



SEINÄJOEN AMMATTIKORKEAKOULU  
SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

*Ndumbe Sydwane Wusiebia, Okechukwu Stephen Odio, Regina Nredah Armah*

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***ASSESSMENT OF THE KNOWLEDGE OF WOMEN TOWARDS***

***CERVICAL CANCER IN AFRICA***

***A Descriptive Literature Review***

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**Thesis abstract**

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*Author: Ndumbe Sydwane Wusiebia, Okechukwu Stephen Odio, Regina Nredah Armah*

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*Supervisor: Terhi Hapala, MNSc, Senior Lecturer*

*Paula Paloniemi, Senior Lecturer*

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Cervical cancer is a significant public health concern worldwide, particularly in African countries where it remains a leading cause of cancer-related deaths among women. The knowledge and awareness of cervical cancer plays a crucial role in its prevention, early detection, and effective management. The purpose of this research is to produce information about cervical cancer trends within the African continent through review of published literature. The aim of this research is to describe the level of awareness of cervical cancer among African women aged 25 to 49 years, highlighting the disparities and similarities across different regions. Research Question: What knowledge do African women aged between 25-49 years have on cervical cancer?

By understanding the gaps in knowledge, appropriate interventions can be developed to improve cervical cancer outcomes in African communities.

Based on the thesis result, the knowledge about cervical cancer screening, prevention and risk factors including cervical cancer screening types were particularly poor. The result of the analysis also shows that there were women who have never heard about the existence of cervical cancer and some other women who do not know the location of cervical cancer/HPV screening and vaccination centers.

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<sup>1</sup> *Keywords: Cervical Cancer, Assessment of Knowledge, Causes, Prevention, Risk Factors*

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## Terms and Abbreviations

ADT	Androgen Deprivation Therapy
DRE	Digital Rectal Examination
EN2	Homeobox Protein Engrailed-2
GLOBOCAN	Global Burden of Cancer
HIV	Human Immunodeficiency Virus
mRNA	Messenger Ribonucleic Acid
CC	Cervical Cancer
STI	Sexually Transmitted Infection
TRUS	Transrectal Ultrasound
UNAIDS	United Nations Joint Program on HIV/AIDS
WHO	World Health Organization
HPV	Human Papillomavirus
SSA	Sub-Saharan Africa
GBD	Global Burden of Disease
IARC	International Agency for Research on Cancer

DES	Diethylstilbestrol
VIA	Visual Inspection with Acetic acid
LLETZ	Large loop excision of the transformation zone
LEEP	Loop electrosurgical excision procedure
ICA	Inductive content analysis
CC	Cervical cancer
SPR	Symptoms, prevention, and risk factors
CCS	Cervical cancer Screening
V	Vaccination

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## 1 INTRODUCTION

Cervical cancer has been designated by the World Health Organization as a global health challenge with an estimated 604 000 new occurrences in 2020. The World Health Organization also reported that cervical cancer accounted for 342 000 deaths in 2020 and that 90% of those deaths occurred in low- and middle-income countries including the African continent. All but one of the top 20 countries globally with the highest burden of cervical cancer in 2018 were in Africa. This poses a huge economic, social and health problem on the African continent with high incidence and mortality rates. Although cervical cancer presents a significant public health threat to women on the African continent, It also constitutes a global health challenge as it is the fourth most common cancer amongst women (WHO,2020).

The human papillomavirus (HPV) is responsible for a significant portion (more than 95%) of cases of cervical cancer. The reproductive tract's most prevalent viral infection is HPV. Most sexually active women and men will contract the disease at some point in their lives; others may do so repeatedly. Infected populations eventually recover from the virus in more than 90% of cases. The condition most frequently associated with HPV is cervical cancer (WHO, 2023)

There have been significant advancements in the understanding and treatment of cervical cancer in recent years, including the development of new screening tests and treatments. Studying cervical cancer can provide opportunities to develop and evaluate new innovations that can improve outcomes for patients (Rajkumar, R., & Budak, M., 2022).

Studies have shown that lack of knowledge and awareness about the disease is a major barrier to early detection and treatment, leading to poor outcomes (Rajkumar, R., & Budak, M. (2022). Almost 20 percent of the overall cancer deaths reported among women in Sub-Saharan Africa (SSA) have been attributed to cervical cancer (Ralaidovy et al., 2018).

It is our opinion that assessing the knowledge of women about cervical cancer can help identify barriers to prevention and develop strategies to increase access to the medical interventions. There are so many Cultural beliefs and practices in Africa that can influence the knowledge and attitudes of women towards cervical cancer prevention and treatment. For example, some



African cultures may have taboos or myths around discussing reproductive health, which can lead to a lack of awareness about cervical cancer. Understanding these cultural factors is important for developing effective prevention and education programs that will ultimately reduce or eradicate the burden of cervical cancer on the African continent. (Gutusa, F., & Roets, L., 2023).

#### GOAL AND PURPOSE OF THE THESIS

The purpose of this research is to produce information about cervical cancer trends within the African continent through review of published literature.

The aim of this research is to describe the level of awareness of cervical cancer among African women aged 25 to 49 years.

Research Question: What knowledge do African women aged between 25-49 years have on cervical cancer?

## **2 Definitions, causes and symptoms of cervical cancer.**

According to the American Cancer Society, (2022), around 8.8 million people die from cancer each year. Cervical cancer is a type of cancer that affects the cervix, the lower part of the uterus that connects to the vagina. The primary causative agent for cervical cancer is the human papillomavirus (HPV), particularly high-risk types such as HPV-16 and HPV-18. HPV is a sexually transmitted virus that can lead to the development of precancerous lesions in the cervix, which, if left untreated, can progress to cervical cancer. According to the World Health Organization (WHO), cancer can be defined as a collection of disorders characterized by abnormal cell proliferation and the ability to spread or harm other bodily parts. The primary distinction between cancer and benign tumors is that benign tumors do not spread (Jayasekara et al., 2016). Cancer signs may include abnormalities in bowel movement, unexplained coughs, irregular bleeding, and a lump in some parts of the body, WHO 2018. In terms of prevalence, 90 million individuals were diagnosed with cancer in 2015, and another study by the Global Burden of Disease (GBD) in 2019 revealed that almost 18 million people were diagnosed with cancer each year.

### **2.1 Prevalence of cervical cancer globally and in Africa**

According to Bray et al., 2020, p. 313-336, cervical cancer is a significant global health concern. It is estimated that in 2020, there were approximately 604,000 new cases of cervical cancer worldwide. Cervical cancer is a significant global health issue, especially in low- and middle-income countries. It ranks as the fourth most common cancer among women worldwide and according to the World Health Organization (WHO), an estimated 570,000 new cases of cervical cancer were diagnosed in 2018, with approximately 311,000 cervical cancer-related deaths worldwide.

Cervical cancer poses a particularly significant burden in Africa, where it is one of the leading causes of cancer-related deaths among women. In Africa, it is estimated that 119,000 new cases of cervical cancer were diagnosed in 2020 (Bray et al., 2020, p. 313-336). Africa has one of the highest cervical cancer burdens in the world. In Africa, cervical cancer is the most common cancer among women. Most cases of cervical cancer in Africa are attributed to lack of access to regular screening, limited awareness, and a high prevalence of risk factors, including HPV infection and limited HPV vaccination programs. According to the International

Agency for Research on Cancer (IARC), African countries such as Malawi, Zambia, Zimbabwe, and Mozambique have some of the highest cervical cancer incidence and mortality rates globally.

Due to ongoing efforts to increase cervical cancer screening, vaccination, and awareness in various regions, including Africa. Public health initiate vaccination programs, and increased access to healthcare services can contribute to reducing the prevalence of cervical cancer. For the most current and region-specific data, it is recommended to consult reputable sources like the World Health Organization (WHO) or national health agencies.

## **2.2 Risk factors of cervical cancer**

Several risk factors are associated with the development of cervical cancer. These risk factors include infection with high-risk types of human papillomavirus (HPV), early coital debut, multiple sexual partners, smoking, a weakened immune system, long-term use of oral contraceptives, and a family history of cervical cancer (American Cancer Society, 2022).

Cervical cancer risk factors are various factors and conditions that can increase the likelihood of developing cervical cancer. It's important to note that having one or more risk factors doesn't guarantee the development of cervical cancer, but it does increase the overall risk.

HPV is the most significant risk factor for cervical cancer. Persistent infection with high-risk HPV strains, particularly HPV-16 and HPV-18, is strongly associated with the development of cervical cancer. Lack of HPV vaccination or not receiving the HPV vaccine as recommended for young individuals can increase the risk of HPV infection and cervical cancer. Smoking tobacco is a well-established risk factor for cervical cancer. It can expose the cervix to harmful chemicals that promote the development of cancer. Conditions or medications that weaken the immune system, such as HIV infection, organ transplantation, or long-term corticosteroid use, can increase the risk of cervical cancer (Nahon cancer institution, 2015).

According to the American Cancer Society, 2022, engaging in sexual activity at an early age can increase the risk of HPV exposure, which is a significant risk factor for cervical cancer. In addition, having multiple sexual partners, or having a partner with multiple sexual partners, can increase the risk of HPV exposure and cervical cancer. Lack of regular cervical cancer

screening (e.g., Pap smears and HPV tests) can reduce the chances of early detection and timely intervention.

