

**SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
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**FACTORS AFFECTING THE ACCEPTABILITY OF CERVICAL CANCER
SCREENING AMONG YOUNG WOMEN (18-35 YEARS) IN THE GREATER
ACCRA REGION, GHANA.**

By

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APRIL, 2025

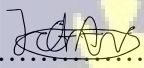


**A DISSERTATION SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN
PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF
MASTER OF PUBLIC HEALTH**

DECLARATION

I, George Johnson, declare that this thesis titled “FACTORS AFFECTING THE ACCEPTABILITY OF CERVICAL CANCER SCREENING AMONG YOUNG WOMEN (18-35 YEARS) IN THE GREATER ACCRA REGION, GHANA.” was achieved independently under the supervision of Professor Alexander Ansah Manu. I further declare that excerpts from other people’s investigations have been duly acknowledged, and this work is the result of my original research.

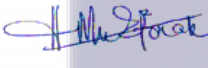
I affirm that this dissertation either in whole or in part has not been presented elsewhere to another degree.

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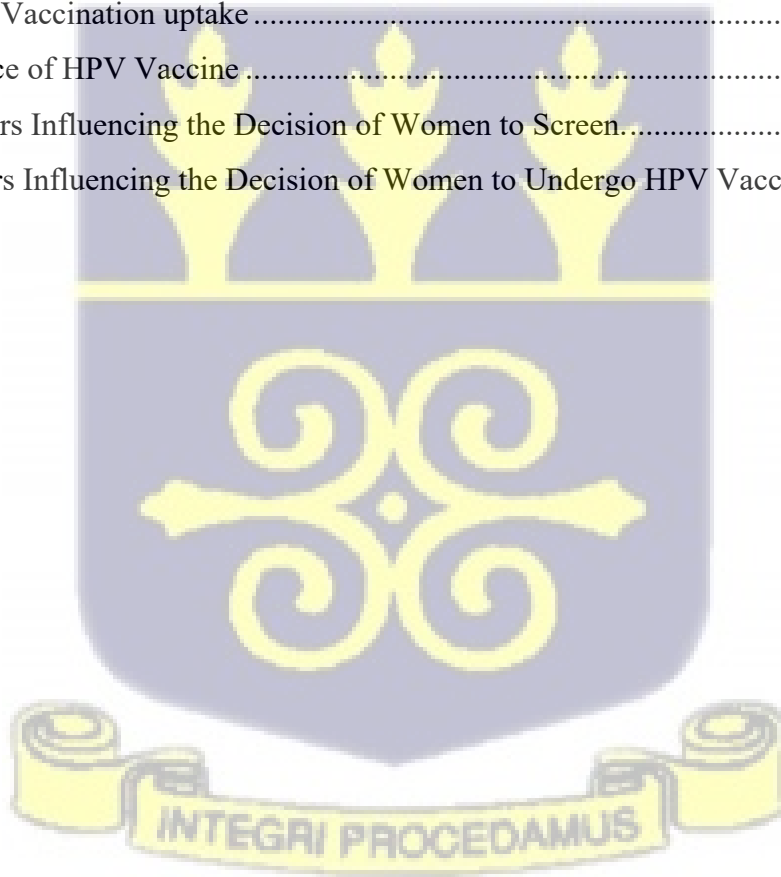
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LIST OF ABBREVIATIONS.

CxCA	Cervical Cancer
SSA	Sub-Saharan Africa
LMICs	Low and Middle-Income Countries
HPV	Human Papilloma Virus
GAR	Greater Accra Region
hr-HPV	High-Risk Human Papilloma Virus
VIA	Visual Inspection with Acetic Acid
USPSTF	United States Preventive Services Task Force
CIN	Cervical Intraepithelial Neoplasm
VLP	Virus-like Particle



ABSTRACT.

Background: About 85% of all Cervical Cancer (CxCA) cases occur in low- and middle-income countries (LMICs). Prophylactic HPV vaccination can prevent the disease, but when it occurs, early detection through screening significantly reduces morbidity and mortality. Increasing screening and vaccination uptake is key to lowering CxCA incidence in these regions.

Aim: To identify the factors affecting the acceptability and uptake of cervical cancer screening and HPV vaccination among young women (18-35 years) in the Greater Accra region, Ghana.

Methods: This cross-sectional study used a mixed-methods approach. Women 18-35 years old living in the Greater Accra Region were recruited for this study. Quantitative questionnaires were used to collect data on acceptability and uptake of vaccination and screening for early disease. Crude associations were tested using chi-squared and Fisher's exact tests. Ordinary and Firth logistic regression models were fitted to determine factors associated with the acceptability and uptake of screening and vaccination. Qualitative data were transcribed verbatim into Microsoft Word. Analysis involved repeated reading and identification of themes, their interrelationships and their contextual interpretations. The quantitative and qualitative data were triangulated using the pillar approach.

Results: The acceptability of screening for early cervical changes was 64.4% whilst the uptake was 4.7%. HPV vaccination acceptability was 56.5% whilst the uptake was 1.39%. Awareness was associated with uptake of both screening and vaccination. Knowledge of CxCA and access to a screening and vaccination facility were associated with the acceptability of both screening and vaccination. Awareness of vaccination was associated with 4.32 [AOR: 5.09; 95% C.I: 1.29,21.0; p-value:0.02] increased odds of screening and 3.69 [95% C.I: 1.70,8.02; p-value:0.001] increased odds of vaccination.

Conclusion: Being in a union and knowledge of CxCA were associated with screening.

Awareness of vaccination was a determinant for both screening and vaccination uptake. This emphasises the need to increase education on CxCA Screening and HPV Vaccination particularly in local languages.



DEDICATION.

I dedicate this work to my mother, Miss Ruth Pamela Aryeh, my brother, Lloyd Andrew Johnson and my aunt, Mrs Josephine Nelson, for their unwavering support during my studies.



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CHAPTER ONE.

1.0 INTRODUCTION.

1.1 BACKGROUND.

Cervical Cancer (CxCA) ranks fourth among the most recorded cancers in females globally. About 13.3/100,000 cases are recorded worldwide annually with a corresponding mortality rate of 7.2/100,000 (D. Singh et al., 2023). However, there are disparities in the disease's distribution with lower incidences and associated mortality recorded in developed countries. About 85% of incidence and mortality occur in Sub-Saharan Africa (SSA) and other underdeveloped regions (LaVigne et al., 2017). The incidence rate in high-income North America is 5.7/100,000 and the mortality rate is 1.7/100,000. In West Africa, the incidence rate is estimated to be 33.7/100,000 with a corresponding mortality rate of 24/100,000.

This makes the disease one of sub-Saharan Africa's greatest public health concerns. In Ghana, it stands at 29.3/100,000 with a mortality rate of 23.8/100,000 (Frick et al., 2023; Ntekim & Ntekim, 2012; Pimple & Mishra, 2022). In the Greater Accra Region (GAR), the age-standardised incidence rate is estimated to be 24.5 (CI:22.9-26.1) per 100,000 (Nartey et al., 2018).

The disparities in incidence and mortality rates between Low- and Middle-Income Countries (LMICs) and developed countries could be attributed to factors such as access to and uptake of vaccines and screening, quality of healthcare systems, socioeconomic status, level of awareness, cultural/traditional and social barriers (Beddoe, 2019; Mullapally et al., 2022; Petersen et al., 2022).

The natural history of the disease is well understood and the evidence is unequivocal that early detection and prophylactic Human Papillomavirus (HPV) vaccination lead to more favourable outcomes (Ong et al., 2023). Cervical cancer can be prevented by screening for and treating precancerous lesions at any stage of its natural history, halting the natural progression (Mishra

et al., 2011). CxCA mortality and morbidity have been reduced worldwide over the decades through screening and early detection(Nygård et al., 2007). In the US and Canada, robust screening programs have reduced CxCA rates by 50-80%(Eun & Perkins, 2020).

Commonly employed screening techniques include the Papanicolau smear, High-risk Human papillomavirus (hr-HPV)-DNA testing and visual inspection of the cervix. The PAP smear involves the collection of cells from the cervix and examining them for cytologic changes consistent with CxCA. HPV-DNA screening also involves collecting cells from the cervix however, these cells are tested for the presence of high-risk HPV DNA since the virus is a risk factor for the development of CxCA. Visual inspection involves applying acetic acid or lugol's iodine to the cervix and visually inspecting it for any abnormalities that may indicate cervical cancer or precancerous lesions(Gates et al., 2021; Stumbar et al., 2019). These screening tools act as secondary methods for preventing the condition since they do not prevent the development of pre-cancerous lesions but enable them to be identified early and decisive action taken before they progress into cancerous lesions(Zhang et al., 2020).

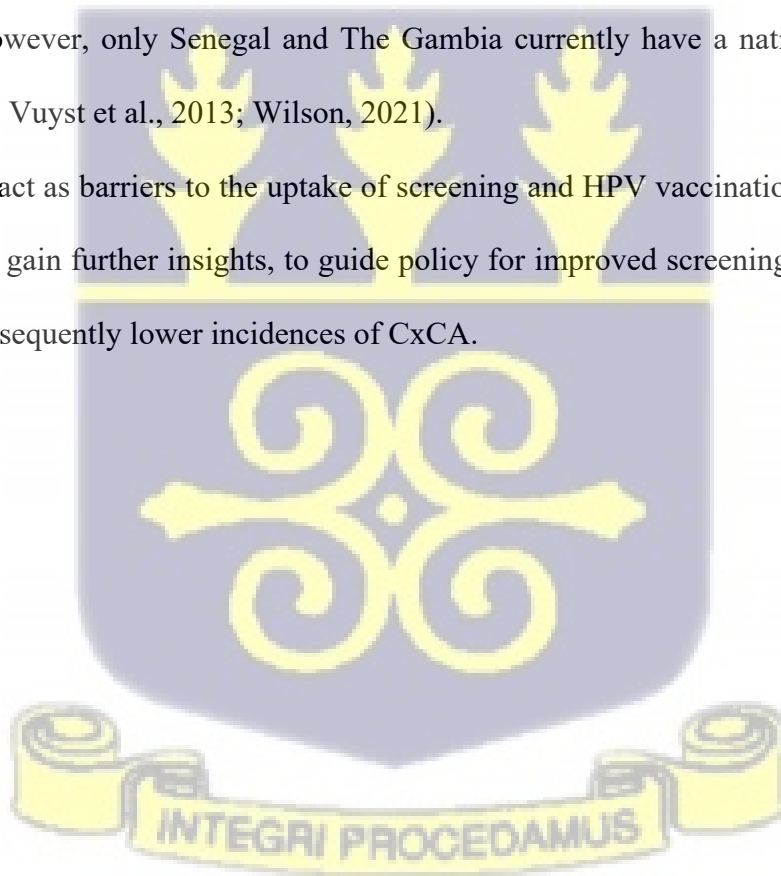
Almost all cases of CxCA are thought to be associated with HPV infection. Every sexually active woman is at risk of contracting the virus(Kumar et al., 2018; Peto et al., 2004). Hence, prophylactic vaccination against the virus has proven effective in preventing CxCA. Vaccination is employed as a primary prevention method since it prevents the development of pre-cancerous lesions(Kaur et al., 2017).

The predicted efficacy of the HPV vaccination, with one dosage or more, ranges between 83 to 96.1%. Vaccination has resulted in maximal reductions of around 90% for HPV 6,11,16 and 18 infections. About 90% reductions of genital warts, 45% of low-grade cytological cervical abnormalities, and approximately 85% of high-grade histologically verified cervical abnormalities have been reported (Garland et al., 2016; Kamolratanakul & Pitisuttithum, 2021). Different vaccines are available for women who decide to get vaccinated. These vaccines are

classified as bivalent, quadrivalent and nonavalent based on the number of strains they offer protection against.

Despite the significance of screening and vaccination in the reduction of CxCA mortality and morbidity, there is a low uptake in most LMICs. This is a key contributory factor to the high incidence of CxCA-associated morbidity and mortality in these countries. Approximately 75% of women in the United States, aged 21 to 65, have undergone CxCA screening. Additionally, 68.1% of adolescents have undergone prophylactic HPV vaccination (Chen et al., 2021; U.S. Department of Health and Human Services, 2019). In comparison, Burkina Faso, Senegal and Ghana have only achieved 6%, 10.9% and 3% screening coverage, respectively (Effah et al., 2022). In West Africa, 9 out of 16 countries have introduced a pilot HPV vaccination programme. However, only Senegal and The Gambia currently have a national vaccination programme (De Vuyst et al., 2013; Wilson, 2021).

Several factors act as barriers to the uptake of screening and HPV vaccination and these need to be studied to gain further insights, to guide policy for improved screening and vaccination uptake, and consequently lower incidences of CxCA.



1.2 PROBLEM STATEMENT.

Cervical cancer is the 4th most reported cancer in females worldwide, with 604,127 cases and 342,000 deaths in 2020(D. Singh et al., 2023). About 85% of these deaths occurred in LMICs, with Sub-Saharan Africa carrying a significant burden(Randall & Ghebre, 2016). Nineteen out of the top 20 countries with the highest CxCA burden as at 2018 were in Africa(WHO, 2018). Annually, an estimated 27,806 women in West Africa are diagnosed with CxCA with 18,766 dying from the condition(Effah et al., 2022). It ranks second among cancers in women in the region. In Ghana, 2,797 women are diagnosed with the condition every year, with 1,699 dying from the condition(*II. Complementary Data on Cervical Cancer Prevention*, 2023).

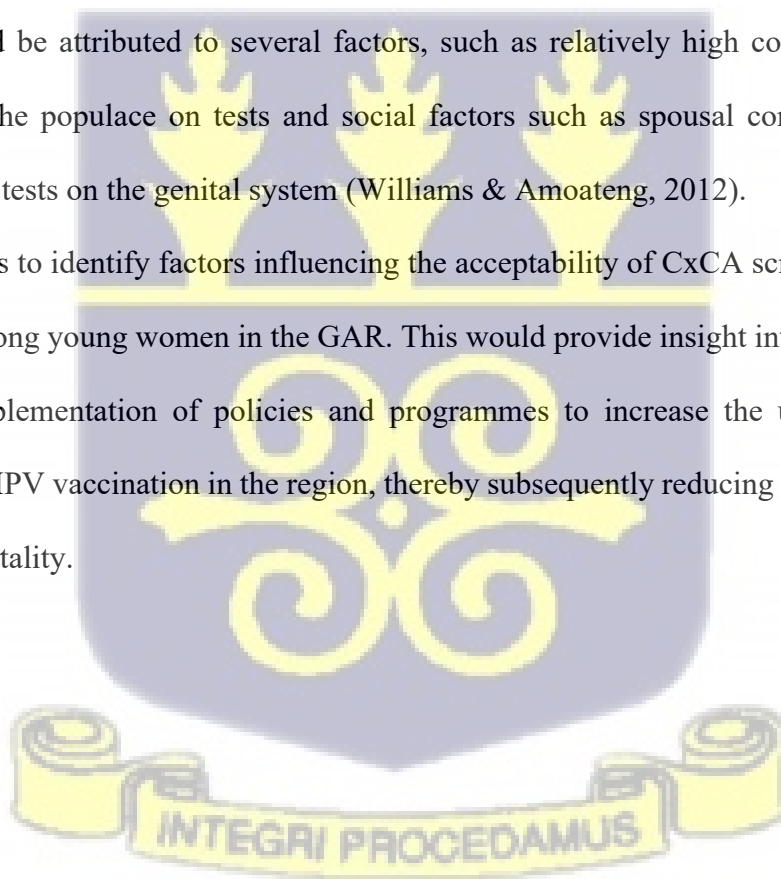
The modal age of CxCA incidence is over 35 years(Adegoke et al., 2012). However, some cases occur in younger females(Adegoke et al., 2012). The precancerous lesions that later progress to malignancies in older women can be identified through the screening of younger women. This enables early intervention, reducing the incidence of CxCA and its associated morbidity and mortality in older women(Hung et al., 2014). Prophylactic vaccination of women against HPV is also an effective strategy against CxCA since the virus is associated with 99% of all CxCA cases. Research has shown that vaccination and regular pap screening reduce CxCA incidence and mortality by an estimated 90% and 80% respectively (Huh et al., 2017; Kavanagh et al., 2017; PDQ® Screening and Prevention Editorial Board, 2022).

Although CxCA screening and HPV vaccination have numerous benefits, Ghana has a low uptake. Approximately 3% of Ghanaian women have undergone cervical cancer screening in their lifetime, while 4.9% of women aged 18-29 have had HPV screening(Effah et al., 2022). Some hindrances to CxCA screening and HPV vaccination programs include lack of funding for screening programs, non-availability of tests and human resources and poor knowledge of the importance of tests. Notwithstanding recent efforts to promote awareness and expand uptake, the acceptability of screening and vaccination has been a significant concern.

Culture and beliefs, socioeconomic conditions, perception, social factors, knowledge and literacy play a major role in the acceptability of screening and vaccination (Phaiphichit et al., 2022).

Human behaviour and to a large extent health-seeking behaviours are influenced by some of the factors mentioned above (Asante et al., 2023). Thus, failure to properly understand and consider these factors in the planning and implementation of screening and vaccination programmes will result in low uptake and to ultimate failure. Hence, the desired reduction in CxCA incidence and associated morbidity and mortality might not be realised. Compared to other regions of Ghana, the Greater Accra Region (GAR) has a comparatively large number of health facilities that provide screening services. However, patronage of these services is often low. This could be attributed to several factors, such as relatively high costs of tests, poor knowledge of the populace on tests and social factors such as spousal consent and stigma associated with tests on the genital system (Williams & Amoateng, 2012).

This study seeks to identify factors influencing the acceptability of CxCA screening and HPV vaccination among young women in the GAR. This would provide insight into and help in the design and implementation of policies and programmes to increase the uptake of CxCA screening and HPV vaccination in the region, thereby subsequently reducing CxCA incidence, burden and mortality.



1.3 JUSTIFICATION.

Culture, beliefs, socioeconomic conditions, perception, social factors, knowledge and literacy have been identified as factors that play a key role in the acceptability of CxCA screening tests and HPV vaccination among young women. Approximately 29.3/100,000 women in Ghana are diagnosed with CxCA annually, with a corresponding 23.8 deaths per 100,000 women. Conversely, in high-income North America, the annual incidence rate is estimated to be 5.7/100,000, and the mortality rate is 1.7/100,000 (Frick et al., 2023; Ntekim & Ntekim, 2012; Pimple & Mishra, 2022). Hence, there are 23.6/100,000 excess cases and 22.1/100,000 excess deaths in Ghana compared to high-income North America (Beddoe, 2019). These excess cases can be attributed to the improved CxCA screening and HPV vaccination programmes in North America. Owing to the importance of screening and vaccination in the early detection, prevention and management of CxCA, these factors are worth studying. A clear comprehension of these factors would be pivotal in increasing CxCA screening coverage and HPV vaccination in the GAR and Ghana as a whole. This study aims to identify and provide a deeper understanding of the factors affecting the acceptability of screening and HPV vaccination in young Ghanaian women in the GAR. The study's insight could guide the development of policies and programs to help widen CxCA screening and vaccination coverage among young women in the region and country at large.

1.4 RESEARCH QUESTIONS.

The primary question under investigation is to understand the factors that influence the acceptability and uptake of CxCA screening and HPV vaccination in young women (18-35 years) in GAR, Ghana. This question will be subdivided into the following component questions:

- i. What is the level of knowledge and awareness of young women in Greater Accra have about cervical cancer screening and HPV vaccination?
- ii. What is the perception of young women on cervical cancer screening and HPV vaccination?
- iii. What is the acceptability and uptake rate of cervical cancer screening and HPV vaccination among young women in the Greater Accra region?
- iv. What are some factors affecting the acceptability and uptake of cervical cancer screening and HPV vaccination among young women?
- v. In what ways do the qualitative interview data help to explain the quantitative results of factors affecting the acceptability and uptake of cervical cancer screening and HPV vaccination?

1.5 STUDY OBJECTIVES.

1.5.1 General Objective.

To determine factors affecting the acceptability and uptake of cervical cancer screening and HPV vaccination among young women (18-35 years) in the Greater Accra region, Ghana.

1.5.2 Specific Objectives.

- i. To assess the knowledge of cervical cancer screening and vaccination among young women in the Greater Accra Region.
- ii. To assess the awareness of cervical cancer screening and vaccination among young women in the Greater Accra Region.
- iii. To assess the perception of young women in the Greater Accra Region on cervical cancer screening and HPV vaccination.
- iv. To estimate the proportion of young women in the Greater Accra region who have undergone cervical cancer screening and HPV vaccination.

- v. To estimate the proportion of young women in the Greater Accra region who are willing to undergo cervical cancer screening and HPV vaccination.
- vi. To identify factors affecting the acceptability of cervical cancer screening and vaccination among young women in the Greater Accra Region.
- vii. To identify factors affecting the uptake of cervical cancer screening and vaccination among young women in the Greater Accra Region
- viii. To explain the factors affecting the acceptability and uptake of cervical screening and HPV vaccination using qualitative data.



