that parents were most apprehensive about safety (76%), there were concerns on long-term and short-term side effects although fewer concerns about short-term side effects at 47%. Apart from safety issues, the second most significant cited reason for vaccine hesitancy was inadequate information at 78%. The Kenyan study conducted among mothers revealed similar findings that safety was an area of concern (39). Another study among teachers in Kenya revealed inadequate information as a reason for their apprehension towards the vaccine (18). A study among nurses in Nigeria indicated that lack of information led to their relaxed recommendation of the vaccine (40). On the contrary, an interventional study among parents in the United States indicated that improving the knowledge levels of parents had insignificant effects on vaccination willingness with attitudes appearing to be more of concern (41). The lack of information and circulating myths and misconceptions on vaccine safety may have led to the hesitancy. The findings of this study indicate parental education and safety issues; therefore, efforts need to be put to alleviate safety concerns related to the vaccine. A systematic review found that parental hesitancy was a key determinant of the success of the HPV vaccination campaigns and therefore parental concerns need to be addressed (42).

A key concern raised by parents that has been reported in other studies is that the child may be too young to be vaccinated (43). Some parents feel that the sexual debut of their children is later than the recommended age of HPV vaccination (44). This highlights further need of parent's education. On a positive note, many parents noted that they had inadequate information 79.8% males and 63.3% females. Over 94% of the respondents were interested in obtaining more information and this desire for more information is an opportunity for increasing HPV vaccine uptake.

In addition to parental reasons for hesitancy we conducted logistic regression analysis that focused on social demographic determinants for willingness to vaccinate the child. We identified five key variables: a parent's knowledge score (AOR 1.133, 95% CI:1.050,1.227) and belief score (AOR 2.395, 95% CI) were positively associated with willingness to have their child vaccinated. This implied that increasing parental knowledge and modifying the beliefs can have a positive impact on willingness to have their child vaccinated. This positive association has been reported in a US study that found a strong positive association between

HPV knowledge and intention to have the child vaccinated (45). This study did not evaluate the influence of parental belief. A cross sectional study on beliefs conducted in Thailand found a positive association between knowledge and acceptance beta coefficient 0.03 (P= 0.01) (46). A positive association was also found between beliefs and beneficial effects about the HPV vaccine beta coefficient 0.022(P=0.07). There's need to increase vaccine access to leverage on the high willingness levels. Subsidization of vaccination related costs that may hinder uptake. Willingness to vaccinate for mothers increases with increase in knowledge in Nigeria (47). This study showed that HPV vaccine education levels influenced the willingness levels positively. This contrasted a study that did not find any significant association between education levels and vaccination propensity (38).

Our study found a negative association between parental level of education (AOR 0.663 95% CI: 0.310,1.419) and age (AOR 0.512; 0.252, 4.043) with willingness to vaccinate. This negative associations were significant even after adjusting for beliefs and knowledge. This meant that older parents and those more educated were less willing to have their children vaccinated. The findings with regards to age differ from a Thailand study whereby older parents were more willing to vaccinate their children compared to the younger parents however this study was not statistically significant(46). However, a negative association was reported between higher education attainment and willingness to have children vaccinated though this was not statistically significant but correlates with the study conducted (46). Educational and behavioral interventions to promote vaccine uptake may need to be targeted on older and more educated parents.

The parental sources of information on the HPV, cervical cancer and vaccine were investigated. Most people had heard about HPV from their colleagues at work as their main source of knowledge. Health officers and television were also mentioned as a significant source of health information. Few parents received their information from religious leaders. Religious parents in Thailand compared to the non - religious were more willing to accept to vaccinate their children (46). This is contrary to the fact that religious leaders have in the past sabotaged HPV vaccination initiatives (27). Effects of peer influence can also be translated to parent-child relationship. A study found that parents were the most important source of information to the adolescent girls about the HPV vaccine (48). Second to health care workers the study found that mothers were very important source of information. A study done amongst African-

Americans found that medical professionals were the most important source of information for parents followed by the television, then parents would pass the information to their children(49). The same study showed that sources of information affected human attitude. Since the natural human preference of interactive conversation was noted as a key a source of information, an interactive mode of communication in passing of HPV knowledge concerning HPV infection, the vaccine and cervical cancer should be adopted. Social media serves to enable such interactive communication. This study noted a disparity in the means of communication between the older and the younger generation. Given that the sources of information tend to be age specific, the interventions should be disseminated using multiple means of communication each targeting a given age group.