Moreover, having a family history of cervical cancer or certain gynecological cancers may slightly increase the risk and long-term use of birth control pills, typically for five years or more, has been associated with a slightly increased risk of cervical cancer.

According to the (American Cancer Society, 2022), having many full-term pregnancies can also be a risk factor, as each pregnancy may expose the cervix to hormones and other factors that could contribute to cancer development. Moreso, Diethylstilbestrol (DES) Exposure has been known to be one of the risk factors of cervical cancer, that is, women whose mothers took DES, a synthetic estrogen, during pregnancy are at an increased risk of developing a rare form of cervical cancer. In addition to that, Low socioeconomic status, and limited access to healthcare and preventive measures, such as regular screenings and HPV vaccination, can contribute to an increased risk.

It's important to remember that many cases of cervical cancer can be prevented or detected at an early, highly treatable stage through regular screening and HPV vaccination. Individuals with multiple risk factors, such as a family history of cervical cancer or a weakened immune system, should consult with their healthcare providers for personalized guidance and screening schedules.

### **2.3 Prevention of cervical cancer**

Cervical cancer is largely preventable, primarily through vaccination against high-risk HPV types, regular cervical cancer screening (Pap tests and HPV tests), and safe sexual practices, including the use of condoms. Preventing cervical cancer primarily involves reducing the risk of human papillomavirus (HPV) infection and undergoing regular screenings (American Cancer Society, 2022).

It has been established that HPV vaccination is an effective way to prevent cervical cancer. HPV vaccines, such as Gardasil and Cervarix, are available for both males and females. These vaccines protect against the most common cancer-causing HPV strains. Practicing safe sex by using condoms can reduce the risk of HPV and other sexually transmitted infections.

However, condoms may not be entirely effective in preventing HPV, as the virus can infect areas not covered or protected by the condom. Regular cervical cancer screenings, such as Pap smears tests, HPV DNA testing and visual inspection with acetic acid (VIA), are essential for early detection and prevention. Pap tests can detect precancerous changes in the cervix, allowing for prompt treatment. In some cases, HPV testing may be recommended in addition to Pap tests, especially for women over 30. This can help identify high-risk HPV strains and assess the risk of developing cervical cancer. Smoking increases the risk of cervical cancer.

In addition, reducing the number of sexual partners may lower the risk of HPV exposure and cervical cancer as well as maintaining good personal hygiene can help reduce the risk of infection. Washing the genital area regularly and avoiding the use of feminine hygiene products can help. It is known that a healthy lifestyle which includes a well-balanced diet, regular exercise, and maintaining a healthy weight can contribute to overall health and may reduce the risk of cervical cancer (American Cancer Society, 2022).

After HPV vaccination, it is important to undergo regular or periodic cervical cancer screenings, as the vaccines do not provide protection against all HPV strains that can cause cancer. When an abnormal pap test result or a positive HPV test is obtained, advice for further evaluation, treatment, and monitoring should be given by healthcare providers.

It is crucial to consult with a healthcare provider for personalized guidance on cervical cancer prevention, as individual risk factors and recommendations may vary. Regular check-ups and open communication with your healthcare provider are key to maintaining good cervical health and preventing cervical cancer. (American Cancer Society, 2022)

Successful cervical screening programs are known to depend on the participation of an informed target population. In Ghana, registered nurses are the most visible, frontline personnel providing health education to patients and the general population (WHO, 2018). Health education involves not only providing relevant information, but also facilitating health-related behavior change such as avoiding high risk sexual behaviors. This could be achieved through emulating good health practices, positive attitudes towards screening by the nurses as their attitudes and actions are predictors of societal health behavior. The goal of health education is to help individuals and communities achieve optimum health through their own initiative. The nurse can use the health belief model as a next step in formulating an action plan

that meets the needs and capabilities of each person in making healthy behavior change. To be effective, a cervical cancer prevention program must include a package of education, screening, and pre-cancer treatment services that reach many women who are at risk of the disease (WHO, 2018).

## **2.4 Cervical cancer and patients with compromised immune system**

Individuals with compromised immune systems, such as those with HIV/AIDS or organ transplant recipients, are at a higher risk of developing cervical cancer. It is crucial for these individuals to have regular cervical cancer screenings and follow the recommendations of their healthcare providers for early detection and prevention (American Cancer Society, 2022).

Cervical cancer is a type of cancer that affects the cervix, which is the lower part of the uterus. For patients with compromised immune systems, due to either ongoing medical conditions or immunosuppressive medications, there are several important considerations regarding cervical cancer:

Firstly, Individuals with compromised immune systems are at a higher risk of developing cervical cancer. This includes people living with HIV/AIDS, organ transplant recipients, and those on immunosuppressive medications for autoimmune diseases or after transplant surgery. Patients with compromised immune systems may have a higher likelihood of persistent or recurrent HPV infections, which can increase their risk of developing cervical cancer. In addition, cervical cancer screening is crucial for early detection. Patients with compromised immune systems may need more frequent screenings and different types of tests, as their immune system may not clear HPV infections as effectively. Consultation with a healthcare provider is essential to determine the appropriate screening schedule.

HPV vaccine is usually recommended for young individuals before they become sexually active. However, for individuals with compromised immune systems who haven't received the vaccine, vaccination may still be beneficial to protect against some HPV strains. Patients with compromised immune systems may also face challenges in treating cervical cancer. Treatments for cervical cancer such as chemotherapy and radiation therapy can contribute to further weakening the immune system. Comprehensive care, which includes coordinated efforts between oncologists, infectious disease specialists, and other healthcare providers is

usually employed to manage both their immune status and cervical cancer treatment effectively.

Moreover, practicing safe sexual behaviors and reducing exposure to HPV is crucial and avoiding smoking, which can further increase the risk of cervical cancer, is important. Because of this, Patients should maintain open communication with their healthcare providers, sharing their immune system status and medical history to receive appropriate care and guidance. It is important for patients and their families to seek support and education. Support groups and educational resources can help individuals better understand their condition and make informed decisions. After treatment, long-term follow-up care to monitor for any recurrence of cervical cancer and address any other health concerns will be necessary.

Finally, it's important for individuals with compromised immune systems to work closely with their healthcare team to create a tailored plan for preventing and managing cervical cancer, considering their specific medical conditions and treatment needs. Regular check-ups, early detection, and appropriate interventions can significantly improve outcomes in this population.

## **2.5 Treatment of cervical cancer in Africa**

The management of cervical cancer is contingent upon several factors, including the disease's stage, the patient's age and health condition, tumor attributes, individual preferences, and the healthcare resources available in each country. Treatment choices encompass both monotherapy and combined approaches, spanning from cervix conization, uncomplicated hysterectomy with or without lymphadenectomy, extensive hysterectomy with pelvic lymphadenectomy, pelvic exenteration, chemotherapy, radiotherapy, to palliative chemotherapy. Favorable outcomes, with the highest likelihood of cure, are associated with early-stage treatment (Gondos et al., 2019, p.468–473).

The management of pre-invasive cervical cancer faces challenges, primarily influenced by the scarcity of screening facilities and limited access to screening services (Mwaka et al., 2018, p.559–563). The utilization of colposcopy remains confined to a few centers. Commonly employed treatment methods for precancerous lesions include hysterectomy and cone biopsy since resources and expertise for large loop excision of the transformation zone (LLETZ), also referred to as loop electrosurgical excision procedure (LEEP), are in

short supply. Addressing invasive cervical cancer in numerous Sub-Saharan African countries remains a significant hurdle, given the inadequate presence of surgical facilities, skilled healthcare providers, and radiotherapy services.

A multidisciplinary approach is required for the management of women with invasive cervical cancer, involving various specialists such as gynecologists, radiation oncologists, medical oncologists, pathologists, medical physicists, technicians, nurses, and counselors (Mwaka et al., 2018, p. 559–563). However, there is a deficiency of these specialists in many locations across the continent, and in instances where they are available, they often operate in isolation rather than as collaborative teams. Operable cases of the disease at the time of presentation are infrequent, with less than 10% of cases in Lagos, Nigeria falling into this category. Even among those who do present early, surgical intervention may not be possible, given the scarcity of certified gynecologists proficient in radical gynecological cancer surgery (Ntekim, 2017, p.67–82).

Follow-up after surgery is often inadequately carried out, as some patients, under the impression of being cured, choose not to return, while others are unable to bear the expenses associated with returning to urban areas. Unfortunately, this treatment is only accessible to a select few, primarily due to the scarcity of resources and the advanced nature of the disease at the time of presentation. Eze et al., (2020, p.1574–1581). observed that radiotherapy was predominantly utilized as a treatment modality in 70% of patients, reflecting the prevalence of cases presenting at stage 2B and beyond. The availability of radiotherapy remains limited in numerous locations in Sub-Saharan Africa. Levin et al. (1997) reported that in 1997, radiotherapy was unavailable in 32 African countries (Mwaka et al., 2018, p. 559–563).