1.6 CONCEPTUAL FRAMEWORK.

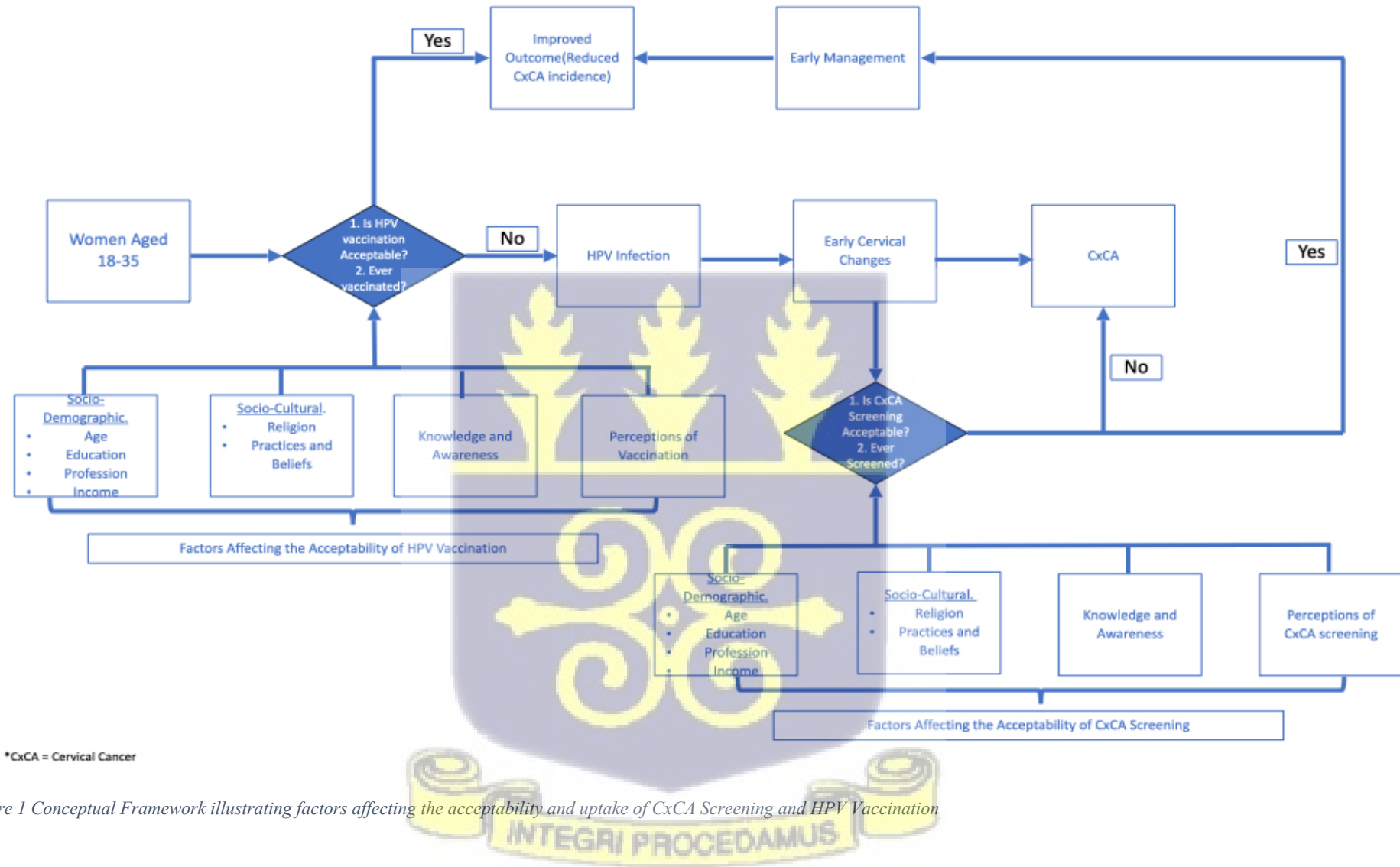
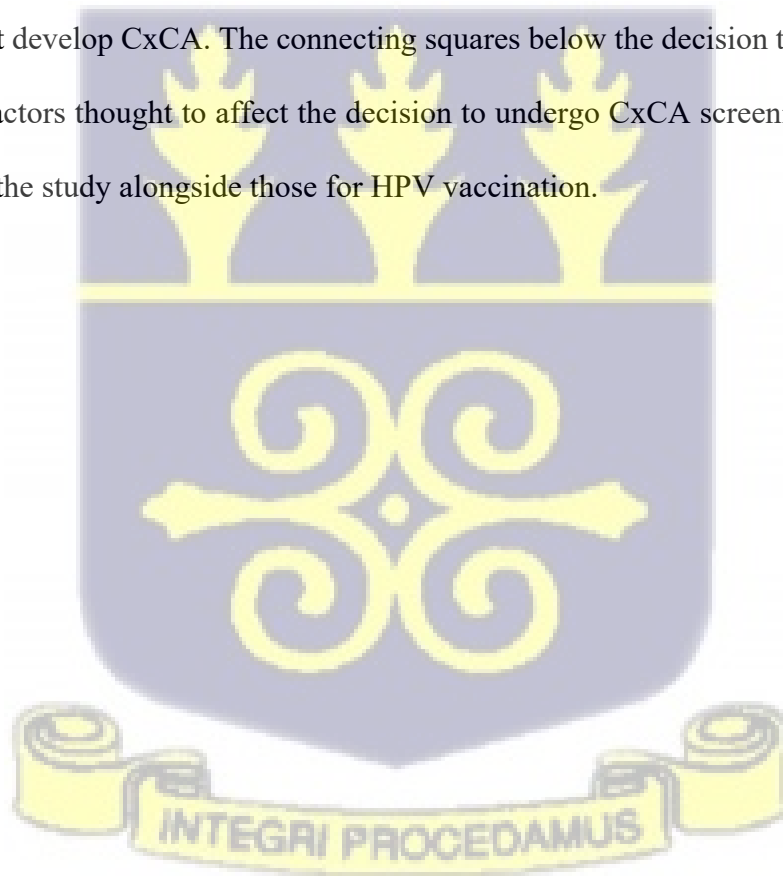


Figure 1 Conceptual Framework illustrating factors affecting the acceptability and uptake of CxCA Screening and HPV Vaccination

The diagram above demonstrates the conceptual framework for the study. The squares represent processes while the rhombuses represent decisions. The directions of the arrows represent the direction of flow. The framework demonstrates how women aged 18-35 decide whether to undergo or not undergo HPV vaccination. The connecting squares below show factors which are thought to affect this decision and will be investigated in the study. Women who decide to get vaccinated have an improved outcome i.e. reduced CxCA incidence. Women who do not get vaccinated might contract HPV infection, which results in cervical changes. These changes might result in CxCA. Upon developing cervical changes, these women would have to decide whether to undergo CxCA screening. Those who choose to undergo screening can receive early management, hence improved outcomes. Those who decide not to undergo screening might develop CxCA. The connecting squares below the decision to undergo CxCA screening are factors thought to affect the decision to undergo CxCA screening. They will be investigated in the study alongside those for HPV vaccination.



CHAPTER TWO.

2.0 LITERATURE REVIEW.

2.1 WHAT IS CERVICAL CANCER?

CxCA refers to neoplasms that originate from cells of the cervix. Like other neoplasms, it results from the abnormal growth of cells that can invade and metastasise to parts of the body. This is not an abrupt process, instead a gradual process which takes years (NCI, 2018). Cytoplasmic changes occur in cervical cells before the development of CxCA. These dysplastic cells are precursor cells to CxCA. This allows a window for early detection and intervention. If these changes are left unattended, it may regress, persist or progress to CxCA (Kumar et al., 2018).

Table 1 Natural History of Squamous Intraepithelial Lesions (Kumar et al., 2018)

Lesion	Regress	Persist	Progress
LSIL (CIN I)	60%	30%	10% (to HSIL)
HSIL (CIN II, III)	30%	60%	10% (to carcinoma) ^a

^aProgression within 10 years.

LSIL, Low-grade SIL; HSIL, high-grade SIL.

Source: Robbins Basic Pathology

About 95% of CxCA incidences are thought to be a result of persistent infection with high-risk HPV species (Small et al., 2017). Seventy per cent of CxCA and precancerous lesions attributed to HPV infection are caused by HPV type 16 and 18 (Ahmed et al., 2017). The cell transformation seen in infection with high-risk HPV strains is due to the activities of the E6 and E7 genes of the virus. When the viral genome integrates into the host chromosome, E6 and E7 are released from transcriptional regulation, resulting in uncontrolled high-level protein synthesis essential for cell transformation. E7 promotes the proliferation of suprabasal cells that evade apoptosis due to the actions of E6. The continuance of this unregulated process

eventually results in CxCA(Ahmed et al., 2017; Brooks et al., 2013; David et al., 2012). Other factors such as hormonal contraceptive use, genetics, smoking, HIV infection, young age at sexual initiation, multiple sexual partners and multiple pregnancies have also been linked to the development of CxCA(Brooks et al., 2013; Gadducci et al., 2011). Many epidemiological studies and mouse-model studies have indicated that hormones play a role in cervical carcinogenesis(Chung et al., 2010). Hence, this could account for oral contraceptive use and multiple parity being risk factors for CxCA since they both result in fluctuations in hormonal levels. Individuals who engage in sexual activity at a young age and those with multiple sexual partners are at a higher risk of contracting HPV infection, which can increase their likelihood of developing CxCA(Luhn et al., 2013). HIV infection and smoking are thought to weaken the immune system, which compromises the body's ability to overcome HPV infection(Kumar et al., 2018; Ma* et al., 2023). This leads to persistent HPV infection, which is a contributing factor to cervical cancer as previously mentioned. Smoking increases dysplasia and also alters the epithelial cell lining, making the individual more susceptible to HPV infection(Nelson et al., 2018). It also exposes the body to many carcinogens, which could result in the development of CxCA.

2.2 BURDEN OF CERVICAL CANCER.

CxCA ranks 7th among the most prevalent cancers globally (3.3%) and 4th among the most prevalent in women. An estimated 604,127 new cases were recorded in 2020 with 342,000 deaths worldwide (D. Singh et al., 2023). The majority of these cases were recorded in LMICs. In Africa, 177,000(29.3% of global incidence) were recorded with 77,000(22.5%of global deaths) deaths (Dzinamarira et al., 2022). The top 10 countries with the highest burden and mortality are all in Africa. In West Africa, 27806 new cases are recorded each year with 18,776 deaths. It is estimated that 2,797 cases of CxCA occur in Ghana each year with 1,699 deaths(Effah et al., 2022; Nartey et al., 2017).

Table 2 Global Incidences of CxCA 2020 (Cervical Cancer Statistics I World Cancer Research Fund International, 2020)

Rank	Country	Number	ASR/100,000
	<i>World</i>	<i>604,127</i>	<i>13.3</i>
1	Eswatini	341	84.5
2	Malawi	4,145	67.9
3	Zambia	3,161	65.5
4	Tanzania	10,241	62.5
5	Zimbabwe	3,043	61.7
6	Lesotho	541	56.8
7	Uganda	6,959	56.2
8	Comoros	167	56.0
9	Mozambique	5,325	50.2
10	Guinea	2,068	50.1

Source: World Cancer Research Fund International

Table 3 Global Death Rates of CxCA 2020 (Cervical Cancer Statistics I World Cancer Research Fund International, 2020)

Rank	Country	Number	ASR/100,000
	<i>World</i>	<i>341,831</i>	<i>7.3</i>
1	Eswatini	214	55.7
2	Malawi	2,905	51.5
3	Zambia	1,904	43.4
4	Zimbabwe	1,976	43.0
5	Tanzania	6,525	42.7
6	Uganda	4,607	41.4
7	Comoros	109	39.8
8	Mozambique	3,850	38.7
9	Lesotho	362	38.7
10	Burundi	1,126	38.5

Source: World Cancer Research Fund International

CxCA is usually asymptomatic during the early stages of the disease. However, as the condition progresses symptoms do present. This includes vaginal bleeding, post-coital and post-menopausal bleeding, foul-smelling vaginal discharge, abdominal and pelvic pain and dyspareunia(G. Singh, 2018).

2.3 PREVENTION OF CERVICAL CANCER.

The natural history of CxCA is well understood. Hence interventions can be made before pre-cancerous lesions become malignant(Adams et al., 2019; Castellsagué, 2008). Prevention methods can be classified as primary, secondary and tertiary(Aggarwal, 2014). The primary methods aim at mitigating risks to prevent the development of disease. HPV vaccination is considered a primary preventive method. HPV vaccination is thought to prevent about 90% of cancers caused by HPV(Medeiros et al., 2009). The secondary methods are aimed at early detection of the disease. When the disease is identified early, it allows for early management with a better outcome. Secondary preventative methods are estimated to have reduced CxCA incidence by 10-80% in Nordic regions(Aggarwal, 2014). Secondary prevention methods include screening tests such as high-risk HPV (hr-HPV) screening, PAP smear and visual inspection with acetic acid (VIA).

Tertiary methods focus on limiting the effects of the condition. Treatment options after early detection include various surgical options such as but not limited to excision, ablation, cone biopsy and hysterectomy(Athanasίου et al., 2022; Lin et al., 2017; Van Nagell et al., 1983).



Table 4 Management of preinvasive cancer (American Society for Colposcopy and Cervical Pathology 2012 guidelines)

Lesion on biopsy	Other features	Management
CIN 1	Preceding cytology of ASC-US, ASC-H, LSIL	Follow up with cytology (6, 12 mo) and HPV testing (12 mo)
CIN 1	Preceding cytology of HSIL, AGC-NOS	Either of these: Diagnostic excisional procedure or review of findings or observation with HPV and cytology (12 and 24 mo) (only if colposcopy satisfactory and ECC negative)
CIN 1	Adolescent (< 20 yr)	Follow up with cytology (12 mo)
CIN 1	21-24 yr	Follow up with cytology and colposcopy (6 monthly, up to 2 yr)
CIN 2/3	Satisfactory colposcopy	Either excision or ablation of transformation zone
CIN 2/3	Unsatisfactory colposcopy or recurrence or endocervical disease	Diagnostic excisional procedure
CIN 2/3	Adolescent (< 20 yr) and young women (21-24 yr)	Observation with cytology and colposcopy (only if colposcopy satisfactory) or treatment using excision or ablation of transformation zone
Adenocarcinoma <i>in situ</i>	Specimen from diagnostic excisional procedure	Hysterectomy preferred (rarely conservative management if margins negative and future fertility desired)

HPV: *Human papilloma virus*. CIN: Cervical intraepithelial neoplasia, ASC-US: Atypical squamous cells - undetermined significance; ASC-H: Atypical squamous cells - cannot exclude; LSIL: Low-grade squamous intraepithelial lesion HSIL: High-grade squamous intraepithelial lesion; ECC: Endocervical curettage.

Source: American Society for Colposcopy and Cervical Pathology



2.3.1 Cervical Cancer Screening.

Cervical cancer screening refers to procedures aimed at detecting precancerous lesions or early stages of cervical cancer in women. It involves the examination of cervical cells or tissue samples to identify abnormalities that may indicate the presence of cervical cancer or its precursor lesions. Some commonly employed tests include the PAP smear, hr-HPV testing and VIA(NCI, 2023).

The PAP smear is the premier and arguably the most well-known CxCA screening test. The test was developed by Georgis Papanicolau a pioneer of exfoliative cytology in 1928. Although this test was developed in 1928 it was accepted as an effective screening test in 1945(BCMJ, 2019). It is a highly specific test for diagnosing CxCA(Kumar et al., 2018). The test involves collecting cells from the ectocervix at the transformational zone. The cells are then fixed on a microscope slide, stained with PAP stain and examined under the microscope. Pathologists look out for cytologic changes associated with cervical neoplasia and pre-cancerous lesions such as increased nuclear size, increased nuclear-to-cytoplasmic ratio, hyperchromasia, prominent nucleoli and even HPV infection. Over the years, numerous reporting systems, including the Bethesda system and the British Society for Clinical Cytology (BSCC), have been created to report findings of PAP smears. Progress in understanding preinvasive cervical pathology has led to a re-evaluation of cytologic classification methods. The Bethesda system has quickly become the internationally recognised standard for reporting results (Koliopoulos et al., 2017; Pangarkar, 2022).

Advances in molecular biology made it possible to screen for hr-HPV DNA in cervical samples directly. The test involves collecting cervical cells and using nucleic acid amplification techniques to detect hr-HPV DNA. The sensitivity value of the test is approximately 94%, in contrast to the PAP test's 54% (Woo et al., 2025). However, it is not as specific as the PAP test (94.1% to 96.8%). The high sensitivity allows for longer screening intervals for women who

test negative. The test is useful for CxCA screening since hr-HPV species are associated with about 99% of all CxCA cases worldwide (Krings et al., 2019). Types 16 and 18 are estimated to be responsible for 70% of all cases of CxCA (Ahmed et al., 2017). Due to the aforementioned, early detection of infection enables effective action to be taken to prevent the development of CxCA.

VIA is a simple, inexpensive yet effective cervical cancer screening test, making it well-suited for LMICs (Ansari et al., 2023). This test can be paired with simple treatment procedures for pre-cancerous lesions (Poli et al., 2015; Wang et al., 2024). VIA is based on the assumption that the majority of preinvasive and invasive cervical lesions are evident with a 'naked-eye' inspection after applying acetic acid (IARC, 2024). A speculum is employed to reveal the cervix. Afterwards, a 3-5% solution of acetic acid is administered to the cervix. After waiting for one minute, the cervix is inspected using a hollow lamp. A positive result (VIA-positive) is marked by the presence of acetowhitening, while a negative result (VIA-negative) is indicated by the absence of acetowhitening. Pink squamous epithelium is typical of the cervix. Cervical intraepithelial neoplasia (CIN) lesions acquire a white hue when exposed to acetic acid; this is because the cervical epithelium produces an excess of cytokeratins and nuclear proteins (IARC, 2024).

Diverse screening programs have been instituted globally utilising a variety of screening tests, taking into account their respective merits and drawbacks, to reduce the burden and mortality associated with CxCA. In Australia and the USA, their respective CxCA screening programs are thought to have reduced CxCA incidence by 50 and 80% respectively (PDQ® Screening and Prevention Editorial Board, 2022; Smith & Canfell, 2016). In Australia, women between 25-74 years are invited for cervical cancer screening every 5 years through their healthcare provider (Australian Government Department of Healthcare, 2024). In the United States, women between the ages of 21 and 29 are advised by the Preventive Services Task Force

(USPSTF) to undergo cervical cancer screening every 3 years using the Pap test in isolation. The USPSTF advises that women between the ages of 30 and 65 undergo either HPV testing, with or without Pap co-testing, every 5 years or Pap testing alone every 3 years. Nonetheless, in Ghana and most West African countries such programs do not exist due to many issues with funding of programs and acceptability of tests being the standouts.

Table 5 USPST Recommendations for Routine Cervical Cancer Screening

Population*	Recommendation	USPSTF Recommendation Grade
Aged less than 21 years	No screening	D
Aged 21-29 years	Cytology alone every 3 years‡	A
Aged 30-65 years	Any one of the following: Cytology alone every 3 years FDA-approved primary hrHPV testing alone every 5 years • Cotesting (hrHPV testing and cytology) every 5 years	A
Aged greater than 65 years	No screening after adequate negative prior screening results?	D
Hysterectomy with removal of the cervix	No screening in individuals who do not have a history of high-grade cervical precancerous lesions or cervical cancer	D

Source: U.S. Preventive Services Task Force



2.3.2 HPV Vaccination.

An estimated 99.7% of CxCA cases are said to be a result of infection with oncogenic strains of HPV. About 40 strains which infect the urinogenital system have been identified over the years. 15 of these 40 strains are thought to play a role in CxCA oncogenesis. Types 16 & 18 are responsible for 70% of CxCA cases associated with HPV while types 31 and 45 account for 10% of cases(Ahmed et al., 2017; Kumar et al., 2018). Every sexually active woman is at risk of contracting HPV during their lifetime. 80 % of these women will contract HPV during their lifetime with 75% of these infections being with oncogenic strains(Brooks et al., 2013; WHO, 2024a).

Given that almost all CxCA cases are a result of HPV infection and all women will be exposed to the virus once they become sexually active, HPV vaccination is employed as a primary CxCA prevention method. It has been incorporated into the national immunisation programs of over 60 nations worldwide(Kaur et al., 2017).

The first vaccine against HPV was licensed in 2006. Currently, there are 6 licensed prophylactic vaccines(CASTLE & MAZA, 2016). The vaccines come in single or two-dosage vials or as prefilled syringes(WHO, 2024b). These vaccines are classified based on the number of species they offer protection against. There is a bivalent, quadrivalent and nonavalent vaccine. All these vaccines protect against types 16 and 18 which are responsible for about 70% of all HPV-related CxCA cases(Meites et al., 2019). The quadrivalent offers additional protection against types 6 and 11 while the nonavalent offers additional protection against types 6,11,31,33,45,52 and 58(Gonçalves et al., 2014; Mariani et al., 2017). The vaccines are produced utilising recombinant DNA and cell-culture techniques to purify the virus's L1 structural protein. This protein then assembles itself into virus-like particles (VLPs), which are empty shells distinct to each strain of HPV. HPV vaccines are free of live biological components or viral DNA, making them non-infectious. HPV vaccines utilise diverse

expression methods, incorporate adjuvants, and do not contain antibiotics or preservatives(Akhatova et al., 2022; Gallego et al., 2024).

Vaccination is targeted at women between the ages of 9-14 before they become sexually active. However, it can be administered through to the age of 26. In many Asian countries, there is no upper age limit for vaccination(Harper & Paavonen, 2008). Research has demonstrated that vaccination exhibits a statistically significant level of efficacy in preventing cervical cancer when given before and after the age of 17. However, the vaccine is more beneficial when administered before age 17 (Ellingson et al., 2023). One prospective outcome of widespread HPV vaccination is a worldwide reduction of up to 90% in the incidence of cervical cancer(Huh et al., 2017; Kavanagh et al., 2017).

2.4 FACTORS AFFECTING ACCEPTABILITY OF CERVICAL CANCER SCREENING AND HPV VACCINATION.

2.4.1 Factors Affecting Acceptability of Cervical Cancer Screening.

Given the significant impact of CxCA screening on lowering CxCA-related morbidity and mortality, it is logical to infer that the test is widely patronised universally. Nevertheless, this is not true. Significant discrepancies exist in CxCA coverage across various regions. Coverage is often extensive in industrialised countries and significantly lower in developing countries. These could be attributed to multiple factors. Some of these factors identified through various studies include; economic factors, education, knowledge of CxCA screening, sociocultural practices and beliefs, and availability of tests and screening programs.

A study carried out in Korea (a developed country) showed that women with higher income levels were more likely to undergo CxCA screening. Age, job status, education and smoking habits were also found to be associated with screening participation (Chang et al., 2017). However, the factors affecting the acceptability of screening in developing countries are more complex and multifaceted. Factors such as poor knowledge and complete lack of awareness of

cervical cancer, poor knowledge of the importance of screening, inaccessibility to screening services, and socio-cultural practices and beliefs were identified as predictors of acceptability to screening in addition to those identified in developed countries (Fentie et al., 2020; Rositch et al., 2012).

A survey undertaken at a university in Ghana identified a lack of awareness that the purpose of pap screening is to diagnose cancer, concerns about what others may think, and a lack of information about how to obtain screening services as the most recognised barriers to screening. Additional hindrances found included scepticism regarding the ability of cervical screening to detect cancer, concerns about the discomfort of the pap test, and fears that the test could impact virginity (Abotchie & Shokar, 2009).

Spousal support is also a key influencer of health-seeking behaviour in married women. In another study carried out in Ghana, Ghanaian men were willing to support their spouses undergo CxCA screening if it would safeguard the health of their spouses. They were hesitant about their spouses getting screened if it would be done by a male (Williams & Amoateng, 2012).

Unique obstacles to screening exist in every country. Deep comprehension of these obstacles is crucial for increasing the acceptance of screening tests and ultimately decreasing the burden and mortality associated with CxCA. Thus, further research in a cosmopolitan city such as Accra is required to enhance comprehension of factors that impact the acceptance of cervical cancer screening among Ghanaian women.

2.4.2 Factors Affecting Acceptability of HPV Vaccination.

HPV vaccination is a proven method for the prevention of cervical cancer. It is safe and effective. Nonetheless, uptake is generally low in Ghana and West Africa at large as compared to developed countries. Many factors account for these discrepancies. These most common can

be grouped as socioeconomic factors, knowledge and awareness of CxCA, safety concerns, sociocultural practices and beliefs as well as societal influences.

In a systemic literature review conducted on the acceptance of the HPV vaccine in West Africa, the most important factors that affected the acceptance of vaccines included: inadequate HPV vaccine information or knowledge, the cost of vaccines, safety concerns and vaccination leading to promiscuity(Wilson, 2021).

