

An Analysis Of The Challenges Faced By Health Care Managers In Local Society. A Case Study Of HPV Vaccines Uptake

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Abstract: *The efforts to prevent cervical cancer are everyone's responsibility, However, the health care managers have an essential role, both in the overall management of vaccination, communication, ensuring availability of vaccines and staffs, implementation of immunization, supporting on the screening and treatment services, as well as in the promotion of these services among women and the entire community. However, if health care manager's team lack adequate knowledge and management of HPV vaccine then, the uptake of the vaccines will be compromised. The objectives of this study was to finding out the challenges faced by healthcare managers in providing HPV vaccines in Embu County. The study targeted 70 participants that were purposely selected. The researcher found out that a majority of health care managers understand that HPV can be prevented through use of HPV vaccination (32, 46%) and many health care system related factors affects the HPV Vaccination uptake to included HPV vaccines and supplies unavailability (20, 29%) and absence of staff to administer vaccines and weak managers HPV knowledge (15, 21%) all the Cramer's V values were positive indicating that health system factors enhance HPV vaccination. The study concluded weak knowledge on HPV and HPV vaccination together with religious cultural factors and health system related challenges has affected HPV vaccination uptake. It has recommended integrating HPV vaccination with other routine vaccination programs at primary health care level improving knowledge on HPV and HPV vaccination and health care managers working on reduction of cancer stigmatization.*

Keywords: *Human papillomavirus, Human Papillomavirus vaccine, vaccine uptake, health care managers, cervical cancer*

I. INTRODUCTION

Human Papilloma Virus (HPV) is an important public health concern globally mostly affecting women of reproductive age. HPV is the causative agent of Cervical Cancer. Irrespective of age and medical interventions, studies have demonstrated that early interventions open up opportunities for healthcare cost reduction and death aversion. HPV vaccination according to WHO (2018) is one of the best primary prevention approaches in the comprehensive cancer control strategy with adolescent vaccination remaining one of the strategies toward implementing the life-course immunization approach set out in the Immunization Agenda 2030. There is also strong evidence that high HPV vaccination coverage leads to protection of unvaccinated individuals through herd immunity, further enhancing the protective effect for the community. WHO current guidelines (WHO, 2020), recommends that young adolescent girls between 9 and 14 years should receive two doses of vaccine to be fully protected.

For the vaccines to work, healthcare managers are tasked to bridge the gap between vaccine uptake and vaccine availability and deal various barriers. This entails sourcing, ensuring vaccines supplies and availing of cheaper vaccines, integrating this with strengthened human resources for health and a community with adequate awareness of the vaccine and its benefits. It is on this premise that this study seeks to determine the challenges faced by healthcare managers in the delivery of effective care. The study will use the HPV vaccine as a case study to help understand institutional management challenges.

AIMS AND OBJECTIVES

This study aims at deliberating on the challenges faced by healthcare managers in local society, a case study of HPV vaccine uptake in Embu County, Kenya with the objective of finding out the challenges faced by healthcare managers in providing HPV vaccines in Embu County, Kenya.

The study objectives include:

- ✓ To determine what personal characteristics affects the uptake of HPV vaccines in Embu County, Kenya.
- ✓ To assess health care managers level of knowledge and attitude towards HPV vaccination that influences the HPV vaccine uptake in Embu County, Kenya
- ✓ To establish the health system challenges influencing the uptake of the HPV vaccine in Embu County, Kenya
- ✓ To determine the challenges the healthcare managers face in providing HPV vaccines in Embu County, Kenya

RESEARCH QUESTIONS

In addressing the objective, the study will sought to answer the following specific questions:

- ✓ What personal characteristics affects the uptake of HPV vaccines in Embu County, Kenya?
- ✓ What level of knowledge and attitude towards HPV vaccination the health care managers have in Embu County, Kenya.
- ✓ How the health system challenges influences the uptake of the HPV vaccine in Embu County, Kenya?
- ✓ What challenges do healthcare managers face in providing HPV vaccines in Embu

BRIEF METHODOLOGY DESCRIPTION

Findings from this study might help both the national and county governments on policy formulation on improving HPV vaccination practices to improve health. It might help sensitize health care managers and health systems administrators' on specific practices affecting service delivery in health. This will support in the capacity building of the health systems managers in the devolved health systems.

This study will be a primary research, will adopt a cross-sectional descriptive study on healthcare leaders, and will assess challenges faced by healthcare managers in ensuring effective HPV vaccine uptake among women of reproductive age. The study will employ the use of a structured quantitative.

SYNOPSIS OF THE CHAPTERS

Chapters in the literature review , chapter I and Chapter II will describes key concepts in the HPV vaccination uptake to include various theoretical and conceptual framework .This includes the literature on the existing evidence based information on the challenges faced that influences the uptake of the HPV vaccines so that vaccination can be ameliorated and a good coverage attained. Chapter 3 will discuss the study methodology and chapter four will contain the findings, analysis and discussions. Conclusions and remarks will be provided while acknowledging the references. With little information known about the challenges faced by health care managers in local society within HPV Vaccination uptake in Embu County, this study will investigate and identify these key challenges.

II. LITERATURE REVIEW

A. INTRODUCTION

HPV vaccine uptake presents some challenging issues for health care managers. The implementation and uptake of the HVP vaccines, has remained therefore, remained a challenge for health care managers in local society. The vaccine has remained a problem especially Socio-economically marginalized women in low-income countries and weaker health system countries especially in Africa that continue to bear the larger of cervical cancer. This chapter describes the key concepts of HPV vaccination challenges by health care managers in the uptake of the vaccines, describes the personal characteristics that affects the uptake of HPV vaccines, discuss how the health system challenges influences the uptake of the HPV vaccines and the key challenges healthcare managers face in providing HPV vaccines.

HPV vaccine is targeting girls before they become sexually active in order to prevent acquisition of a sexually transmitted infection (STI) as well. WHO recommends that two doses of the currently licensed HPV vaccines be administered to 9–13-year-old girls to prevent infection with two types of human papillomavirus that account for about 70% of cervical cancer cases. The full benefits of HPV vaccine in reducing infection and the subsequent risk of cervical cancer will only be appreciated years and even decades after girls have been vaccinated. Countries introducing HPV vaccine should invest a sustained delivery of HPV vaccine so that it becomes positively associated with adolescent girls and a socially acceptable demanded service according to WHO (2016).

B. EMPIRICAL REVIEW

This section focuses on the studies done by other researchers. It is organized into sub-sections namely an overview of the personal characteristics that affects the uptake of HPV vaccines, how the health system challenges influences the uptake of the HPV vaccines and the key challenges healthcare managers face in providing HPV vaccines.

PERSONAL CHARACTERISTICS THAT AFFECTS THE UPTAKE OF HPV VACCINES

Adequate coverage is key to the success of human papillomavirus (HPV) vaccination programmes and can be affected by personal characteristics of individuals. According to Bingham, Drake and La Montagne (2009), most vaccine-related decision-making occurs within the family unit, by one or more caregivers, and largely depends upon the caregivers' perceptions of the child's risk of exposure. This framework may leave adolescents particularly vulnerable because many caregivers incorrectly assume their children are at low risk for acquiring an STI. Caregiver misperceptions will then mirror adolescent beliefs of invulnerability according to Rosenthal *et al* (1995). Unfortunately, potentially flawed assumptions about adolescent sexual behaviour may cloud decision-making, and prevent a child from accepting and adhering to a vaccination schedule (Zimet *et al* 2006) .A successful uptake

of the vaccine program will then need to address this complex interplay between familial, developmental and psychosocial factors influencing adherence in the adolescent population.

According to Zimet *et al* (2006), adolescent-specific factors affects adherence. These factors include a lack of self-efficacy, stigma associated with a specific illness and an inability to consider future medical consequences into decision-making processes due to misperceptions of invulnerability and low risk. A recent qualitative study by Ford *et al* (2009) focussing on barriers to adolescent vaccination in the USA showed that parent-child relationships, cognitive development, autonomy, time spent in school, relationship with 'medical homes', legal status and likelihood of having medical insurance all impacted adolescents' ability to accept and complete a multi-step vaccine. Based upon these data, it is clear that a multi-factorial approach to understanding vaccine uptake and adherence in adolescents is necessary to improving vaccine completion rates. However, some evidence to indicate that, regardless of gender, greater health-related information interest, understanding, and need to manage uncertainty and threats were associated with increased intention to receive the HPV vaccine, while greater need to deliberate was associated with decreased vaccination intentions. These results suggest that there are psychological differences that are associated with HPV vaccination decisions and that these motivations should be considered in efforts to improve HPV vaccine uptake. According to Marlow *et al* (2009), some common ten personal factors and socio-demographic variables to explore their potential direct and modifying effects on the HBM constructs, willingness and uptake: age of the participant; age of the daughter; class of the daughter; marital status of the participant; number of children (<18 years) in the household; ever heard of cervical cancer (awareness participant); years of schooling of the participant; origin of the participant: whether the.

Moreover, lack of trust in organisations and individuals who advise on or promote vaccine uptake, lack of culturally and linguistically appropriate information, and inconvenient locations and timings of vaccine appointments can further lessen the uptake of the vaccines (WHO, 2017). This will include parental awareness of HPV vaccination that is an essential facilitator of HPV vaccinations in children.

Vaccine hesitancy was also witnessed among the health care workers, many of whom belong to various religious faiths that were responsible for propagating negative sentiment regarding the HPV vaccine. Their lack of confidence manifested in a reluctance to actively promote the vaccine to eligible girls, failure to provide enquiring parents with correct information on the risks and benefits associated with HPV vaccination; choosing to vaccinate girls whose parents expressed minimal hesitancy and therefore consented fully to vaccination.

Several previous studies on HPV vaccination by Osazuwa-Peters *et al.* (2017), Adjei Boakye *et al.* (2017) and Preston and Darrow (2019) noted that a lack of knowledge regarding the HPV vaccine is one of the causes of low HPV vaccination rates. These findings suggest that the necessity of parental education to promote HPV vaccination is effective. To promote rates of HPV vaccine uptake, national policies

should include parents as decision-makers and aim to increase their knowledge and awareness.

Additionally, education, income and social economic status are known to have a significant effect on overall health outcomes and it is recommended that to increase uptake of the vaccines and work on the personal characteristics that hinder the uptake of the HPV vaccination, health workers and health managers require to provide adequate information on HPV vaccine, raising awareness of the vaccine in markets, schools, and radio talk shows, and communicating the target to health staffs workers.

To increase the uptake of HPV vaccination among females, it is essential to understand the factors affecting HPV vaccine initiation. Previous review studies have reported that race and ethnicity, age, health insurance status, previous vaccination history, personal knowledge and awareness of HPV, and parental knowledge and education levels are significant predictors for HPV vaccination uptake.

Vaccination of adolescent girls is the most effective long-term intervention for reducing the risk of developing cervical cancer. The great long-term benefit of HPV vaccination makes it important to initiate and sustain this approach in all countries. According to Drolet *et al* (2019), there is also strong evidence that high HPV vaccination coverage leads to protection of unvaccinated individuals through herd immunity, further enhancing the protective effect for the community. WHO (2020) current guidelines recommend that young adolescent girls between 9 and 14 years receive two doses of vaccine to be fully protected. Data suggesting protection after a single dose have led to trials that will provide evidence for future schedule optimization Brotherton *et al.* (2019) and Stanley and Dull (2018).

HPV vaccine coverage is inequitably distributed across geographical settings and income, with higher income countries achieving higher vaccine coverage. According to WHO (2020), a high vaccine prices coupled with recent supply challenges have significantly constrained the ability of many countries to introduce the HPV vaccine into national immunization programmes and to ensure sustainability of current programmes. To ensure high levels of acceptance and sustained coverage, the introduction of HPV vaccination programmes must be accompanied by strong communication strategies for advocacy and social mobilization to affirm the efficacy, safety and benefits of the vaccine. Tailored strategies to address the rising anti-vaccine movement are essential. These are points that health managers sometimes miss.

Accordingly, WHO (2018) suggests that in addition to HPV vaccination, a comprehensive prevention strategy must include age-appropriate information on sexual and reproductive health, safer sexual practices – such as delaying sexual debut, decreasing the number of sexual partners, condom use, and male circumcision where appropriate – and cessation of tobacco use. Concerted efforts to promote healthy lifestyles among adolescents (boys and girls) are critical for a healthier population for sustainable development.

Despite the radical measures, a report by Bruni, *et al.*, (2021) and WHO (2020) posits that the HPV vaccine uptake in stands at 3% against a 51% target. The Human Papilloma Virus (HPV) vaccine is considered one of the greatest pharmaceutical innovations that is posited to eradicate HPV

among women. However, recent studies have demonstrated that there is an inequitable distribution, access, and uptake of the vaccine globally. Moreover, studies have demonstrated that vaccine implementation faces multiple barriers that include; poor delivery infrastructure, poor community engagement, vaccine costs, inadequate knowledge, and lack of early screening tools. For the vaccines to work, healthcare managers are tasked to bridge the gap between vaccine uptake and vaccine availability. This entails sourcing and availing of cheaper vaccines, integrating this with strengthened human resources for health and a community with adequate awareness of the vaccine and its benefits. It is on this premise that this study seeks to determine the challenges faced by healthcare managers in the delivery of effective care. The study will use the HPV vaccine as a case study to help understand institutional management challenges.