There was minimal knowledge on HPV, its association with cervical cancer and the availability of the HPV vaccine across gender. This finding is consistent with other studies done. A Kenyan study recognized low to moderate levels of knowledge about HPV vaccine and cancer (18). Poor knowledge levels were noted in a study among nurses done in Nigeria (40). Systematic review of studies conducted in sub-Saharan countries indicated low levels of knowledge of cervical cancer and HPV (50). In this study, the level of knowledge was poor indicating the need for more parental knowledge on the HPV vaccine. This should be addressed given that study show that parents are a critical information source to their children (48). In order to address the gaps in knowledge on the HPV vaccine as noted in our study, messages on HPV need to be transmitted more frequently and regularly. The knowledge gaps were mode of transmission, link to cervical cancer risk factors for cervical cancer and vaccine safety. A curriculum that addresses the knowledge gaps particularly the safety concerns need to be designed.

The beliefs on the HPV vaccine were noted to be average. A significant portion of the study population held on to beliefs that are erratic and likely to derail efforts in immunization. The wrong beliefs are likely to affect the subject's confidence in allowing their daughters to be immunized. Belief in the vaccine effectiveness was not very strong as only about 60% of the respondents believed that the vaccine was effective. Amongst the adult women in USA 29.8% believe that the HPV vaccine is successful at preventing cervical cancer (51). A study done among Malaysian medical students revealed that they had positive attitudes towards the HPV vaccination(52). A polish study revealed a positive attitude towards HPV vaccination among

parents (43). Key messages need to be crafted that address the myths and misconceptions concerning HPV vaccine.

Male involvement is key when it comes to reproductive health issues. A study in Eldoret - Kenya among women indicated that the weight of their male partners decision bore a strong correlation with their baseline acceptance (53). Our study found that males had less knowledge on HPV vaccine for decision making compared to their female counterparts. For instance, only 59% of male respondents knew that the HPV vaccine prevents cervical cancer compared to 71% of females( $P=0.004$ ). Females scored better than their males counterparts in a Malaysian study (54). A study in India among students found that the women knew more about HPV vaccine than the males (55). There's an ill perception among men that HPV and cervical cancer are women health matters (56). The feminization of the HPV vaccine which has led female focused interventions has resulted in a systemized neglect of the male gender in the HPV vaccine campaigns. Lack of inclusion of male in the HPV vaccines issues is also a deliberate policy aimed at cost minimization(57). There's a global call to gender neutral HPV vaccination initiatives (36). Men's knowledge was generally poor. To reverse this trend, communication and educational initiatives campaigns should focus on raising awareness on the poor levels of knowledge on the disease men's risk behavioral patterns in women acquiring the HPV infection and how men are directly affected by the HPV infection and cervical cancer (58). Issues of penile cancer and even the carrier role men play ought to be brought to light to bridge the indifference (56). The media should be encouraged to portray maternal and reproductive health as an issue that involves the male's partners. Men should be encouraged to actively participate in reproductive health issues. Male friendly reproductive services should be adopted. The government should design common interventions with the male inclusive agenda on reproductive health. When vaccine advocacy is focused on the males they will be in favor of protecting the women and therefore improvement in vaccine uptake (58).

An interesting finding was the effects of age and gender on knowledge score. Younger men of the same age group with women performed better in terms of their knowledge. This may indicate a shifting culture whereby older men were not in the past allowed to know women issues. Cultural barriers could explain this as much older generation of men are less likely to actively engage in such conversations. A study conducted in china among women revealed that age influenced knowledge of cervical cancer though this was not statistically significant(59).



Younger women were found to be ignorant reflecting that women are more disadvantaged due to cultural issues, early school dropout rates, early marriages among other issues that commonly affect girls at a younger age (59). Over time women's knowledge increases indicating knowledge diffusion through informal acquisition of knowledge. This could be occasioned by the interactive nature of women in exchanging ideas, maternity visits, self-help groups among others. Intervention targeting younger mothers should be made. This may include finding them in their women groups and engaging them in key HPV vaccination discussions.

This study investigated decision making process between parents and their adolescents. This study noted that parents are very important in decision making concerning HPV vaccination. A key determinant is the parental approval to getting child vaccinated (60). A study conducted among Thailand parents clearly indicated the critical role of parents in decision making concerning their adolescents health (46). This shows the need to target both the children and parents in the vaccine educational campaigns.