A study conducted in Nigeria among female health workers identified vaccine availability, safety concerns and promotion of promiscuity as barriers to vaccination(Ugwu et al., 2013). This is consistent with the findings of the systemic literature review. However, this study was conducted among health workers hence as expected knowledge of vaccines was not identified as a hindering factor. Thus the results may not be generalisable.

In a Ghanaian study, the most common concerns against vaccination included the safe administering of the vaccine, cost, possible side effects and the vaccine promoting early sex. Statistically significant hindrances to vaccine acceptance included women's limited understanding of the severity of cervical cancer and the effectiveness of the Pap test in detecting it. Low perception of the risk of cervical cancer, insufficient social support for vaccine use, and a lack of confidence in finding a doctor or clinic to receive the vaccine was also significant(Coleman et al., 2011). This study used a quantitative approach and hence focused on the breadth but not the depth of the themes.

It has been estimated that a 70% vaccination coverage in Ghana could lead to a mean reduction in the lifetime risk of cervical cancer of about 35%(Goldie et al., 2008). Considering the significance of this, studies must be carried out to both identify and understand the factors which affect the acceptability of HPV screening. This will lead to improved CxCA outcomes.

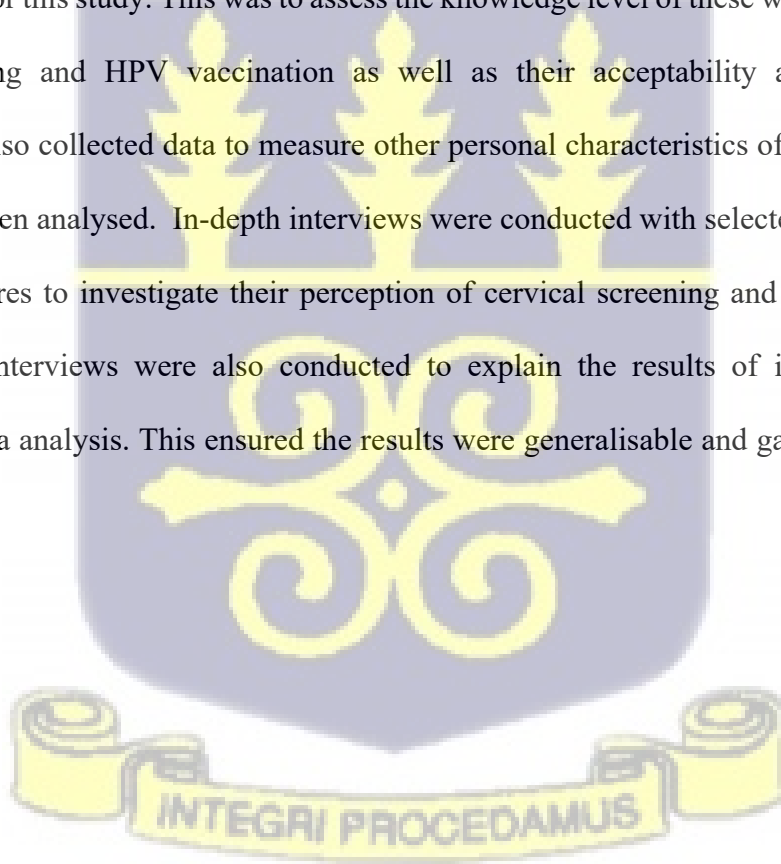
CHAPTER THREE.

3.0 METHODS.

3.1 STUDY DESIGN.

This study was a cross-sectional study and employed a mixed-method approach(exploratory sequential design). A cross-sectional design was chosen since this study was not amenable to a cohort design. The study also sought to assess the exposures and outcomes simultaneously, which is best done with a cross-sectional design. The design was also chosen since the study was to be completed within a limited period with limited logistics.

Questionnaires were administered to women between 18-35 years of age living in the Greater Accra Region for this study. This was to assess the knowledge level of these women on cervical cancer screening and HPV vaccination as well as their acceptability and uptake. The questionnaire also collected data to measure other personal characteristics of the respondents. The data was then analysed. In-depth interviews were conducted with selected respondents to the questionnaires to investigate their perception of cervical screening and its acceptability. The in-depth interviews were also conducted to explain the results of interest from the quantitative data analysis. This ensured the results were generalisable and gave context to the results.



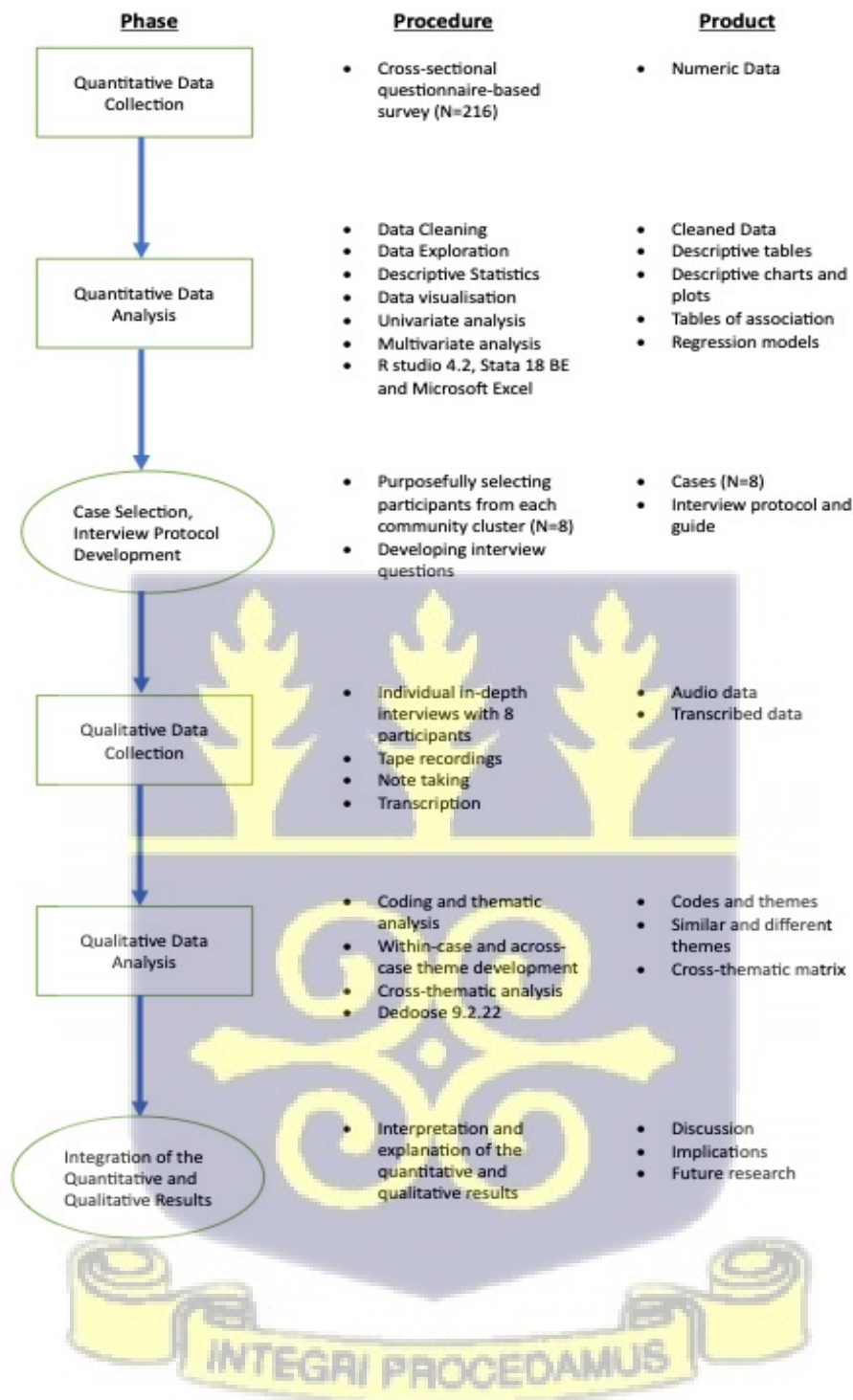


Figure 2 Diagram for the study design and procedure

Table 6 Methods table for answering research questions

Research Question	Research Approach	Technique	Tool
What is the prevalence of Cervical Cancer Screening and HPV vaccination among young women in the Greater Accra Region?	Quantitative	Questionnaire	Questionnaire
What is the level of knowledge and awareness young women in Greater Accra have about cervical cancer ?	Quantitative	Questionnaire	Questionnaire
What is the perception of young women on cervical cancer screening and HPV vaccination ?	Qualitative	In-Depth Interview	Interview Guide
What are some factors affecting the acceptability and uptake of cervical cancer screening and HPV vaccination among young women?	Quantitative Qualitative	Questionnaire In-Depth Interview	Questionnaire Interview Guide
In what ways do the qualitative data help to explain the quantitative results ?	Quantitative Qualitative	Questionnaire In-Depth Interview	Questionnaire Interview Guide



3.2 STUDY SETTING.

The study was carried out in the Greater Accra Region of Ghana. The Greater Accra region is situated on the southern coast of Ghana and covers a total land area of 3,245 square kilometres. The region is the political and administrative centre of Ghana and houses the capital city. It is a densely populated cosmopolitan urban area. The region's population is estimated at 5,455,692 per the 2021 population census. The population comprised 2,679,063 males, constituting 49% of the total population, and 2,776,629 females, making up 51%. The region has 707 community health and planning (CHPS) facilities, 299 clinics, 101 maternity homes, 32 health centres, 22 polyclinics, and 111 hospitals.(GHS, 2024) The Cervical Cancer Prevention and Training Centre, Catholic Hospital Bator, estimates that there are about 19 cervical cancer screening centres across the region as of July 2019(MyJoyOnline, 2020). These facilities run VIA, HPV testing, PAP smear, colposcopy and mobile colposcopy. The GAR was one of the 3 regions in Ghana where an HPV vaccination trial was run in 2013(Nartey et al., 2018). Thirty-three thousand girls aged between 10-13 years were vaccinated against HPV. (Vodicka et al., 2022). The cosmopolitan nature of the region means there will be a good representation of the various ethnic groups within the study sampling frame. The educational level, type of employment and socio-economic status of residents are also diverse. These should make results from the study generalisable.

3.3 STUDY POPULATION.

Ghanaian women aged 18-35 who are residents of the Greater Accra Region were recruited for this study.

3.3.1 Inclusion Criteria.

- Ghanaian women aged between 18-35 residing in the Greater Accra Region who consented to take part in the study.

3.3.2 Exclusion Criteria.

- Ghanaian women aged between 18-35 residing in the Greater Accra Region but have lived in high-income countries for over 5 years.

3.4 SAMPLE SIZE CONSIDERATION.

3.4.1. Quantitative Approach.

In estimating the minimum sample size needed to assess the proportion of young women who have undergone CxCA screening, Stata version 18BE was used. The software used the formula below.

$$n = \frac{\{Z_{\beta/2}\sqrt{p(1-p)} + Z_{\alpha/2}\sqrt{[\hat{p}(1-\hat{p})]}\}^2}{(p - \hat{p})^2}$$

Where: n = minimum sample size

$Z_{\alpha/2} = 1.96$ at 95% confidence interval

$Z_{\beta/2} = 0.84$ at 80% power

P = Hypothesised value of the population proportion = 0.049 (Effah et al., 2022)

$\hat{p}$ = Anticipated proportion = 0.01

P was assumed to be 0.01. Effah et al.'s estimate was done across the entire country. However, this study was done only in Accra. Hence, it was expected that a smaller proportion of women would have undergone screening. Hence, a smaller number was required to draw inferences on the study population.

Hence, minimum sample size = 168.6=169

Adjusting for a 25 % non-response rate = 147 * 1.25=211.25 = 212

Hence, the final estimated sample size(n) was 212.

However, a sample size of 216 was used.

3.4.2 Qualitative Approach.

Eight participants were recruited for the in-depth interview. This number was used since no new codes or themes were being developed after the 7th participant. Studies have also shown it is an optimal sample size to reach data saturation(Vasileiou et al., 2018). The participants were recruited from those interviewed for the quantitative part of the study.

3.5 SAMPLING.

3.5.1 Quantitative Approach.

Simple random sampling was used to recruit participants who fit the inclusion criteria.

Participants were drawn from nine communities, which were grouped into three clusters. These clusters were classified as high, middle, and low-income communities based on the perceived economic status of the residents. This classification utilised the Accra poverty mapping provided by the Accra Metropolitan Assembly. The income levels map was referenced for this purpose. Communities identified as non-poverty and low-poverty pockets were grouped and classified as high-income communities for the study. Those classified as moderate poverty pockets were designated as middle-income communities. Communities categorised as high and very high poverty pockets were combined and classified as low-income communities. Three communities were sampled from each cluster. A database containing all the communities and their classifications was created using Microsoft Excel, comprising two columns named “community “ and “ cluster. “ A new column titled " label “ was then created. The formula =RAND() was employed to generate random numbers between 0 and 1 for each community. The sort function was applied to organise the data in ascending order, using the label column as the reference. The first three communities from each cluster were subsequently selected. Participants were interviewed from each selected community.

In each community, the street names were extracted using Google Maps, leading to the creation of a dataset containing all the streets. The RAND() function was used to generate random numbers in a new column. The sort function was again utilized to order the dataset in ascending fashion, referencing the random numbers. The first three streets from each community were chosen.

The houses on each street were counted manually and assigned numbers. A dataset featuring all the house numbers was created in Excel. Random numbers were generated in new columns using the =RAND() function. The dataset was then sorted in ascending order based on the random numbers. The last eight house numbers on each street were sampled, with eight participants selected from each street.

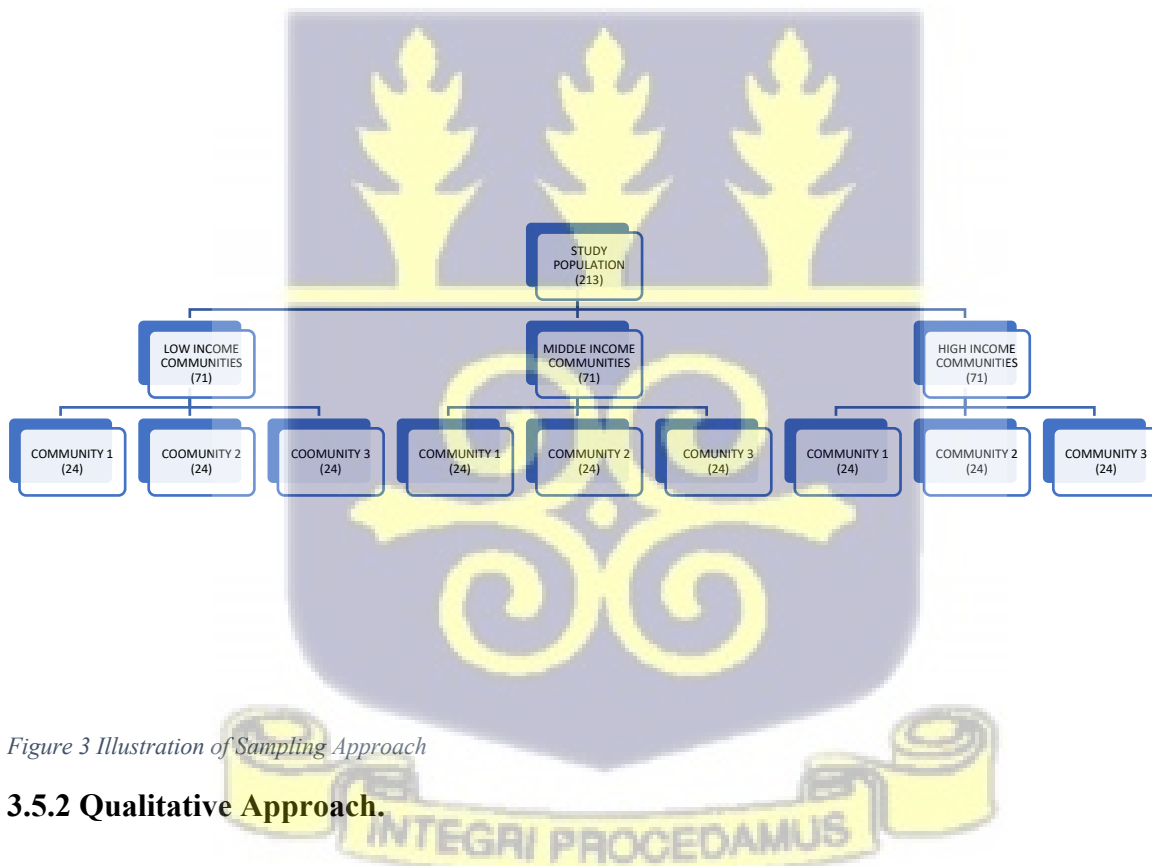


Figure 3 Illustration of Sampling Approach

3.5.2 Qualitative Approach.

Purposive sampling was used to select participants. The participants were drawn from those who took part in the quantitative survey. This technique was employed since it allowed information-rich participants to be targeted and recruited for the study.

3.6 DATA COLLECTION.

3.6.1 Quantitative Approach.

A structured questionnaire was used to collect data from participants. The questionnaires were administered to participants by research assistants and the principal investigator. The questionnaires were administered between December 2024 and January 2025. Each questionnaire took between 15- 20 minutes to complete. The questionnaire was administered electronically or using printed versions, depending on the preference of participants and prevailing circumstances. The questionnaire was divided into seven sections and fifty-two questions to obtain data from participants. The data obtained was to help assess:

- i. Socio-demographics of participants.
- ii. The knowledge level of participants on CxCA screening and HPV vaccination.
- iii. The level of awareness of participants on CxCA screening and HPV vaccination
- iv. The acceptability of CxCA screening and HPV vaccination in participants.
- v. The proportion of participants who have undergone CxCA, CxCA screening and HPV vaccination.
- vi. Factors influencing participant's decision to screen or vaccinate.

3.6.2 Qualitative Approach.

In-depth interviews were carried out with participants by the Principal Investigator. An interview guide was used to guide the questions during the interview. Each interview lasted between 30-45 minutes. The interview guide was divided into three sections. The interviews were used to obtain data to help assess:

- i. Perceptions of participants on CxCA screening and HPV vaccination.
- ii. The knowledge and awareness of participants on CxCA, CxCA screening and HPV vaccination.
- iii. Factors influencing participant's decision to screen and vaccinate.

- iv. Factors influencing participant's choice of screening and vaccination facility to use.
- v. Factors which would facilitate the uptake of any potential vaccination or screening policy.

There were probes to obtain more information from each participant.

3.6.3 Pre-testing.

The questionnaire and interview guide for this study were pre-tested on a small population. This enabled potential flaws in the questionnaire and interview guide to be identified and addressed before the study commenced.

3.7 STUDY VARIABLES.

The study variables were classified as dependent and independent variables.

3.7.1 Dependent Variables.

This study had four dependent variables(outcomes). These were:

- i. Acceptability of CxCA screening.
- ii. Acceptability of HPV vaccination.
- iii. Uptake of CxCA screening.
- iv. Uptake of HPV vaccination.

For this study, acceptability was defined as a participant's willingness to undergo cervical cancer screening and HPV vaccination. It was measured with a question asking if participants would be willing to undergo CxCA screening and HPV vaccination. Uptake was defined as having been screened for CxCA or having been vaccinated against HPV. It was measured with a question asking if participants had undergone screening and vaccination.

3.7.2 Independent Variables.

The independent variables of this study were the factors which affect the uptake and acceptability of CxCA screening or HPV vaccination among young women.

They included:

i. Socio-demographics of participants.

This included variables that measured characteristics of the study population, such as age, marital status, religion, highest level of education attained, employment status, salary bracket, sexual history, gravidity and parity. These variables were measured using a questionnaire.

ii. Knowledge level of participants on CxCA.

For this study, knowledge level was defined as the accurate information the participants have on CxCA, CxCA screening, and HPV vaccination. Questions 2, 3, and 5 from section B of the study questionnaire were used to assess participants' knowledge level. Participants were scored one point for every correct answer they provided. The maximum number of points a participant could score from each question is 5. The points from all 3 questions were summed. A participant could score a maximum of 15, with 0 being the minimum. Scores between 0 to 4 were classified as poor knowledge. Scores between 5 to 9 were classified as fair knowledge. Scores between 10 to 15 were classified as good knowledge.

iii. Perceptions of participants on CxCA screening and HPV vaccination.

For this study, perception was defined as the participant's views and opinions on CxCA, CxCA screening and HPV vaccination. This was obtained using an in-depth interview guide.

3.8 DATA PROCESSING AND ANALYSIS.

3.8.1 Quantitative Data Processing and Analysis.

Cleaning and entering the collected quantitative data were performed using Microsoft Excel and Stata 18 BE. This step was essential to double-check for mistakes and take corrective measures. The quantitative data were then analysed using STATA version 18 BE and R Studio

version 4.2. Frequencies and proportions were computed for various variables. Cross-tabulations were also performed between the independent variables and all four dependent variables. The chi-square test of association and Fisher's exact test were conducted to examine the relationship between the independent and each dependent variable. P-values ≤ 0.05 were considered statistically significant. 95% Confidence intervals were also estimated for the independent variables in the crosstabulations. Independent variables which had statistically significant associations for each dependent variable were selected for regression models with the various dependent variables they had significant associations with. Ordinary and Firth logistic regressions were also fitted for the dependent and independent variables. 95% confidence intervals were calculated for the odds ratios. P-values ≤ 0.05 were considered statistically significant

3.8.2 Qualitative Data Processing and Analysis.

The recordings from the in-depth interviews were translated into English where necessary and transcribed verbatim in Microsoft Word. Each transcript was then reviewed. The transcripts were then read repeatedly. Codes were developed using interpretation-focused coding on Dedoose software version 9.2.22. Themes and sub-themes were then developed from the codes. The codes were grouped under these themes and sub-themes based on their correlation with the theme and sub-theme. Tables were then developed to summarise findings.

3.8.3 Triangulation.

The Pillar Integration Process (PIP) technique was utilised to triangulate qualitative and quantitative data, presenting both data types in a joint display (Fetters et al., 2013; Johnson et al., 2019). The PIP aimed to minimise potential observer bias and facilitate the integration and synthesis of data from both visual and methodological perspectives (Johnson et al., 2019).

3.9 ETHICAL CONSIDERATIONS

3.9.1 Ethical Clearance

Ethical Clearance for the Study was sought and attained from the IRB of the Noguchi Institute of Medical Research (NMIMR) Institutional Review Board (IRB).

3.9.2 Informed Consent.

An information sheet which explains the purpose, risks, benefits of the study, privacy, and confidentiality of the information provided by the study participants, the opportunity to withdraw at any point in the study was provided to all eligible and willing participants before the interview was conducted.

3.9.3 Potential Risks and Benefits.

The study posed minimal to no risk to the participants. There were no direct benefits to the informants but the data generated will be used to inform better health policies.