In 2003, a total of 15 countries in Africa were without a single radiotherapy machine. Nigeria, Africa's most populous nation, possessed merely five radiotherapy centers as of 2009: four under governmental ownership and one privately owned. The recommended ratio by the WHO is 0.4 radiotherapy machines per million population. Nigeria's five machines for 140 million people equates to 0.04 per million, falling significantly below the WHO's guideline. In contrast, the United States boasts 12 machines per million people (Nketim, 2017, p.67–82). Apart from the scarcity of machines, the available ones frequently remain non-operational due to the absence of resources for proper maintenance and repair. Furthermore, there is a



shortage of adequately trained personnel such as radiotherapists and medical physicists, along with a deficiency of essential materials (Eze et al., 2020, p.1574–1581).

In conclusion, the treatment landscape for cervical cancer is diverse and continually evolving. The choice of treatment depends on the stage of cancer, individual patient factors, and ongoing research developments. A collaborative approach involving healthcare professionals, patients, and researchers is crucial for optimizing treatment outcomes.

## **2.6 Pap smear Test**

A Pap smear, also recognized as a Pap test, functions as a screening procedure for cervical cancer. This process entails the retrieval of cells from the cervix, the lower section of the uterus connecting to the vagina, followed by a microscopic examination to identify any abnormalities or indications of precancerous or cancerous conditions. The primary purpose of Pap smears is to identify early signs of cervical cancer or precancerous conditions, allowing for prompt intervention and treatment. Additionally, the test proves effective in pinpointing infections, inflammation, and other irregularities in the cervix. During a Pap smear, a healthcare provider employs a speculum to open the vagina and then collects a cell sample from the cervix using a small brush or spatula. Subsequently, the collected cells are placed on a glass slide or in a liquid medium and forwarded to a laboratory for examination (American College of Obstetricians and Gynecologists, 2018).

In accordance with the guidelines of the US Preventive Services Task Force, 2018, the recommended frequency for Pap smears varies, but it generally suggests initiation at age 30 with subsequent tests every 3-5 years, contingent on age and risk factors. Consistent Pap smears play a vital role in early detection, thereby diminishing the risk of advancing cervical cancer. It is crucial for women, including those who have received the HPV (human papillomavirus) vaccine, to undergo routine screening since the vaccine does not provide protection against all HPV types associated with cervical cancer (National Cancer Institute, 2020). Despite the effectiveness of Pap smears, it's essential to acknowledge that they may not detect all instances of cervical cancer or precancerous lesions. The integration of HPV testing as a co-test with Pap smears has enhanced the sensitivity of cervical cancer screening (Saslow et al., 2012, p.147–172).

Numerous studies have indicated an enhancement in women's knowledge levels concerning cervical cancer prevention after receiving health education. Following this health education, there was an observed inclination among women to undergo Pap smear tests or express a willingness to do so (Bingham & Sowjanya, 2014). According to the writer, if the nurses can create small programs to educate women in their various villages and cities about cervical cancer or print out posters about cervical cancer and the importance of pap smears screening it will go a long way.

Cervical cancer distinguishes itself among reproductive tract malignancies due to its potential for nearly complete prevention through regular cytological screening and the timely treatment of precancerous lesions. To optimize prevention efforts, it is recommended that women undergo screening during various interactions with healthcare professionals, including initial antenatal clinic visits, family planning clinics, sexually transmitted infection clinics, and gynecological clinics (Bingham & Sowjanya, 2014).

For sexually active women, it is strongly recommended to undergo annual screening from age 18 to 35; thereafter, the frequency can be extended to every 3 to 5 years, contingent upon consistently negative test results. To ensure the reliability and effectiveness of cytological or Pap smear tests, essential factors include the presence of trained providers, access to a dependable cytology laboratory, continuous availability of high-quality equipment and supplies, a well-established record-keeping system, and efficient referral mechanisms for diagnosis and treatment (Eze et al., 2020, p.1574–1581).

Cytological screening, particularly the Papanicolaou smear or Pap smear, has proven to be one of the most successful public health measures for cancer prevention. Developed countries widely offer cervical cancer screening, leading to the detection of lesions at the pre-cancerous or early cancerous stage (Eze et al., 2020, p.1574–1581). The documented benefits of cervical cancer screening programs in developed countries are notable, with Denmark experiencing a 25% decline in mortality with 40% coverage and Norway achieving a 10% reduction with 5% coverage (Wright, 2011). However, the mortality rates from cervical cancer remain high in Nigeria and many other African countries accompanied by a low level of awareness about cervical cancer and screening for cervical abnormalities (Eze et al., 2020, p.1574–1581).

### **3 GOAL AND PURPOSE OF THE THESIS**

The purpose of this research is to produce information about cervical cancer trends within the African continent through review of published literature.

The aim of this research is to describe the level of awareness of cervical cancer among African women aged 25 to 49 years.

Research Question: What knowledge do African women aged between 25-49 years have on cervical cancer?

## **4 METHODOLOGY**

### **4.1 Literature Review**

For the purposes of this research, the concept of qualitative literature review was used which includes using case studies of cervical cancer from different African countries and communities. Qualitative literature review involves collecting data in the form of text, and thereafter, evaluating the data to identify recurring themes, patterns, or relationships. The data is further analyzed before discussing the results of the analysis. Qualitative analysis can provide informed insights into complex phenomena, such as human behaviors, social interactions, cultural practices, and subjective experiences. It is often used to generate hypotheses, develop theories, or inform policy decisions in areas such as healthcare, education, and public policy, (Thomas, D. R. 2006, p.1.)

### **4.2 Data Collection**

The initial step in the data retrieval process was to do a database search on ScienceDirect, PubMed, CINAHL, SeAMK Finna, and Sage journals. This was achieved by utilizing several expressions and key terms that were connected to our main research questions. The key terms used in these databases include cervical cancer, cervical cancer in Africa, knowledge & awareness of cervical cancer in Africa, perception of cervical cancer in Africa, attitude towards cervical cancer in Africa, risk factors, prevention and causes of cervical cancer. Boolean phrases and other similar terms were also used. The search was limited to publications that were written within the last ten years from 2013 to 2023. This search put forth over 1324 results. The search was further restricted to articles that had been published in English language which had been peer reviewed and had full text. This produced 99 results. Consequently, the 99 papers were assessed, and further securitized with a selection criteria before final selections are made.

The second step in the data collection process involves removing articles that had duplicates and thoroughly perusing through the articles to carefully assess their caliber, quality, and applicability to our research question. Articles that failed to fulfill the above-listed standards and were not relevant to our research question were eliminated. There were 59 articles that

could be used to conduct our research. The data collection and elimination process were carried out by the three authors during September and October 2023. Amongst the 59 articles that could possibly be used for our research, seven articles were randomly selected to be used for the research without any biases.