## **5.2 Study limitations**

The study was conducted in an urban area of a low-income country whereby parents were well educated and had better access to information, therefore the key findings on the low levels of knowledge and high willingness may not be extrapolated to other parts of the country. Particularly rural and hard to reach areas where literacy is low. We did not explore the effects of religious dominations and culture on parental decisions. Cultural aspects such as lack of women in decision making and stigma associated with reproductive issues was not adequately explored. Variables affecting vaccine access such as distance to the nearest public facility, knowledge about where the vaccine can be obtained, costs and travels were not explored. The vaccine is offered free in all public facilities but there may exist provider related barriers to access such as responsiveness and these were not addressed as key issues to vaccine hesitancy. We did not determine how sources of information affects attitudes and beliefs.

## **5.3 Conclusions and recommendations**

Despite the low levels of knowledge and safety concerns, there was a high parental willingness to have their children vaccinated. The key reason for vaccine hesitancy were insufficient knowledge and safety concerns. High levels of knowledge and beliefs were positively

correlated with the parent's willingness to vaccinate the children. Men generally had lower levels of knowledge on the HPV vaccine compared to the females. The most important source of knowledge were peers at work places. Parents were willing to receive more education and were also willing to allow their children to obtain reproductive health education given that many parents reported that they respected their children's decision. Studies have also shown that children depend on their parent's knowledge(48). Upscaling of intervention that simultaneously involve adolescents and parents could be initiated in religious institutions and schools where both age groups are likely to meet. There should be greater involvements of religious institutions and their leaders in targeted campaigns. The vaccine should be availed to the male gender to achieve gender equity.

We recommend that further research in equities in reproductive health services, focus on rural areas, influence of culture on religion and how media services affect knowledge and beliefs. Further studies can also be done to identify provider and geographical related barriers to the free HPV vaccine.

On policy and practice we recommend that information that addresses specific knowledge gaps be crafted. Media sources should be tailored according to education level, age groups and gender. Gender neutral interventions should be encouraged. Interventions should be designed that simultaneously involve both adolescents and parents.

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## APPENDICES

### APPENDIX I: THE ELIGIBILITY CHECK LIST

#### Instructions

2. Answer by ticking appropriately on the spaces provided.
3. Feel free to ask for clarification whenever in need.

	<b>THE ELIGIBILITY CHECK LIST</b>	Tick here
1	Be adults aged above 18 years.	
2	Have a pre- or adolescent child aged 9-14 years.	
3	Seen in the medical clinic of KNH.	
4	Provide informed consent.	
6	Can communicate fluently either in Swahili or English	

## **APPENDIX II: CONSENT FORM**

### **Title: DETERMINANTS OF HPV VACCINE HESITANCY AMONG PARENTS ATTENDING KENYATTA NATIONAL HOSPITAL OUTPATIENT CLINICS**

#### **Introduction**

I am **Chester Kolek**, a student at the University of Nairobi pursuing a Master of Clinical Pharmacy degree. As you might be aware, cervical cancer is very common among women in Kenya and one of the major risk factors that leads to development of the disease is the HPV virus. Currently, a vaccine is available for young girls to prevent them from getting infected by the HPV virus. The purpose of this study is to identify how people respond to information about this vaccine and to outline some of the reasons why the vaccine is not popular in the Kenyan population. I am therefore requesting you to allow me to ask you questions relevant to this study. Once you accept to take part in this study, I will request you to sign your name or to make your mark on this form. I will offer you a copy to keep if need be.

Please feel free to ask any questions as I take you through the explanations of the study.

#### **Objective**

The main aim of this study is to assess the attitude to the cervical cancer vaccine and to identify some of the reasons why most people hesitate from taking the vaccine and therefore suggest the most suitable ways of improving the vaccine's acceptance in our population.

#### **Procedure**

This study will involve a face to face interview where you will be asked some questions about your knowledge on the cervical cancer vaccine and your willingness to get your child vaccinated. It will take approximately 20 minutes of your time. The information shared as interview responses will be written on a coded questionnaire. No other patients will know about or hear as you are asked and as you respond to the questions. The information will be analyzed and the findings published as part of my Master's dissertation. The findings will also be shared with the ministry of Health and various journals to help in improving the vaccination program.

**Participation**

Your participation in this study is voluntary. Your refusal to take part in the study will not affect the quality of treatment accorded to you in the health facility. Your values will be respected.

**Risks**

There is no major risk involved. There is no financial obligation on your side. During the assessment, precaution will be taken to ensure your privacy and comfort.