3.9.4 Privacy and Confidentiality.

The interviews were conducted in a way that ensured the privacy of participants was respected. Participants were kept anonymous, and no specific response was linked to them.

3.9.5 Voluntary Participation and Withdrawal.

All participants had the liberty to withdraw from the study at any point in time they felt discomforted.

3.9.6 Training of Research Assistants

Research Assistants were trained after being recruited. The training involved an orientation on the study, the data collection tools and confidentiality.

3.9.6 Data Access and Storage.

Data was only available to the principal investigator and the assigned supervisor.

3.9.7 Compensation/ Payment.

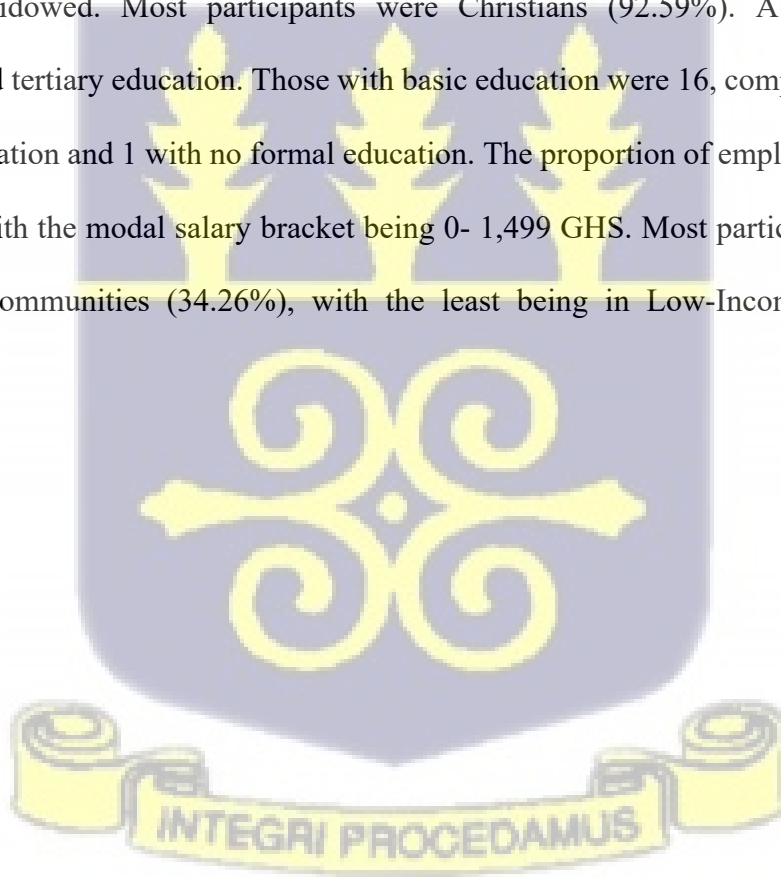
There was no form of compensation to participants of the study during or at the end of the study.

CHAPTER FOUR.

4.0 RESULTS.

4.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS.

Two hundred and sixteen females participated in the study. The average age of participants was 24.42 years, with the majority (47.09%) between 18 and 23 years. One hundred and sixty-eight participants were currently single. This group consisted of those who were either single, divorced or widowed. Most participants were Christians (92.59%). About 56.74% of respondents had tertiary education. Those with basic education were 16, comprising 15 people with basic education and 1 with no formal education. The proportion of employed participants was 48.44%, with the modal salary bracket being 0- 1,499 GHS. Most participants resided in High-Income communities (34.26%), with the least being in Low-Income Communities (32.41%).



7 Socio-Demographic Characteristics of Participants

Characteristic	N = 216 ¹
Age of Participant (years)	24.42 ± 4.25
No response	10
Age Group of Participant	
18-23 years	97 (47.09%)
24-29 years	75 (36.41%)
30-35 years	34 (16.50%)
No response	10
Marital Status of Participant	
Currently Single	168 (77.78%)
In Union	48 (22.22%)
Participant's Religious Affiliation	
Christian	200 (92.59%)
Non-Christian	16 (7.41%)
Participant's Highest Education Level	
Basic	16 (7.44%)
Secondary	77 (35.81%)
Tertiary	122 (56.74%)
No response	1
Participant's Employment Status	
Unemployed	32 (14.88%)
Employed	105 (48.84%)
Student	78 (36.28%)
No response	1
*Participant's Salary Bracket	
0 - 1,499 GHS	36 (34.95%)
1,500 - 2,999 GHS	20 (19.42%)
3,000 - 4,499 GHS	30 (29.13%)
4,500 - 5,999 GHS	8 (7.77%)
> 6,000 GHS	9 (8.74%)
N/A	110
No response	3
Type of community participant lives	
Low-Income Community	70 (32.41%)
Middle-Income Community	72 (33.33%)
High-Income Community	74 (34.26%)
Participant's Birth Region	
Greater Accra	66 (30.70%)
Other	149 (69.30%)
No response	1
Participant's Insurance Status	
Uninsured	22 (10.19%)
Insured	194 (89.91%)
Coitarche	
Not yet	94 (44.13%)
< 18 years	22 (10.33%)
> 18 years	97 (45.54%)
No response	3
*Number of lifetime sexual partners	
1	55 (50.00%)
2	33 (30.00%)
>=3	22 (20.00%)
N/A	94
No response	12
*Gravidity	
Never	62 (52.54%)
1	24 (20.34%)

Characteristic	N = 216 ¹
2	19 (16.10%)
≥3	13 (11.02%)
N/A	94
No response	4

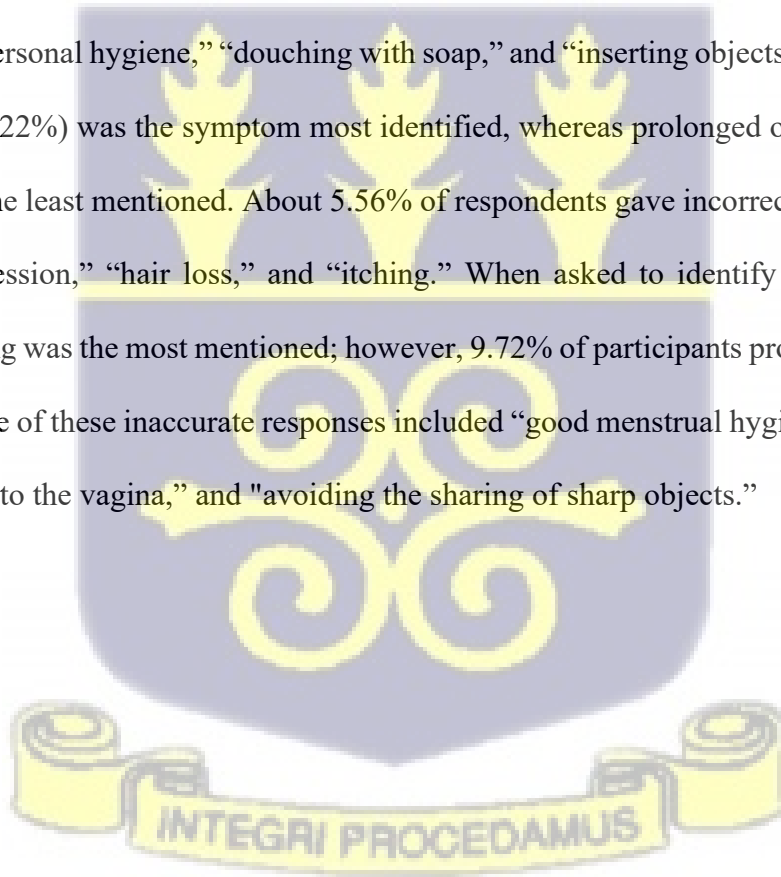
¹Mean ± SD; n (%)

*applicable depending on status for preceding characteristic

4.2 KNOWLEDGE AND AWARENESS OF CERVICAL CANCER, SCREENING AND HPV VACCINATION.

4.2.1 Knowledge of Cervical Cancer, Screening and HPV Vaccination.

Participants were asked to identify risk factors for cervical cancer (CxCA), its symptoms, and ways to prevent it. Unprotected sex (26.39%) was the most frequently cited risk factor, followed by multiple sexual partners (24.54%). The risk factor identified the least was multiple pregnancies (1.39%). Approximately 9.2% of participants mentioned incorrect risk factors, such as “poor personal hygiene,” “douching with soap,” and “inserting objects into the vagina.” Pelvic pain (22.22%) was the symptom most identified, whereas prolonged or heavier periods (2.78%) were the least mentioned. About 5.56% of respondents gave incorrect answers, which included “depression,” “hair loss,” and “itching.” When asked to identify ways to prevent CxCA, screening was the most mentioned; however, 9.72% of participants provided inaccurate responses. Some of these inaccurate responses included “good menstrual hygiene,” “ceasing to insert objects into the vagina,” and “avoiding the sharing of sharp objects.”



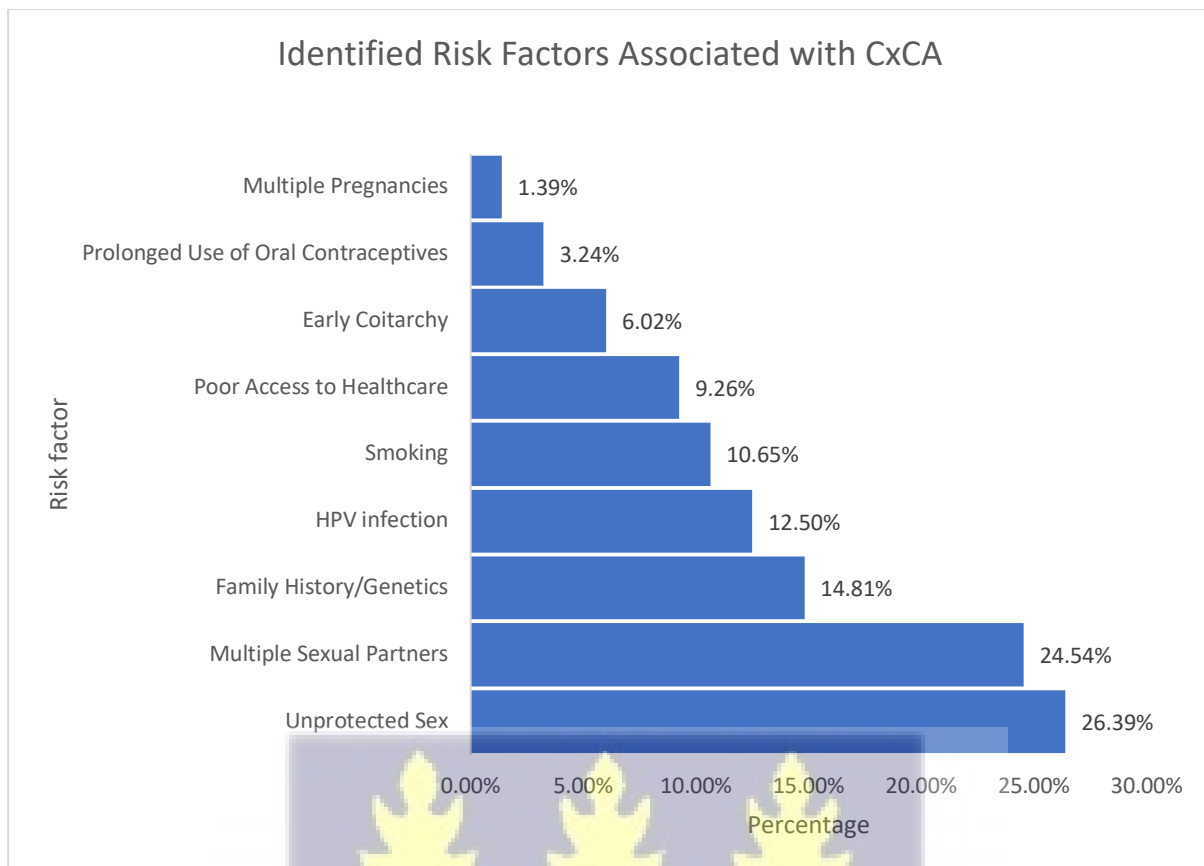


Figure 4 Participant's identified risk factors associated with CxCA

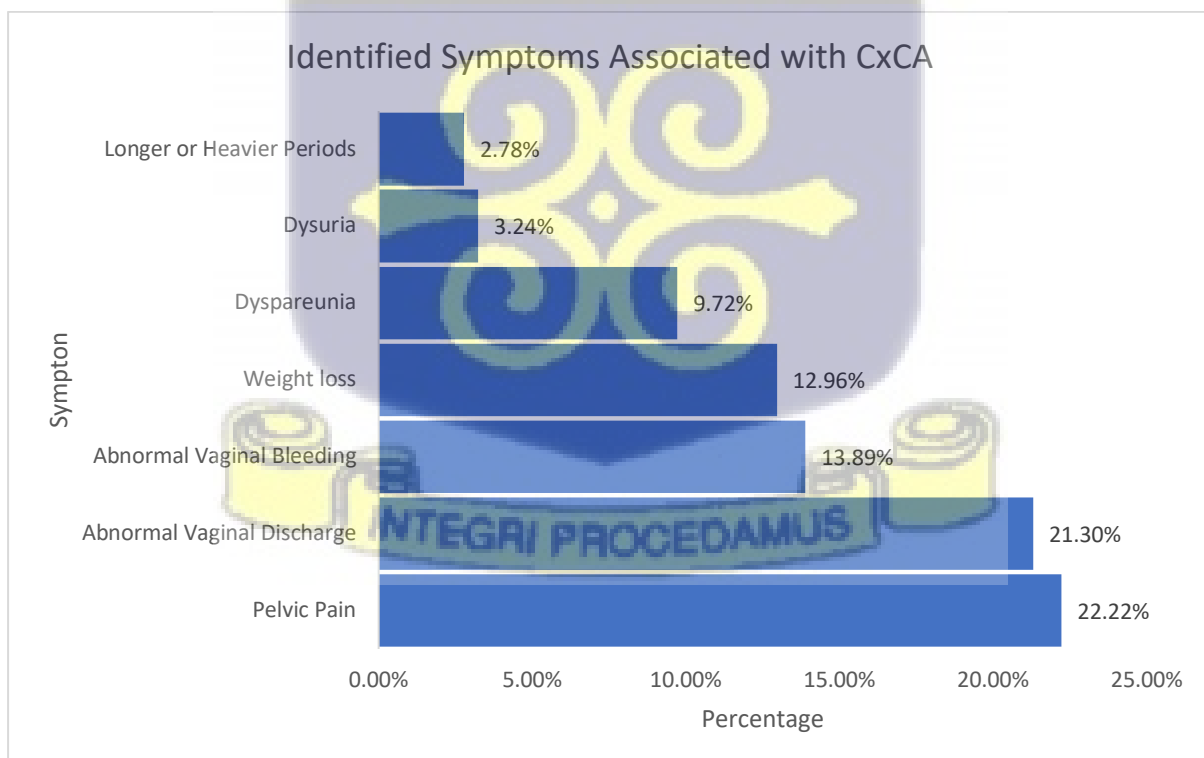


Figure 5 Participant's Identified CxCA symptoms

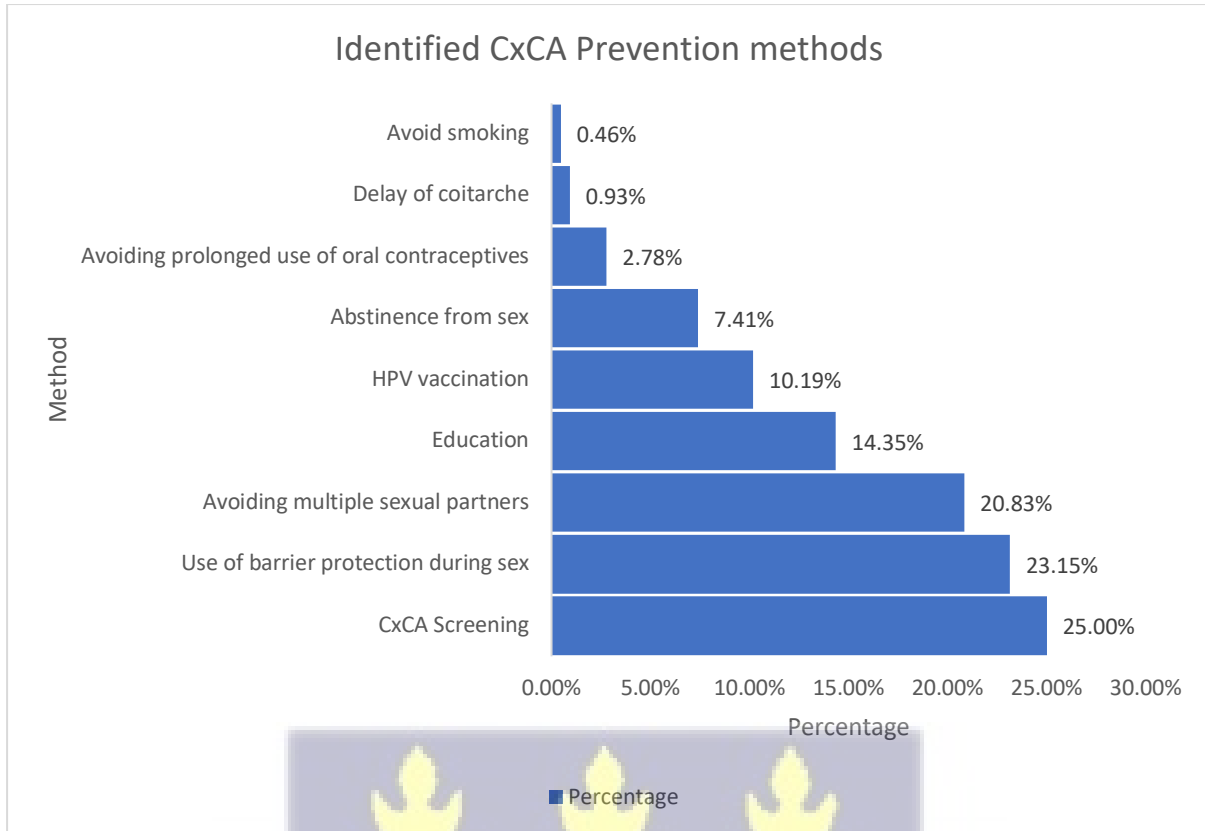


Figure 6 Participant's identified prevention methods

Each participant was allowed as many responses as they could provide for risk factors, symptoms and ways to prevent CxCA. However, a maximum of 5 responses were graded for each question, with accurate responses being graded over inaccurate ones when respondents provided more than 5 responses. Each correct response was assigned a score of 1. The maximum score an individual could achieve was 15. The 25th, 50th and 75th percentiles were 1, 2 and 4, respectively. Scores between 0 and 4, inclusive, were classified as poor knowledge; scores from 5 to 9 were deemed fair knowledge, and scores from 10 to 15 indicated good knowledge. Approximately 81.48% [95% C.I: 75.66%, 86.43%] of participants demonstrated poor knowledge, while 1.39% [95% C.I: 0.29%, 4.01%] showed good knowledge.

Table 8 Knowledge score and level of participants

Characteristic	N = 216 ¹	95% CI ²
Knowledge score	1.00, 2.00, 4.00*	2.30, 2.92
Participant's Knowledge level		
Poor	176 (81.48%)	75.65%, 86.43%
Fair	37 (17.13%)	12.36%, 22.83%
Good	3 (1.39%)	0.29%, 4.01%

*p25, p50, p75; n (%)

Characteristic	N = 216 ¹	95% CI ²
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²CI = Confidence Interval

4.2.2 Awareness of Cervical Cancer, Screening and HPV Vaccination.

Participants were asked questions to determine their awareness of CxCA, CxCA screening, and HPV vaccination. About 66.98% [95% C.I: 60.26%, 73.22%] of participants had heard of CxCA. One hundred and fourteen participants believed there were ways to prevent or reduce the risk of CxCA. Approximately 47.20% and 20.74% of participants were aware of CxCA screening and HPV vaccination, respectively. Forty-nine percent of those who had heard of CxCA screening knew of facilities where they could be screened, while 45.45% of those who had heard of HPV vaccination were aware of facilities that offered vaccination.

Table 9 Awareness of Cervical Cancer, Screening and HPV Vaccination

Characteristic	N = 216 ¹	95% CI ²
Have you heard of CxCA?		
No	71 (33.02%)	26.78%, 39.74%
Yes	144 (66.98%)	60.26%, 73.22%
No response	1	
Are there ways to prevent/lower the risk of CxCA?		
No	16 (8.16%)	4.74%, 12.92%
Yes	114 (58.16%)	50.92%, 65.15%
Not Sure	66 (33.67%)	27.10%, 40.75%
No response	20	
Have you heard of CxCA screening?		
No	113 (52.80%)	45.88%, 59.65%
Yes	101 (47.20%)	40.35%, 54.12%
No response	2	
*Do you know any facility that offers CxCA screening?		
No	51 (51.00%)	40.80%, 61.14%
Yes	49 (49.00%)	38.86%, 59.20%
N/A	113	
No response	3	
Have you heard of HPV vaccination?		
No	171 (79.53%)	73.52%, 84.72%
Yes	44 (20.47%)	15.28%, 26.48%
No response	1	
*Do you know any facility that offers HPV vaccination?		
No	24 (54.55%)	38.85%, 69.61%
Yes	20 (45.45%)	30.39%, 61.15%
N/A	171	
No response	1	

¹n (%)

²CI = Confidence Interval

*question applicable if respondent answered yes in preceding question

4.3 PERCEPTIONS OF CERVICAL CANCER, SCREENING AND HPV VACCINATION.

Participants were asked about their thoughts on CxCA screening and HPV vaccination during the in-depth interview. The major findings from this are illustrated in Table 11 below. Some participants considered screening and vaccination beneficial, suggesting screening aids in the early detection of CxCA. Most participants expressed a willingness to undergo screening, with some asserting that any possible discomfort or side effects associated with screening and vaccination would not deter them due to their benefits. A participant stated,

“It is a medical screening, so if you have it sometimes you need to feel a bit uncomfortable, if it will help you, why not?”.

Concerning vaccination, the participant said,

“Oh yes, so far so good. Vaccines do have their side effects, so if they can help prevent the disease, why not?”.

In contrast, some participants also raised concerns about the issue of vaccine safety as a reason to be hesitant about HPV vaccination. Additionally, two participants mistakenly believed that vaccination eliminates the need for screening. This appeared to be their motivation for undergoing vaccination. One of these participants responded,

“ If I take the vaccine, I won’t need to go and do the screening because I know I am protected against it and I don’t have it”.

Participants were also of the view that screening is necessary for those who are sexually active or of a certain age bracket.