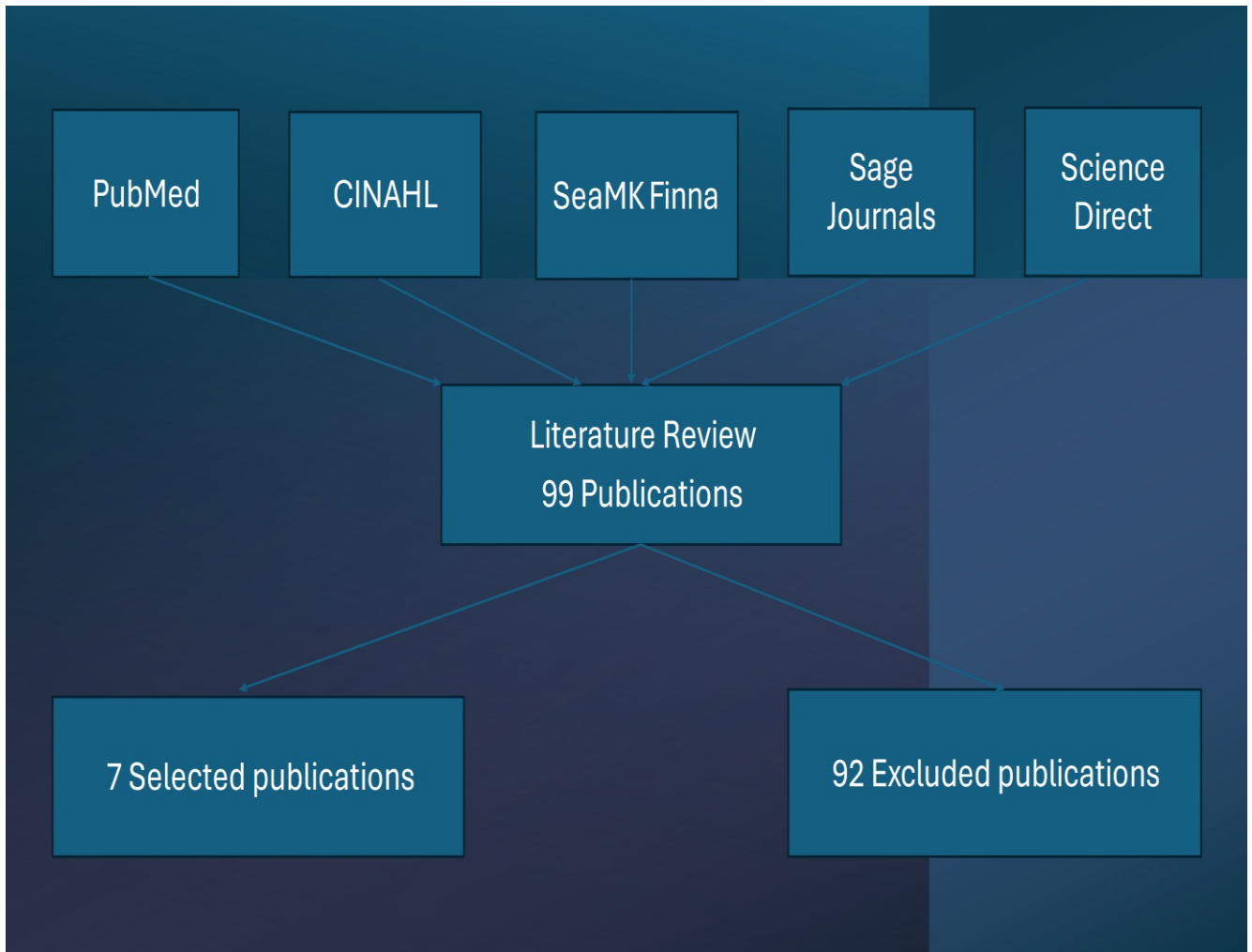


Figure 1. Data collection process

Table 1. Data inclusion and exclusion requirement

<b>Data inclusion requirement</b>	<b>Data exclusion requirement</b>
Articles whose results or analysis answer our research questions.	Articles whose applicability to our research topic was in doubt.
Articles that were published within the last 10 years (2013-2023)	Articles whose content were not entirely evidence based.
Articles that have been peer reviewed/ Articles that were published in English language.	Articles that were published in languages other than English language.
Articles that are evidence based in relation to our research topic and research questions.	
Articles that discussed risk factors and prevention of cervical cancer	

### ***4.3 Ethical Consideration***

Ethics, according to Assasi et al, 2014, refers to the concept of right and wrong that researchers must consider when doing their research. Ethics also deals with what is morally acceptable and undesirable to undertake. Vergnes et al., 2010, added that there are various ethical issues to consider, and that these issues vary depending on whether the researcher is undertaking primary or secondary research. The secondary technique is applied in this instance, and author attribution is the most important moral factor. At all times, all the arguments, counter arguments, theories, and empirical evidence cited in this research were clearly referred to the original author, and their name both cited in the body of text and added to the list of our bibliography. It is also important that all data sources used in this research are trustworthy and dependable. Only well-regarded databases and highly rated peer-reviewed articles and publications were used.

To ensure transparency and eliminate author(s) bias, it was crucial to offer each article or publication that was selected for the research an equal chance of being included or omitted. Consequently, all three authors jointly partook in the decision to include or exclude an article or publication, and that the justification for inclusion and exclusion strictly followed the data inclusion criteria previously discussed.

The Finnish National Board on Research Integrity (TENK) advocates for openness of data used in conducting research work. In the light of this, data used for this research was preserved and well documented. This was done to promote open science and to ensure that data used is available for further studies and to other researchers, (TENK, 2021).

This thesis was written according to the guidelines of Seinajoki University of Applied Sciences instructions for written work which provides a standard and guide for all written work in the institution. The authors participated in thesis seminars and attended courses in information seeking. The feedback from our supervisors equipped and guided us while writing this thesis.

The authors solemnly declare no conflict of interest.

#### **4.4 Data Analysis**

Inductive content analysis (ICA) was used to analyze data sets selected for this thesis. ICA is suited for studies or research that involves text-based data. It entails summarizing the content of different individual articles or publications in textual data. An assessment of how knowledgeable African women are on the risk factors, symptoms and prevention of cervical cancer was induced based on previous studies, observations and research conducted by other scholars. Thomas D. R, 2006, p.1, had stated that the inductive method of data analysis can be used to “condense raw textual data into a brief, summary format and to establish clear links between research objective and research findings”. The steps in this analysis method are data reduction, data grouping and finally organizing the data set into concepts that addressed our research objective.

Considering the scope of the research topic, research question and our target population, a qualitative analysis method was chosen for this study. Inductive content analysis was used.

It is a process of examining and interpreting non numerical data to understand the underlying meanings, patterns, and themes. This type of analysis is often used in social sciences, humanities, and other fields where data cannot be easily quantified or measured.

Table 2. List of articles

NO	REFERENCE	AIM	METHOD	RESULTS
1	Ebu, N. I., Mupepi, S. C., Siakwa, M. P., & Sampsell, C. M. (2014). Knowledge, practice and barriers toward cervical cancer screening in Elmina, Southern Ghana. <i>International journal of women's health</i> , 7, 31-39	To assess the level of knowledge of women about pap smear tests, determine the practices of women regarding Pap smear tests and to determine the barriers to Pap smear tests in Elmina, Ghana.	Cross sectional study of 392 randomly selected sexually active females aged 10 – 70 years using structured interview questions.	97.7% of the respondents had never heard about the Pap smear test. 68.4 % of the women had never heard about cervical cancer. 93.6% of the respondents had no knowledge of cervical cancer risk factors.
2	Osei, E. A., Stella, A., Judith, E. G., & Ezekiel, O. (2021). Knowledge on cervical cancer screening and vaccination among females at Oyibi Community. <i>BMC Women's Health</i> , 2021; 21 : 148	The study aimed to explore the knowledge on cervical cancer screening and vaccination among females at Oyibi community	A qualitative exploratory design was employed to purposely recruit 35 participants who were made up of 7 members in a group forming 5 focus group discussions in all.	The study revealed low knowledge on screening and vaccination of cervical cancer among women who participated in the study.
3	Antje, H., Ulrike, K., Theda, B., Bariki, M., Furaha, S., & Oliver H. Tanzanian women`s knowledge about	The study aimed to better understand cervical cancer	The study used a cross-sectional survey among prevACamp	The study revealed an alarming lack of knowledge about



	<p>cervical cancer and HPV and their prevalence of positive VIA cervical screening results. Data from a prevention and Awareness campaign in Northern Tanzania, 2017 – 2019.</p> <p>Global Health Action 2021, Vol. 14, 1852780</p>	<p>and HPV knowledge amongst female prevACamp participants and to determine the prevalence of precancerous lesions among women undergoing cervical cancer VIA screening</p>	<p>attendees in two regions in Northern Tanzania. Questionnaires and clinical data from VIA were used. Data was collected from October 2017 to March 2019.</p>	<p>cervical cancer and to a lesser extent about HPV amongst the study participants.</p>
4	<p>Tope, O., Oluwakemi, O. &amp; Mobolanle, R. B. Knowledge, attitude and practice of cervical cancer prevention among women residing in an urban slum in Lagos, Southwest Nigeria. Pan African Medical Journal, 2019; 32:130</p>	<p>The study assessed the knowledge, attitude and preventive practices toward cervical cancer among women living in an urban slum in Lagos, Nigeria.</p>	<p>This descriptive cross-sectional study was carried out on 305 women of reproductive age. Multistage sampling method was used to select the respondents. Data was collected using interviewer administered questionnaires.</p>	<p>The study results revealed that knowledge of cervical cancer, screening and HPV immunization was poor. Most study participants did not consider themselves at risk of cervical cancer.</p>
5	<p>Ayalign Mengesha, Anteneh Messele &amp; Biruk Beletew. Knowledge and attitude towards cervical cancer among reproductive age group women in Gondar town, Northwest Ethiopia. BMC Public Health (2020) 20:209</p>	<p>The aim of the study was to assess the knowledge and attitude of reproductive age group women towards cervical cancer in Gondor town.</p>	<p>A descriptive community based cross sectional study was carried out using an interviewer administered questionnaire for data collection. A</p>	<p>The overall knowledge of women towards cervical cancer was inadequate. Less than 80% of the participants lack knowledge that HPV is the causative agent</p>

			<p>multistage sampling was used to select the study participants. Descriptive statistics like frequency, mean and percentage were computed using SPSS version 20 software program.</p>	<p>for cervical cancer.</p>
6	<p>Jennifer F. D., Colette, M. K., Jyotika, B &amp; Firoza, H. Cervical cancer knowledge and screening uptake by marginalized population of women in inner city Durban, South Africa: Insights into the need for increased health literacy.</p>	<p>The study explored the levels of knowledge and screening rates of cervical cancer among vulnerable women living in the inner city of Durban, South Africa.</p>	<p>A mixed method study was conducted within the context of Women's Health outreach initiative. A pre-intervention survey was used to collect the data from 109 participants.</p>	<p>The study revealed that knowledge of cervical cancer was inadequate and that only a third of the women had previously been screened. Half of the participants tested positive for other STIs and a small number tested positive for HPV.</p>
7	<p>Ami, R., Moore &amp; Nichola Driver. Knowledge of Cervical Cancer Risk Factors Among Educated Women in Lome, Togo: Half-Truths and Misconceptions. Sage Open October-December 2014: 1 - 8</p>	<p>This study assessed what Togolese educated women know about cervical cancer and the accuracy of their knowledge. The</p>	<p>A cross-sectional survey of 97 educated women was conducted in Lomé, Togo. The participants were asked to freely list the risk factors known to</p>	<p>The results of the study revealed that the study participants had inaccurate knowledge about cervical cancer. Induced abortions and</p>

		study also examined the factors that correlate with accurate knowledge among women.	them and explain the reason why they thought those factors were risk factors.	poor sanitary practices were listed as risk factors of cervical cancer.
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Vishnu Renjith et al, 2021, defined Healthcare research as a systematic inquiry intended to generate trustworthy evidence about issues in the field of medicine and healthcare. It is known that qualitative, quantitative, and mixed methods are the most popular methods of research amongst researchers. The research methodology a researcher adopts depends on the research question and the type of data that would be used to conduct the research. While quantitative methodology deals with analyzing datasets with numerical values, qualitative methodology seeks to analyze text-based datasets. There has been an increased acceptance in the use of qualitative research methodology in healthcare research, (Al-Busaidi Z. Q., 2008, p. 1).