HEALTH SYSTEM CHALLENGES

A study by Kiberu *et al* (2014) estimated the level of uptake for the bivalent HPV vaccine in Mbale district, in eastern Uganda and found that 14% of the study participants were fully vaccinated due to factors associated with health systems challenges.

One of the major issues of low uptake of the HPV vaccine was attributed to inadequate training among health workers about the vaccines. Consequently, training of health workers to provide adequate information on HPV vaccine, raising awareness of the vaccine in markets, schools, and radio talk shows, and communicating the target to health workers can be a challenge to health care managers that they need to work on during HPV vaccination.

Insufficient funds to cover all activities of HPV vaccination can be a huge challenge. This is critical shortfalls in HPV implementation to include training of health workers on HPV vaccine. If no proper social mobilization messaging on HPV, vaccine because the vaccine had not yet known, known and available in many low-income settings, then the uptake will definitely be low.

Additionally, low uptake may also be attributed to the lack of Information, Education and Communication (IEC) materials on HPV vaccine in health facilities, schools and other communal places such as markets. All these can only be achieved if the health care managers have enough funds to work on this. These IEC materials are usually a way of communicating health related information to a vast majority of the population, this is in agreement with findings from one study which stressed the lack of education material on HPV vaccination given by health professionals to young adolescents as a barrier to vaccine uptake and emphasized the need to improve education about cervical cancer, prevention and HPV vaccination (La Torre *et. al*, 2013). Several studies have highlighted the need for health workers to be trained to provide adequate information about this vaccine. In many of these studies, health workers are the most preferred source of information and influence the decision to vaccinate Kessels *et al*. (2012), Marshall *et al*. (2007) and Mullins *et al*. (2013). Furthermore, receiving adequate information from a health care provider greatly improved uptake of the vaccine, this finding is similar to other studies, where healthcare

professionals impacted the choice for adolescents to receive the HPV vaccine according to Ferrer *et al*. (2014) and Cassidy and Schlenk (2012) and these decisions were shaped by confidence in the vaccination program and healthcare providers. This may call for health workers to provide a brief discussion on the vaccine, its benefits and possible side effects prior to administration Ferrer *et al*. (2014).

Similarly, an interventional study by Kester *et al*. (2014) and Dorell *et al* 2009) conducted in the United States of America showed the effect of a brief (10 minutes) group HPV educational session on knowledge and intent to vaccinate among young adults. Individuals in the intervention group were three times more likely to take on the vaccine; this is similar to findings from this study where girls who received an explanation on the side effects of the vaccine were almost three times more likely to take on the vaccine as compared to those who did not receive an explanation. Findings from this study show that adolescents who received adequate information about HPV vaccine were more likely to receive it, and this is similar to findings from another study conducted in Kenya that discovered that perceiving oneself to be adequately informed was a strong determinant of HPV vaccine uptake according to Vermandere *et al*. (2016). This means that health care managers need to provide opportunity to the health workers to be trained to provide the necessary knowledge on HPV vaccine prior to provision on the vaccine to the adolescent girls.

Moreover, a lack of awareness is a major factor influencing initiation and uptake of the HPV vaccine, this is what managers need to ensure to increase uptake of HPV vaccination according to WHO (2017). This finding is similar to a study that sought to understand suboptimal HPV vaccine uptake among ethnic minority adolescents, with the strongest predictor of initiation reported as vaccine awareness according to Bastani *et al* (2011). Bastani *et al*. (2011) study also highlighted that the lack of information about HPV vaccine and where to obtain it by mothers of the girls negatively influenced their decision-making. Additionally, a study among women in Malawi, showed that respondents believed that HPV vaccine uptake would be increased if information were dispersed throughout the community, since they strongly believed that this would address the challenge of low awareness on HPV vaccine (Ports, Reddy and Rameshbabu, 2013). This shows the importance of social mobilization organised and done by health care managers especially for such new vaccines that are outside of the known target age group.

Inadequate human resources for health can be a challenge to health care managers (Hongoro and McPake, 2004) and remain a health system related issue. Human resources for health can be inadequate in various health facilities to provide HPV vaccine. If no staffs are available and or we have just a few staffs based on the work, these staffs might not be able to provide the vaccines or do all the work of caring for patients. During HPV vaccination, health facilities workers usually have to leave the health facility and move to schools to provide the HPV vaccine to the girls; this leaves the work at the health facility to a few health workers and increases the burden on the few staff members who remain at the facility. This can be a challenge to the health care managers managing

these health staffs with huge workload. A study by Wigle *et al.* (2013), Hongoro, and McPake (2004) indicated that the uptake of HPV vaccine in low and middle-income countries is related to human resources for health care numbers. The implication of this is that the Ministry of Health and health care managers will need to find more innovative ways of increasing the human resource needed to provide the vaccine to this special age group. The insufficient human resources remain as a challenge to vaccine delivery, this is consistent with findings from another study where human resources find it a challenge to go to outreach clinics, they use vaccinators to help ease on the work load (Wigle *et al.*, 2013). This remains a great challenge to health care managers that need to work on.

Vaccine and supplies can be out of stock or rather its supply can be inconsistent making it a barrier in the uptake. HPV vaccination logistics can pose a great challenge to the healthcare managers and this vaccine out of stock, can worry a lot the health workers about the efficacy of the vaccine since the second dose can get delayed later than the recommended time of 6 months interval. A study by Ports *et al.* (2013) concluded that availability of HPV vaccines could have influence over adolescent girl's uptake of HPV vaccine. If many times, the adolescents found the vaccine out of stock, this can get them and health workers the efficacy of the vaccine since the second dose was received much later than the recommended time of 6 months interval.

The inconsistency in supply may be because new vaccines impose pressure on the health systems of most developing countries. As a result, they are faced with challenges in their vaccine supply and logistics systems (Zaffran *et al.* 2013). Additionally, storage capacity bottlenecks can occur at national, regional, and district levels and system inefficiencies threaten vaccine access, availability, and quality in many low-income countries. In Kenya, HPV forecasts and supplies can be adjusted to cater for peak demand during the months of Jan – March, May -August and October - December when many young girls are in schools, can easily be reached, and can be educated about the vaccination.

In ensuring service delivery, a health system building block for a strong health system can be a challenge to health care managers. Integration of services can be a good option significant to increase uptake of the HPV vaccine. This is because adolescents get extra services such as deworming, family planning, HIV testing and health education that are given at these outreach clinics. Gavi (2017) recommends that integrated programs offer opportunities for other age-relevant services such as de-worming and nutritional supplements. This integrated approach presents an opportunity to reduce the cost and burden on health systems of delivering separate interventions.

The cold chain (fridges, thermometer, vaccine carriers, and storage space) and the infrastructure can be inadequate and a challenge in delivering vaccines. A study by Wigle *et al.*, (2013) elaborated that infrastructure for the delivery of the HPV vaccine if lacking can be a huge challenge to the health care managers. However, cold chain may have been found to be better due to the continuous support of the United Nations children's fund (UNICEF) and Gavi support to the Expanded Program on Immunization in many counties in Kenya.

The similarly striking low rates of HPV vaccination in a study among Cambodian American teenagers highlighted the need to improve vaccination outreach according to Lee *et al.* (2016). These findings are similar to a study findings by Wigle *et al.* (2013) that suggests that developing a targeted public health HPV vaccination programs for various geographical groups, will reduce cervical cancer disparities. Outreach clinics are suitable, particularly for children out of school.

Another important issue is the Covid 19 challenging the health system. In Kenya, when COVID 19 pandemic that struck in the early months of 2020 it necessitated prolonged school closure and also caused significant disruption to health service delivery. Immunization services were especially hard hit as priority shifts necessitated by the COVID-19 pandemic response resulted in a number of counties postponing some scheduled immunization activities such as polio and Measles/rubella campaigns. Faced with the dire threat of reversal of the gains made in raising HPV vaccine coverage, the ministry of health through the National Vaccines and Immunization Program embarked on conducting HPV vaccine catch-up through outreach programs that were conducted in open spaces in-line with COVID 19 infection control protocols. However, the uptake of the vaccine was not an increase for stigma of Covid 19 in the community.

HEALTHCARE MANAGERS CHALLENGES FACE IN PROVIDING HPV VACCINES

Despite health system related challenges and personal characteristics that affects the uptake of HPV vaccination, health care managers face a number of other numerous challenges as well.

Poor health caregiver-child communication, low knowledge on HPV vaccination, higher caregiver stress, lower caregiver quality of life and worse caregiver cognitive functioning, poor and weak management styles, absence of logistics, absence of infrastructure and logistics, weaker policies on vaccination, absence of finance to drive the whole exercise strategies and activities and weaker community participation and relationship with health care system and other institutions are all factors that can affect the adolescent adherence to health behaviours. A recent HPV vaccine acceptability study highlighted the importance of health caregivers in adolescents' willingness to be vaccinated. Managers need to work together with health care givers to ensure all are in place for efficient vaccination. Researchers found that female health caregivers' in HPV vaccination acceptability was associated with vaccine acceptability for the girls as were maternal beliefs about their girls are likelihood of getting HPV and need to be served by other females.

Health workers care managers and health care givers should then undergo training including interpersonal communication (IPC) training, training to identify and address the special needs of adolescents beyond vaccination, and have ability to provide and access to HPV vaccination materials they can provide to female children and would learn from, and they can use to teach others to include a leaflet, a frequently asked Questions list, and a poster with images and simple phrases about HPV vaccination and its importance.

The literature and findings from many studies have provides that many challenges especially in the health systems, managers and personal characteristics exist globally but little is known how these three elements in Embu County, Kenya which the study will investigate.

Chapter 2 in the literature review II will elaborate on the frameworks to include the model of health behaviour that have greater influence in the uptake and adherence to an HPV vaccine.

CONCEPTUAL FRAMEWORK FOR HPV VACCINE UPTAKE

According to WHO (2020), HPV is the main cause of cervical cancer. There are 528 000 cases of cervical cancer diagnosed each year. Of the 266 000 women who die every year from cervical cancer in the world, the great majority live in developing countries. Low- and middle-income countries, where more than 85% of cervical cancer deaths occur, can particularly benefit from HPV vaccine. Accordingly, by the end of 2015, more than 65 countries introduced national HPV vaccine programmes and a number of others had or planned to introduce pilot or demonstration programmes. The pace of introduction in low-income countries eligible for support from Gavi, the Vaccine Alliance, is increasing (WHO, 2018). More than 30 countries are approved presently for GAVI-supported demonstration programmes and national introductions. Increasing HPV vaccination rates in girl adolescence requires identifying the unique factors affecting girl adolescent HPV vaccine initiation and establishing public health policies accounting for those factors.

Despite the radical measures, a report by Bruni, *et al.*, (2021) posits that the HPV vaccine uptake in stands at 3% against a 51% target. The Human Papilloma Virus (HPV) vaccine is considered one of the greatest pharmaceutical innovations that is postulated to eradicate HPV among women. However, recent studies have demonstrated that there is an inequitable distribution, access, and uptake of the vaccine globally. Moreover, studies have demonstrated that vaccine implementation faces multiple barriers that include poor delivery infrastructure, poor community engagement, vaccine costs, inadequate knowledge, and lack of early screening tools. High vaccine prices coupled with recent supply challenges have significantly constrained the ability of many countries to introduce the HPV vaccine into national immunization programs and to ensure sustainability of current programs.

According to WHO (2010), cervical cancer is the fourth most common cancer in women with more than 85% of the burden in developing countries and the majority of cervical cancer mortality occurs in developing countries, where screening and optimal treatment are not adequately available. Cancer of the cervix constituted 22.2% of all cancers among women in Sub-Saharan Africa in 2012 according to Anorlu (2008). In Uganda, cervical cancer is the number one cancer killer disease among women; this is followed by breast cancer Mutyaba *et al* (2009). With the incidence standing at 52 /100,000 women of reproductive age, it is one of the highest globally. Regrettably, more than half of these women die every year according to WHO (2012) and Parkin *et al* (2010). According to Parkin *et al* (2010) and in Uganda alone,

Kampala cancer registry shows that Uganda has an age standardized incidence rate of 47.5 per 100,000 against the global estimate of 15.8 per100, 000 that is extremely high. Many of the cervical cancer cases present with an advanced stage of the disease that cannot be easily managed therefore vaccination for prevention of this is important and need to be promoted.