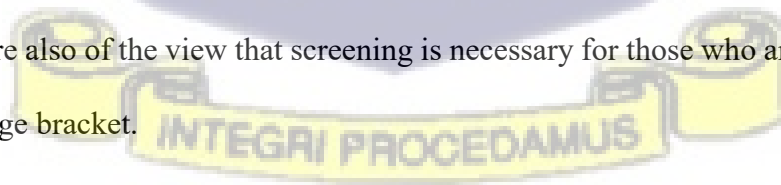


Table 10 Themes and Sub-Themes on Participants' Perception of CxCA Screening and HPV Vaccination

Themes and Sub-Themes	Illustrations
Screening & Vaccination are beneficial	
Screening helps with early detection	"If there is a place set up for screening it helps with early detection."
Vaccination should be added to the EPI	"I think it should be part of our healthcare system that at this age you need to be vaccinated. Like the way they have made polio and the rest normal. They should make it normal"
Screening & Vaccination are acceptable	
HPV vaccination is acceptable	"I will say it is a good thing. Because I see it to be like the COVID vaccination. Like the vaccination we've been taking. They are all good so when the need comes and you have to go and do it you just go once you have your money. You shouldn't think about the cost involved because in future when it escalates. It is better to prevent than make it worse."
Screening is acceptable	"I think it is a good thing every female of teenage age and upwards should do it. It helps check for any abnormalities. It prevents cervical cancer from being aggressive if you have it."
Side effects of vaccination are acceptable	"That is fine. It is normal. But if it will implicate your health, no. Headaches and dizziness it is fine because it will just be for some time but at the end of the day you are protected. You can't stay away from sexual activity. If the vaccine will help eliminate the cancer fine."
Screening & Vaccination are for a particular demographic	
I do not need screening at this age	"Yes, at my age I do not need the test"
I have not screened but advise others to screen	"I have not gone to do the screening because I have my own opinion on cervical cancer and why I have not screened. However, I do recommend to people who are in their menopause. I do recommend to them that when there is this free screening they should go and check."
Those who are sexually active should check for Cervical Cancer	"I think what I heard of it is those that mostly engage in sexual activity are the ones who have to be checking for cervical cancer."
Vaccine safety concerns	
Later we hear vaccines are not safe	"Looking back at COVID and later we hear the vaccines are not safe, I don't think I will take that. Probably all I have to do is to rather protect myself. With the experience I had with COVID-19 vaccination, I don't think I would like to go for another vaccine. Because I am G6PD partial defect anything containing sulphur I do not take."
Misconceptions on Screening & Vaccination	
Vaccination eliminates the need for screening	"If I take the vaccine I won't need to go and do the screening because I know I am protected against it and I don't have it"
Vaccination is fast	"If I go maybe in 5 minutes I can be done."

4.4 ACCEPTABILITY AND UPTAKE OF CERVICAL CANCER SCREENING AND HPV VACCINATION.

4.4.1 Acceptability of Cervical Cancer Screening and HPV Vaccination

4.4.1.1 Acceptability of Cervical Cancer Screening.

Participants were asked if they would undergo CxCA screening to determine whether it was acceptable. About 64.35% [95% C.I: 57.57%,70.73%] found it acceptable.

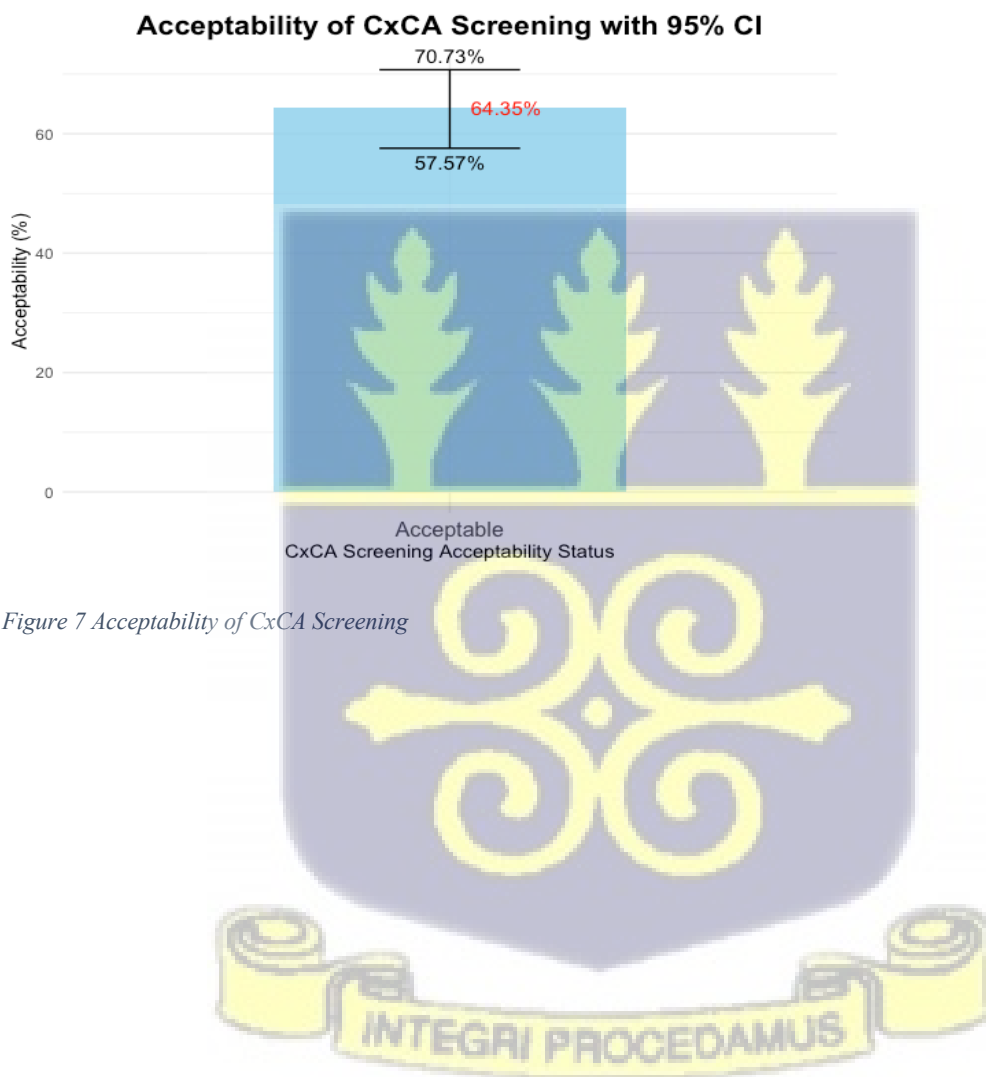


Figure 7 Acceptability of CxCA Screening

4.4.1.2 Acceptability of HPV Vaccination.

Respondents were asked if they would be willing to undergo HPV vaccination. About 56.48% [95% C.I:49.59%,63.19%] responded yes. This proportion represents the acceptability rate among participants.

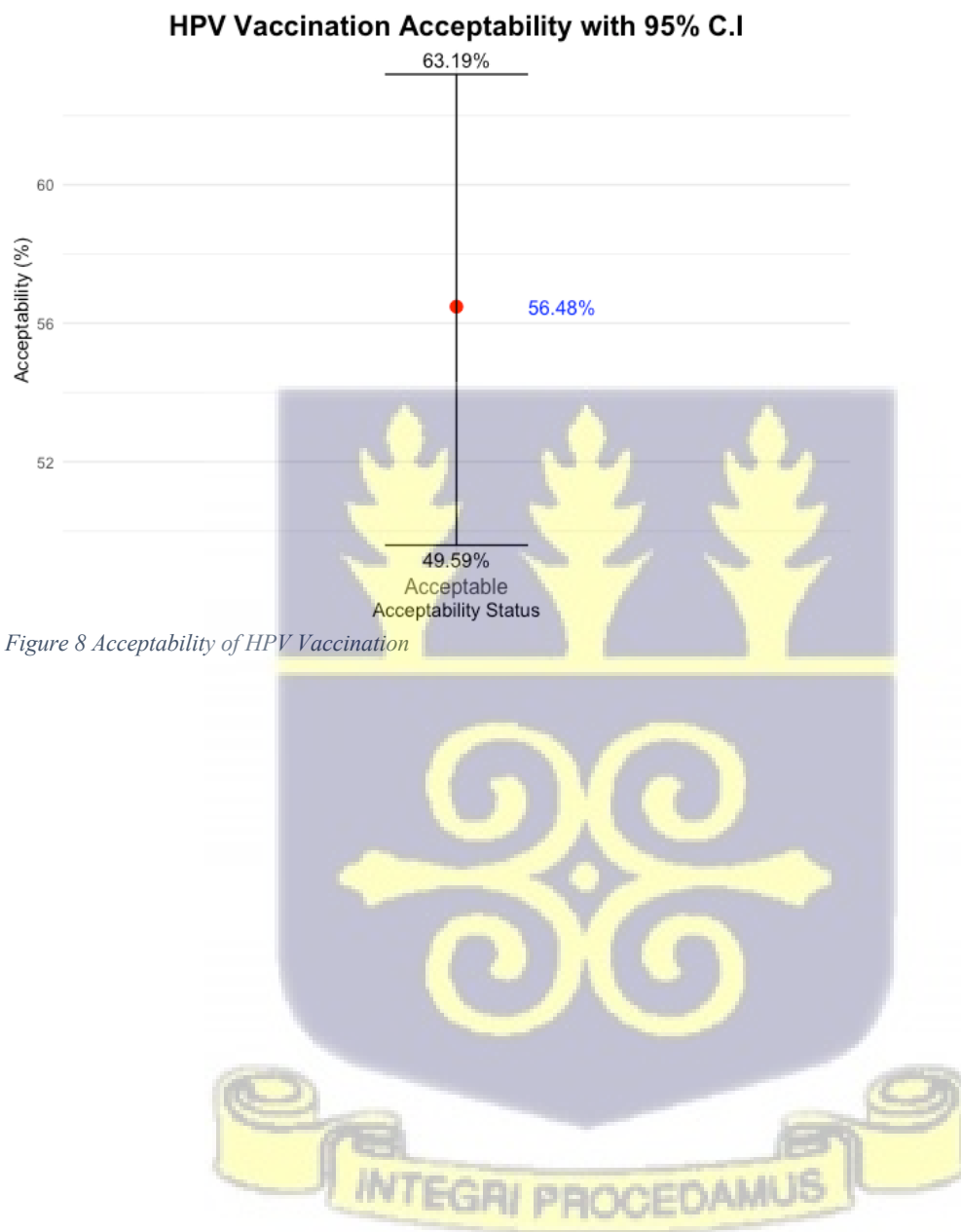


Figure 8 Acceptability of HPV Vaccination

4.4.2 Uptake of Cervical Screening and HPV Vaccination.

4.4.2.1 Uptake of Cervical Cancer Screening.

Approximately 4.65% [95% C.I: 2.25%,8.39%] of participants have undergone any form of CxCA screening. PAP smear was the most utilised screening method, with 90% utilisation among participants. One participant utilised HPV screening.

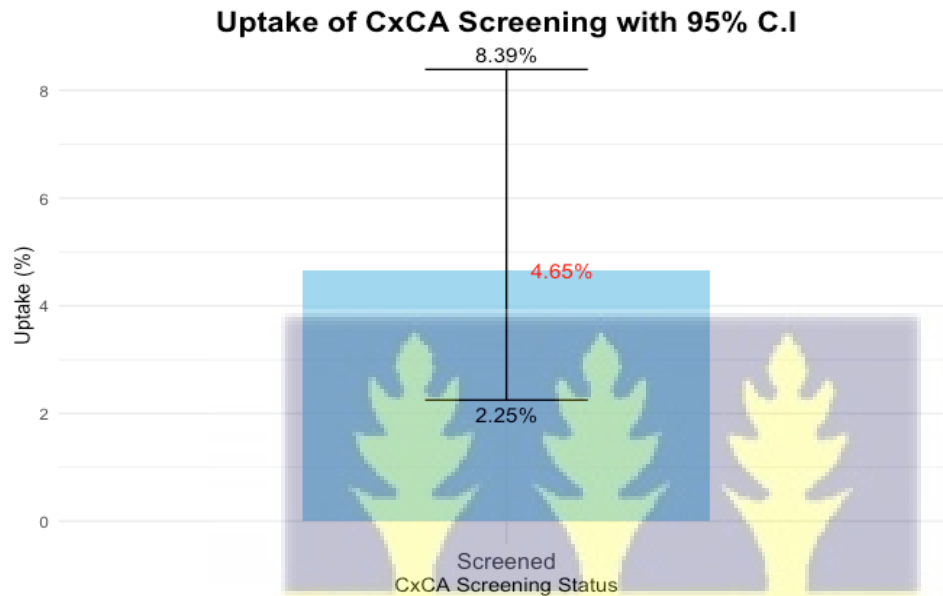


Figure 9 Cervical Cancer Screening Uptake

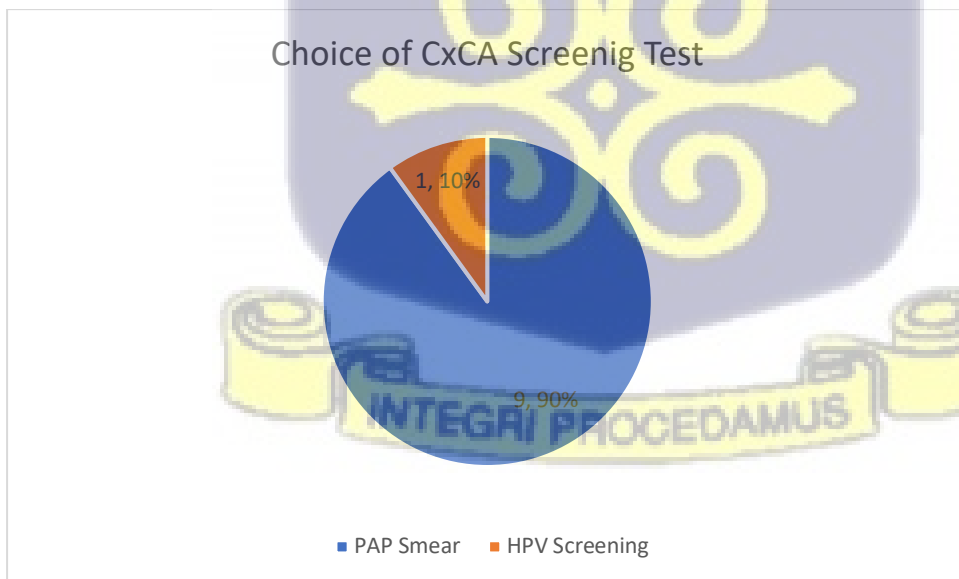


Figure 10 Choice of CxCA Screening test

4.4.2.2 Uptake of HPV Vaccination.

The HPV vaccine uptake rate among participants was estimated to be 1.39% [95% C.I: 0.29%-4.01%]. One out of the 3 participants who had been vaccinated took the quadrivalent vaccine. The remainder were not certain of which vaccine they received.

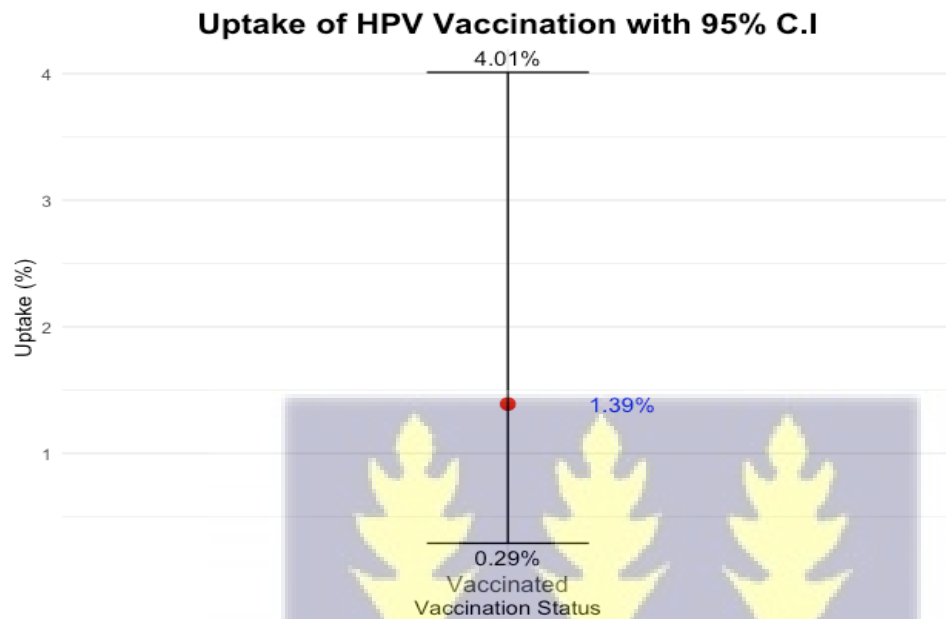


Figure 11 HPV Vaccination uptake

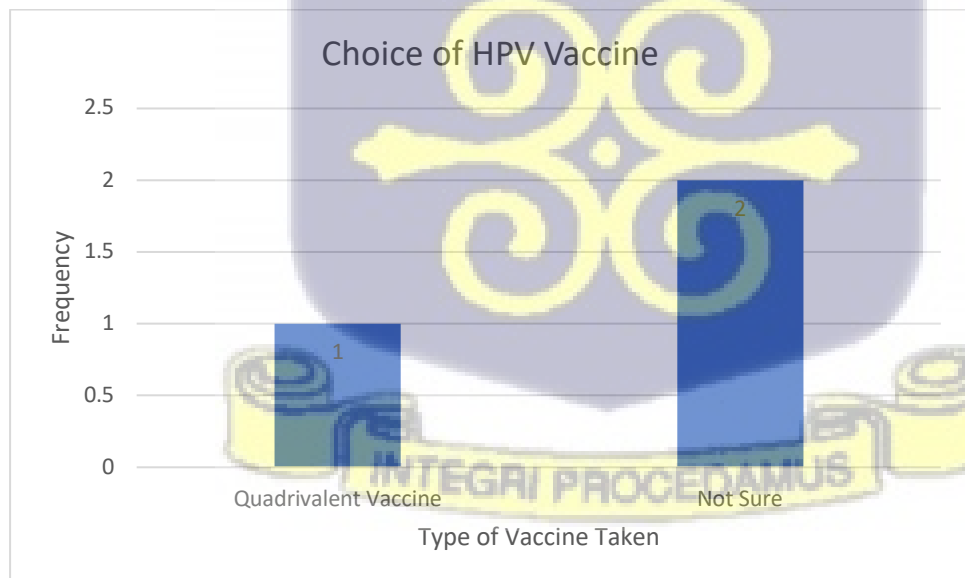


Figure 12 Choice of HPV Vaccine

4.5 ASSOCIATION BETWEEN VARIOUS FACTORS AND CERVICAL CANCER SCREENING/HPV VACCINATION ACCEPTABILITY AND UPTAKE.

Cross-tabulations were performed between sociodemographic characteristics, knowledge and awareness factors, and: i. CxCa screening acceptability ii. HPV vaccination acceptability iii. CxCa screening uptake iv. HPV vaccination uptake. Pearson's chi-square test or Fisher's exact test was employed to assess any associations between the outcomes and exposures, depending on the expected values.

4.5.1 Association between Various Factors and Cervical Cancer Screening Acceptability.

4.5.1.1 Association between Sociodemographic Factors and Cervical Cancer Screening Acceptability.

Associations between the various sociodemographic factors and the acceptability of cervical cancer screening were tested. Birth Region and coitarche were found to have significant associations with CxCA screening acceptability. For the Region of birth, the majority (64.75%) of those who found CxCA screening acceptable were born in the Greater Accra Region. The majority of those who found CxCA acceptable for coitarche were those who had not yet engaged in sexual intercourse.