L P Wong, 2008, p. 14, attributed the increased acceptance and popularity of qualitative methodology to the inability of quantitative methodology to “provide insight into in-depth information about the attitudes, beliefs, motives, or behaviors of people, for example in understanding the emotions, perceptions and actions of people who suffer from a medical condition” (L P Wong, 2008). It is evident that quantitative research methodology is not suited to investigate these contemporary health issues or experiences. For qualitative research like ours, analysis of the datasets involves implementing a system that enables the researcher to thoroughly read through and efficiently organize the text-based datasets to enhance the understanding of the health challenge being understudied.

The process of analyzing qualitative datasets mainly includes categorization(coding) and visualization of the results. The essence of categorization is to condense the huge number of text-based datasets to enable the researcher to identify similar trends or any emerging

trends in the dataset as well as guide researchers in understanding their data through providing informed insight.

## 5 USING NVIVO 14 FOR CODING

Coding is the process of dividing text-based datasets into subgroups and thereafter, classifying them into different categories. Therefore, a code can be defined as a tag or label used for allocating identified themes or topics from data compiled in a study (Wong, L, 2008, p.14). Conventionally, colored pencils were used to code text-based datasets. Colors were used to separate the different subgroups in the text before cutting out the colored data and sorting it. However, following the advancement of computer programming, digital software(s) has been developed for categorizing data and these software(s) have steadily gained acceptance amongst researchers.

Notwithstanding the digitalization of coding, computer assisted qualitative data analysis software(s) cannot analyze qualitative datasets for a researcher. These computer software(s) are tools used to manage qualitative data. It is the responsibility of the researcher to read through the dataset, identify and create the codes as well as induce meanings from the dataset.

NVIVO 14 is a revolutionary computer assisted qualitative data analysis software which was developed by Lumivero. It can process data from different sources such as interviews, web pages, field notes, academic publications, audio files, video files and surveys and helps researchers to gain informed insights from diverse datasets. Researchers can import, organize, process, and visualize their data in NVIVO. Considering the convolution of organizing and analyzing big amounts of datasets in qualitative research, computer assisted software such as NVIVO 14 with enhanced data management features increases efficiency.

## 5.1 QUALITATIVE DATA ANALYSIS STAGES USING NVIVO 14

Table 3. Data analysis stages using NVIVO 14

STAGES	DETAILS
Stage 1: Create project	Research name. Description of the research Research attributes.
Stage 2: Data	Import datasets. Data classification Text files, video and audio hyperlinks are supported by NVIVO.
Stage 3: Coding and data analysis	Identify codes in the dataset. Create codes. Merge codes into hierarchies or sub themes they belong to. The type of relationships and sentiments can be assigned to the codes at this stage. Query
Stage 4: Visualization	Charts, Hierarchy charts, Maps and Cluster analysis Code book

The data analysis process was started on NVIVO 14 by creating and naming the project "Cervical Cancer Research". The project was described as academic research undertaken by Nursing students. Next, the seven datasets intended to be used for the analysis were imported. Each of the imported publications were assigned a number starting from number 1 to number 7. This was done so that we can be able to identify the source of each data used in the analysis. No video or audio data files were imported nor used in the data analysis. All the imported publications were carefully perused to understand the context of their content and to also help develop codes from our dataset.

Furthermore, the coding or categorization of all imported data was done. L, P Wong, 2008, p.14 had defined coding as the action of identifying a passage in a text document that reflects an idea or a concept and thereafter linking it to a node that represents that idea or

concept. In other words, a code and the identified segment of the passage must be conceptually related. There are two distinct methods of creating a code. The first method entails creating the code(s) before perusing through the data while the second method entails thoroughly reading through the data and then creating the codes as they arise from the data.

Table 4. List and description of codes used for data analysis.

Name	Description	Files	References
Information on CC screening and vaccination	Information relating to cervical cancer screening and HPV vaccination	0	0
CC screening and vaccination centers	Information on where to find cervical cancer screening and vaccination centers	3	3
CC screening and vaccination sources of information	Means of receiving information on cervical cancer screening and vaccination	4	4
CC vaccination	Information about HPV vaccine	2	2
CC vaccine effectiveness	Trust in the effectiveness of HPV vaccine	2	2
Procedure for CC screening	Information on how cervical cancer screening is done	2	2
Types of CC screening	Information on the different types of cervical cancer screening	6	7
Personal experience		0	0
Aware of CC screening and vaccination cost	Personal experience about the cost of cervical cancer screening and HPV cost	1	1
Never heard about CC	No prior information or news about cervical cancer	3	4
Not Aware of CC SPR	Individual insights about cervical cancer symptoms, prevention, and risk factors	5	10

Table 4 above shows the list and description of codes derived while thoroughly perusing or reading through the seven imported datasets used for this analysis. Nine different codes were derived from the dataset as described above. Files show the number of datasets each of the codes were found at while references reflect the number of times the codes appeared throughout the entire dataset.

To categorize a sentence, phrase, or paragraph, in NVIVO 14 under a particular code, highlight the sentence or phrase or paragraph and drag it the code it belongs to. This can be done under the coding section. NVIVO 14 displays texts already assigned to a given code in colors, bold fonts, and attaches a coding stripe. This is like the traditional color coding done on paper using inks and colors. NVIVO uses coding stripes to link a sentence or text to a particular code.

The query features were not used, nor did we assign a relationship (positive or negative) type for the codes. This was because both features were inconsequential to the research question. We repeated this process for all imported datasets, associating the texts with the right codes before proceeding to the last stage of the analysis. The goal was to code texts found in the dataset that reflects the knowledge level of African women on cervical cancer. These texts contained either individual personal experiences or acquired information on cervical cancer.

The visualization stage is the last phase in the data analysis process. In this phase, NVIVO 14 displays the results of coding, a code book and a frequency table showing the number of times each of the codes appeared on the data set. The rigor NVIVO 14 brings to bear, adds greater reliability to its data analysis process. Finally, the data contained in the frequency table was exported to Excel program where a bar chart was generated to show the number of times each of the codes appeared throughout the dataset.



## CATEGORIZATION OF CODES, SUB THEMES AND THEME

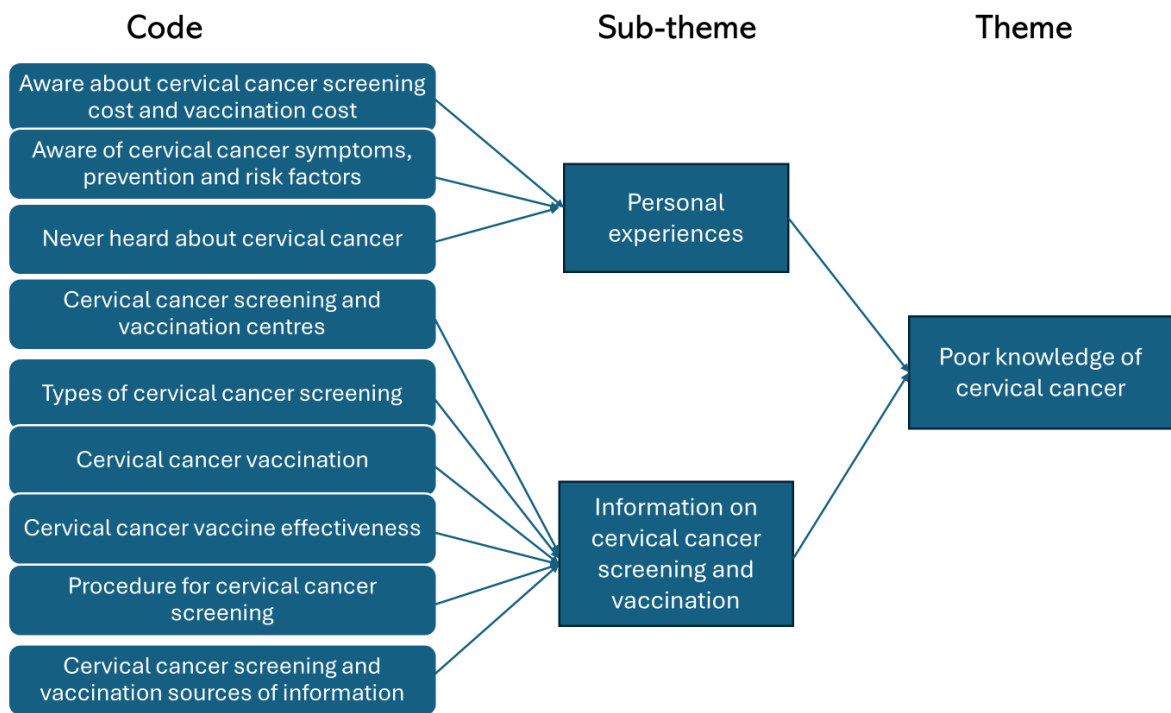


Figure 2. Categorization of codes to sub themes and main themes.