**Benefits**

The results obtained from this study will be shared with the authority responsible for cervical cancer vaccination initiative and they may be used to determine the best way of enhancing vaccine acceptance to reduce the cases of cervical cancer in our country.

**Compensation**

There will be no monetary compensation to participants for agreeing to voluntarily use their time for the study.

**Confidentiality**

Effort will be made to keep your personal information confidential. The information will be kept under lock and key and only be used to facilitate vaccine awareness and for academic purposes. However, confidentiality may be broken at your request or when a court of law asks for it.

**Justice**

You will be treated the same as other participants regardless of your response. Your social status, gender, culture or lifestyle will not negatively affect the treatment. There will be no discrimination.

**Veracity**

I will be truthful of all the information given. The importance of each question will be explained if requested for.

**Dissemination of information**

The information generated from the data may be published in reputable journals to enhance wide circulation. In addition, it may be presented at conferences and seminars. The Ministry of Health may also be informed of the findings.

**Problems or questions**

If you have any questions about the study or for any further enquires you should contact Chester Kolek on 0726 080479.

If you have any questions about your rights as a research participant you should contact the Secretary of the Kenyatta National Hospital/University of Nairobi – Ethics Research Committee on the contacts:

The Secretary, KNH/UoN-ERC,  
Kenyatta National Hospital,  
P. O. Box 20723-00202, Nairobi.  
Tel: 2726300-9 / 2716450 ext. 44102, Fax: 725272

**Ethical approval**

Ethical approval was obtained from the Kenyatta National Hospital/University of Nairobi – Ethics Research Committee to conduct this study at the KNH medical outpatient unit. I therefore kindly request you to sign this consent form. Thank you for your consideration.

**Participant’s statement**

I have read this form or had it read to me. I have discussed the information with those concerned. All my concerns have been addressed. I understand that y decision to take part in this study is voluntary. By signing this form, I do not give up any rights that I have a s a research participant.

**Participant’ name**

\_\_\_\_\_

**Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**Researcher’s statement**

I have taken the participant through the entire consenting process and obtained his/her consent without coercion. I will maintain confidentiality and give guidance to the participant where necessary.

**Researcher's name** \_\_\_\_\_

**Signature** \_\_\_\_\_

**Date** \_\_\_\_\_

**APPENDIX III: QUESTIONNAIRE**

**STUDY TITLE: DETERMINANTS OF HPV VACCINE HESITANCY AMONG PARENTS ATTENDING KENYATTA NATIONAL HOSPITAL OUTPATIENT CLINICS**

**Guidelines**

1. Give your answers by appropriately responding in the blank spaces provided. This will involve either writing the responses or circling the appropriate choice as the questions will require.
2. Feel free to ask for clarification whenever in need.

**SECTION 1: Sociodemographic characteristics.**

1. What is your age? \_\_\_\_\_ Years.      Date of Birth (Year): \_\_\_\_\_

<b>Age category (Years)</b>	<b>(Tick)</b>	<b>Code</b>
18-30		1
31-40		2
Above 40		3

2. Sex:

<b>Category</b>	<b>(Tick)</b>	<b>Code</b>
Male		1
Female		0

3. What is your Occupation:

<b>Category</b>	<b>(Tick)</b>	<b>Code</b>
Formal employment		1
Self-employed		2
Other (specify).....		3

4. What is your Level of education so far:

Category	(Tick)	Code
I have no formal education		1
Primary level		2
Secondary level		3
Tertiary		4

5. What is your marital status?

Category	(Tick)	Code
Married		0
Single (Divorced/never married/ widow/widower)		1

6. What is your religion?

Category	(Tick)	Code
Christian		1
Muslim		2
Others ((specify):		3

7. Do you have children?

	tick	Code
Yes		1
NO		0

8. If yes?

Category	(Tick)	Code
Yes, boys only		1
Yes, girls only		2
Yes, boys and girls		3



9. What is /are the age/ages of the girls.....

What is the estimated average age of children (girls) in your family?

	Category	(Tick)	Code
10.	8 years of younger		0
11.	9-11 years		1
12.	12-14 years		2
13.	15 years or older		3
14.	Not Applicable		4

SECTION 2: Awareness and knowledge of the HPV vaccine.