Providing the Human Papilloma Virus (HPV) vaccine is aimed at primary prevention against cervical cancer so that there is no risk of infection progressing to cervical cancer later in life, because HPV is responsible for almost 90% of cervical cancer cases according to WHO (2012). It is estimated that the HPV vaccine will reduce deaths from cervical cancer by two-thirds if uptake reaches 80% (Boyce and Holmes, 2012). Two vaccines to prevent HPV infection, the cause of cervical cancer, are now approved for use in over 120 countries. This has created an opportunity to greatly enhance prevention of cervical cancer. The HPV immunization program is expected to have a significant impact on public health; however, challenges exist with delivery of the vaccine to adolescents aged 9 to 15 years that is the recommended population for HPV vaccinations by the World Health Organization (2009). This is because routine immunizations in most national programs target children younger than 5 years of age according to Grace (2006), Kharbanda, and Kahn (2010).

Frequently, these acceptability studies apply (health) behaviour theories that include a variety of factors (e.g. attitudes, beliefs, perceived barriers) which are believed to influence the uptake of vaccines and other services likelihood of a certain action according to Brewer and Fazekas (2007) and Allen *et al* (2010). Therefore, by investigating these theories' constructs, researchers aim to identify determinants of vaccine uptake and refusal to incorporate them in vaccination strategies. An example of such theory is the 'Health Belief Model' (HBM), an established model often used to identify determinants of vaccination behaviour (Gerend, 2012). The original HBM according to Rosenstock (1974) indicates that in order for an individual to take action (e.g. to vaccinate a daughter or receive HPV), this person would have to (1) perceive the disease at least as 'moderately severe'; (2) perceive a susceptibility or vulnerability to the disease; (3) believe that there are benefits in taking the preventive action; and (4) not perceive major barriers obstructing the action. According to the theory, the likelihood to action increases when the perceived benefits outweigh the perceived barriers. Additionally, the HBM according to Rosenstock, Strecher and Becker (1988), Champion, and Skinner (2008) is often extended with two more constructs: (5) self-efficacy, indicating the 'expectancies about one's own competence to perform the behaviours' and (6) cues to action (CTA), i.e. 'the specific stimuli necessary to trigger the decision making processes.

Brewer *et al.* (2007) and Cunningham *et al.* (2014) have reviewed HPV vaccine acceptability studies focusing on the HBM constructs in the USA and Africa respectively. The former review included twenty-eight studies, the latter fourteen (among ten countries). Perceived susceptibility reported in African studies was not always high that might have been caused by misunderstandings such as believing the disease is inherited. In general, own risk was considered lower

than a daughter's risk of HPV infection or cervical cancer. While studies in the USA revealed a positive relation between susceptibility and acceptability. Cunningham *et al.* (2014) reported either no correlation or also a positive one. Among all studies, the majority of the participants agreed that cervical cancer is a serious illness (perceived severity).

While two studies, in Botswana and Ghana according to DiAngi *et al.* (2011) and Coleman, Levison and Sangi-Haghpeykar (2011) suggested that they detected an association between HPV vaccine acceptability and perceived severity, the other studies were not conclusive. Perceived effectiveness of the HPV vaccine was the main benefit investigated while in terms of barriers cost and safety concerns were discussed, among others. The link with acceptability remains again unclear for both constructs: reported barriers do not necessarily deter acceptability and trusting the vaccine's efficacy does not always lead to higher willingness to vaccinate. Finally, cues to action indicated by American studies included physician's recommendation and school requirement, and although this was only reported by few studies, a positive association with acceptability was found (Brewer and Fazekas, 2007). In the African studies, cues to action also enclosed endorsement from the government and acknowledgement by community members (associations with acceptability were not investigated) according to Cunningham, Davison and Aronson (2014). In general, both reviews showed that the HBM constructs influence people's willingness to vaccinate against cervical cancer. However, they do caution for overreliance on the results: since almost all studies included were cross-sectional, no causal relations could be identified (Brewer and Fazekas, 2007).

It is generally agreed upon that there is a need to further test health behaviour theories as to justify their use in promotion and vaccination interventions and to verify their applicability in different settings. It is known that the utility of the HBM varies according to the type of behaviour that is predicted (preventive versus curative) and the health condition to be tackled (prevalence, morbidity and mortality of the disease in the study setting). Furthermore, according to Weinstein (2007) and Noar and Mehrotra (2011), cultural or socio-demographic variables might affect the predictive value of the model.

According to Janz and Becker (1984), the socio-demographic characteristics can have both direct and modifying effects on the (associations between) HBM constructs. With regard to HPV vaccination, characteristics such as cervical cancer knowledge, age of the daughter or conservative thinking often affect acceptability (Allen *et al.*, 2010). However, there is no clear description on which are most important and there is no agreement on how such personal characteristics fit the HBM (e.g. directly, mediated, or moderating effects).

Similarly, cue to action (CTA) are poorly studied. In theory, two types are distinguished: internal cues, such as symptoms, and external cues, such as advice from others or a promotional campaign. While these conventional definitions seem straightforward, measuring CTA remains a challenge given that "a cue can be as fleeting as a sneeze or the barely conscious perception of a poster" according to Champion and Skinner (2008). In addition, to truly be a factor that influences

behaviour, the trigger does not only have to reach the person, it also needs to prompt adoption of the behaviour. So depending on an individual's perception, a certain cue might be interpreted as a trigger or not. Therefore, we propose to include a personal assessment of a cue such as promotion, expanding CTA to receiving and personally evaluating the motivator, e.g. by using the questions 'did you receive an invitation for the cervical cancer vaccination program?' and 'did you feel well informed?'

Additionally, another point of discussion about the operationalization of the HBM is the outcome measure according to Brewer and Fazekas (2007) and Allen *et al.* (2010). While the original HBM had actual behaviour as outcome (e.g. vaccine uptake'), many studies apply the HBM to identify factors influencing acceptability or intention, considering these intervening variables as a precursor of behaviour. However, attitudes and intentions do not always translate into health behaviours. Research should therefore not only include antecedents but also the actual behaviours as to distinguish factors that influence willingness versus those that inhibit or drive true behaviours.

Moreover, theories should be tested through longitudinal studies in which the influence of past behaviours – often the biggest predictors of future behaviours – is, if possible, excluded according to Weinstein (2007), Noar, and Mehrotra. Given that HPV vaccination in Kenya is not yet widespread, a pilot vaccination program offered the opportunity to measure the predictive value of the HBM constructs in this context and to explore the additional value of innovative variables

Moreover, the theories of health behaviour can offer *a priori* predictions about beliefs likely to influence uptake and adherence to an HPV vaccine. According to Were *et al.* (2009) and Williams *et al.* (2009), models have been successfully used to better understand and explain both health promotion behaviours and illness prevention behaviours. To inform future research on HPV vaccination, we developed a theoretical framework to organise potential determinants of HPV vaccine uptake and adherence behaviour. Our framework, which we are titling 'The Vaccine Perceptions, Acceptability and Adherence Model' is based on a systematic review of the literature focussing on vaccine acceptability and uptake, using theory to identify predictors of HPV vaccine uptake and adherence, emphasising the populations most affected by cervical cancer.

We have based our approach of adapting conceptual models to new cultural settings on the heuristic model advocated by Ware *et al.* (2009) who suggest that adapting a model to a new setting based on empirical research will lead to more effective public health interventions than creation of a *de novo* model. The framework displayed here is intended to act as a first step towards improving vaccine adherence research, particularly in regions of the world where STIs are endemic. Further formative research and testing is necessary to refine this model, in order to identify which, if any of these constructs drive behaviour.

For the literature review, the author searched PubMed/MEDLINE and other scholar google based electronic databases from 1995 to 2022 (the approximate time frame during which HPV was known to cause cervical cancer), as well as electronic conference proceedings of the recent HPV

related conferences, for articles related to HPV vaccine uptake and adherence. The focus was on likely challenges faced by health care managers on HPV vaccination uptake, health care system related factors related to HPV vaccination uptake challenges and personal characteristics barriers. The author further searched the reference sections of included articles and acknowledged them.

In addition, given the limited number of articles available discussing HPV vaccine adherence, we decided to expand our search and look at models of understanding uptake of vaccination as a concept, via a review of medication adherence literature. While this uncovered an extensive amount of literature, we ultimately felt that adherence to a preventive measure such as vaccination was too different from treatment adherence like in the case of HIV medication. The author therefore only included one reference in the text to medication uptake – specifically showing that uptake, as a general concept, can be challenging in adolescents. Inclusion criteria for our searches were an examination of awareness, knowledge or attitudes related to HPV vaccine uptake, and reporting original data in English.

By using these search terms, we generated over 400 research papers. We focussed on how factors such as acceptability, awareness, knowledge and beliefs (of both the female adolescents, health care managers and the health caregiver) influenced actual behaviour in the later years of our search. We then considered descriptive, methodological and contextual factors from each relevant study to gain an understanding of what research has already been done in this field. We identified key themes (discussed below) through this literature relating to factors influencing uptake and adherence of the HPV vaccine.

For health belief model constructs, the researcher examined literature from both clinical psychology and public health, focussing on a range of validated models that have been developed over the past several decades that have been used to elucidate the interactions of variables affecting individual health-seeking processes (Fishbein and Azjen, (1975) and Bogart, and Delahanty (2004). Research driven by socio-behavioural theory has been previously used to examine adherence, with the added dimension of personal history with the vaccine (e.g. side-effects associated with the first dose, cost of the first visit) and the health care system, as well as the evolving community beliefs regarding perceived risk of disease acquisition and perceived risk and effectiveness associated with the vaccine.

The review emphasises the Health Belief Model (Becker 1974). The constructs in this model includes perceived risk, perceived effectiveness of the vaccine, perceived barriers to vaccine uptake and adherence, and cues to action (situational factors that trigger one to get vaccinated or adhere to a vaccine regimen) – have been previously shown to be important predictors of vaccination.

While behaviourist models of health seeking, such as the Health Belief Model, are highly relevant in the context of immunisation uptake, they can neglect the complex relationships among individuals, sociocultural and political-economic conditions. This potential shortcoming is of particular relevance in resource-limited settings where perceptions of vaccines (and of health care systems, in

general) may be very different from a Western context, where behaviourist theories originate and where individualistic factors are emphasised. An integrated and dynamic framework that recognises both the cultural and economic forces at play is therefore required to analyse HPV vaccine uptake and adherence in resource-limited settings

The health belief model according to Brewer and Fazekas (2007) incorporates information from our literature review as well as the theories mentioned above, recognising that HPV vaccine acceptability and adherence are shaped by structural and sociocultural factors that inform both the individual adolescent and her caregiver – influencing the perceived risk of disease acquisition and perceived effectiveness of the vaccine. Barriers to vaccine acceptability, along with cues to action (which we term ‘facilitators’), will affect vaccine uptake. In the case of vaccine adherence, both the adolescent and caregiver’s experience with the first point of care, along with evolving community beliefs about the HPV vaccine, involve an additional step, with a new set of barriers and facilitators to adherence behaviour that is informed. This is framed within an environmental context that informs decision making for both the adolescent and the caregiver.

A brief illustrative example demonstrates the model. Information sent to an adolescent regarding an HPV vaccine as part of an educational campaign can influence both perceived risk and perceived effectiveness of a vaccine. Factoring in the youth’s past behaviours, particularly the level of engagement with the health care system and her history of vaccinations, along with sociodemographic factors and social norms, both barriers and facilitators to vaccine initiation are generated. In low-income settings, it is important to recognise that structural factors, such as costs related to this vaccine and transportation to get to the clinic, may trump the individual’s ability to initiate vaccination, even if perceived effectiveness of the vaccination is high. These factors continue to influence vaccine adherence, with the added dimension of personal history with the vaccine (e.g. side-effects associated with the first dose, cost of the first visit) and the health care system, as well as the evolving community beliefs regarding perceived risk of disease acquisition and perceived risk and effectiveness associated with the vaccine.

Both individual and caregiver factors are essential in a vaccination targeting adolescents. The author has therefore indicated an ongoing exchange between these two as part of the process of both vaccine initiation and vaccine adherence. Caregivers’ perceptions of cervical cancer severity, along with their beliefs regarding the likelihood of HPV acquisition, are weighed against perceived barriers to HPV vaccination, stigma associated with discussions relating to sexuality and concerns about vaccine side effects. These beliefs are connected to a caregiver’s trust of the health care system in general, and trust in vaccinations as effective prevention strategies. The caregiver’s impact on the ultimate decision to vaccinate will likely correlate with his or her relatedness to the adolescent and to the daughter’s health care provider, and feelings about the daughter’s current or future sexuality.