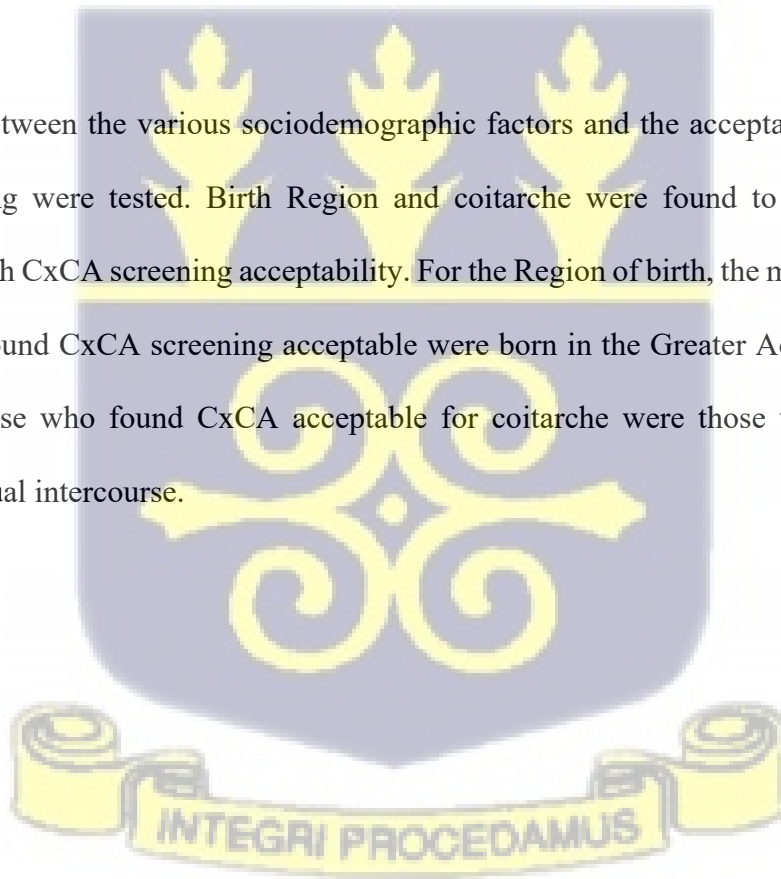
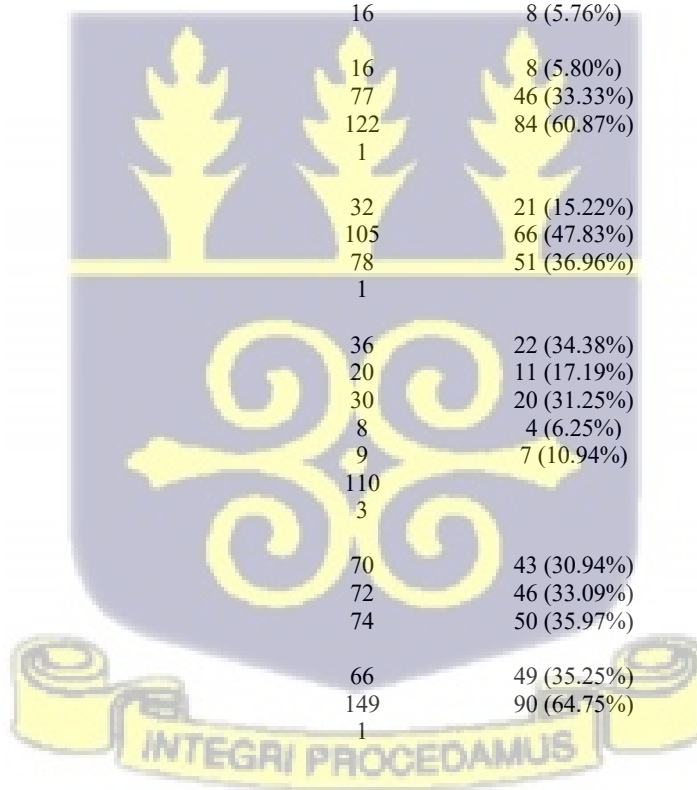


Table 11 Association between sociodemographic characteristics and acceptability of CxCA screening

Characteristic	Total, N = 216 ¹	Acceptable, N = 139 ¹	95% CI ²	p-value ³
Age Group of Participant				0.60
18-23 years	97	64 (49.61%)	40.69%, 58.55%	
24-29 years	75	44 (34.11%)	25.99%, 42.97%	
30-35 years	34	21 (16.28%)	10.37%, 23.80%	
No response	10			
Marital Status of Participant				0.99
Currently Single	168	108 (77.70%)	69.86%, 84.32%	
In Union	48	31 (22.30%)	15.68%, 30.14%	
Participant's Religious Affiliation				0.21
Christian	200	131 (94.24%)	88.97%, 97.48%	
Non-Christian	16	8 (5.76%)	2.52%, 11.03%	
Participant's Highest Education Level				0.20
Basic	16	8 (5.80%)	2.54%, 11.10%	
Secondary	77	46 (33.33%)	25.54%, 41.86%	
Tertiary	122	84 (60.87%)	52.20%, 69.06%	
No response	1			
Participant's employment status				0.99
Unemployed	32	21 (15.22%)	9.67%, 22.32%	
Employed	105	66 (47.83%)	39.26%, 56.49%	
Student	78	51 (36.96%)	28.90%, 45.58%	
No response	1			
*Participant's Salary Bracket				0.71
0 - 1,499 GHS	36	22 (34.38%)	22.95%, 47.30%	
1,500 - 2,999 GHS	20	11 (17.19%)	8.90%, 28.68%	
3,000 - 4,499 GHS	30	20 (31.25%)	20.24%, 44.06%	
4,500 - 5,999 GHS	8	4 (6.25%)	1.73%, 15.24%	
> 6,000 GHS	9	7 (10.94%)	4.51%, 21.25%	
N/A	110			
No response	3			
Type of community participant lives				0.74
Low-Income Community	70	43 (30.94%)	23.38%, 39.33%	
Middle-Income Community	72	46 (33.09%)	25.35%, 41.57%	
High-Income Community	74	50 (35.97%)	28.01%, 44.54%	
Participant's Birth Region				0.05
Other	66	49 (35.25%)	27.34%, 43.80%	
Greater Accra	149	90 (64.75%)	56.20%, 72.66%	
No response	1			



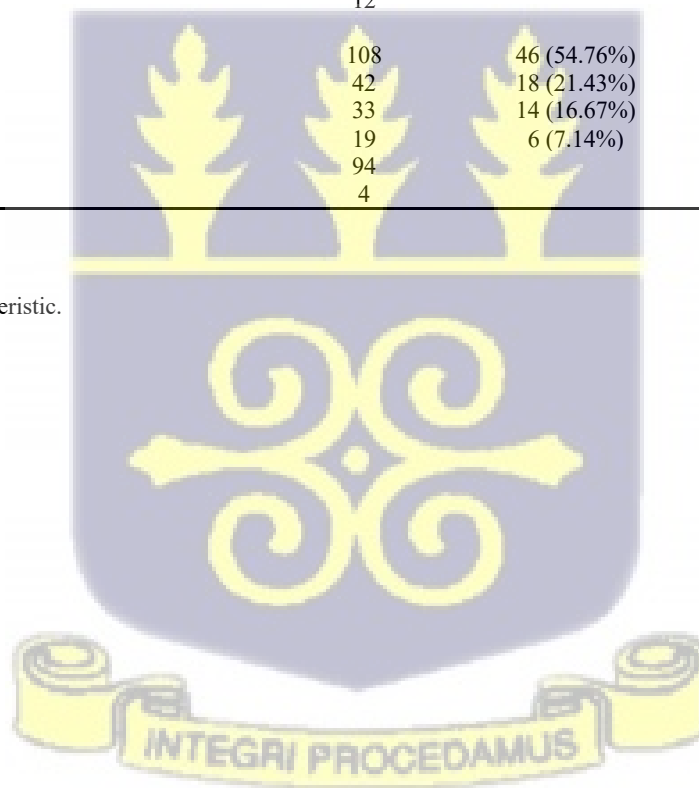
Characteristic	Total, N = 216 ¹	Acceptable, N = 139 ¹	95% CI ²	p-value ³
Participant's Insurance Status				0.69
Uninsured	22	15 (10.79%)	6.17%, 17.17%	
Insured	194	124 (89.21%)	82.83%, 93.83%	
Coitarche				0.03
Not yet	94	52 (37.96%)	29.81%, 46.64%	
< 18 years	22	18 (13.13%)	7.98%, 19.97%	
> 18 years	97	67 (48.91%)	40.27%, 57.58%	
Unknown	3			
*Number of lifetime sexual partners				0.83
1	55	40 (50.00%)	38.60%, 61.40%	
2	33	25 (31.25%)	21.35%, 42.59%	
>=3	22	15 (18.75%)	10.89%, 29.03%	
N/A	94			
No response	12			
*Gravidity				0.25
Never	108	46 (54.76%)	43.52%, 65.66%	
1	42	18 (21.43%)	13.22%, 31.74%	
2	33	14 (16.67%)	9.42%, 26.38%	
>=3	19	6 (7.14%)	2.67%, 14.90%	
N/A	94			
No response	4			

¹n (%)

²CI = Confidence Interval

³Pearson's Chi-squared test; Fisher's exact test

*applicable depending on status for preceding characteristic.



4.5.1.2 Association between Knowledge and Awareness of Cervical Cancer Screening/HPV Vaccination and Cervical Cancer Screening Acceptability.

Most participants (89) who suggested there was a way to prevent or lower the risk of CxCa found CxCA screening acceptable. The same trend was seen in those who had heard of CxCA screening and HPV vaccination, and those who knew facilities that offered CxCA screening. All the aforementioned variables had a statistically significant association (p-value <0.05) with CxCA screening acceptability. A significant association was also observed between knowledge level and CxCA screening acceptability.



Table 12 Association between Knowledge and Awareness of Cervical Cancer Screening/HPV Vaccination and Cervical Cancer Screening Acceptability.

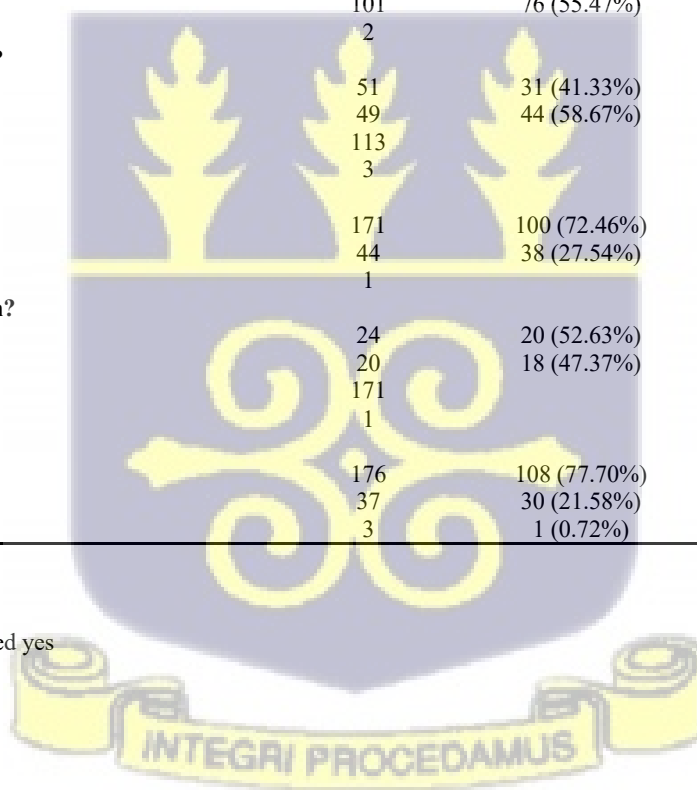
Characteristic	Total, N = 216 ¹	Acceptable, N = 139 ¹	95% CI ²	p-value ³
Have you heard of CxCA?				0.09
No	71	40 (28.99%)	21.58%, 37.31%	
Yes	144	98 (71.01%)	62.69%, 78.42%	
Unknown	1			
Are there ways to prevent/lower the risk of Cervical Cancer?				0.001
No	16	11 (8.66%)	4.40%, 14.97%	
Yes	114	89 (70.08%)	62.15%, 78.59%	
Not Sure	66	27 (21.26%)	14.50%, 29.40%	
Unknown	20			
Have you heard of CxCA screening				0.001
No	113	61 (44.53%)	36.04%, 53.25%	
Yes	101	76 (55.47%)	46.75%, 63.96%	
No response	2			
*Do you know any facility that offers CxCA screening?				0.001
No	51	31 (41.33%)	30.08%, 53.50%	
Yes	49	44 (58.67%)	46.70%, 69.92%	
N/A	113			
No response	3			
Have you heard of HPV vaccination?				0.001
No	171	100 (72.46%)	64.22%, 79.72%	
Yes	44	38 (27.54%)	20.28%, 35.78%	
No response	1			
*Do you know any facility that offers HPV Vaccination?				0.67
No	24	20 (52.63%)	35.82%, 69.02%	
Yes	20	18 (47.37%)	30.98%, 64.18%	
N/A	171			
No response	1			
Participant's Knowledge level				0.02
Poor	176	108 (77.70%)	69.86%, 84.32%	
Fair	37	30 (21.58%)	15.06%, 29.35%	
Good	3	1 (0.72%)	0.02%, 3.94%	

¹n (%)

²CI = Confidence Interval

³Pearson's Chi-squared test; Fisher's exact test

*question is application if preceding question was answered yes



4.5.2 Association between Various Factors and HPV Vaccination Acceptability.

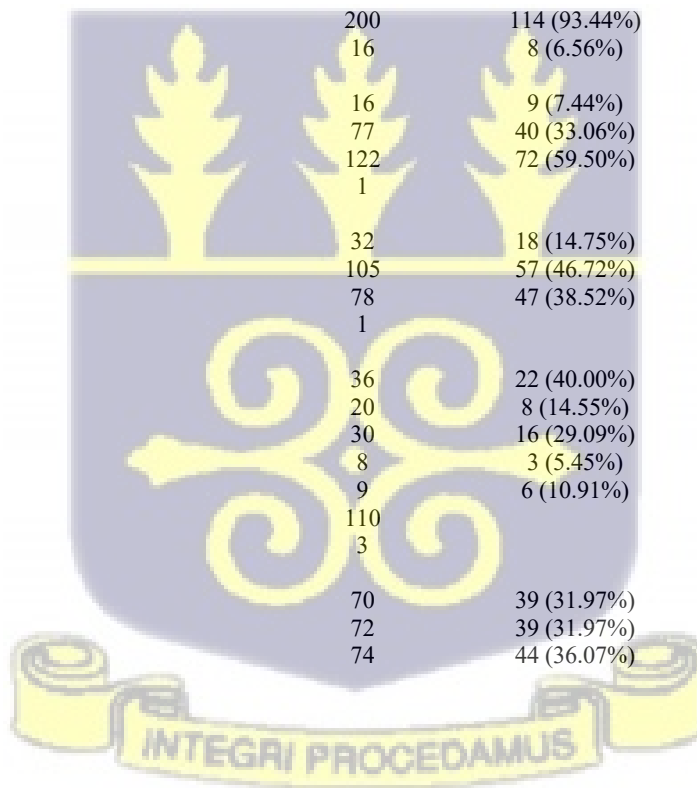
4.5.2.1 Association Between Sociodemographic Characteristics and HPV Vaccination Acceptability.

Women aged between 18 and 23 exhibited the highest HPV vaccine acceptance rate across all age groups (53.10%). The modal acceptability rate (40.00%) was among those who earned between 0 and 1,499 GHS. The acceptability rate was equal in low- and middle-income communities. Participants whose coitarche was >18 years old recorded the highest acceptability rate. However, there was no statistically significant association between any socio-demographic characteristic and the acceptability of HPV vaccination



Table 13 Association between Sociodemographic Characteristics and Acceptability of HPV Vaccination

Characteristic	Total, N = 216 ¹	Acceptable, N = 122 ¹	95% CI ²	p-value ³
Age Group of Participant				0.14
18-23 years	97	60 (53.10%)	43.48%, 62.55%	
24-29 years	75	35 (30.97%)	22.61%, 40.36%	
30-35 years	34	18 (15.93%)	9.72%, 24.00%	
No response	10			
Marital Status of Participant				0.53
Currently Single	168	93 (76.23%)	67.68%, 83.47%	
In Union	48	29 (23.77%)	16.53%, 32.32%	
Participant's Religious Affiliation				0.61
Christian	200	114 (93.44%)	87.49%, 97.13%	
Non-Christian	16	8 (6.56%)	2.87%, 12.51%	
Participant's Highest Education Level				0.61
Basic	16	9 (7.44%)	3.46%, 13.65%	
Secondary	77	40 (33.06%)	24.78%, 42.19%	
Tertiary	122	72 (59.50%)	50.20%, 68.33%	
Unknown	1			
Participant's Employment Status				0.72
Unemployed	32	18 (14.75%)	8.98%, 22.31%	
Employed	105	57 (46.72%)	37.64%, 55.97%	
Student	78	47 (38.52%)	29.86%, 47.76%	
No response	1			
*Participant's Salary Bracket				0.45
0 - 1,499 GHS	36	22 (40.00%)	27.02%, 54.09%	
1,500 - 2,999 GHS	20	8 (14.55%)	6.50%, 26.66%	
3,000 - 4,499 GHS	30	16 (29.09%)	17.63%, 42.90%	
4,500 - 5,999 GHS	8	3 (5.45%)	1.14%, 15.12%	
> 6,000 GHS	9	6 (10.91%)	4.11%, 22.25%	
N/A	110			
No response	3			
Type of community participant lives				0.80
Low-Income Community	70	39 (31.97%)	23.82%, 41.02%	
Middle-Income Community	72	39 (31.97%)	23.82%, 41.02%	
High-Income Community	74	44 (36.07%)	27.57%, 45.25%	

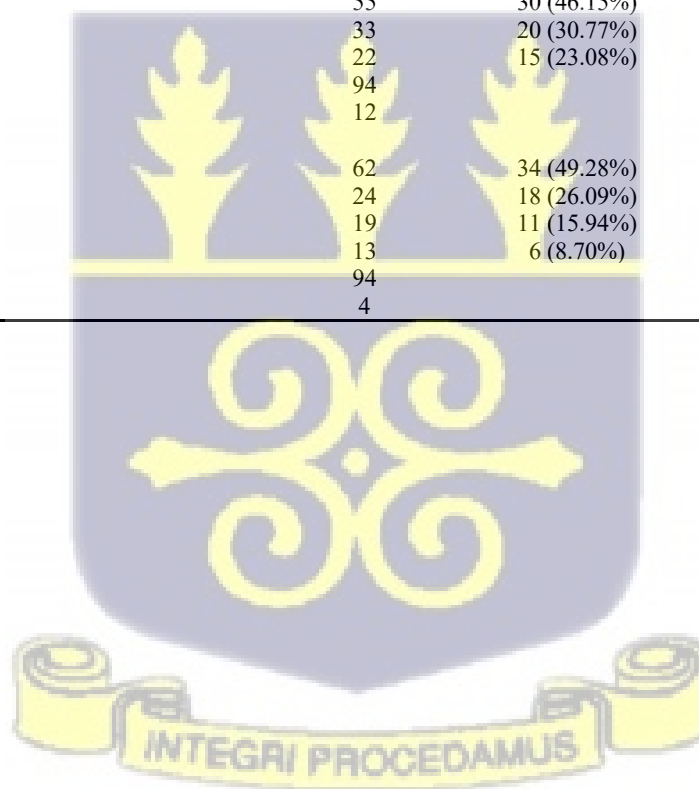


Characteristic	Total, N = 216 ¹	Acceptable, N = 122 ¹	95% CI ²	p-value ³
Participant's Birth Region				0.10
Other	66	43 (35.25%)	26.82%, 44.41%	
Greater Accra	149	79 (64.75%)	55.59%, 73.18%	
No response	1			
Participant's Insurance Status				0.24
Uninsured	22	15 (12.30%)	7.05%, 19.47%	
Insured	194	107 (87.70%)	80.53%, 92.95%	
Coitarche				0.25
Not yet	94	50 (41.67%)	32.74%, 51.02%	
< 18 years	22	16 (13.33%)	7.82%, 20.75%	
> 18 years	97	54 (45.00%)	35.91%, 54.35%	
No response	3			
*Number of lifetime sexual partners				0.53
1	55	30 (46.15%)	33.70%, 58.97%	
2	33	20 (30.77%)	19.91%, 43.45%	
>=3	22	15 (23.08%)	13.53%, 35.19%	
N/A	94			
No response	12			
Gravidity				0.28
Never	62	34 (49.28%)	37.02%, 61.59%	
1	24	18 (26.09%)	16.25%, 38.06%	
2	19	11 (15.94%)	8.24%, 26.74%	
>=3	13	6 (8.70%)	3.26%, 17.97%	
N/A	94			
No response	4			

¹n (%)

²CI = Confidence Interval

³Pearson's Chi-squared test; Fisher's exact test



4.5.2.2 Association Between Knowledge and Awareness of CxCA Screening/HPV Vaccination and HPV Vaccination Acceptability.

The highest acceptability rate was recorded among those who suggested there are ways to prevent or lower the risk of CxCA(69.72%) compared to those who thought the contrary. More participants who knew CxCA screening facilities were willing to vaccinate against HPV compared to those who did not. The same trend was observed in those who knew a CxCA screening facility compared to those who did not know (38:22). Statistically significant associations(p -value < 0.05) were found between awareness of ways to lower the risk of CxCA, awareness of facilities that offer CxCA screening, awareness of HPV vaccination and acceptability of HPV vaccination.



Table 14 Association between knowledge and awareness of CxCA screening, HPV Vaccination and Acceptability of HPV Vaccination

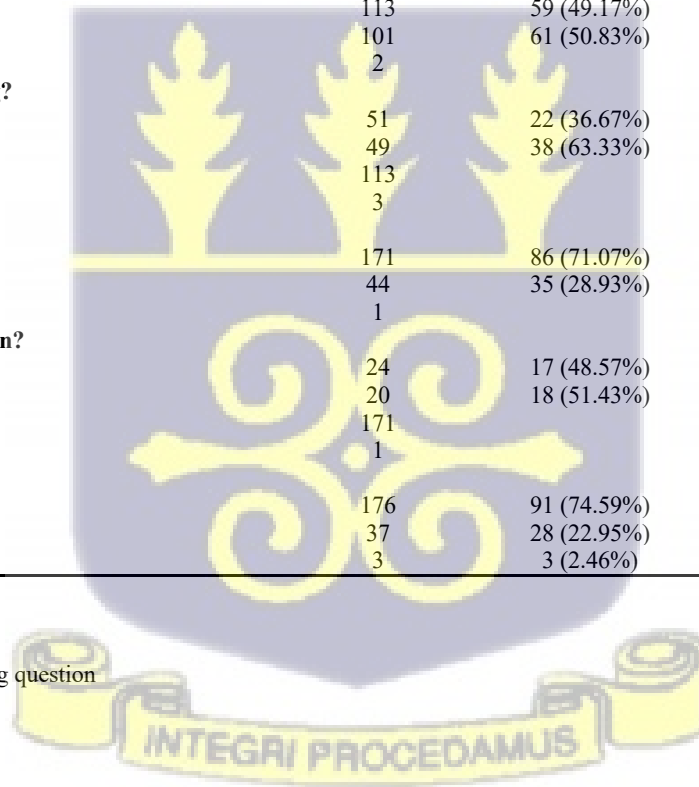
Characteristic	Total, N = 216 ¹	Acceptable, N = 122 ¹	95% CI ²	p-value ³
Have you heard of CxCA?				0.50
No	71	38 (31.15%)	23.07%, 40.16%	
Yes	144	84 (68.85%)	59.84%, 76.93%	
No response	1			
Are there ways to prevent/lower the risk of Cervical Cancer?				0.001
No	16	9 (8.26%)	3.85%, 15.10%	
Yes	114	76 (69.72%)	60.19%, 78.16%	
Not Sure	66	24 (22.02%)	14.65%, 30.97%	
No response	20			
Have you heard of CxCA screening				0.23
No	113	59 (49.17%)	39.93%, 58.45%	
Yes	101	61 (50.83%)	41.55%, 60.07%	
No response	2			
*Do you know any facility that offers CxCA screening?				0.001
No	51	22 (36.67%)	24.59%, 50.10%	
Yes	49	38 (63.33%)	49.90%, 75.41%	
N/A	113			
No response	3			
Have you heard of HPV vaccination?				0.001
No	171	86 (71.07%)	62.13%, 78.95%	
Yes	44	35 (28.93%)	21.05%, 37.87%	
Unknown	1			
*Do you know any facility that offers HPV Vaccination?				0.15
No	24	17 (48.57%)	31.38%, 66.01%	
Yes	20	18 (51.43%)	33.99%, 68.62%	
N/A	171			
No response	1			
Participant's Knowledge level				0.01
Poor	176	91 (74.59%)	65.91%, 82.04%	
Fair	37	28 (22.95%)	15.82%, 31.43%	
Good	3	3 (2.46%)	0.51%, 7.02%	

¹n (%)

²CI = Confidence Interval

³Pearson's Chi-squared test; Fisher's exact test

*question applicable if participant selected yes in preceding question



4.5.3 Association between Various Factors and Uptake of Cervical Cancer Screening.

4.5.3.1 Association between Sociodemographics and Cervical Screening Uptake.

About 60% of those who had screened for CxCA were currently in a union. All participants who had screened had tertiary education. Approximately 42.86% of participants who had screened earned over 6,000 GHS a month. Significant associations were found between participants' Highest education level, marital status, salary bracket and cervical cancer screening uptake.



Table 15 Association between Sociodemographic Characteristics and Uptake of CxCA Screening.