HPV

15. Have heard about HPV infection?

Category	(Tick)	codes
Yes		1
No		0

What is the mode of transmission of HPV? (Tick any/all that apply)

	Category	(Tick)	Yes(codes)	No (codes)
16.	Physical contact		1	0
17.	Aerosol/Air droplet		1	0
18.	Sexual intercourse		1	0
19.	Other (specify):		1	0

Knowledge about mode of transmission (correct =1, incorrect = 0)

Which of the following persons can be infected by HPV

		Tick	Yes=1	No = 0	I don't know =2
20.	Male		1	0	
21.	Female		1	0	
22.	Both		1	0	
23.	I don't know				

Knowledge about persons who can be infected by HPV (correct =1, incorrect = 0)

**24.** Is everyone infected with HPV going to have symptoms

**(Yes =1, No= 0, I don't know=2)**

- Yes
- No
- I don't know

**25.** Will Infection with HPV lead to cervical cancer:

**(Yes =1, No= 0, I don't know=2)**

- Yes
- No
- I don't know.

**26.** How can genital HPV infection be prevented?

### **CERVICAL CANCER**

**27.** Have heard about cervical cancer?

<b>Category</b>	<b>(Tick)</b>	<b>codes</b>
Yes		1
No		0

**28.** Is cervical cancer one of the leading causes of cancer deaths in women in Kenya? **(Yes =1,**

**No= 0, I don't know=2)**

- yes
- no
- I don't know

**29.** Is cervical cancer caused by the HPV infection? **(Yes =1, No= 0, I don't know=2)**

- Yes
- No
- I don't know

**30.** Is cervical cancer preventable? **(Yes =1, No= 0, I don't know=2)**

- Yes

- No
- I don't know

If yes, how can cervical cancer be prevented?

Categories	Tick here	Yes (code)	No (codes)
31. Pap smear		1	0
32. Vaccination		1	0
33. Abstinence		1	0
34. Condom use		1	0
35. I don't know		1	0

36. Have you heard about the pap smear test? (Yes =1, No= 0, I don't know=2)

- Yes
- No

**HPV VACCINE**

What is the HPV vaccine used for? (Yes =1, No = 0, I don't know=2)

37. Prevention of HPV infection

- Yes
- No

38. Prevention of cervical cancer

- Yes
- No

39. Prevention of genital warts

- Yes
- No

40. What is /are the age group of your girl children

.....

41. Which ages is/are eligible for the HPV vaccine?

	Tick	code
26 and below		1
Above 26		0
I don't know		2

**42.** Are you aware that all girls aged 10 years are being offered a Human Papilloma Virus (HPV) vaccine? (Yes =1, No = 0, I don't know=2)

- Yes
- No
- I don't know

If YES, how did you hear about it? (Tick all that apply)

CATEGORIES	TICK	YES (codes)	NO (codes)
<b>43.</b> From fellow workers		1	0
<b>44.</b> From politicians		1	0
<b>45.</b> From Religious leader		1	0
<b>46.</b> On Radio		1	0
<b>47.</b> On Television		1	0
<b>48.</b> From Health Officers		1	0
<b>49.</b> Other (specify)		1	0

**50.** Is there need for Pap smear screening after receiving HPV vaccination? (Yes =1, No = 0, I don't know=2)

- Yes
- No
- I don't know

SECTION 3: Attitude towards the HPV vaccines

**Tick the most applicable answer.**

Variable	Yes=1	No=0	I don't know=2
<b>51.</b> Do you believe that your child is at risk of HPV infection?			
<b>52.</b> Do you believe that HPV infection is severe?			
<b>53.</b> Do you believe that the HPV vaccine is effective?			
Do you want to be educated more on HPV?			

**SECTION 4: HPV vaccination willingness (Yes=1, No=0)**

**54.** Would you recommend that your child or a close relative be vaccinated?

- Yes
- No
- I don't know.

**55.** Would you recommend that young girls (below 10 years) be given the HPV vaccine?

- Yes
- No
- I don't know

**SECTION 5: Reasons for vaccine acceptance and hesitancy.**

**What are the reasons that make you accept the HPV vaccination?**

Choose all the responses you deem relevant.

**Reasons for accepting HPV vaccination**

**Yes=1 No= 0 I don't know= 3**

- 56.** I know that the vaccine is effective at preventing Cervical cancer
- 57.** Other parents are getting the vaccine for their daughter and I feel I should do the same for mine
- 58.** There are verified sources of information declaring the vaccine safe
- 59.** The doctors recommend the vaccine
- 60.** The school and government recommend the vaccine
- 61.** My daughter has been asked to have the vaccine

**What are the reasons why you may be hesitant to have the child vaccinated?**

Choose all the responses you deem relevant.