Adolescent-specific factors, including developmental factors, may also affect vaccination. While a lack of executive function may falsely lead to feelings of immortality and therefore a diminished desire to obtain a vaccine, other factors

such as high self-esteem and high self-efficacy may increase health-seeking behaviour and likelihood of vaccine initiation. According to Sales et al (2008), the adolescent's mental health and social support are both important factors in behaviours associated with prevention of STIs. Both the caregiver's and adolescent's beliefs about vaccine safety, along with knowledge of HPV and disease acquisition, will probably be informed by the environmental context. Message framing (gain v. loss or STI protection v. cervical cancer prevention) is an essential component of the environmental context and has been known to influence the intention to receive the HPV vaccine (Gerend and Shepherd, 2007). In addition, the media is an important component of the external environment that influences HPV vaccine uptake, and the tone (supportive of the vaccine v. alarmist) taken in the lay press can have a significant impact on vaccine acceptability (Hilton *et al.* 2009 and Abdelmutti and Hoffman-Goet (2009). These factors are displayed in our model below. This model is intended to act as a first step towards improving vaccine adherence research, particularly in regions of the world where cervical cancer rates are high. Further formative research and testing is necessary to refine this model (Fig.2.1) in order to identify which, if any, of these constructs drive uptake adherence, particularly in developing

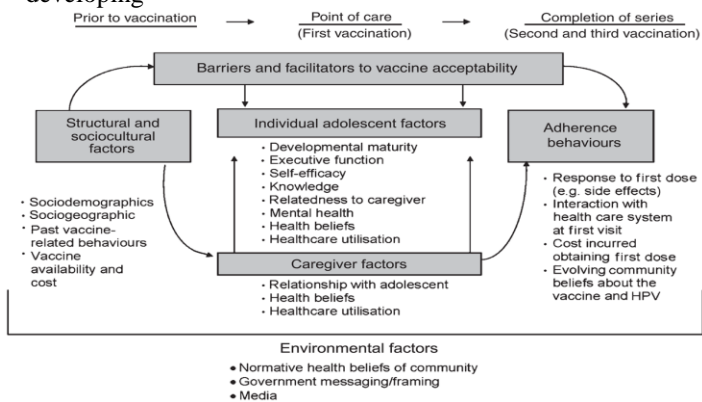
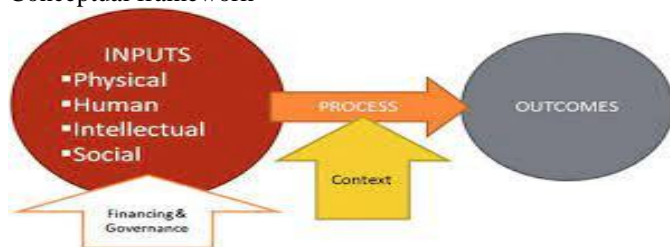


Figure 2.1: the Vaccine Perceptions, Accountability and Adherence Model

Conceptual framework



Source: Author (2022)

Figure 2.2: Conceptual framework

The works from other researcher's highlights that various challenges in HPV vaccination uptake by the health care managers, have been proposed, and implemented measures to address these challenges. Whereas literature indicates the health care managers challenges that influences the uptake HPV vaccination in Embu County and this study will undertake to identify about the challenges. Thus, there exists a knowledge gap on this subject, particularly in Kenya and in Embu in particular.

Nevertheless, Vaccine hesitancy was also witnessed among the health care workers, many of whom belong to various religious faiths that were responsible for propagating negative sentiment regarding the HPV vaccine. Their lack of confidence manifested in a reluctance to actively promote the vaccine to eligible girls, failure to provide enquiring parents with correct information on the risks and benefits associated with HPV vaccination; choosing to vaccinate girls whose parents expressed minimal hesitancy and therefore consented fully to vaccination.

Moreover, barriers of vaccines the four most common reasons or barriers for low uptake of HPV vaccination as reported by the respondents were as follows: insufficient information about the vaccine, safety concerns, expensive cost, and the fact that they do not know where to get the vaccine according to Ogochukwu *et al.*, (2017). The reasons for none uptake of the vaccine (safety concerns and high cost) is similar to that reported by a study conducted among HIV positive women in Nigeria who stated safety concerns (24.4%) and expensive cost of the vaccine (19.5%) as the reasons for failure of uptake of HPV vaccine according to Nyengidiki, Durugbo and Oranu (2016). Another study among adolescents in Nigeria reported that 62% of the respondents stated expensive cost for non-uptake of HPV vaccine (Ogochukwu *et al.*, 2017).

Similarly, a study among mothers of adolescents in Lagos state by Nyengidiki, Durugbo and Oranu (2016) found that most (96.5%) of the respondents reported that they would want more information HPV and its vaccine which corroborates a similar barrier in this study which reported respondents need for more information. More so, a study done among female Iranian nurses by Mojahed *et al* (2013) reported that inadequate knowledge of HPV vaccine (26.2%) and safety concerns (41.4%) were the major reasons for unwillingness to be vaccinated, which is consistent with findings in this study where respondents stated the need for more information before becoming vaccinated and safety concerns as barriers to vaccination. Generally, studies have reported the most common barriers to uptake of HPV vaccination were mostly insufficient information about and high cost of the vaccine. These barriers can be overcome by target interventions aimed at increasing knowledge of HPV vaccine among young persons and vaccination subsidization in Kenya.

JUSTIFICATION OF THE STUDY

Despite the severity of cervical cancer and the mitigation strategies offered by governments in LMICs, there exists a dearth of studies that explain the challenges the health care managers have in the low uptake of HPV vaccination services in these countries. Different empirical and anecdotal studies have cited different determinants of this low uptake citing healthcare leadership as the core challenge. Other studies have identified logistical, financial, human resources, and social challenges. Owing to the scarcity of information on the topic, this study seeks to assess the influence of leadership on the delivery of essential healthcare services using HPV vaccination as a case study. The study findings therefore will enable the stake holders determine the main issues in HPV vaccination uptake and shed light on improving the HPV

vaccination uptake. Next chapter will be the methodology of how this study will be carried out and this study will follow use apply mixed designs.

III. METHODOLOGY

A. INTRODUCTION

The chapter explains the research design, the target population, sampling design, and sample size that were used in the study. It further presents data collection techniques, how validity and reliability will be achieved, the research instrument that will be employed, the ethical considerations, and how data analysis is conducted.

B. RESEARCH DESIGN

The study will utilize multiple research designs involving both qualitative and quantitative approach. This study will utilize both in collecting data, analysing, presenting and discussing the findings. This research design is considered appropriate because it shows an in-depth analysis to describe the correlation existing in the autonomous variables. According to Colorafi and Evans (2016), this design does not manipulate variables or arrange for events to happen. A research design that utilizes a mixed design both qualitative and quantitative data and research is referred to as mixed research design. By using this approach, reliability is improved (Kaur, 2016) and use of an advanced point of view to the research questions Tariq and Woodman (2013).

Furthermore, mixed designs addresses study questions and theoretical perspective at different levels that complement the strengths of a single design and overcome the weaknesses of a single design. Therefore, the mixed designs outweighed a single research design because they are easier to describe and are helpful in designing and validating study instruments according to Biddix (2016). The quantitative method moreover, measured the determinants of human resource management practices that influences the performance of nurses in Turkana county Kenya by using numerical data and the study applied positivist epistemology approach that assumes that there is an external objective reality that can be measured without influence of the researcher (Naidoo and Wills, 2009).

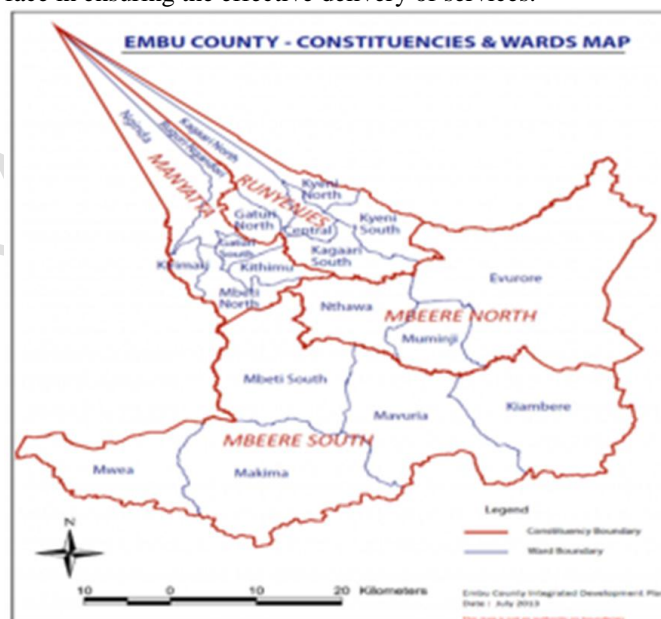
Whereas the Inductive research strategy can be used to answer 'what' questions and the deductive and retroductive strategies can be used to answer 'why' questions according to Dubois and Gadde (2002), Wagesho, and Jain (2013). This study applied abductive strategy can answer both types of questions. Mixed methods research according to Modell (2010) explicitly examines the social within the economic in order to demonstrate a mutual exchange of ideas between sociology and economics. An abductive research approach seemed most suitable given the nature of the research objective. Unlike inductive and deductive reasoning, abductive research can explain, develop or change the theoretical framework before, during or after the research process (Dubois and Gadde, 2002). In fact, abductive research according to Friedrichs and Kratochwil (2009) moves back

and forth between inductive and open-ended research settings to more hypothetical and deductive attempts to verify hypotheses. Accordingly, abductive reasoning consists of a pragmatic approach to advancing the social sciences through a process of systematic combining in academic research.

Other methods and methodologies to include interview will be rejected from the research because conducting interview studies can be very costly as well as very time-consuming, Interview studies provide less anonymity, which is a big concern for many nurses' respondents and can cause biases. Therefore, the study will adopt a cross-sectional descriptive study on healthcare leaders and will assess challenges faced by healthcare managers in ensuring effective HPV vaccine uptake among women of reproductive age. The study will employ the use of a structured quantitative.

C. STUDY AREA

The study was be conducted in Embu County in Kenya. Embu County. The study will sample health managers at different levels of care i.e. Level 3, 4, and 5 health facilities. Its primary focus will be on the enablers and challenges they face in ensuring the effective delivery of services.



Embu County 0.6560° S, 37.7238° E

D. TARGET POPULATION

Regnault (2017) suggests that a total population whole group of individuals having a common attribute. The study will target all consenting healthcare managers within the county health facilities and leaders at the county health headquarters.

E. INCLUSION CRITERIA

- The study will collect based on the listed criteria:
- ✓ All willing healthcare managers working within Embu county's levels 3, 4, and 5 will be interviewed.
 - ✓ Managers who have been working in the management capacity for more than 6 months.

- ✓ All managers with a permanent government contract.
- ✓ Managers who will provide their consent to be part of the study.

EXCLUSION CRITERIA

- ✓ All managers working in Embu county as levels 1 and 2 facilities
- ✓ All healthcare managers working for non-governmental health facilities
- ✓ Those managers who are on leave, training student's managers regardless of whether basic training or post basic training.

F. SAMPLING PROCEDURE

Sampling according to Suresh, Thomas and Suresh (2011) form a process whereby a certain number of observations are used as a representation of the larger population. Mugenda and Mugenda (2010) indicate that 10% to 30% of the population is considered an adequate sample for a research study. The study areas had close to 235 health care managers and this research therefore used 30% in order to come up with a large enough sample to justify generalizability of findings. In this study, 70 participants will be selected purposely from the sample health managers at different levels of care i.e Level 3, 4, and 5 facilities. A simple random sampling technique will be used to get the study participants. The purposively selected respondents will then be taken through a study briefing to help them understand the rationale, the gains, and the challenges of the study before consenting. Upon consenting, the questionnaire will be issued to the study respondents. A purposive sampling method will be used on the Key Informants of the study. The study will employ a census sampling method on all the healthcare managers working in the three levels of care.

G. Instrumentation

Primary data will be collected using self-administered questionnaire (Annex 1) As Dell-Kuster *et al.* (2014), point out questionnaires are regarded effective tools that are used to conduct research. Structured questionnaires are cheaper compared to other methods and enables researcher collect extensive information. The study collected primary data from the research study sites with the help of questionnaires. Primary data at research site according to Wagesho, Goel, and Jain (2013) do capture information that is right at the study place with guaranteed quality and appropriate for the research objective.

Quantitative data will therefore be collected using a structured questionnaire that will contain standardized questions developed by the researcher. These questions will be responsible for measuring challenges faced by healthcare managers in the running of the health systems. The questions will use HPV Vaccine administration as a guide to understanding these challenges and some of the correlates to these challenges.

H. PRETESTING

Pretesting of the instrument was done to ensure that the questions are relevant, and clearly understood by the respondents. Pretesting will be done in Meru County two weeks before actual data collection (Outside Embu County) to determine the reliability research tools. Thirty questionnaires (30% of the actual sample size) were administered after which they will be edited and reliability test performed. This sets a minimum criterion of 10% necessary for pretesting a tool.