Table 5. NVIVO 14 Code book

CODE	REFERENCES	FILES
Never heard about CC	4	3
Not Aware of CC SPR	10	5
Types of CC screening	7	6
Aware of CC S and V cost	1	1
Procedure for CC screening	2	2
CC vaccine effectiveness	2	2
CC vaccination	2	2
CC S and V centers	3	3
CC S and V information	4	4

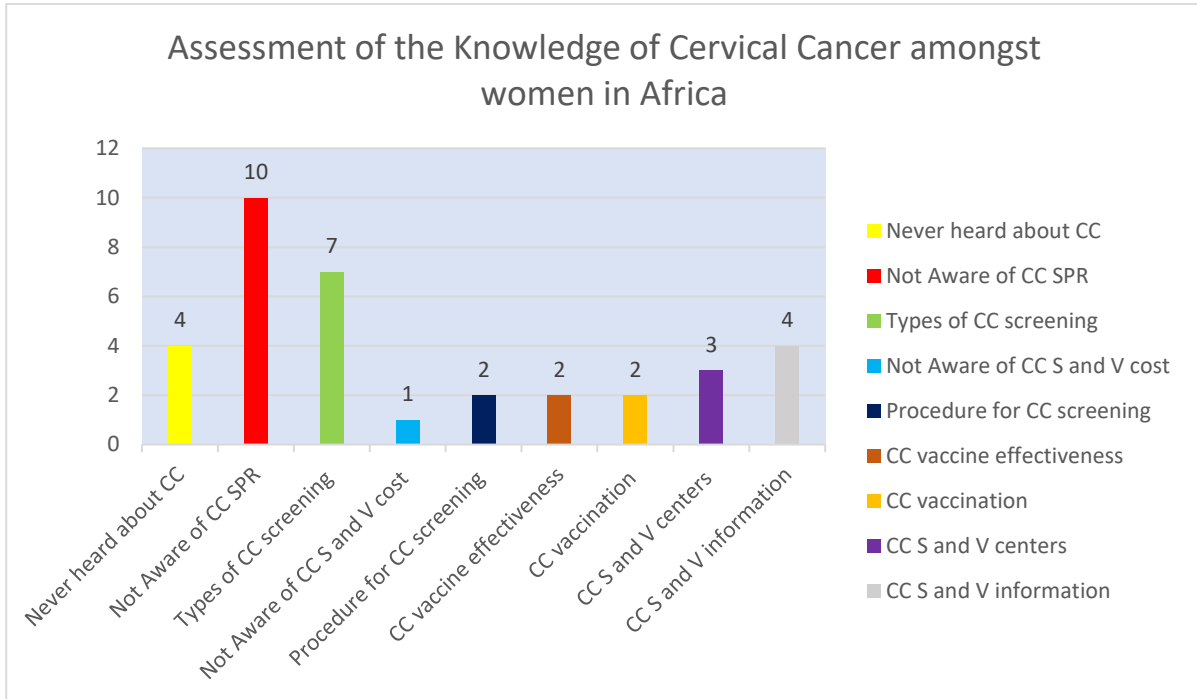


Figure 3. Frequency chart showing codes

## **6 RESULTS OF DATA ANALYSIS**

A total of 5029 sexually active women participated in the seven studies (dataset) used for this research. Nine codes were deduced from our dataset. Two sub themes and one theme emerged from our study. The deduced codes reflect cervical cancer knowledge level amongst African women. The codes were divided into two sub themes which contains information on personal experiences of African women about cervical cancer and information relating to acquired information on cervical cancer.

There were differences in the number of times each of the codes emerged throughout the dataset. However, it is remarkable to note that eight codes out of the nine codes appeared at least twice within the data with one code significantly appearing ten times within the entire data. Knowledge about cervical cancer screening, prevention and risk factors including cervical cancer screening types were particularly poor. The result of the analysis also shows that there were women who have never heard about the existence of cervical cancer and some other women who do not know the location of cervical cancer/HPV screening and vaccination centers.

### **6.1 AWARE ABOUT CERVICAL CANCER SCREENING AND VACCINATION COST**

The results of data analysis shows that one participant knew the cost of cervical cancer screening and vaccination hence the code only appeared once in our dataset. The prices for the screening and vaccination may be different in several locations across the African continent. However, lack of knowledge about the cost for cervical cancer screening and vaccination may give room to misconceptions about the cost. Misinformation regarding the screening and vaccination cost contributes to discouraging women to go for screening.

It is also evident from paper 2 that 97% of the study participants could not afford the financial cost of the Pap smear test. This was because the Pap smear test is not covered by the National Health Insurance Scheme.

## **6.2 AWARE OF CERVICAL CANCER SYMPTOMS, PREVENTION AND RISK FACTORS**

It is known that precancerous and cancerous lesions are caused through infection with high-risk HPV strains, particularly HPV 18 and 16. Likewise, high risk sexual behaviors are clinically proven to predispose individuals to the risk of HPV infection among other well established risk factors. It was evident from the results of our analysis that information on cervical cancer symptoms, prevention and risk factors was significantly poor as this code repeatedly emerged throughout our data. Having an understanding about the pathology of a disease or being informed about a disease can improve both the treatment and prevention outcome.

Information from paper (data) 4 shows that “Majority of the respondents did not know the symptoms of cervical cancer (90.8%), cervical cancer screening (92.1%) and HPV immunization (98.4%) (Tope Olubuodun et al, 2017).

Furthermore, 65.1% (501) of the study participants from paper (data) 3 are/were aware of cervical cancer. “59.7% (299) of them replied they didn’t know the risk factors of cervical cancer, majority, 81.4% (408) of the participants didn’t know whether cervical cancer is caused by HPV or not” (Ayelign Mengesha et al, 2020).

“Concerning prevention and treatment, only 327 (65.3%) and 214 (42.7%) said that cervical cancer is preventable and curable respectively (Ayelign Mengesha et al, 2020).

## **6.3 NEVER HEARD ABOUT CERVICAL CANCER**

It is alarming to note that some women do not have any prior knowledge, nor have they heard about cervical cancer. Different factors such as literacy level may be responsible for this circumstance. However, throughout our dataset, there is a good number of study participants who very rarely or never heard about cervical cancer. This code ranked third as the most recurring code in our data. Quotes extracted from paper (data) 2 shows that a significant number of women have never heard about cervical cancer. This certainly poses a challenge to the eradication of cervical cancer.

“More than half (68.4%) of the women have never heard about cervical cancer” (Nancy Innocentia Ebu et al, 2014, p. 31–39).

Similarly, quotes from paper (data) 4 show a very low awareness of cervical cancer in a sampled population. “Most of the respondents (98.7%) have not heard about cancer but only 39 (12.8%) had heard of cervical cancer “(Tope Olubuodun et al, 2017).

It is also evident that 1644 (75%) of the participants in paper (data) 5 have never heard about HPV infection and 731 (33%) reported that they have never heard of cervical cancer. 2192 women were interviewed for this study (Antje Henke et al, 2021).

#### **6.4 CERVICAL CANCER SCREENING AND VACCINATION CENTERS**

The elimination of cervical cancer depends largely on the access to screening and vaccination. However, access to the screening and vaccination centers is very limited in low- and middle-income countries. From the analysis of our data, women face challenges such as screening and vaccination centers being too far away from their communities or not having or knowing any screening and vaccination centers located in their communities. These challenges hamper or prevent women from undergoing screening, vaccination and getting reliable information on cervical cancer.

Three hundred and eighty-seven participants in paper (data) 2, which corresponds to 99.4% of the study participants noted that screening facilities were not available in their community. The nonexistence of screening centers in communities such as this can negatively affect or discourage women from undergoing HPV screening.

#### **6.5 TYPES OF CERVICAL CANCER SCREENING**

Cervical cancer screening aims to detect precancerous changes or the early stage of cervical cancer in women before symptoms develop. The two primary types of cervical cancer screening are the pap smear test and the human papillomavirus (HPV) test (National Cancer Institute, 2022). Pap smear test is designed to detect the abnormal changes in the

cells of the cervix which may indicate precancerous or cancerous conditions while the human papillomavirus (HPV) test is designed to seek for high-risk strains of the virus, which is a sexually transmitted infection linked to the development of cervical cancer.

Furthermore, a combination of pap smear and HPV testing may be carried out. This is known as co-testing. Co testing leverages the strengths of both methods of cervical cancer screening. A combination of these two tests improves the overall sensitivity and specificity of cervical cancer screening.