	<b>Reasons for accepting HPV vaccination</b>	<b>Yes=1</b>	<b>No= 0</b>	<b>I don't know= 3</b>
<b>62.</b>	I am against all Vaccinations			
<b>63.</b>	Child refusal			
<b>64.</b>	The Vaccine is not safe			
<b>65.</b>	Since it's a new vaccine its side effects are not well known			

66.	The safety profile of the vaccine is still unknown			
67.	There may be lifelong health problems from the vaccine.			
68.	The vaccine could result in some short term side effects			
69.	The vaccine will result in pain especially when being injected site.			
70.	My daughters are not yet of age to receive the vaccine			
71.	The vaccine may make the young girls start having sex			
72.	I would not want my daughters stigmatized as promiscuous.			
73.	My religion does not allow vaccination			
74.	The HPV vaccine is not necessary			
75.	The HPV vaccine costs. {travel, and others			
76.	I have inadequate information about the vaccine to decide.			

For the following section, please indicate whether you agree or disagree with the statement.

		Agree=1	Neutral=2	Disagree=0
77.	All girls aged 10 years should get the HPV vaccine			
78.	HPV Vaccine is safe			
79.	HPV infection is common in Kenya			
80.	I have enough information about HPV vaccine to guide my daughters			
81.	I would like to know more about the HPV vaccine.			
82.	Girls aged 10 years should get education about sex.			

SECTION 6: Decision process.

**83.** Would you ask your child for permission before you take them for vaccination??(Yes =1, No = 0, I don't know=2).

- Yes
- No
- I don't know.

**END OF QUESTIONNAIRE**

Thank you for your time.

## APPENDIX IV: DODOSO

**STUDY TITLE:** UJUZI, MTAZAMO NA NIA YA CHANJO YA SARATANI YA SHINGO YA KIZAZI KATI YA WAGONJWA WANAHUDHURIA HOSPITALI YA KITAIFA YA KENYATTA YA WAGONJWA WA NJE YA KLINIKI.

### MAAGIZO

1. Jibu kwa kuweka jibu ipasavyo kwenye nafasi ulizopewa.
2. Kwa maswali yaliyofunguliwa wazi, tafadhali andika majibu yako kwenye nafasi ulizopewa.
3. Jisikie huru kuuliza ufafanuzi wakati wowote utahitaji.

### SEHEMU YA KWANZA: Tabia za Kijamiiodemographic

1. Una umri miaka mingapi? \_\_\_\_\_ Miaka: \_\_\_\_\_ Tarehe ya kuzaliwa (mwaka): \_\_\_\_\_

<b>Kitengo cha umri (Miaka)</b>	<b>(Alama)</b>	<b>Kodi</b>
18-30		1
31-40		2
Juu ya 40		3

2. Jinsia:

<b>Kitengo</b>	<b>(Alama)</b>	<b>Kodi</b>
Mume		1
Mke		0

3. Unafanya kazi gani:

<b>Kitengo</b>	<b>(Alama)</b>	<b>Kodi</b>
Kuajiriwa		1
Kujiajiri mwenyewe		2
Zingine (taja kwa ukamilifu) .....		3

4. Kiwango chako cha elimu ni kipi:

<b>Kitengo</b>	<b>(Tick)</b>	<b>Code</b>
Sijapata masomo yoyote		1
Kiwango cha msingi		2
Kiwango cha sekondari		3
Kiwango cha chuo		4

**5. Umeoa?**

<b>Kitengo</b>	<b>(Alama)</b>	<b>Kodi</b>
Nimeoa		0
Sijaoa(talakiwa/sijawaioa/ mjane)		1

**6. Dhehebu lako ni lipi?**

<b>Kitengo</b>	<b>(Alama)</b>	<b>Kodi</b>
Mkristo		1
Muislamu		2
Zinginezo (taja):		3

**7. Je, una watoto?**

	<b>Alama</b>	<b>kodi</b>
Ndio		1
La		0

**8. Kama ni ndio,**

<b>Kitengo</b>	<b>(Alama)</b>	<b>Kodi</b>
Ndio, wavulana pekee		1
Ndio, wasichana pekee		2
Ndio, wavulana na wasichana		3

**9. Watoto wako ni wenye umri gani.....**



Umri wa wastani wa Watoto katika familia yako ni upi?