I. RELIABILITY

Yin, 2014 explains reliability refers to the extent at which a research instrument produces reliable results after repetitive tests. A pilot study will be conducted to test the reliability of the questionnaires. Based on the findings of the pilot study, reliability coefficient will be evaluated through a Pearson's Product Moment Correlation Method whereby a reliability coefficient of at least 0.75 implied of a highly dependable instrument. Mugenda and Mugenda (2010) in their research, argue that reliability coefficient varies between -1.00 and +1.00 with reliability of 0.75 and above indicates perfect reliability and 00 indicating no reliability, -1.00 to 0 show negative reliability. The researcher used the Pearson correlation – SPSS 26.

J. VALIDITY

Data collection instrument validity will be done via face validity, and pretesting the content from the experts.

K. METHODS OF DATA ANALYSIS

Quantitative data collected from the respondents will be de-identified and entered into a computer software for analysis. Data collected will be analyzed using the Statistical Package for Social Studies (SPSS Version 26) software. Data will be stored in electronic formats. Files containing the data will be password encrypted. This storage will be maintained before and after analysis. Once collected, data will be entered, checked, edited, cleaned, coded, backed up, and organized accordingly. After editing, variables of interest will be presented for analysis, categorization, ordering, manipulation, and summarizing guided by the research questions.

The study population will be characterized using a descriptive analysis of variables. A 95% confidence interval (CI) will be used to measure the level of significance. Categorical variables will be summarized using proportions and counts while continuous variables will be summarized using means, medians, and interquartile ranges. Stratified univariate analysis by age group and sex will be performed. Mean age with standard deviation and discrete age will be categorized accordingly. Chi-square tests will be used for the comparison of categorical data.

Inferential statistics will be done using multiple binary logistic regression. Univariate logistic regression will be used to identify factors associated with leadership challenges. It will also be used to estimate odds ratios (ORs) with a 95% confidence interval. The bivariate analysis will be conducted

to determine the association between independent variables and outcome variables. Factors with a significant p-value (≤ 0.05) will be included in the multivariable analysis.

L. ETHICAL CONSIDERATIONS

Upon successful defense of the proposal, an ethical clearance certificate will be requested from the University Ethics and Research Committee. Upon getting the ethical clearance, a research permit will be sought from the National Council for Science and Technology (NACOSTI) in Kenya. With both the ethical approval and research permit, the researcher will obtain a letter from the university introducing him to the facility and the need for the student (Principle Investigator – PI) to conduct the study. Upon facility approval, the principal investigator will approach study participants, introduce the study, the rationale behind it, the benefits, setbacks, and benevolence of the study.

Respondents will be clearly explained about the study and it will be made clear that it is voluntary with the respondent having the right to decline or withdraw. A written consent form will be presented to the study participants by the principal investigator or a trained assistant. Anonymity will be ensured throughout the study, as participants will not write personal information on the questionnaire. The names on the consent form will not appear in the study and all personal identifiers will be handled with a high level of confidentiality and only accessible to the primary investigator, assistants, and authorized persons. All personal information will be destroyed after

M. METHODOLOGY LIMITATION

The following were the limitations encountered in the field while collecting the data; Data collection will be done close to the August 2022 Kenyan general election period where the political temperatures are getting higher in Embu County and there is always suspicion of taking political information and the researcher, therefore with the help of the authorization letter from NACOSTI will assure the managers that the information was purely for academic purposes and most of the information they will provide will be kept confidential. Furthermore, Embu County occupies an area of 2,821 km with 157 distant health facilities of from each other. The researcher took the purposive sampling in order to capture the whole areas.

IV. FINDINGS / ANALYSIS / DISCUSSION

A. INTRODUCTION

This chapter presents the results, analysis and discussions of the research findings. Research findings in this case comprise the response rate, results on socio-demographic attributes of respondents and outcomes on the study elements. The research results are presented in form of tables and figures

B. RESPONSE RATE

Seventy health care managers from level 3 to 5 hospitals took part in the research survey and it represented a maximum of 100% response that is more than what is recommended by Mugenda and Mugenda (2010) of 70% response rate to justify generalisation of the results.

a. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

This section entails the basic demographic profile of the health care manager's respondents, and their different qualifications roles and responsibilities of the respondents.

Variable	Category	Frequency	Percentage
Gender	Male	24	34
	Female	46	66
	Total	70	100
Age	Between 10 – 18	0	0
	Between 18 – 30	22	31
	Above 40 years	48	69
	Total	70	100
	Education	Certificate	10
Diploma		46	66
Undergraduate		12	17
Post Graduate		2	3
Total	70	100	
Residence	Urban	22	31
	Rural	48	69
	Total	70	100
Terms of employment	Contract	36	51
	Permanent	32	46
	Seconded	2	3
	Total	70	100
Marital status	Single	16	23
	Married	44	63
	Divorced	8	11
	widow	2	3
	Total	70	100
Religion	Catholic	37	53
	Protestant	18	26
	Muslim	12	17
	None	3	4
	Total	70	100
Do you have children	Yes	54	77
	No	16	23
	Total	70	100
If Yes :	Girls only	15	21

Boys Only	12	17
Both Boys and Girls	43	61
Total	70	100

Table 4.1: the demographic profile of the respondents

b. AWARENESS AND KNOWLEDGE OF HPV VACCINES

Variable	Category	Frequency	Percentage
Have you heard of HPV vaccination	Yes	70	100
	No	0	0
	Total	70	100
If Yes, what is the mode of transmission	Physical contact	0	0
	Aerosol /air droplet	0	0
	Sexual Intercourse	45	64
	Injections	15	21
	Kissing	10	14
	I don't know	0	0
	Total	70	100
What is the risk factor to HPV infection	Early sexual debut	42	60
	Obesity	0	0
	Smoking	0	0
	Multiple sexual partners	28	40
	I don't know	0	0
	Total	70	100
What mode of prevention of HPV infection are you aware	HPV Vaccination	32	46
	Condom use	12	17
	Regular HPV screening	16	23
	Abstinence	8	11
	I don't know	2	3
	Total	70	100
	Which of the following persons can be infected with HPV	Male	10
Female		40	57
Both		20	29
I don't know		0	0
Total		70	100
Is everyone	Yes	28	40
	No	10	14

infected by HPV going to have symptoms	I don't know	32	46
	Total	70	100
Will infection with HPV lead to cervical cancer	Yes	35	50
	No	15	21
	I don't know	20	29
	Total	70	100

Table 4.2: Knowledge about HPV and HPV Vaccination

C. DESCRIPTIVE FINDINGS

Variable	Category	Frequency	Percentage
Have you heard about cervical cancer	Yes	65	93
	No	5	7
	Total	70	100
Is cervical cancer one of the leading causes of cancer death in Women in Kenya	Yes	25	36
	No	45	64
	Total	70	100
Is Cervical cancer caused by HPV infection	Yes	45	64
	No	25	36
	Total	70	100
Is cervical cancer preventable	Yes	30	43
	No	40	57
	Total	70	100
If Yes , how can cervical cancer be prevented	Pap smear	10	14
	Vaccination	45	64
	Abstinence	6	9
	Condom use	5	7
	I do not know	4	6
	Total	70	100

Table 4.3: Personal characteristics effects on the uptake of HPV vaccines in Embu County, Kenya

Table 4.4: Health care Managers Level of knowledge and attitude towards HPV vaccination that influences the HPV vaccine uptake in Embu County, Kenya

Variable	Category	Yes	No
What is the HPV vaccines used for	Prevention of HPV infection	50	20
	Prevention of cervical Cancer	50	20
	Prevention of Genital warts	25	45
	Others	45	25
	Total		70

Variable	Category	Frequency	Percentage
Which age is/are eligible for HPV vaccines	26 and below	25	36
	Above 26	30	43
	I don't know	15	21
Total		70	100
Are you aware that all girls aged 10years are being offered HPV vaccines	Yes	56	80
	No	14	20
Total		70	100
If yes, how did you hear about it?	From fellow workers	10	14
	From the school	3	4
	From politicians	2	3
	From religious leaders	10	14
	On the Radio and Television	25	36
	From Health workers	15	21
Do you believe that your child is at risk of HPV infection	Yes	60	86
	No	10	14
Total		70	100
Do you believe that HPV infection is severe?	Yes	70	100
	No	0	0
Total		70	100
Do you believe HPV vaccine is effective	Yes	60	86
	No	10	14
Total		70	100
Do you want to be educated more on HPV	Yes	65	93
	No	5	7

Table 4.5: Recommendation for HPV vaccination

Variable	Category	Frequency	Percentage
Do you recommend that your child or	Yes	65	93
	No	5	7
	I don't	0	0

Variable	Category	Frequency	Percentage
Would you recommend the young girls (Below 10 years) be given the HPV vaccines	Yes	60	86
	No	10	14
Total		70	100

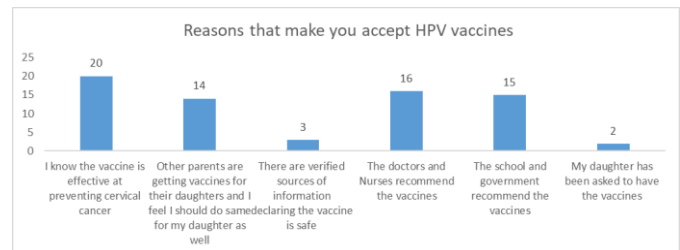


Figure 4.1: Reasons for acceptance of HPV vaccines

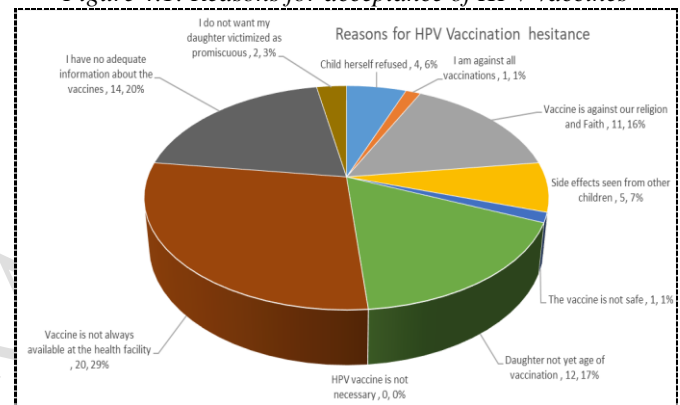


Figure 4.2: Reasons for Hesitance for HPV Vaccination

HEALTH SYSTEM CHALLENGES INFLUENCING THE UPTAKE OF THE HPV VACCINE IN EMBU COUNTY, KENYA

Indicate whether you agree or disagree	Agree	Disagree	Total
All girls aged 10 years should receive HPV vaccines	60	10	70
HPV vaccine is safe	65	5	70
HPV infection is common in Embu	55	15	70
I would like to know more about HPV vaccine	65	5	70
Girls aged 10 years should get educated about sex	40	30	70
HPV vaccine is effective in preventing cervical cancer	36	34	70
I will recommend the vaccine because I feel my daughter is at risk of getting HPV	56	14	70
I feel the vaccine will keep my child is safe from cervical cancer	45	25	70

I feel it is better to be vaccinated before becoming sexually active	55	15	70
The cost of the vaccine the vaccine discourages me from sending my daughter for vaccination	38	32	70
I will recommend to use the vaccine if it is available in the clinic to girls at a subsidized price	48	22	70
I feel only sexually active ladies should get the vaccine	56	14	70
HPV vaccine may have long negative effects on my child	47	23	70
More information on HPV and its vaccine will be needed before	60	10	70
I recommend the vaccine	68	2	0
HPV vaccination should be included on the National Program on immunization	65	5	70
Total	791	259	1050

Table 4.6: Indicate if one agrees with these statements or not related to HPV Vaccination

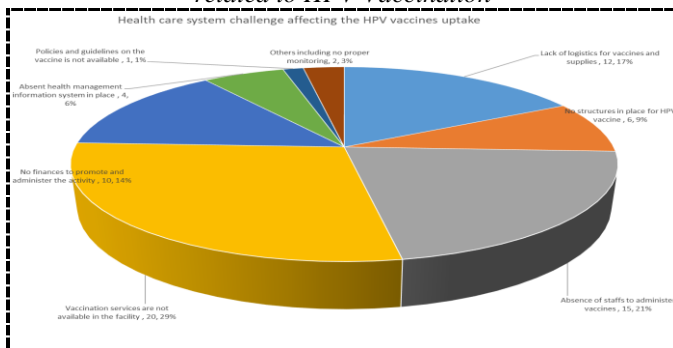


Figure 4.3: Health system challenges affecting HPV Vaccination uptake

When probed more on what can be done to increase uptake of HPV vaccines, the respondents mentioned of improving communication and or education the community on HPV and vaccination, ensuring the vaccines are available both at the health facility and in the outreach services, use primary health care structure and strengthening curriculum to health staffs on HPV and vaccination. On the challenges the managers face on the HPV vaccination uptake, the managers mentioned that the most common were absence of vaccines, poor community knowledge on vaccines and its importance, religious tolerance and pressure, redundant community culture and taboos not permitting children to go for vaccines, themselves not integrated in to vaccination practices and have low knowledge on HPV and shortage of health care staff.