Characteristic	Total, N = 215 ¹	Screened, N = 10 ¹	95% CI ²	p-value ³
Age Group of Participant				0.17
18-23 years	97	2 (22.22%)	2.52%, 55.61%	
24-29 years	75	6 (66.67%)	34.75%, 93.33%	
30-35 years	33	1 (11.11%)	0.25%, 44.50%	
No response	10			
Marital Status of Participant				0.01
Currently Single	167	4 (40.00%)	12.16%, 73.76%	
In Union	48	6 (60.00%)	26.24%, 87.84%	
Participant's Religious Affiliation				0.55
Christian	199	9 (90.00%)	55.50%, 99.75%	
Non-Christian	16	1 (10.00%)	0.25%, 44.50%	
Participant's Highest Education Level				0.02
Basic	16	0 (0.00%)	0.00%, 33.63%	
Secondary	77	0 (0.00%)	0.00%, 33.63%	
Tertiary	121	9 (100%)	66.37%, 100%	
No response	1			
Participant's Employment Status				0.50
Unemployed	31	1 (10%)	0.25%, 44.50%	
Employed	105	7 (70%)	34.75%, 93.33%	
Student	78	2 (20%)	2.52%, 55.61%	
No response	1			
*Participant's Salary Bracket				0.01
0 - 1,499 GHS	36	0 (0%)	0.00%, 40.96%	
1,500 - 2,999 GHS	20	1 (14.29%)	0.36%, 57.87%	
3,000 - 4,499 GHS	30	2 (28.57%)	3.67%, 70.96%	
4,500 - 5,999 GHS	8	1 (14.29%)	0.36%, 57.87%	
> 6,000 GHS	9	3 (42.86%)	9.90%, 81.59%	
N/A	110			
No response	2			
Type of community participant lives				0.99
Low-Income Community	70	3 (30.00%)	6.67%, 65.25%	
Middle-Income Community	71	3 (30.00%)	6.67%, 65.25%	
High-Income Community	74	4 (40.00%)	12.16%, 73.76%	
Participant's Birth Region				0.99
Other	66	3 (30%)	6.67%, 65.25%	
Greater Accra	148	7 (70%)	34.75%, 93.33%	
No response	1			
Participant's Insurance Status				0.60
Uninsured	22	0 (0.00%)	0.00%, 30.85%	
Insured	193	10 (100%)	69.15%, 100%	
Coitarche				0.53
Not yet	94	3 (33.33%)	7.49%, 70.07%	
< 18 years	22	0 (0.00%)	0.00%, 33.63%	
> 18 years	96	6 (66.67%)	29.93%, 92.51%	
No response	2			
*Number of lifetime sexual partners				0.14
1	54	2 (33.33%)	4.33%, 77.72%	
2	33	4 (66.67%)	22.28%, 95.67%	
>=3	22	0 (0%)	0.00%, 45.93%	
N/A	94			
No response	12			
*Gravidity				0.15
Never	62	2 (33.33%)	5.27%, 85.34%	
1	23	1 (16.67%)	0.51%, 71.64%	
2	19	3 (50%)	5.27%, 85.34%	
>=3	13	0 (0%)	0.00%, 52.18%	
N/A	94			
No response	4			

¹n(%)

²CI= Confidence Interval

³Fisher's exact test

*eligibility to answer question depends on response provided in previous question

4.5.3.2 Association between Knowledge and Awareness of Cervical Cancer Screening and Cervical Screening Uptake.

All participants who had been screened for CxCA had heard of CxCA. The same pattern was observed among those who believed there was a way to prevent or reduce the risk of CxCA, those who had heard of CxCA screening, and those who knew facilities offering CxCA screening. All of these factors had significant associations with the uptake of CxCA screening. Additionally, the knowledge level and awareness of a facility providing HPV vaccination had a significant association with CxCA screening uptake.



Table 16 Association between Knowledge and Awareness of CxCA screening, HPV Vaccination and Uptake of CxCA Screening.

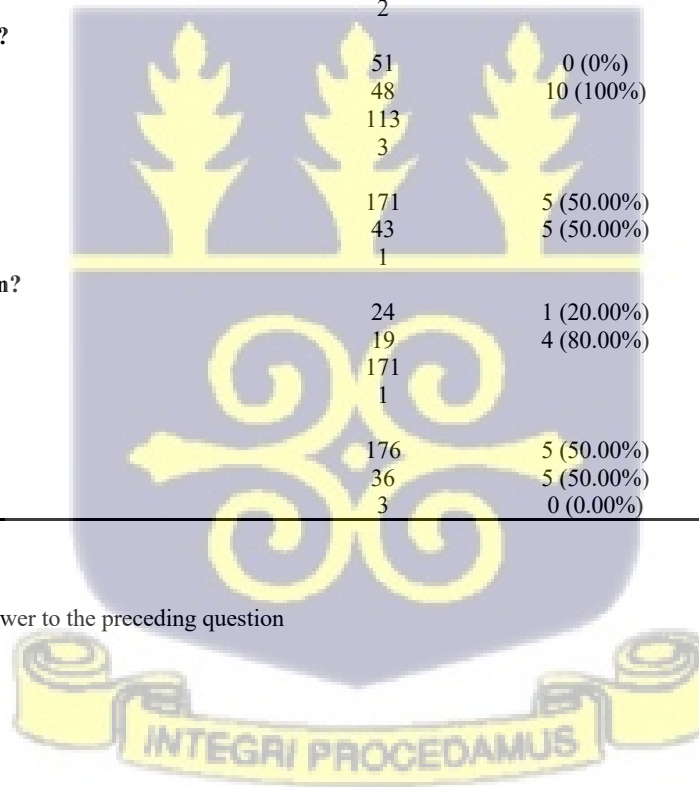
Characteristic	Total, N = 215 ¹	Screened, N = 10 ¹	95% CI ²	p-value ³
Have you heard of CxCA?				0.03
No	71	0 (0.00%)	0.00%, 30.85%	
Yes	144	10 (100%)	69.15%, 100%	
Are there ways to prevent/lower the risk of Cervical Cancer?				0.02
No	16	0 (0.00%)	0.00%, 30.85%	
Yes	113	10 (100%)	69.15%, 100%	
Not Sure	66	0 (0%)	0.00%, 30.85%	
No response	20			
Have you heard of CxCA screening				0.001
No	113	0 (0.00%)	0.00%, 30.85%	
Yes	100	10 (100%)	69.15%, 100%	
No response	2			
*Do you know any facility that offers CxCA screening?				0.001
No	51	0 (0%)	0.00%, 30.85%	
Yes	48	10 (100%)	69.15%, 100%	
N/A	113			
No response	3			
Have you heard of HPV vaccination?				0.03
No	171	5 (50.00%)	18.71%, 81.29%	
Yes	43	5 (50.00%)	18.71%, 81.29%	
No response	1			
*Do you know any facility that offers HPV Vaccination?				0.15
No	24	1 (20.00%)	0.51%, 71.64%	
Yes	19	4 (80.00%)	28.36%, 99.49%	
N/A	171			
No response	1			
Participant's Knowledge level				0.02
Poor	176	5 (50.00%)	18.71%, 81.29%	
Fair	36	5 (50.00%)	18.71%, 81.29%	
Good	3	0 (0.00%)	0.00%, 30.85%	

¹n (%)

²CI = Confidence Interval

³Fisher's exact test

*eligibility to answer the question is dependent on the answer to the preceding question



4.5.4 Association between Various Factors and Uptake of HPV Vaccination.

4.5.4.1 Association between Sociodemographic Characteristics and Uptake of HPV Vaccination.

HPV vaccination uptake was highest in individuals aged 18-23 years(66.67%). All vaccinated participants were currently single. About 66.67% of vaccinated participants were students. All vaccinated individuals also had health insurance and were all yet to engage in sex hence, the number of lifetime sexual partners and gravidity were excluded from this analysis. There were no significant associations between vaccination uptake and any sociodemographic characteristic



Table 17 Association between Sociodemographic Characteristics and Uptake of HPV Vaccination.

Characteristic	Total, N = 216 ¹	Vaccinated, N = 3 ¹	95% CI ²	p-value ³
Age Group of Participant				0.99
18-23 years	97	2 (66.67%)	9.43%, 99.16%	
24-29 years	75	1 (33.33%)	0.84%, 90.57%	
30-35 years	34	0 (0.00%)	0.00%, 70.76%	
No response	10			
Marital Status of Participant				0.99
Currently Single	168	3 (100%)	29.24%, 100%	
In Union	48	0 (0.00%)	0.00%, 70.76%	
Participant's Religious Affiliation				0.99
Christian	200	3 (100%)	29.24%, 100%	
Non-Christian	16	0 (0.00%)	0.00%, 70.76%	
Participant's Highest Education Level				0.65
Basic	16	0 (0.00%)	0.00%, 70.76%	
Secondary	77	2 (66.67%)	9.43%, 99.16%	
Tertiary	122	1 (33.33%)	0.84%, 90.57%	
No response	1			
Participant's Employment Status				0.73
Unemployed	32	0 (0.00%)	0.00%, 70.76%	
Employed	105	1 (33.33%)	0.84%, 90.57%	
Student	78	2 (66.67%)	9.43%, 99.16%	
No response	1			
*Participant's Salary Brackey				0.36
0 - 1,499 GHS	36	0 (0.00%)	0.00%, 97.5%	
1,500 - 2,999 GHS	20	1 (100%)	2.5%, 100%	
3,000 - 4,499 GHS	30	0 (0.00%)	0.00%, 97.5%	
4,500 - 5,999 GHS	8	0 (0.00%)	0.00%, 97.5%	
> 6,000 GHS	9	0 (0.00%)	0.00%, 97.5%	
N/A	110	2		
No response	1			
Type of community participant lives				0.54
Low-Income Community	70	1 (33.33%)	0.84%, 90.57%	
Middle-Income Community	72	0 (0.00%)	0.00%, 70.76%	
High-Income Community	74	2 (66.67%)	9.43%, 99.16%	
Participants Birth Region				0.22
Other	66	2 (66.67%)	9.43%, 99.16%	
Greater Accra	149	1 (33.33%)	0.84%, 90.57%	
Unknown	1	0		
Participant's Insurance Status				0.99
Uninsured	22	0 (0.00%)	0.00%, 70.76%	
Insured	194	3 (100%)	29.24%, 100%	
Coitarche				0.24
Not yet	94	3 (100%)	29.24%, 100%	
< 18 years	22	0 (0.00%)	0.00%, 70.76%	
> 18 years	97	0 (0.00%)	0.00%, 70.76%	
No response	3			

¹n(%)

²CI= Confidence Interval

³Fisher's exact test

*question applicable depending on answer to preceding question

4.5.4.1 Association between Knowledge and Awareness of Cervical Cancer Screening and HPV Vaccination and Uptake of HPV Vaccination.

Every vaccinated participant in the study had heard of HPV vaccination. The same pattern was observed for those who had heard of CxCA, those who thought there were ways to prevent or lower the risk of CxCA and those who had heard of CxCA screening. The only significant relationship with vaccination uptake was between those who had heard of HPV vaccination.



Table 18 Association between Knowledge and Awareness of CxCA Screening, HPV Vaccination and Uptake of HPV Vaccination.

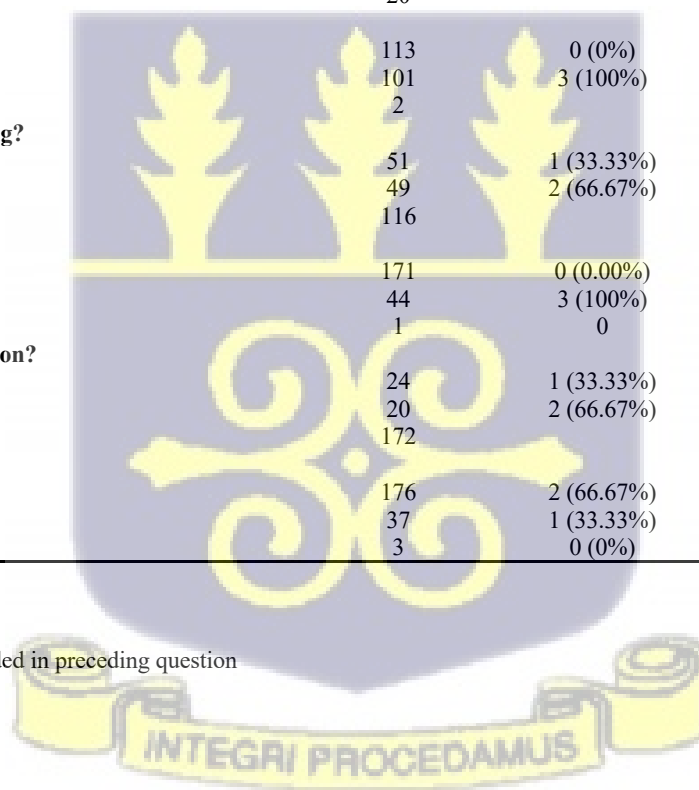
Characteristic	Total, N = 216 ¹	Vaccinated, N = 3 ¹	95% CI ²	p-value ³
Have you heard of CxCA?				0.55
No	71	0 (0%)	0.00%, 70.76%	
Yes	144	3 (100%)	29.24%, 100%	
No response	1			
Are there ways to prevent/lower the risk of Cervical Cancer?				0.45
No	16	0 (0.00%)	0.00%, 70.76%	
Yes	114	3 (100%)	29.24%, 100%	
Not Sure	66	0 (0.00%)	0.00%, 70.76%	
No response	20			
Have you heard of CxCA screening?				0.10
No	113	0 (0%)	0.00%, 70.76%	
Yes	101	3 (100%)	29.24%, 100%	
No response	2			
*Do you know any facility that offers CxCA screening?				0.61
No	51	1 (33.33%)	0.84%, 90.57%	
Yes	49	2 (66.67%)	9.43%, 99.16%	
N/A	116			
Have you heard of HPV vaccination?				0.01
No	171	0 (0.00%)	0.00%, 70.76%	
Yes	44	3 (100%)	29.24%, 100%	
No response	1	0		
*Do you know any facility that offers HPV Vaccination?				0.58
No	24	1 (33.33%)	0.84%, 90.57%	
Yes	20	2 (66.67%)	9.43%, 99.16%	
N/A	172			
Participant's Knowledge level				0.46
Poor	176	2 (66.67%)	9.43%, 99.16%	
Fair	37	1 (33.33%)	0.84%, 90.57%	
Good	3	0 (0%)	0.00%, 70.76%	

¹n (%)

²CI = Confidence Interval

³Fisher's exact test

*Eligibility to answer question depends on response provided in preceding question



4.6 FACTORS AFFECTING THE ACCEPTABILITY AND UPTAKE OF CERVICAL CANCER SCREENING AND HPV VACCINATION.

4.6.1. Interpersonal Factors Influencing the Decision of Participants to Undergo Cervical Cancer Screening and Vaccination.

Participants were asked whether factors identified in previous studies and literature as influencing women's decisions to undergo screening and vaccination would similarly influence their choices to get screened or vaccinated.

4.6.1.1 Interpersonal Factors Influencing the Decision of Participants to Undergo Cervical Cancer Screening.

Most participants agreed that the sex of the person conducting the test and spousal consent would not impact their decision to be screened. However, factors such as the cost of the test and the associated pain were found to influence the decision to undergo screening.

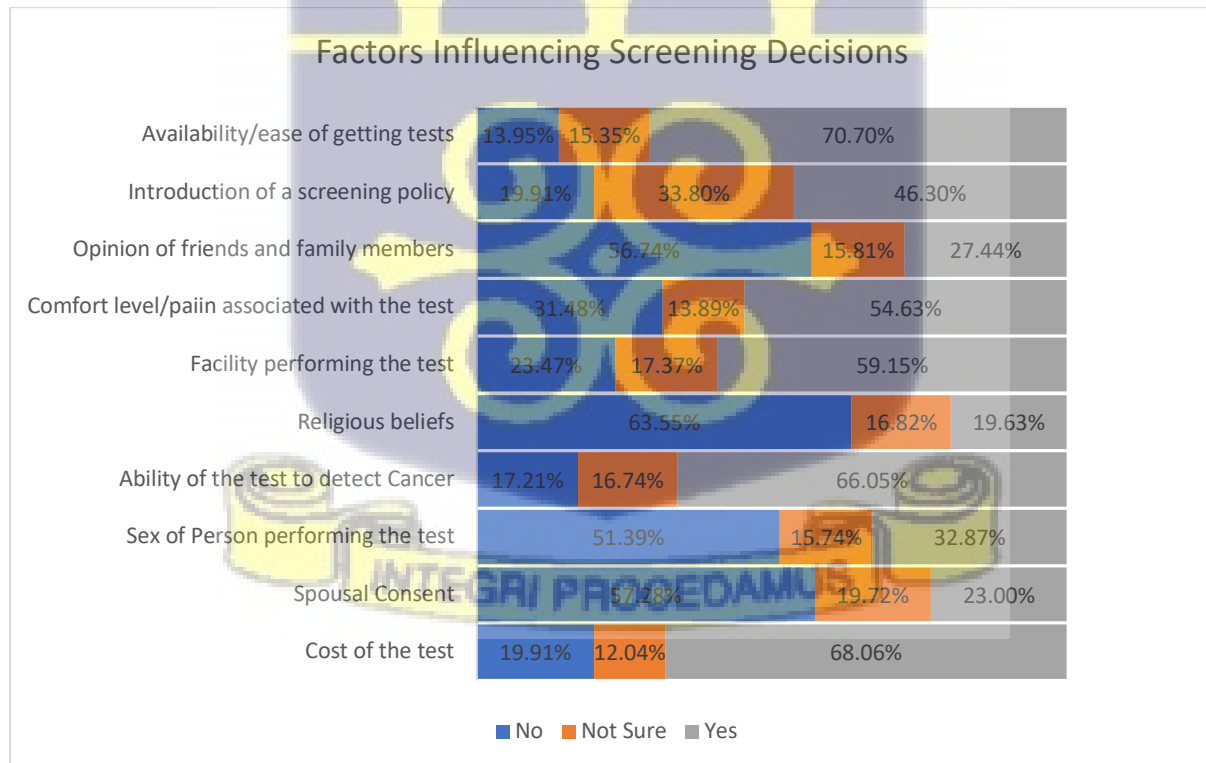


Figure 13 Factors Influencing the Decision of Women to Screen.

4.6.1.2 Interpersonal Factors Influencing the Decision of Participants to Undergo HPV Vaccination.

Most participants indicated that their decision to get vaccinated would not be impacted by the opinions of friends and family nor by cultural, religious, or personal beliefs. Factors such as the cost of vaccines, concerns about vaccine safety, and the advice of healthcare professionals were found to impact the decision to get vaccinated among most participants.

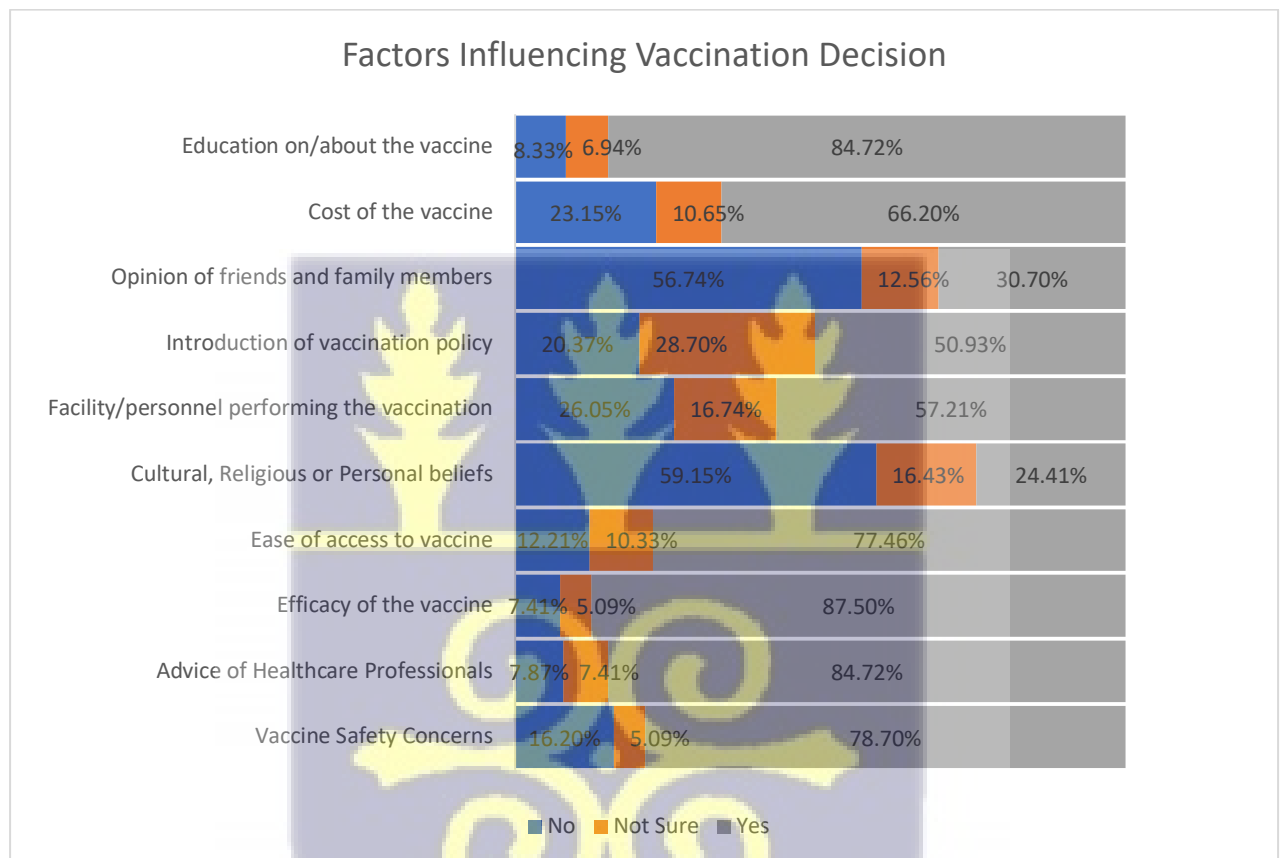


Figure 14 Factors Influencing the Decision of Women to Undergo HPV Vaccination.

4.6.2 Factors Affecting the Acceptability of Cervical Cancer Screening and HPV Vaccination.

Regression models were run with CxCA screening and HPV vaccination acceptability as dependent variables. Sociodemographic characteristics and Knowledge and awareness factors that had statistically significant associations with the dependent variables in the univariate analysis were used as the independent variables.

4.6.2.1 Factors Affecting the Acceptability of Cervical Cancer Screening.

A logistic regression was run between the acceptability of cervical cancer screening and selected factors. Awareness of screening was omitted from the model due to collinearity. Coitarche <18 years was also omitted in the adjusted model since it predicts success perfectly. The odds of CxCA screening being acceptable among those who know a facility that offers CxCA screening was 5.68 [95% C.I: 2.05,18.60; p-value: 0.002] times higher as compared to those who did not know of a facility that offers CxCA screening. After adjusting for other variables, the odds of CxCA being acceptable among those who knew a facility that offered CxCA screening was 4.76 [95% C.I: 1.43,18.1; p-value:0.02] times higher than those who did not know any such facility. The odds of accepting CxCA screening were increased by 80% among those who first had sex after age 18. This was 2.73 times higher after adjusting for other variables. However, the adjusted odds ratio was not statistically significant.