<b>Kitengo</b>	<b>(Alama)</b>	<b>Kodi</b>
10. Chini ya miaka 8		0
11. Miaka 9-11		1
12. Miaka 12-14		2
13. Miaka 15 na Zaidi		3
14. Sijui		4

SEHEMU YA PILI: Kiwango cha ufahamu wa chanjo ya HPV

**HPV**

15. Nimesikia habari kuhusu ugonjwa wa HPV?

<b>Kitengo</b>	<b>(Alama)</b>	<b>kodi</b>
Ndio		1
La		0

HPV inasambazwa kupitia njia gani? (weka alama kwa jibu linalofaa)

<b>Kitengo</b>	<b>(Alama)</b>	<b>Ndio(kodi)</b>	<b>La (kodi)</b>
16. Physical content		1	0
17. Aerosol/Air droplet		1	0
18. Kushiriki ngono		1	0
19. Zingine (taja):		1	0

Ufahamu kuhusu njia ya usambazaji (sahihi =1, lisilosahihi= 0)

Ni kitengo kipi cha watu miongoni mwa wafuatao ambao wanaezakuambukizwa na ugonjwa wa HPV?

	<b>Alama</b>	<b>Ndio=1</b>	<b>La= 0</b>	<b>Sijui=2</b>
20. Wanaume		1	0	
21. Wanawake		1	0	
22. Wote		1	0	
23. Sijui				

Ufahamu kuhusu yule anayeweza kuambukizwa ugonjwa wa HPV (Sahihi =1, Isiosahihi = 0)

24. Je, ni wote walio na ugonjwa wa HPV wataonyesha ishara ya ugonjwa huu?

(Ndio =1, La= 0, Sijui=2)

- Ndio
- La
- Sijui

25. Je, kuambukizwa na HPV kwawezasababisha saratani ya ungu wa kike?

(Ndio =1, La= 0, Sijui=2)

- Ndio
- La
- Sijui

26. Ugonjwa wa HPV yaweza kuzuiwa kwa njia gani?

.....

### **SARATANI YA KIZAZI**

27. Je, umeskia kuhusu saratani ya ungu wa kike?

<b>Kitengo</b>	<b>(Alama) kodi</b>
Ndio	1
La	0

28. Je, saratani ya ungu wa kike ni moja wapo ya saratani inayoongoza kusababisha kifo ya wanawake nchini Kenya? (Ndio =1, La= 0, Sijui=2)

- Ndio
- La
- Sijui

29. Je, saratani ya ungu wa kike inasababishwa na HPV? (Ndio =1, La= 0, Sijui=2)

- Ndio
- La
- Sijui

30. Je, saratani ya ungu wa kike laweza kuzuiwa? (Ndio =1, La= 0, Sijui=2)

- Ndio
- La
- Sijui

Kama ni ndio, je, saratani ya kike inaeza kuzuiwa kwa njia gani?

<b>Vitengo</b>	<b>Sahihisha hapa</b>	<b>Ndio (kodi)</b>	<b>La (Kodi)</b>
<b>31.</b> Pap smear		1	0
<b>32.</b> Chanjo		1	0
<b>33.</b> Kutoshiriki ngono		1	0
<b>34.</b> Kutumia mpira wa kondomu		1	0
<b>35.</b> Sijui		1	0

**36.** Je, umeskia kuhusu pap smear test? (Ndio =1, La= 0, Sijui=2)

- Ndio
- La

**CHANJO YA HPV**

**Je, chanjo ya HPV inatumiwa kuzuia ugonjwa upi? (Ndio =1, La = 0, Sijui=2)**

**37.** Kuzuia ugonjwa unaosababishwa na HPV

- Ndio
- La

**38.** Kuzuia saratani ya kizazi

- Ndio
- La

**39.** Kuzuia genital warts

- Ndio
- La

**40.** Watoto wako wa kike wana umri mgani wa wastani?

.....

**41.** Je, ni Watoto wa umri gana wanapaswa kupewa chanjo ya HPV?

	<b>Alama</b>	<b>Kodi</b>
26 na kurudi chini		1
Zaidi ya 26		0

**42. Je, wafahamu kuwa wasichana wote wenye umri wa miaka kumi wanapewa chanjo ya HPV? (Ndio =1, La = 0, Sijui=2)**

- Ndio  
 La  
 Sijui

**Kama ni ndio, ulifahamu kwa njia gani? (weka alama kwa jibu sahihi)**

<b>KITENGO</b>	<b>Alama</b>	<b>Ndio (kodi)</b>	<b>La (kodi)</b>
<b>43.</b> Kupitia wafanyakazi wenzangu		1	0
<b>44.</b> Kupitia wanasiasa		1	0
<b>45.</b> Kupitia viongozi wa kidini		1	0
<b>46.</b> Kwenye redio		1	0
<b>47.</b> Kupitia televisheni		1	0
<b>48.</b> Kupitia maafisa wa afya		1	0
<b>49.</b> Wengine		1	0