The study collected data on the distribution of healthcare managers by gender, age, religion, marital status, if they have children or not and their level of education. The results in Table 4.1 above showed that most of the health care managers were females 46(66%), were of the ages more than 40 years (48, 69%), married (44, 63%), Catholics (37, 53%) and were employed on contract basis (36, 51%). Moreover, they had a

Diploma education and less had a postgraduate education (2, 3%) and were having children (54, 77%) and were mostly having either boys and girls children (43, 61%).

Table 4.2 indicates that all health care managers (100%) have heard of HPV vaccination, 45 (40%) believe that HPV can be transmitted through sexual intercourse with early sexual debut (42,60%) and having multiple sexual partners (28,40%) as the top risk factors to HPV infection. However, different mode of prevention of HPV infection known was multiple with many respondents suggesting use of HPV vaccination (32, 46%), having regular HPV screening (16, 23%) and condom use (12, 17%). Nevertheless, most of the health care managers believe that females (40, 57%) are the most affected and infected by HPV and do not know (32, 46%) if people infected with HPV exhibit some symptoms. At least 50% (35) of the health care managers believe that if any person is infected with HPV it can lead to cervical cancer.

A majority have heard of cervical cancer (63, 90%) but do not know (45, 64%) if cervical cancer remain one of the leading causes of cancer death in Women in Kenya. However, health care managers understand that cervical cancer is caused by HPV infection (45, 64%) and a majority think it is unpreventable (40, 57%). For those who mentioned that it could be prevented, a majority suggested of Pap smear (10, 14%), vaccination (45, 64%), abstinence (6, 9%) and use of condom use (5, 7%).

A majority of the health care managers in table 4.4 knows that HPV vaccines helps to prevention of HPV infection (50, 72%) and prevention of cervical Cancer (50, 72%) with a majority mentioning that the right age for administration of the vaccines is children of over 26 years (26 , 43%) and those below age of 25 years (25, 36%). Moreover, a majority are also aware that all girls aged 10years are being offered HPV vaccines (56, 80%). A majority believe that their children can be infected by HPV (60, 80%), HPV remain severe (100%), that HPV vaccines are effective (60, 86%) and would like to be educated more on HPV (65, 93%).

Table 4.5 indicate that 93% (65) have recommended that their child or relative receive HPV vaccine and further recommend that children below 10years to receive the same vaccine (60, 86%). The main reasons that enable the health care managers to opt for vaccination of their children in Figure 4.1 are that they believe the vaccine is effective in preventing cervical cancer (20%), doctors and nurses (16%) and Ministry of health or the government recommend for it and they have seen and heard other parents sending their daughters and children to be vaccinated.

Figure 4.7 indicates the reasons for non-uptake for vaccination to include vaccine not always available (20, 29%), they have inadequate knowledge about the vaccine to encourage their children to be vaccinated (14, 20%), child not yet at the age of the recommended vaccination age brackets (12, 17%), vaccine is against the religion (11, 16%) and seen side effects of HPV Vaccination from other children (5, 7%).

A majority of the health care managers agree in table 4.6 agree that all girls aged 10 years should receive HPV vaccines (60) ,HPV vaccine is safe (65), HPV infection is common in Embu (55), would like to know more about HPV vaccine (65), Girls aged 10 years should get educated about sex (40), HPV vaccine is effective in preventing cervical cancer (36)

recommend the vaccine because I feel my daughter is at risk of getting HPV (56), I feel the vaccine will keep my child safe from cervical cancer, feel it is better to be vaccinated before becoming sexually active (45), that the cost of the vaccine discourages me from sending my daughter for vaccination, recommend to use the vaccine if it is available in the clinic to girls at a subsidized price (48), feel that only sexually active ladies should get the vaccine, HPV vaccine may have long negative effects on my child (47). Moreover, more information on HPV and its vaccine will be needed before vaccination (60), that health care managers recommend for vaccination (68) of all children and HPV vaccination should be included on the National Program on immunization (65).

Figure 4.3 indicate the health care system affecting HPV Vaccination uptake in Embu to include HPV vaccination or supplies unavailable at the health facility (20,29%), absence of staff to administer vaccines (15, 21%), lack of logistics and supplies (12, 17%), absence of health management information system in place (4, 6%), absence of finance to buy vaccines and roll vaccination (10, 14%), absent structures in place for HPV vaccines (6,9%) and absence of policies and guidelines on vaccination (1,1%).

Furthermore, managers elaborated other challenges they face to include absence of HPV vaccines, poor health care staff, health care managers and community knowledge on vaccines and its importance, religious tolerance especially for catholic church that has been against vaccination and pressure, redundant community culture and taboos not permitting children to go for vaccines, themselves not integrated in to vaccination practices and have low knowledge on HPV and shortage of health care staff.

To determine health system capability to influence uptake of HPV vaccination, HPV and HPV vaccination knowledge of health care managers leading to the reasons accepting and refusal to HPV vaccination and its uptake, chi-square tests were conducted. Computed scores of the independent variables were related to HPV vaccination uptake

HEALTH SYSTEM FACTORS * WHY REFUSAL HPV VACCINES

Crosstab Count

	Why Refusal HPV Vaccines								Total
	HPV vaccine is not necessary	I am against all vaccinations	The vaccine is not safe	Children themselves refused	Side effects from other children	Daughter not yet vaccinated	Vaccine is against our religion and Faith	Vaccine is not always available at the health facility	
Health system factors on the vaccine is not available	1	0	0	0	0	0	0	0	1

Others including no proper monitoring	0	0	0	0	0	0	0	1	1
Others including no proper monitoring	0	0	0	0	0	1	0	0	1
No structures in place for HPV vaccine	0	1	0	0	0	0	0	0	1
No finances to promote and administer the activity	0	0	1	0	0	0	0	0	1
Lack of logistics for vaccines and supplies	0	0	0	1	0	0	0	0	1
Absence of staffs to administer vaccines	0	0	0	0	0	0	1	0	1
Vaccination services are not available in the facility	0	0	0	0	1	0	0	0	1
Total	1	1	1	1	1	1	1	1	8

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	56.000 ^a	49	.229
Likelihood Ratio	33.271	49	.958
Linear-by-Linear Association	.142	1	.707
N of Valid Cases	8		

a. 64 cells (100.0%) have expected count less than 5. The minimum expected count is .13.

Symmetric Measures

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Phi	2.646			.229
Nominal by Nominal	Cramer's V	1.000		.229
	Contingency Coefficient	.935		.229
Interval by Interval	Pearson's R	-.142	.328	.737 ^c
Ordinal by Ordinal	Spearman Correlation	.214	.450	.537 ^c
N of Valid Cases	8			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

REASONS ACCEPTING HPV VACCINES * WHY REFUSAL HPV VACCINES

	Why Refusal HPV Vaccines						Total
	I am against all vaccinations	The vaccine is not safe	Child herself refused	Side effects seen from other children	Daughter not yet age of vaccination	Vaccine is against our religion and Faith	
Daughter asked to vaccinate	0	0	0	0	1	0	1
There are verified sources of information declaring the vaccine is safe	0	0	0	0	0	1	1
Other parents are getting vaccines for their daughters and I feel I should do same for my daughter as well	1	0	0	0	0	0	1
The school and government recommend the vaccines	0	1	0	0	0	0	1
The doctors and Nurses recommend the vaccines	0	0	0	1	0	0	1
I know the vaccine is effective at preventing cervical cancer	0	0	1	0	0	0	1
Total	1	1	1	1	1	1	6

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.000 ^a	25	.224
Likelihood Ratio	21.501	25	.664
Linear-by-Linear Association	3.505	1	.061
N of Valid Cases	6		

a. 36 cells (100.0%) have expected count less than 5. The minimum expected count is .17.

Symmetric Measures

	Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.	
Nominal by Nominal	Phi	2.236		.224	
Interval by Interval	Cramer's V	1.000		.224	
	Contingency Coefficient	.913		.224	
Ordinal by Ordinal	Pearson's R	-.837	.085	-3.063	.038 ^c
	Spearman Correlation	-.429	.357	-.949	.397 ^c
N of Valid Cases		6			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Variable	Chi square value	df	P-Value	Cramer's V
Health care system related	56	49	0.229	0.229
Reasons for acceptance of HPV vaccines and why refusal HPV vaccination	30	25	0.224***	0.224

***Significant at 95% CL

Chi-square analysis in Table 4.8 showed a there was non-significant association of health care related factors and why refusal uptake of HPV vaccination ($\chi^2= 56.00$, $df=49$, $p=0.0229$, $v=0.229$) and between motivation for acceptance to vaccination and reasons for refusal uptake of HPV vaccination ($\chi^2= 30.00$, $df=25$, $p=0.025$, $v=0.224$). All the Cramer's V values were positive indicating that health system factors enhance HPV vaccination including an influencing performance of these factors on the HPV vaccination uptake.

This study result agrees that health care manager's influence on HPV Vaccination should be boundless and any challenges they face in local society need to be identified adequately and be dealt with appropriately in order to motivate to improve the vaccination. Vaccination of adolescent girls is the most effective long-term intervention for reducing the risk of developing cervical cancer. The great long-term benefit of HPV vaccination makes it important to initiate and sustain this approach in all countries. There is also strong evidence that high HPV vaccination coverage leads to protection of unvaccinated individuals through herd immunity, further enhancing the protective effect for the community.

Though a majority of the health care managers remained mature females that are considered good in human resource, administration and management of the health facilities in the context of Embu and well educated with Diploma, the study has identified that they have faced numerous challenges at different levels that have influenced that uptake of the HPV vaccine. Effective HPV vaccine health care Management is

important because it provides the platform needed to monitor and assess the vaccine supply chain system to identify strengths and weaknesses of the system at all levels to enhance the development of improvement plan to strengthen the system and ensure that uptake is improvement while working on all barriers to vaccination.

Health care managers will work ensuring HPV vaccines stock availability and help in managing the stocks this is because HPV vaccine stock management and procedure is a key component of the vaccine supply chain system, which seeks to ensure that vaccine handling, physical inventory, stock-control systems, stock-level management, good warehousing practice, and disposal procedures for damaged and expired vaccines are done in accordance to global standards. Furthermore, distribution of HPV vaccines between and within levels of the supply chain system seeks to ensure that the transportation of vaccines and other commodities are done in an effective manner, including the correct use of passive containers (cold boxes), appropriate packing practices, and maintaining transport contingency plans. This whole is done if good health care management is place.

Effective information systems and supportive health care management functions, including the use of standard operating procedures and supportive management functions are critical for effective functional of the HPV vaccination programmes and health care managers need accurate and timely information that allows them to verify vaccines and equipment needs, validate vaccine coverage, and identify weak links in the supply chain in order to develop measures to address these. Managers must learn how to make information available and use the information to forecast vaccine needs, allocate stock, manage staff and resources, modify delivery routes and frequencies, act rapidly where equipment becomes dysfunctional, and recommend policy changes.

Results showed that inadequate knowledge of HPV and HPV vaccination by the health care managers have contributed to the low uptake of HPV vaccines. Despite a good number of health care managers having heard about HPV and HPV Vaccines, most did not understand the mode of transmission and if cancer is the leading cause of Embu women, if cervical cancer is caused by HPV infection and cervical cancer can be prevented, do not know the age brackets of HPV Vaccination of children and the health care managers continue to stick to the idea of their religion affecting vaccination uptake. Lack of knowledge about the disease has a great impact on uptake of the vaccination and the kind of specific support the health care managers can or is ought to provide to the vaccination health team.

Low-income countries especially in Africa continue to have weaker health systems and weaker management of health care thus is contributing to weaker services provision especially all the six recommended building blocks for a strong system by WHO, these results suggest that there have been unavailable of HPV vaccination or supplies at the health facility, inadequate knowledge about the vaccine to encourage their children to be vaccinated, absence of staff to administer vaccines, lack of logistics and supplies, absence of health management information system in place, absence of finance to buy vaccines and roll vaccination, absent structures in place

for HPV vaccines and absence of policies and guidelines on vaccination. All these barriers reduces the uptake of vaccines.

Moreover, other barriers identified with HPV vaccination from health care managers included lack of awareness, lack of perceived risk for cervical cancer, cost, lack of parental support, inconvenience of getting the vaccination, stigma associated with connection with sexual activity, and concern regarding safety.

The study further identified other barriers to include lack of awareness, lack of perceived risk for cervical cancer, cost, lack of parental support, inconvenience of getting the vaccination, stigma associated with connection with sexual activity, and concern regarding safety. Other facilitators to low uptake of HPV vaccination if no proper leadership and health care management identified by the study included parental encouragement, protection of one's health, lack of logistical barriers, and perceived safety and efficacy of the vaccine. The study agrees with the respondent's participants recommendation that increasing awareness of HPV vaccination and cervical cancer, reducing cost of vaccination and making the vaccine compulsory to increase vaccine uptake. Furthermore, public education on cervical cancer and the vaccine should be stepped up to increase public awareness. A school-based national vaccination programme need to be proposed by the target group to increase the rate of uptake of HPV vaccination in Embu.