This study has shown that women within the African continent have poor or insufficient knowledge about cervical cancer screening types. Listed below are some of the quotes from our study participants when asked questions about cervical cancer screening types. These quotes were extracted from paper (data) 1.

“No please, I have no ideas about what you are asking for. I don’t know of any effective and efficient screening that is done. The only thing I know is the blood they take doing antenatal services” (Evans Appiah Osei et al, 2021, p.1–9).

“For where I am, I don’t know much about screening that is done; it is only pap smear that I have heard of but that one too, I don’t know much about it and I have not done it myself, my friends told me about it” (Evans Appiah Osei et al, 2021, p.1–9).

## **6 .6 CERVICAL CANCER VACCINATION**

The clinical use and administration of HPV vaccination commenced in 2006. The World Health organization has sustained efforts to ensure the availability of these vaccines, although there is disparity in its accessibility across the world. Access to the vaccine is more in high income countries when compared to low-income countries (Lisa Rahangdale et al, 2022). Less than 25% of low-income countries have human papillomavirus vaccination as part of their national immunization schedules. Most gaps in the introduction and coverage of human papillomavirus vaccines are in regions of Africa and Asia where the burden of cervical cancer is also high (WHO,2022).

The high incidence rates of cervical cancer within the African continent are exacerbated by low awareness of the existence of cervical cancer vaccine or outrightly casting doubt on the effectiveness of the vaccine. amongst African women. This can be seen from the responses of the participants in paper 1.

“I don’t know if there are vaccines available for preventing cervical cancer. I don’t have any idea about the vaccine but i think maybe it is part of the vaccination we were given when we were young like polio and the rest” (Stella Appiah et al, 2021).

“I have heard of it but I don’t know if it is injected or poured into the mouth like the vitamin A vaccine given” (Stella Appiah et al, 2021).

## **6.7 CERVICAL CANCER VACCINE EFFECTIVENESS**

Theoretically, HPV vaccination lowers the chances of developing cervical cancer in the future by preventing the first infection with high-risk HPV strains. Evidence from both randomized trials and population-based studies have shown that vaccination against human papillomavirus reduces the incidence of cervical pre-cancer (Lisa Rahangdale et al, 2023) It is known that beliefs are a significant determinant in vaccine uptake (Joel Fokom et al, 2019, p. 1). Casting doubt on the effectiveness of cervical cancer vaccines can negatively impact future uptake of vaccination. From our data, it was revealed that some of the participants believed that the cervical cancer vaccine is effective, and some women also believed that the vaccine is not effective against cervical cancer.

Quotes relating to the effectiveness of the cervical cancer vaccines shows that some the respondents believe that “the vaccine may cause sexually transmitted infections, could have negative health effects and that the vaccine could encourage promiscuity among young people”.



## 6.8 PROCEDURE FOR CERVICAL CANCER SCREENING

The healthcare provider collects a sample of the cells from the cervix using a spatula or a small container. The cell samples are then examined under a microscope for any abnormalities. Pap smear test works on the principle that precancerous or cancerous cells exfoliate from the cervix into the vaginal conduit. When these abnormal cells are detected using the microscope, healthcare providers can then intervene and prevent further progression to cervical cancer (National Cancer Institute, 2022). The procedure for HPV testing is like a pap smear test. After collecting sample cells from the cervix, these cells are further analyzed for the presence of high-risk HPV DNA. Some of the study participants reported that they do not know how cervical cancer screening is done. This code appeared twice within our dataset. This is evident from the responses of the study participants from paper (data) 1.

“I don’t know how the screening is done like the step-by-step process because I have not done it before and I am not aware of it “(Osei et al, 2021, p.1–9).

“I know about the condition, and it is a cancer that affects women, and we need to screen but i don’t know how the screening is done because I was not paying attention when the program was going on. I know that occasionally you need to screen to know your status and if it is discovered that you have then they will treat you, so that you can get better” (Evans Appiah Osei et al, 2021, p.1-9).

## 6.9 CERVICAL CANCER SCREENING AND VACCINATION SOURCES OF INFORMATION

Cervical cancer information was mainly obtained from social media, family, friends, physicians as well as radio and television health programs. It is important that the information source is reliable and contains clinically correct information. Many of the participants got information from their personal doctors while social and conventional media was the second most used source of information.

Quotes from paper (data) 4 shows that “Most of the respondents` knowledge of cervical cancer came from the media and the hospital”.

It can also be seen from quotes in paper 5 that “Mass media was the major source of information” as reported by 41.1% of the study respondents.

Similarly, quotes from paper (data) 4 show a very low awareness of cervical cancer in a sampled population. “Most of the respondents (98.7%) have not heard about cancer but only 39 (12.8%) had heard of cervical cancer” (Tope Olubuodun et al, 2017).

It is also evident that 1644 (75%) of the participants in paper (data) 5 have never heard about HPV infection and 731 (33%) reported that they have never heard of cervical cancer. 2192 women were interviewed for this study (Antje Henke et al, 2021).

## 7 DISCUSSION

Limited awareness exists on the cause, prevention and the risk factors associated with cervical cancer among African women aged 25 - 49. Similarly, this demographic group has the highest incidence rates of cervical cancer compared to other regions of the world (WHO, 2018). Cervical cancer stands as the predominant cancer affecting women in Africa, with an estimated 604 000 new occurrences in 2020. The World Health Organization also reported that cervical cancer accounted for 342 000 deaths in 2020 and that 90% of those deaths occurred in low- and middle-income countries in the African continent. All but one of the top 20 countries globally with the highest burden of cervical cancer in 2018 were in Africa. However, the underlying factors contributing to this escalating burden of cervical cancer remain largely undefined among African women. Thus, the current study aimed to investigate the levels of awareness and knowledge, perceptions of self-vulnerability towards the course, prevention, and risks factors of cervical cancer among African women.

The results of this study revealed a low level of awareness about cervical cancer among African women. The findings of this study are consistent with the findings of other previous academic studies such as (Ebu et al., 2014, p. 31–39). However, there are differences in cervical cancer awareness among these women. Women residing in urban areas or areas close to urban areas had an idea about the causes, prevention and risk factors of cervical cancer while women living in suburban or rural communities were less knowledgeable about cervical cancer causes, prevention and risk factors (Mapanga, 2018, p. 18-29). Women living in these communities have less access to healthcare services and screening centers compared to women living in urban areas.

The low socioeconomic status of women living in rural communities contributes to their inability to afford the cost of screening services and HPV vaccination (Mapanga, 2018, p. 18-29). This is further exacerbated by the non-existence or poor implementation of national health insurance schemes in some of these African countries. Notwithstanding the above, few of the women population living in villages were knowledgeable about the disease but are impeded from seeking for screening and vaccination due to lack or limited finances. These findings mirror those of previous research conducted in Africa among women (Osei et al., 2021, p.1–9). Considering the escalating health burden posed by cervical cancer among African women, these findings underscore the importance of enhancing the quality of information

dissemination. regarding cervical cancer. Therefore, there is a need to develop tailored promotional messages and utilize multiple communication channels, including the mass media, to reach a broader audience effectively.

Studies on the knowledge of African women regarding the causes, prevention, and risk factors of cervical cancer vary in findings compared to research conducted by other authors. In some studies, African women demonstrate a lower level of awareness and understanding of cervical cancer (Ebu et al., 2014, p. 31–39). According to Osei et al., (2021, p.1–9), African women revealed low knowledge on screening and vaccination of cervical cancer compared to women in more developed countries. For example, they may lack knowledge about the role of HPV infection in cervical cancer development or the availability of preventive measures such as HPV vaccination (Antje et al., 2021). Additionally, awareness of screening methods like Pap smears or HPV testing may be limited among African women, leading to lower uptake of preventive measures (Osei et al., 2021, p.1–9) and (Ebu et al., 2014, p. 31–39). Cultural and religious factors, socioeconomic status, and limited access to healthcare services can contribute to these disparities in knowledge.

Conversely, other studies may find that African women have comparable levels of knowledge regarding cervical cancer causes, prevention, and risk factors to women in other regions (Tope et al., 2019). Factors such as targeted education campaigns, improved access to healthcare services, and increased awareness through community outreach programs can contribute to higher levels of knowledge among African women in these studies (Tope et al., 2019).

Additionally, advancements in technology and communication may facilitate the dissemination of information about cervical cancer prevention and risk factors to a broader audience in African communities living in the urban areas. While according to Ayelign et al., 2020, the knowledge of women toward the causes, prevention and risks factors of cervical cancer was inadequate as less than 80% of the population lacked the knowledge about the disease while (Ami et al., 2014) concluded that the population have inaccurate knowledge about cervical cancer as induced abortion and poor sanitary practices were listed as risk factors of cervical cancer.

Religion also seems to impact the levels of knowledge about cervical cancer (Osei et al., 2021, p.1–9). It's not surprising, given that religions, which showed limited knowledge about cervical cancer, promote conservative attitudes toward sexuality and even hospitals as they believe

that God will heal them in case of sickness and if he doesn't it means that the illness is God's way of bringing them closer to him.