**50. Je, kuna umuhimu wa kukaguliwa kupitia njia ya Pap smear screening baada ya kupewa chanjo ya HPV? (Ndio =1, La = 0, Sijui=2)**

- Ndio  
 La  
 Sijui

**SEHEMU YA TATU: Hisia kuhusu chanjo ya HPV**

**Chagua jibu lifaalo zaidi**

**Vitengo**

**Ndio=1 La=0 Sijui=2**

- 51.** Je, unaamini kuwa mtoto wako yuko kwenye hatari ya kupata HPV?
- 52.** Je, unaamini kuwa ugonjwa wa HPV ni hatari?
- 53.** Je, unaamini kuwa chanjo la HPV ni kamilifu?

54. Je, ungependa kufunzwa zaidi kuhusiana na HPV?

SEHEMU YA NNE: Kusudi la chanjo ya HPV (Ndio=1, La=0)

55. Je, ungependekeza mtoto wako ama mtu wa uko yako apewe chanjo ya HPV?

- Ndio
- La
- Sijui

56. Je, ungependekeza ya kuwa wasichana wenye umri wa chini ya miaka kumi wapewe chanjo ya HPV?

- Ndio
- La
- Sijui

SEHEMU YA TANO: Sababu za kukubalika kwa chanjo na kusita.

### **Sababu zako za kukubali chanjo dhidi ya HPV**

Chagua jibu lifaalo zaidi

**Sababu za kukubali chanjo ya HPV**

**Ndio=1 La= 0 Sijui= 3**

- 57. Chanjo ya HPV ni kamilifu kuzuia saratani ya uzai
- 58. Wazazi wengine wanakubali Watoto wao wapewe chanjo ya HPV
- 59. Kuhakikishiwa kuwa chanjo ni salama na ni kamilifu.
- 60. Chanjo ya HPV imependekezwa na madaktari
- 61. Chanjo ya HPV imependekezwe na shule ama serikali.
- 62. Watoto waliuliza kupewa chanjo ya HPV

### **Je, ni sababu gani zinawezafanya usite kumpa mwanao chanjo ya HPV**

Chagua jibu lifaalo zaidi

**Sababu za kukubali chanjo ya HPV**

**Ndio=1 La= Sijui= 3**

**0**

- 63. Napinga chanjo ya aina yoyote
- 64. Mtoto amekataa
- 65. Sina uhakika na usalama wa chanjo

66. Madhara ya chanjo haijulikana kwa kuwa chanjo ni bado mpya
67. Usalama wa chanjo haujathibitishwa
68. Chanjo yawezasababisha shida za kiafya.
69. Chanjo iko na madhara ya muda mfupi.
70. Chanjo ya HPV inasababisha uchungu eneo linapodungwa
71. Watoto wangu wa kike wangali wenye umri mdogo
72. Chanjo itafanya wasichana wadogo waanze kushiriki ngono ya mapema
73. Singependelea Watoto wangu wa kike wabandikwe kuwa washerati
74. Dhehebu langu haliruhusu chanjo
75. Chnajo ya HPV si lazima
76. Chanjo ya HPV ni lenye gharama ya juu{travel, and others
77. Niko na habari ya kutosha kuhusu chanjo ya HPV

Kwa sehemu ifuatayo, tafadhali ashiria ikiwa unakubaliana nayo au la

**Nakubal**    **Wastani=**    **Nakataa=0**  
**i=1**            **2**

- 78 Wasichana wote wenye umri wa miaka 10 wanafaa kupokea chanjo.
- 79 Chanjo ya HPV ni salama
- 80 Chanjo ya HPV ni la kawaida Kenya.
- 81 Niko na habari ya kutosha kuhusu HPV ambayo nawezeaeleza Watoto wangu wa kike.
- 82 Ningependa kujua Zaidi kuhusu chanjo ya HPV.
- 83 Wasichana wenye umri wa miaka 10 wanafaa kuelimishwa kuhusu ngono.

SEHEMU YA SITA: Hatua ya uamuzi

**84. Je, utamwomba mwanao ruhusa kabla ya kumpeleka kupewa chanjo? (Ndio =1, La = 0, Sijui=2).**

- Ndio
- La
- Sijui

**MWISHO WA DODOSO**  
**ASANTE**