The study finding further reveals that there is low understanding of HPV vaccination safety and the link between the HPV vaccine and sexuality, there are a lot of misinformation received from the internet and parental vaccine hesitancy, there have been opportunities for increasing vaccination include parental education, establishment of a reminder system and that there is a need for increasing access to HPV vaccine providers, and education for health care providers, increasing trust in physicians, using the internet or social media to propagate positive messaging, utilizing existing technology more effectively, providing training to the physicians and clinical staffs on HPV and HPV vaccination and using the schools as potential point for venue for promotion of the vaccine.

In Embu, HPV vaccine coverage is inequitably distributed across geographical health facilities and income, with higher income parts of the Embu county and those near the headquarter of the county achieving higher vaccine coverage. High vaccine prices coupled with supply challenges have significantly constrained the ability of many to introduce the HPV vaccine into national immunization programmes and to ensure sustainability of current programmes. To ensure high levels of acceptance and sustained coverage, the study identified that introduction of HPV vaccination programmes must be accompanied by strong communication strategies for advocacy and social mobilization to affirm the efficacy, safety and benefits of the vaccine.

Moreover, in addition to the HPV vaccination, a comprehensive prevention strategy must include be included accordingly with HPV vaccination to include use of age-appropriate information on sexual and reproductive health, safer sexual practices such as delaying sexual debut decreasing the number of sexual partners, condom use, and male circumcision where appropriate and cessation of tobacco

use. Concerted efforts to promote healthy lifestyles among adolescents (boys and girls) are critical for a healthier population for sustainable development.

The main reasons that enable the health care managers to opt for vaccination of their children in the study reveals that health care managers that they believe the vaccine is effective in preventing cervical cancer, doctors and nurses and Ministry of health or the government recommend for it and they have seen and heard other parents sending their daughters and children to be vaccinated.

Health care managers need to secure sufficient and affordable HPV vaccines. A concerted effort will be needed between partners and the private sector to overcome vaccine supply constraints. Additionally, through appropriate market-shaping interventions, more affordable prices can be achieved while ensuring a healthy HPV vaccines market.

Health care managers need to increase the quality and coverage of vaccination this is because increasing the coverage of HPV vaccination will require efficient and sustainable multisector delivery platforms (such as school immunization programmes) and innovative community-based approaches to reach vulnerable populations (such as adolescent girls who are not in school). Monitoring systems or registers should track and improve coverage and quality as well.

The study findings reveals shortage of communication strategies among the health care managers in improving uptake of HPV vaccination. There is a need to improve communication and social mobilization. As HPV vaccination programmes are introduced and expanded, they will need nationwide, evidence-based communication and social mobilization efforts. Understanding the social, cultural, societal and other barriers that may affect the acceptance and uptake of the vaccine will be critical. Some communities will need extra engagement to overcome vaccine hesitancy and counter misinformation.

Health care managers the study reveals lack innovative knowledge on improving the efficiency of vaccines delivery. National guidelines, policies and strategies should be updated as new evidence and innovations become available on better and more efficient approaches to HPV vaccination. These can be achieved if good health care managers is present.

Furthermore, cervical cancer programmes should be situated within a holistic approach to health systems that is people centred and responsive to the needs of women across the life course. Primary care should remain the preferred entry point for cervical cancer prevention interventions, but service structures need to accommodate women presenting at any point in the system. Such efforts should be mutually reinforcing and facilitate the integration of cervical cancer services with other specific programmes. For example, within the health sector, interventions should transcend common dividing lines – between immunization programmes, adolescent health services, HIV and sexual and reproductive health services, and communicable disease and non-communicable disease programmes, including cancer prevention and control.

The study findings indicated that there are numerous health care system related factors that has affecting HPV Vaccination uptake in Embu to include HPV vaccination or

supplies unavailable at the health facility (20,29%), absence of staff to administer vaccines (15, 21%), lack of logistics and supplies (12, 17%), absence of health management information system in place (4, 6%) , absence of finance to buy vaccines and roll vaccination(10, 14%), absent structures in place for HPV vaccines (6,9%) and absence of policies and guidelines on vaccination (1,1%). If health care managers

Accordingly, one of the most fundamental barriers to HPV Vaccination is the current lack of systematic information on immunization needs that need to be identified by health care managers that children are not immunized and why and on the resources available to meet those needs. Health care providers must be available to deliver care, but shortages of health care staffs exist in Embu. Such shortages of staffs may leave children with acute care services but few preventive care services, including immunizations. Serious health care provider shortages that affect many rural areas as well if not well addressed HPV vaccines will not be delivered to many needing adolescent children. This need will only be solved if health care managers understands the importance of vaccination, allocate staffs to administer vaccines, and help to follow up especially in cases of appointments.

LIMITATIONS OF YOUR STUDY

It is expected that a weak health system that cannot strongly support HPV vaccination and if it's incorporated with less knowledgeable or untrained health care managers, vaccination practices and its uptakes won't go well. Statistical analysis of the data does not demonstrate a statistical significance between health care systems related factors and reasons for refusal to uptake HPV vaccination and between motivation for acceptance to vaccinate and reasons for refusal uptake of HPV vaccination. This is weakness is a limitation of the data because the analysis was expected otherwise, but the study finding did not show this important feature.

V. CONCLUSION

Cervical cancer is among the most common cancers in women worldwide, with the greatest burden in developing countries. In Kenya, cervical cancer is the second leading cause of cancer-related deaths and the second most common cancer among women.

HPV vaccination provides protection against HPV types 16 and 18, which are responsible for approximately 70% of cervical cancer cases. The optimal age of vaccination is in the early adolescent period, before sexual debut with possible HPV infection .HPV can cause cancer in both men and women. Immunisation protects against most cancers caused by HPV. The vaccine protects against nine strains of HPV responsible for cervical and some other cancers, and genital warts. Protection is long lasting, so immunisation at age 11 or 12-years-old protects well into adulthood. This review found that health care managers need to be better informed and educated on HPV and HPV vaccine to reduce their own vaccine hesitancy.

Uptake of HPV vaccine can be improved by adopting better communication, engagement, supportive information

resources, and training for healthcare professionals. HPV vaccination remain unsatisfactory low across most of low income and prevalence of many inequalities affecting HPV vaccination remain an issue that require to be dealt with. Health care managers leading HPV vaccination from the study looks less knowledgeable about HPV, vaccination, and the strategies to deal with HPV vaccination and its promotion are less understood by the health care managers in Embu.

Together with applying school-based intervention that has a favourable effects on the beliefs about primary prevention of HPV, and increased the HPV vaccination rates in a diverse population of adolescents, primary health care approach especially in low income countries is the one of the most effective way to sustainably solve today's challenges to health and health systems and is fundamental to achieving the shared global goals of universal health coverage and the health-related Sustainable Development Goals.

The study challenges the weak health care system that has affected uptake of HPV vaccination and in relation to refusal or low uptake to HPV vaccination. The findings this not associate the two. However, the researcher concludes that a weak health system that is not capable to provide HPV vaccines and its supplies, weak or absent human resource to administer the vaccine, absent essential services of vaccination, lacks finance to roll out or initiate the HPV Vaccination program, lack clear policies and guidelines on how manage vaccination remain incapable to provide vaccination and many children deserving HPV vaccination will not be reached and will always remain at risk of cancers.

The study recommends on integrating HPV vaccination with other routine vaccination programs and universal health coverage and using school-based intervention that can be an excellent venue to receive many HPV Vaccination children. As health care is devolved in Kenya, Embu county need to invest in the primary health care workforce because a sufficiently sized health workforce, with staff who have an optimal mix of skills and who are competent and equitably distributed, can support the delivery of new cervical cancer prevention and treatment interventions, as well as palliative care services.

Sustainable financing should be secured through domestic resource mobilization, private sector engagements and partnerships, increased efficiencies in the health system, and ensuring that user fees are not imposed on the poorest, thereby safeguarding their financial protection. Health financing and protection systems, and care delivered closer to where women live and work, are core to achieving elimination.

Improving knowledge on HPV and HPV vaccination need to be optimally in place. Training programs in the health sector should be reviewed and need to cover all those who work in the health care including managers. The Health care managers will support in coordination, supply and management issues of HPV vaccines, all communication about HPV vaccination, coordinating monthly analysis of HPV vaccination data, any post-introduction support and will help in monitoring linkages among project partners and government entities while helping to address any challenges that comes in during HPV vaccination if well trained.

Furthermore, the study recommends that Embu health care managers need to work on reduction of cancer

stigmatization as this has been seen from the study to cause refusal of HPV vaccines among the adolescent group requiring HPV vaccine. Patient awareness, health literacy and education initiatives, especially through cancer survivor groups can greatly contribute to addressing stigmatization associated with cancer. Future research should further be directed towards identifying more parental factors that affect the uptake of HPV vaccination.

REFERENCES

- [1] Abdelmutti N, Hoffman-Goetz L. (2009.) Risk messages about HPV, cervical cancer, and the HPV vaccine Gardasil: a content analysis of Canadian and U.S. national newspaper articles. *Women Health*. 2009; 49:422–40.10.1080/03630240903238776 [PubMed: 19851946]
- [2] Adjei Boakye E, Tobo BB, Rojek RP, Mohammed KA, Geneus CJ, Osazuwa-Peters N. Approaching a decade since HPV vaccine licensure: Racial and gender disparities in knowledge and awareness of HPV and HPV vaccine. *Hum Vaccin Immunother* 2017 Nov;13(11):2713-2722 [FREE Full text] [doi: 10.1080/21645515.2017.1363133] [Medline: 28853980]
- [3] Allen JD, Coronado GD, Williams RS, Glenn B, Escoffery C, Fernandez M, et al. A systematic review of measures used in studies of human Papilloma virus (HPV) vaccine acceptability. *Vaccine*. 2010;28(24):4027–37. doi:10.1016/j.vaccine.2010.03.063.
- [4] Anorlu RI.(2008). Cervical cancer: the sub-Saharan African perspective. *Reprod Health Matters*. 2008;16(32):41–9.
- [5] Banura C, Sandin S, van Doorn L-J, Quint W, Kleter B, Wabwire-Mangen F, et al. (2010).Research article type-specific incidence, clearance and predictors of cervical human papillomavirus infections (HPV) among young women: a prospective study in Uganda; 2010.
- [6] Bastani RM, Glenn BA, Tsui J, Chang LC, Marchand EJ, Taylor VM, et al. Understanding suboptimal human papillomavirus vaccine uptake among ethnic minority girls. *Cancer Epidemiol Biomarkers Prev*. 2011;20(7):1463–72.
- [7] Bingham A, Drake JK and LaMontagne DS(2009) Socio-cultural issues in the introduction of human papillomavirus vaccine in low-resource settings. *Arch Pediatr Adolesc Med*. 2009; 163:455–61.10.1001/archpediatrics.2009.50 [PubMed: 19414692]
- [8] Bogart, LM.; Delahanty, DL (2004) . Psychological models. In: Boll, TJ.; Frank, RC.; Baum, A.; Wallander, JL., editors. *Handbook of clinical health psychology*. vol 3. Models and perspectives in health psychology. Washington DC: American Psychological Association; 2004. p. 249-89.
- [9] Boyce T, Holmes A. (2012).Addressing health inequalities in the delivery of the human papillomavirus vaccination programme: examining the role of the school nurse. *PLoS One*. 2012;7(9):e43416.
- [10] Brewer NT, Fazekas KI. (2007). Predictors of HPV vaccine acceptability: a theory-informed, systematic