Additionally, religious beliefs and practices can predict the likelihood of undergoing clinical examinations for cervical cancer (Osei et al., 2021, p.1-9) and (Ami et al., 2014) This rationale supports the idea of integrating information and prevention campaigns about cervical cancer into the school curriculum.

In some cultures, it is expected that married women within reproductive age must or should seek permission from their husband before seeking for such screening. These types of religious and cultural practices forbid women from exposing their bodies to male medical practitioners without the express permission from their husbands. Then add citation...some studies have been carried out about such cultural practices.

Overall, seven articles were used to carry out this study and all the authors came out with the same conclusion as we did, that African women between the age of 25- 49 lack adequate knowledge about the causes, prevention and the risks factors of cervical cancer. While there may be variations in the knowledge of African women on cervical cancer compared to other regions, efforts to improve awareness, education, and access to preventive measures can help bridge these gaps and reduce disparities in cervical cancer outcomes globally.

The study's findings reveal that the effectiveness of clinical management practices for cervical cancer in Sub-Saharan Africa, along with the role of healthcare professionals, can be categorized into three main treatment approaches: primary, secondary, and tertiary care. Primary prevention aims to lower the risk of infection and reduce the prevalence of HPV, a common sexually transmitted infection. Vaccination against HPV, targeting individuals aged nine to thirteen, is recommended to prevent infection, as studies suggest that a significant portion of HPV infections occur within two years of sexual activity initiation, typically around 13 to 15 years of age in African girls (Romanowski et al., 2014).

While the World Health Organization (WHO) advocates for HPV vaccination inclusion in national immunization programs, many African countries still lack access to these vaccines, with only a few, such as South Africa, Lesotho, Rwanda, and Uganda, implementing efficient

national programs. In 2013, the Global Alliance for Vaccines expanded its vaccine program to more countries in sub-Saharan Africa, yet barriers persist, including limited emphasis on vaccinating boys, parental hesitancy towards vaccines, and challenges in accessing remote areas (Friedman et al., 2014). Other preventive measures include promoting condom use, male circumcision, and reducing the number of sexual partners.

In clinical management, practitioners fulfill various roles, spanning from secondary to tertiary prevention (Collins, 2019). Secondary prevention involves methods like screening, particularly through Pap smears, to detect cancer early and prevent its progression. However, in many African countries, challenges like limited infrastructure and follow-up systems hinder widespread Pap smear utilization (Ports et al. 2015). Alternative screening methods endorsed by WHO, such as visual inspections, offer effective options in resource-constrained settings. Tertiary prevention targets invasive cervical cancer, crucial as late-stage diagnoses are common in Africa, limiting treatment options to palliative care for many patients due to inadequate facilities (Collins, 2019, p.1–4). Consequently, mortality rates for cervical cancer in African countries are significantly higher compared to developed nations, highlighting the urgent need for improved access to screening and treatment facilities to reduce the burden of the disease (Rosser et al., 2015).

Cervical cancer is the most common cancer in women worldwide. It is curable and preventable when diagnosed in an early stage, but when care is not taken, or neglected it can cause a life. HPV virus is the main cause of cervical cancer. Nurses are among the healthcare professionals which are easy to reach and most influential in society. They play a critical role in preventing cervical cancer in their communities through various initiatives and activities. Nurses educate communities about cervical cancer risk factors, symptoms, prevention strategies, and the importance of early detection through workshops, community talks, and health campaigns. (Li et al., 2020).

Nurses raise awareness about the availability and benefits of HPV vaccination, encouraging women and adolescents to get vaccinated. Nurses provide information on the importance of regular cervical cancer screening, such as Pap smears and HPV testing, and help dispel myths and misconceptions surrounding these procedures. Nurses administer HPV vaccines as part of national immunization programs, school-based vaccination campaigns, and outreach

initiatives. They ensure vaccine availability, storage, and proper administration, including adherence to vaccination schedules (Odunyemi et al. 2018).

Nurses monitor vaccine coverage rates and implement strategies to reach underserved populations, including remote rural areas and marginalized. Nurses perform cervical cancer screenings, including Pap smears and HPV testing, in clinical settings such as health centers, clinics, and mobile outreach units. They provide counseling and support to women undergoing screening, addressing fears and concerns, and promoting adherence to follow-up appointments. Nurses facilitate access to screening services by organizing screening camps, conducting community outreach, and providing transportation assistance to women in need (O'Connor et al., 2021, p. 3).

According to (Caixia Li a et al., 2020) in a nurse-led intervention, nurses play a major role in decision-making in patient care. They also contribute to early cancer detection in several ways. Nurses offer education and counseling about cancer symptoms, risk and screening methods to enable them to be aware of the symptoms of cancer and how to seek early treatment.

In Ghana, nurses act as frontline personnel whose aim is to provide support and promote health education to society. They assist in the triage and referral of women with abnormal screening results for further evaluation and treatment. They provide pre- and post-treatment counseling, education on treatment options, and support for women undergoing procedures such as colposcopy, biopsy, and cryotherapy. Nurses collaborate with multidisciplinary teams, including physicians, gynecologists, and oncologists, to ensure comprehensive care for women diagnosed with cervical cancer (Ebu et al., 2014, p. 31–39).

Nurses play a crucial role in follow-up care for women after treatment for precancerous lesions or cervical cancer. However, their competence is also very beneficial in educating the public about cervical cancer. They monitor patients for recurrence, provide ongoing education on lifestyle modifications and risk reduction strategies, and offer psychosocial support to address emotional and social needs. Nurses empower women to advocate for their health, encourage regular health check-ups, and promote adherence to recommended screening and vaccination guidelines. Moreover, nurses engage with community leaders, policymakers, and stakeholders to advocate for the prioritization of cervical cancer prevention and control efforts and having sufficient outline to provide accurate information on cervical cancer can aid in removing the

obstacles preventing more people from getting screening for the disease and can help eliminate the barriers low uptake of cervical cancer screening (Mugassa and Frumence, 2019).

They participate in advocacy campaigns to raise awareness, mobilize resources, and address barriers to access such as cost, transportation, and cultural beliefs. Nurses collaborate with local organizations and government agencies to develop and implement evidence-based interventions tailored to the specific needs of African communities. To improve the nurse-patient connection, nurses must learn how to be self-aware and understand their patients' needs. (Rasheed et al., 2019).

Nurses contribute significantly to the prevention, early detection, and management of cervical cancer in African populations, ultimately improving women's health outcomes and reducing the burden of this preventable disease.



## 8 CONCLUSION

In conclusion, addressing the course, prevention, and risk factors associated with cervical cancer among African women aged 25-49 was presented as a multifaceted challenge. Various dimensions of this pressing issue were delved into, shedding light on the unique circumstances and factors that contributed to its prevalence and impact within this demographic. The critical role of education and awareness in combating cervical cancer was highlighted, empowering African women to take proactive steps for prevention and early detection by grasping the risk factors, such as human papillomavirus (HPV) infection, lack of screening, and limited access to healthcare services.

Furthermore, the importance of culturally sensitive interventions and community-based approaches was emphasized, recognizing the diverse sociocultural contexts in which cervical cancer manifested and facilitating the design of effective prevention strategies that resonated with African women and their communities. Moving forward, prioritizing comprehensive healthcare systems that offer accessible and affordable screening programs, HPV vaccination campaigns, and treatment options tailored to the needs of African women was deemed essential.

Collaboration among governments, healthcare professionals, NGOs, and grassroots organizations was seen as pivotal in driving progress and alleviating the burden of cervical cancer across the continent. Ultimately, fostering a shared commitment to education, prevention, and equitable healthcare access was aspired to, envisioning a future where cervical cancer was no longer ranked as a leading cause of mortality among African women aged 25-49. Continued collective efforts were encouraged to ensure that every woman had the opportunity to lead a healthy and fulfilling life, free from the threat of cervical cancer.

## **8.1 LIMITATION OF THE STUDY**

One significant drawback of this research was the abundance of articles identified, prompting the need to refine the exclusion criteria to reduce the pool of results. However, this refinement unintentionally resulted in the exclusion of potentially valuable material. Among this excluded material could have been insights into disease epidemiology and advancements in cancer medicine relevant to African cancer research.

## **8.2 RECOMMENDATIONS OF FUTURE RESEARCH**

Future researchers are advised to address some key areas. Firstly, there is a necessity for studies that delve into the strategies aimed at enhancing the status of cervical cancer in Africa, with a specific emphasis on mitigating the concerning portrayal depicted by existing research. Additionally, it is crucial to investigate the contributions of governments and non-governmental organizations (NGOs) in offering remedies, particularly to residents of rural areas. Studying behavioral patterns and lifestyles can offer valuable insights into how they influence the development of cervical cancer, thus enabling the implementation of targeted interventions. Additionally, research into factors affecting the acceptance of screening, such as stigma surrounding digital rectal examination (DRE), and the expansion of screening service accessibility are crucial for planning and enhancing the uptake of cervical cancer screening among African women.

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## **APPENDICES**

Appendix 1. How to add appendices

Appendix 2. Planning of marketing

Appendix 3. How to add appendixes if the template does not include appendices