- review. *Prev Med.* 2007; 45:107–14.10.1016/j.ypmed.2007.05.013 [PubMed: 17628649]
- [11] Brewer NT, Fazekas KI. (2007). Predictors of HPV vaccine acceptability: a theory informed, systematic review. *Prev Med.* 2007;45(2–3):107–14. doi:10.1016/j.ypmed.2007.05.013.
- [12] Brotherton JM, Budd A, Rompotis C, Bartlett N, Malloy NJ, Andersen RL (2019). Is one dose of human papillomavirus vaccine as effective as three? A national cohort analysis. *Papillomavirus Research.* 2019;8:100177. doi:10.1016/j.pvr.2019.100177.
- [13] Cassidy B, Schlenk EA. Uptake of the human papillomavirus vaccine: a review of the literature and report of a quality assurance project. *J Pediatr Health Care.* 2012;26(2):92–101.
- [14] Champion VL, Skinner SR. (2008). The health belief model. *Health behavior and health education: theory, research and practice.* Fourth ed. 2008.
- [15] Coleman MA, Levison J, Sangi-Haghpeykar H. HPV vaccine acceptability in Ghana, West Africa. *Vaccine.* 2011;29(23):3945–50. doi:10.1016/j.vaccine.2011.03.093.
- [16] Cunningham MS, Davison C, Aronson KJ. (2014). HPV vaccine acceptability in Africa: a systematic review. *Prev Med.* 2014;69c:274–9. doi:10.1016/j.ypmed.2014.08.035.
- [17] DiAngi YT, Panozzo CA, Ramogola-Masire D, Steenhoff AP, Brewer NT. A cross-sectional study of HPV vaccine acceptability in Gaborone, Botswana. *PLoS One.* 2011;6(10):25481. doi:10.1371/journal.pone.0025481.
- [18] Dorell CG, Yankey D, Santibanez TA, Markowitz LE. Human papillomavirus vaccination series initiation and completion, 2008–2009. *Pediatrics.* 2011;128(5):830–9.
- [19] Drolet M, Benard E, Perez N, Brisson M, on behalf of the HPV Vaccination Impact Study Group. Population-level impact and herd effects following the introduction of papillomavirus vaccination programmes: updated systematic review and meta-analysis. *human Lancet.* 2019;394(10197):497–509. doi:10.1016/S0140-6736(19)30298-3.
- [20] Ferrer HB, Trotter C, Hickman M, Audrey S. Barriers and facilitators to HPV vaccination of young women in high-income countries: a qualitative systematic review and evidence synthesis. *BMC Public Health.* 2014;14:700.
- [21] Fishbein, M.; Azjen, I. (1975) *Belief, attitude, intention and behavior: an introduction to theory and research.* Reading, MA: Addison-Wesley; 1975.
- [22] Ford CA, English A, Davenport AF, Stinnett AJ. (2009) Increasing adolescent vaccination: barriers and strategies in the context of policy, legal, and financial issues. *J Adolesc Health.* 2009; 44:568–74.10.1016/j.jadohealth.2008.11.015 [PubMed: 19465321]
- [23] Forster AS, Marlow LA, Stephenson J, Wardle J, Waller J. (2012) Human Papilloma virus vaccination and sexual behaviour: cross-sectional and longitudinal surveys conducted in England. *Vaccine.* 2012;30(33):4939–44. doi:10.1016/j.vaccine.2012.05.053.
- [24] Garrib A, Herbst K, Dlamini L, McKenzie A, Stoops N, Govender T, et al. An evaluation of the district health information system in rural South Africa. *SAMJ: S Afr Med J.* 2008;98(7):549–52.
- [25] Gerend MA, (2012) . Shepherd JE. Predicting human papillomavirus vaccine uptake in young adult women: comparing the health belief model and theory of planned behavior. *Ann Behav Med.* 2012;44(2):171–80. doi:10.1007/s12160-012-9366-5.
- [26] Gerend MA, Shepherd JE. Using message framing to promote acceptance of the human papillomavirus vaccine. *Health Psychol.* 2007; 26:745–52.10.1037/0278-6133.26.6.745 [PubMed: 18020847]
- [27] Grace JA. (2006) Adolescent immunization: challenges and opportunities. *J Sch Nurs.* 2006;22(2):87–93.
- [28] Hilton S, Hunt K, Langan M, Bedford H, Petticrew M. (2009). Newsprint media representations of the introduction of the HPV vaccination programme for cervical cancer prevention in the UK (2005–2008). *Soc Sci Med.* 2010; 70:942–50.10.1016/j.socscimed.2009.11.027 [PubMed: 20064682]
- [29] Hongoro C, McPake B. How to bridge the gap in human resources for health. *Lancet.* 2004;364(9443):1451–6.
- [30] Janz NK, Becker MH. (1984) The Health Belief Model: a decade later. *Health Educ Q.* 1984;11(1):1–47.
- [31] Kessels SJ, Marshall HS, Watson M, Braunack-Mayer AJ, Reuzel R, Tooher RL. Factors associated with HPV vaccine uptake in teenage girls: a systematic review. *Vaccine.* 2012;30(24):3546–56.
- [32] Kester LM, Shedd-Steele RB, Dotson-Roberts CA, Smith J, Zimet GD. The effects of a brief educational intervention on human papillomavirus knowledge and intention to initiate HPV vaccination in 18–26 year old young adults. *Gynecol Oncol.* 2014;132(Suppl 1):S9–12.
- [33] Kharbanda EO, Kahn JA. (2010) Vaccinating teens: current guidelines, challenges, and opportunities. *Pediatr Ann.* 2010;39(8):483–9.
- [34] Kiberu VM, Matovu JK, Makumbi F, Kyoziira C, Mukooyo E, Wanyenze RK. Strengthening district-based health reporting through the district health management information software system: the Ugandan experience. *BMC Med Inform Decis Mak.* 2014;14(1):40.
- [35] Kisaakye E, Namakula J, Kihembo C, Kisakye A, Nsubuga P, Babirye JN. Level and factors associated with uptake of human papillomavirus infection vaccine among female adolescents in Lira District, Uganda. *Pan Afr Med J.* 2018; 31:184.
- [36] La Torre G, De Vito E, Ficarra MG, Firenze A, Gregorio P, Boccia A. Is there a lack of information on HPV vaccination given by health professionals to young women? *Vaccine.* 2013;31(42):4710–3.
- [37] Marlow LA, Waller J, Evans RE, Wardle J. (2009) . Predictors of interest in HPV vaccination: a study of British adolescents. *Vaccine.* 2009; 27:2483–8.10.1016/j.vaccine.2009.02.057 [PubMed: 19368790]
- [38] Marshall H, Ryan P, Robertson D, Baghurst P. A cross-sectional survey to assess community attitudes to introduction of human papillomavirus vaccine. *Aust N Z J Public Health.* 2007;31:235–42.
- [39] Mojahed S, KariMi M, BoKaie M, SaliMi T. (2013) Attitude and knowledge of Iranian female nurses about

- human papillomavirus infection and cervical cancer: A cross sectional survey. *J Prev Med Hyg* 2013;54:187-90.
- [40] Mullins TL, Griffioen AM, Glynn S, Zimet GD, Rosenthal SL, Fortenberry JD, et al. Human papillomavirus vaccine communication: perspectives of 11-12 year-old girls, mothers, and clinicians. *Vaccine*. 2013; 31(42):4894-901.
- [41] Mutyaba T, Mirembe F, Sandin S, Weiderpass E. (2009). Male partner involvement
- [42] Nyengidiki TK, Durugbo IK, Oranu E. (2016) Human papilloma virus awareness and uptake of HPV vaccination among human immunodeficiency virus positive women in Nigeria. *Int J Trop Dis Health* 2016; 15:1-7.
- [43] Noar SM, Mehrotra P. (2011). Toward a new methodological paradigm for testing theories of health behavior and health behavior change. *Patient Educ Couns*. 2011;82(3):468-74. doi:10.1016/j.pec.2010.11.016.
- [44] Ogochukwu TN, Akabueze J, Ezeome IV, Aniebue UU, Oranu EO. (2017) Vaccination against Human Papilloma Virus in Adolescent Girls: Mother's Knowledge, Attitude, Desire and Practice in Nigeria. *J Infect Dis Preve Med* 2017;5:1.
- [45] Osazuwa-Peters N, Adjei Boakye E, Mohammed KA, Tobo BB, Geneus CJ, Schootman M. (2017). Not just a woman's business! Understanding men and women's knowledge of HPV, the HPV vaccine, and HPV-associated cancers. *Prev Med* 2017 Jun;99:299-304. [doi: 10.1016/j.ypmed.2017.03.014] [Medline: 28341458]
- [46] Parkin DM, Almonte M, Bruni L, Clifford G, Curado M-P, Pineros M. (2008). Burden and trends of type-specific human papillomavirus infections and related diseases in the Latin America and Caribbean region. *Vaccine*. 2008;26:L1-L15.
- [47] Parkin DM, Namboozee S, Wabwire-Mangen F, Wabinga HR (2010). Changing cancer incidence in Kampala, Uganda, 1991-2006. *Int J Cancer*. 2010;126(5): 1187-95.
- [48] PATH (2008) . Protecting girls and women from cervical cancer. 2008.
- [49] Ports KA, Reddy DM, Rameshbabu A. Barriers and facilitators to HPV vaccination: perspectives from Malawian women. *Women Health*. 2013;53(6):630-45.
- [50] Preston SM, Darrow WW. Are men being left behind (or catching up)? Differences in HPV awareness, knowledge, and attitudes between diverse college men and women. *Am J Men's Health* 2019 Dec;13(6):1557988319883776 [FREE Full text] [doi: 10.1177/1557988319883776] [Medline: 31787066]
- [51] Reducing loss to follow-up after cervical cancer screening in Uganda. *Int J Gynecol Obstet*. 2009;107(2):103-6.
- [52] Rosenstock IM, Strecher VJ, Becker MH. (1988). Social learning theory and the Health Belief Model. *Health Educ Q*. 1988;15(2):175-83.
- [53] Rosenstock IM. (1974). The health belief model and preventive health behavior. *Health Educ Monogr*. 1974;2(4):354-86.
- [54] Rosenthal SL, Kottenhahn RK, Biro FM, Succop PA. (1995). Hepatitis B acceptance among adolescents and their parents. *J Adolesc Health*. 1995; 17:248-54.10.1016/1054-139X(95)00164-N [PubMed: 8580126]
- [55] Sales JM, Milhausen RR, Wingood GM, DiClemente RJ, Salazar LF, Crosby RA. (2008). Validation of a parent-adolescent communication scale for use in STD/HIV prevention interventions. *Health Educ Behav*. 2008; 35:332-45.10.1177/1090198106293524 [PubMed: 17200099]
- [56] Stanley M, Dull P. HPV. (2018) single-dose vaccination: impact potential, evidence base and further evaluation. *Vaccine*. 2018; 36 (32 Pt A) :4759-60. Doi:10.1016/j.vaccine.2018.02.076.
- [57] Vermandere H, van Stam MA, Naanyu V, Michielsen K, Degomme O, Oort F. Uptake of the human papillomavirus vaccine in Kenya: testing the health belief model through pathway modelling on cohort data. *Glob Health*. 2016;12:72.
- [58] Ware NC, Idoko J, Kaaya S, Biraro IA, Wyatt MA, Agbaji O, (2009). Explaining adherence success in sub-Saharan Africa: an ethnographic study. *PloS Med*. 2009; 6:e11.10.1371/journal.pmed. 1000011 [PubMed: 19175285]
- [59] Weinstein ND. (2007) Misleading tests of health behavior theories. *Ann Behav Med*. 2007;33(1):1-10. doi:10.1207/s15324796abm3301_1.
- [60] WHO. (2009). Human papillomavirus vaccines, WHO position paper. *Wkly Epidemiol Rec*. 2009; 84:118-31 WHO; 2009.
- [61] WHO (2010). Human papillomavirus infection and cervical cancer WHO; 2010.
- [62] WHO. (2012). Prevention of cervical cancer through screening using visual inspection with acetic acid (VIA) and treatment with cryotherapy. A demonstration project in six African countries: Malawi, Madagascar, Nigeria, Uganda, the united republic of Tanzania and Zambia. Geneva: World Health Organization. : African Population and Health Research Center, International Agency for Research on Cancer; 2012.
- [63] WHO (2016). HPV Vaccine Communication, Special considerations for a unique vaccine 2016 update. Geneva: World Health Organization; 2017 (WHO/IVB/17.02). Licence: CC BY-NC-SA 3.0 IGO. Available at: <https://apps.who.int/iris/bitstream/handle/10665/250279/WHO-IVB-16.02-eng.pdf>
- [64] World Health Organization. (2017). Human papillomavirus vaccines: WHO position paper, May 2017-recommendations. *Vaccine* 2017 Oct;35(43):5753-5755. [doi: 10.1016/j.vaccine.2017.05.069]
- [65] WHO (2018) .Global Cancer Observatory. Cancer tomorrow: a tool that predicts the future cancer incidence and mortality burden worldwide from the current estimates in 2018 up until 2040. International Agency for Research on Cancer, World Health Organization; 2018 (<http://gco.iarc.fr/tomorrow>, accessed 2 October 2020).
- [66] WHO (2020). Assessing national capacity for the prevention and control of non-communicable diseases: report of the 2019 global survey. Geneva: World Health Organization; 2020 (<https://apps.who.int/iris/handle/10665/331452>, accessed 2 October 2020).
- [67] Wigle J, Coast E, Watson-Jones D. (2013). Human papillomavirus (HPV) vaccine implementation in low and

- middle-income countries (LMICs): health system experiences and prospects(). *Vaccine*. 2013;31(37):3811–7.
- [68] Williams GC, Niemiec CP, Patrick H, Ryan RM, Deci E (2009). The importance of supporting autonomy and perceived competence in facilitating long-term tobacco abstinence. *Ann Behav Med*. 2009; 37:315–24.10.1007/s12160-009-9090-y [PubMed: 19373517]
- [69] Zimet GD, Liddon N, Rosenthal SL, Lazcano-Ponce E, Allen B. (2006). Psychosocial aspects of vaccine acceptability. *Vaccine*. 2006; 24(Suppl 3):S201–

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