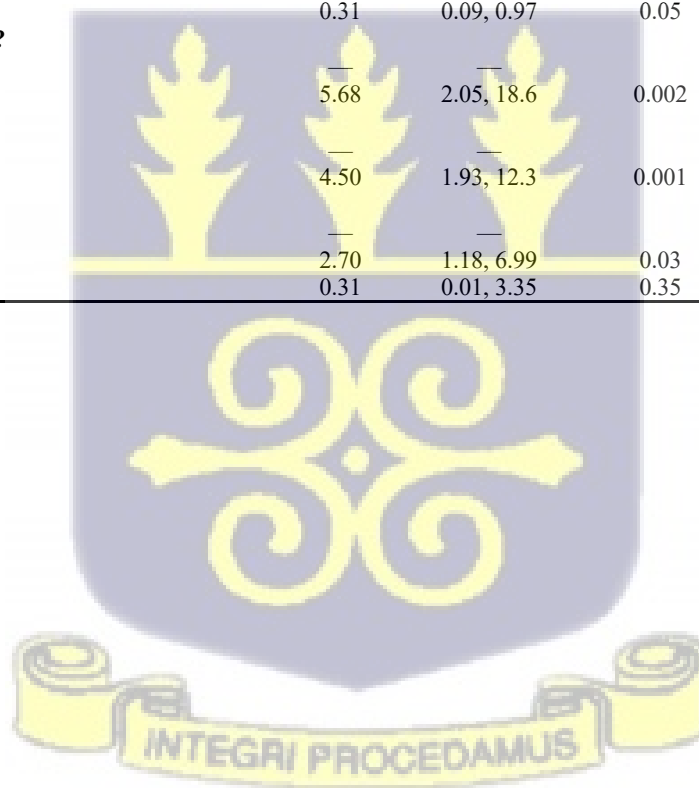


Model 1 Crude and Adjusted Logistic Regression Model between CxCA Screening Acceptability and various factors

Characteristic	OR ¹	Crude OR (95% CI)		p-value	OR ¹	Adjusted OR (95% CI)		p-value
			95% CI ²				95% CI ²	
Participant's Birth Region								
Other	—	—			—	—		
Greater Accra	0.53	0.27, 0.99	0.05		0.69	0.19, 2.27	0.55	
Coitarche								
Not yet	—	—			—	—		
< 18 years	3.63	1.24, 13.3	0.03		Omitted	N/A, N/A	N/A	
> 18 years	1.80	1.00, 3.28	0.05		2.73	0.93, 8.59	0.07	
Are there ways to prevent/lower the risk of Cervical Cancer?								
No	—	—			—	—		
Yes	1.62	0.47, 4.91	0.41		2.34	0.08, 67.5	0.57	
Not Sure	0.31	0.09, 0.97	0.05		2.42	0.08, 72.5	0.56	
Do you know any facility that offers CxCA screening?								
No	—	—			—	—		
Yes	5.68	2.05, 18.6	0.002		4.76	1.43, 18.1	0.02	
Have you heard of HPV vaccination?								
No	—	—			—	—		
Yes	4.50	1.93, 12.3	0.001		3.29	0.82, 15.5	0.11	
Participant's Knowledge level								
Poor	—	—			—	—		
Fair	2.70	1.18, 6.99	0.03		1.04	0.24, 4.90	0.96	
Good	0.31	0.01, 3.35	0.35		0.11	0.00, 3.39	0.15	

¹OR = Odds Ratio

²CI = Confidence Interval



4.6.2.2 Factors Affecting the Acceptability of HPV Vaccination.

A Firth logistic regression was performed to examine the acceptability of HPV vaccination in relation to selected variables. This model was chosen over a standard logistic regression as it is more suitable for addressing rare outcomes and small sample sizes. Additionally, it demonstrated enhanced model performance using the Akaike and Bayesian Information Criteria. The odds of accepting HPV vaccination among women who had heard of it were 3.69 [95% C.I: 1.76, 8.44; p-value 0.001] times greater than those who had not. Following adjustments for other variables, the odds decreased to 2.82 [95% C.I: 1.02, 8.41; p-value: 0.05]. The odds of finding HPV vaccination acceptable among women who were aware of a CxCA screening facility were 4.39 times higher compared to those who were unaware of such a facility. After adjusting for other variables, the odds were 3.51 times higher.

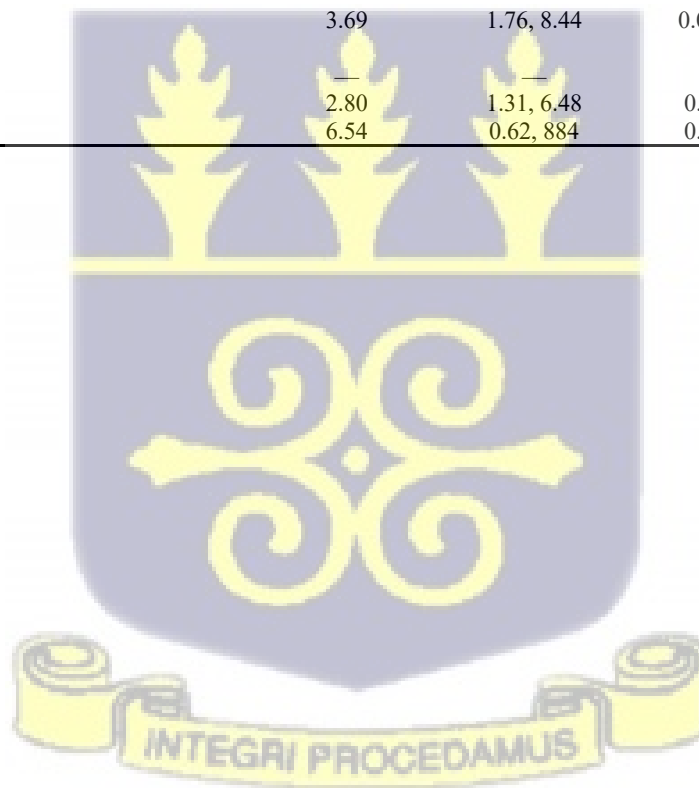


Model 2 Crude and Adjusted Firth Logistic Regression Model between HPV Vaccination Acceptability and various factors

Characteristic	OR ¹	Crude OR (95% CI)	p-value	OR ¹	Adjusted OR (95% CI)	p-value
		95% CI ²			95% CI ²	
Are there ways to prevent/lower the risk of Cervical Cancer?						
No	—	—		—	—	
Yes	1.57	0.54, 4.41	0.39	1.75	0.22, 13.8	0.58
Not Sure	0.46	0.15, 1.33	0.15	1.69	0.19, 16.2	0.63
Do you know any facility that offers CxCA screening?						
No	—	—		—	—	
Yes	4.39	1.90, 10.7	0.001	3.51	1.40, 9.26	0.01
Have you heard of HPV vaccination?						
No	—	—		—	—	
Yes	3.69	1.76, 8.44	0.001	2.82	1.02, 8.41	0.05
Participant's Knowledge level						
Poor	—	—		—	—	
Fair	2.80	1.31, 6.48	0.01	1.74	0.59, 5.47	0.33
Good	6.54	0.62, 88.4	0.13	2.18	0.13, 33.1	0.64

¹OR= Odds Ratio

²CI = Confidence Interval

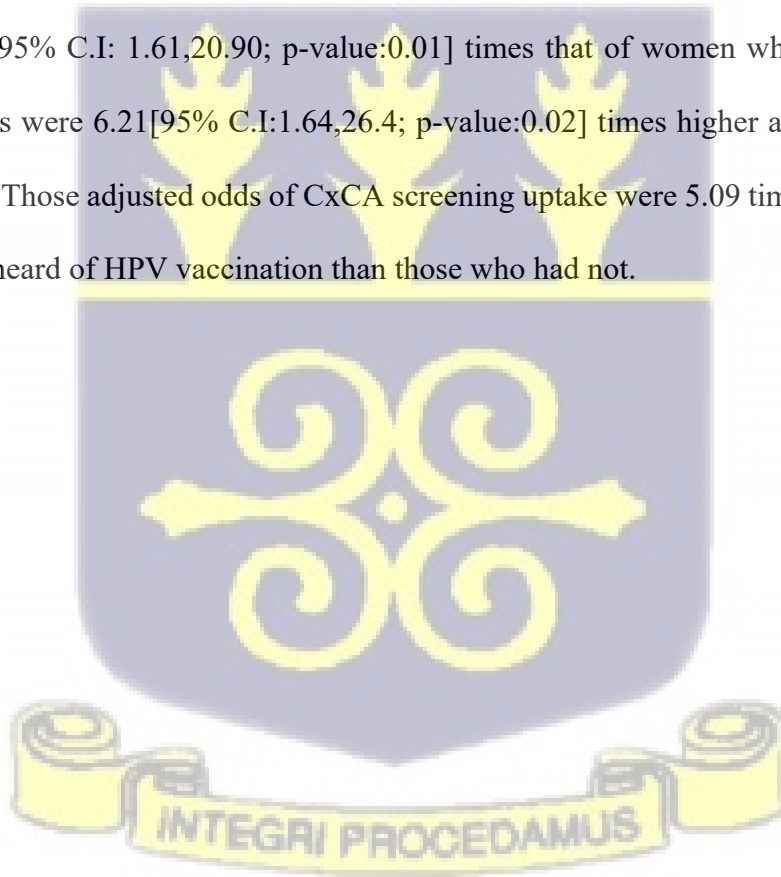


4.6.3 Factors Affecting the Uptake of Cervical Cancer Screening and HPV Vaccination.

Regression models were run using CxCA screening and HPV vaccination uptake as dependent variables. Sociodemographic characteristics and Knowledge and awareness factors that had statistically significant associations with the dependent variables in the univariate analysis were selected as independent variables.

4.6.3.1 Factors Affecting the Uptake of Cervical Cancer Screening.

A Firth logistic regression was run between CxCA screening uptake and selected factors. Education, salary bracket, CxCA awareness, awareness of prevention methods, awareness of CxCA screening, awareness of a facility that offered screening and knowledge level were omitted due to collinearity. Women currently in a union had odds of undergoing CxCA screening 5.56[95% C.I: 1.61,20.90; p-value:0.01] times that of women who were currently single. The odds were 6.21[95% C.I:1.64,26.4; p-value:0.02] times higher after adjusting for other variables. Those adjusted odds of CxCA screening uptake were 5.09 times higher among those who had heard of HPV vaccination than those who had not.



Model 3 Crude and Adjusted Firth Logistic Regression Model between CxCA Screening Uptake and various factors

Characteristic	OR ¹	Crude OR (95% CI)		p-value	OR ¹	Adjusted OR (95% CI)		p-value
		95% CI ²				95% CI ²		
Marital Status of Participant								
Currently Single	—	—			—	—		
In Union	5.56	1.61, 20.90		0.01	6.21	1.64, 26.4		0.01
Have you heard of HPV vaccination?								
No	—	—			—	—		
Yes	4.32	1.22, 15.3		0.02	5.09	1.29, 21.0		0.02
Participant's Knowledge level								
Poor	—	—			—	—		
Fair	5.44	1.53, 19.4		0.01	3.15	0.84, 11.6		0.09
Good	4.45	0.03, 55.5		0.34	3.26	0.02, 52.0		0.48

¹OR= Odds Ratio

²CI = Confidence Interval



4.6.3.2 Factors Affecting the Uptake of HPV Vaccination.

A Firth logistic regression was run between HPV vaccination uptake and awareness of HPV vaccination. The odds of a woman being vaccinated against HPV were 3.69[95% C.I: 1.70,8.02; p-value: 0.001] times higher among women who had heard of HPV vaccination as compared to women who had not heard of HPV vaccination. This was statistically significant.

Model 4 Firth Logistic between HPV Vaccination and Awareness of HPV Vaccination

Characterisitic	OR ¹	95 % C.I. ²	p-value
Have you heard of HPV Vaccination?			
No	-	-	-
Yes	3.69	1.70,8.02	0.001

¹OR = Odds Ratio

²C.I = Confidence Interval



4.7 TRIANGULATION.

The following pillars were identified from the data using the Pillar Integration Process.

Pillar 1: The proximity, perceived capacity of the facility and experiences of others influence the decision to screen and vaccinate.

During the survey, 59.15% and 57.21% of participants indicated that the facility providing screening and vaccination services would influence their decision to get screened or vaccinated.

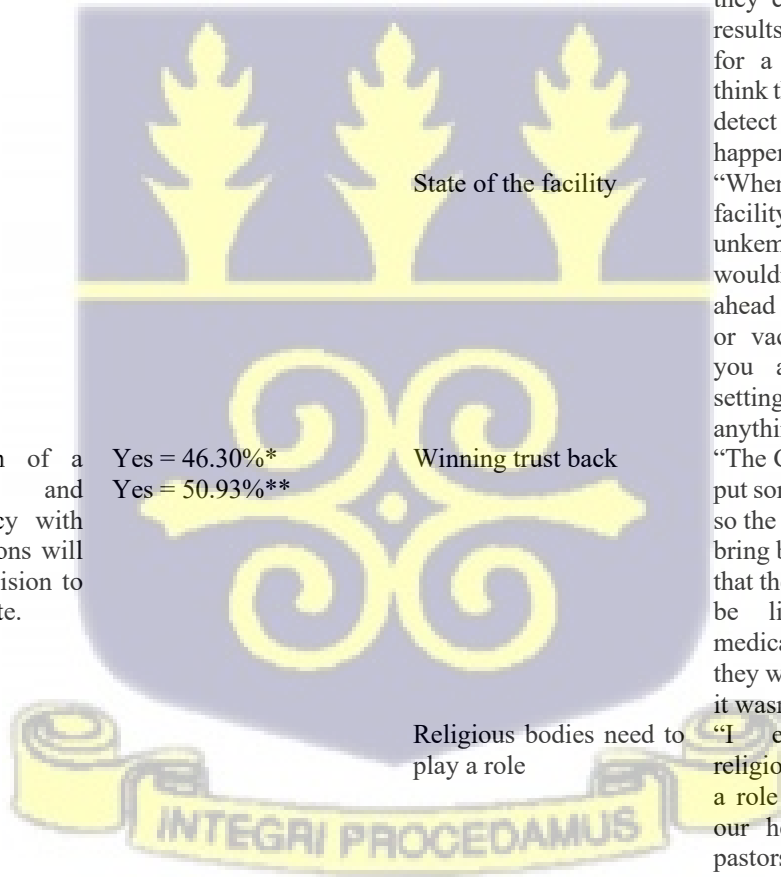
In the interviews, participants noted that factors such as the proximity of the facility, the experiences of others, the facility's capacity and competence, and its overall condition would be taken into account when selecting a location for screening or vaccination. Participants expressed a preference for facilities that are closer to them. They would also be less inclined to visit a facility where others had reported negative experiences. Additionally, participants would avoid choosing an untidy facility.

Pillar 2: The introduction of a screening and vaccination policy with some considerations will influence the decision to screen or vaccinate.

Approximately 46.30% of respondents indicated they would be willing to participate in screening if a screening policy were introduced, while 50.93% of participants expressed their willingness to get vaccinated should a vaccination policy be implemented. However, they noted that certain considerations must be taken into account when formulating these policies to ensure public engagement. Some participants believed the government would need to work on restoring public trust in the safety of vaccinations to promote participation. They felt that the side effects and negative publicity surrounding the COVID-19 vaccines have dissuaded many individuals from getting vaccinated. Additionally, some participants thought that screening and vaccination should be subsidised or provided free of charge to enhance uptake. Others suggested that screening should be conducted by women, as they may feel more comfortable in that scenario.

Table 19 Joint Display Table

Pillar	Quantitative Result N = 216	Qualitative Themes N = 8	Illustrations
The proximity, perceived capacity of the facility and experiences of others influence the decision to screen and vaccinate.	Yes = 59.15%* Yes = 57.21%**	Proximity of facility Experiences of others Capacity or competence of the facility	“I would choose a place closer to me” “Maybe my house is far when I pick a car and go result is not ready and next day when I do the same thing too it’s not ready. Maybe if someone went and that’s what they are doing I wouldn’t go there.” “I think I prefer a private hospital. They are well equipped with so many equipment and modern things so I know what results I am getting. For other hospitals the patients are flooded and they can even exchange results. For me I will go for a private facility. I think there they can really detect what is happening.” “When I come to a facility and it looks unkempt like that I wouldn’t be pushed to go ahead with the screening or vaccination. Because you are in a facility setting so I shouldn’t see anything of that sort.” “The COVID has already put some doubt in people, so the Government has to bring back trust in people that the medication won’t be like the COVID medication, and later, they will come and tell us it wasn’t good.” “I even think the religious bodies also play a role when it comes to our health. When their pastors speak, they will listen. They will be going for the regular screening and all that” “Before someone will do something, you will have to educate them. Because no one will just get up and say they are going go
The introduction of a screening and vaccination policy with some considerations will influence the decision to screen or vaccinate.	Yes = 46.30%* Yes = 50.93%**	Winning trust back Religious bodies need to play a role Education and awareness	



	to do cervical screening when they don't know what it is about. So, I think before the screening they should raise public awareness, public education about cervical cancer, what causes it and a whole lot of education about it so people know that this thing is important and I have to do it. Like they should try and convince them so they do it."
Facility setting related	"So it shouldn't be in like a very Porsche set up with people wearing coats and being all professional. It should be normal they should be normal like normal women so we can understand them. So they can talk to us more. It shouldn't be that professional like a Porsche or hospital setting. It should be a normal setting so we don't feel uncomfortable going."
Free or subsidised	"The test is available, but if they can reduce the price and also if they can put it on the national health insurance for all women to have access to the test, it will be great."
Adding incentives to the policy	"They can attach something like if you go and screen you can get a sanitary pad. Something just to attract them. Something you can use as a mother or bring to your daughter. Something to get them to the hospital. It will make others troop in for screening. Sanitary pad is around 20 cedis but is very difficult for people to afford."
Screening should be done by women	"It should be a women's thing. Most women don't feel comfortable with a man doing the screening for them."
Talk in local languages	"They shouldn't come all talking big English and

Placing restrictions on
the unvaccinated

things. They should talk to us in our local dialects. They should let us understand that this is going on.”

“So, if you get the vaccine, you get to have a card and when you are trying to get to certain places you’re restricted. If you are restricted from going to certain places because of the vaccine you would go for it”

*Screening decision

**Vaccination decision



CHAPTER FIVE.

5.0 DISCUSSION.

5.1 DISCUSSION

Most participants had heard of CxCA; however, only 47.20% and 20.74% knew of screening and vaccination, respectively. This is not an isolated finding, as half of the Ghanaian women with CxCA who were interviewed in a teaching hospital had never heard of HPV vaccines (Zurales et al., 2023). Another survey in the Ahanti Region of Ghana estimated that just 13.2% of participants knew of CxCA screening (Prempeh, 2018). The low level of awareness could be attributed to several factors. These include a woman's level of education, little or limited information and publicity on screening and vaccination, as well as the sparsity of educational material on CxCA in local languages. Lower awareness about CxCA, screening, and vaccination has been observed in Ghanaian women with lower levels of education (Williams et al., 2018). This might be because women with lower levels of education have difficulty reading and writing in English. This, coupled with the scantness of educational materials in local languages, could explain the low levels of awareness among this demographic of women.

An overwhelming 81.48% were estimated to have poor knowledge of CxCA, screening, and HPV vaccination despite the high self-reported awareness of CxCA. Similar findings were reported in a study in Ghana (Nyaaba & Akurugu, 2023). The low knowledge levels could also be attributed to factors such as a lack of publicity and education on CxCA and a paucity of information on CxCA in local languages. A participant mentioned that they do not hear much about CxCA as they do about cancers such as breast cancer and further suggested that the use of English and medical terminology in health education can be overwhelming and intimidating (see [Table 19](#)). This may hinder the comprehension of information related to CxCA, screening, and vaccination. This underlines the need to intensify education on CxCA, screening, and vaccination, particularly in local languages, to make it more relatable and understandable.

Participants generally perceived screening and vaccination as beneficial and acceptable, although some had concerns regarding the safety of vaccines and screening, as well as other myths concerning both. These findings are not limited to this study, as other researchers have also reported such concerns in their studies (Appiah et al., 2023; Zuraes et al., 2023). A participant in another study retorted

“I am afraid this procedure may interfere with a woman’s sexual urge and ability to enjoy sex like that why I think it is not necessary for them trying to force us to do this thing. I and my boyfriend are making plans of getting married soon so I don’t want any complications from these insertions” (Appiah et al., 2023).

There is a need for such fears to be allayed, and misconceptions dispelled through rigorous education campaigns. This might increase screening and vaccination uptake, thus improving the correlation between the general perception and uptake.

Knowledge of ways to reduce the risk of CxCA, awareness of a screening facility, understanding of HPV vaccination, and familiarity with CxCA, screening, and vaccination were identified as factors associated with the acceptability of screening and vaccination. Individuals with greater knowledge of CxCA had higher odds of deeming screening and vaccination acceptable compared to those with limited knowledge. Understanding the condition, screening, and vaccination leads to a better grasp of the potential benefits, making it more acceptable to those individuals compared to those with less knowledge. The decreased odds of screening acceptability among those uncertain about ways to reduce the risk of CxCA emphasised this (see [Model 2](#)).

Despite respondents finding screening and vaccination acceptable, only 4.65% of participants had been screened, while 1.39% had been vaccinated. The estimated screening uptake is consistent with another study conducted in Ghana (Saaka & Hambali, 2024).

Acceptability of screening and vaccination does not necessarily translate into uptake. Several factors influence the uptake of screening and vaccination. When asked what would influence their decision to screen or vaccinate, most respondents indicated that the cost of the vaccine or test, the introduction of a screening or vaccination policy, and the facility performing the test or vaccination were among the factors affecting their decision. These factors can be classified as enablers to screening and vaccination.

Respondents expressed a willingness to patronise screening or vaccination policies if the government subsidised the cost or made it free. Socioeconomic status is a known determinant of health-seeking behaviour (Kraft & Kraft, 2021). When people cannot afford medical interventions, they abstain from using them. Hence, it is important that screening and vaccination are made cheaper to increase uptake. Screening and vaccination could also be added to the National Health Insurance Scheme (NHIS) to make it more affordable.

The presence of a screening or vaccination policy enables screening and vaccination. The presence of a policy creates an enabling environment for women to access screening. However, a screening programme not backed by a comprehensive policy is likely to be ineffective; thus there is a need to develop screening and vaccination programmes backed by a comprehensive policy aiming to reduce CxCA mortality and morbidity (Marfo et al., 2024).

Being in a union was also identified as an enabler for screening, while awareness of HPV vaccination was shown to be an enabler for immunisation. Other enablers identified included the desire to stay healthy and education.

Some barriers to screening and vaccination identified included fear, cultural and religious beliefs, cost of tests and illiteracy (See [Suppl Table 1](#)).

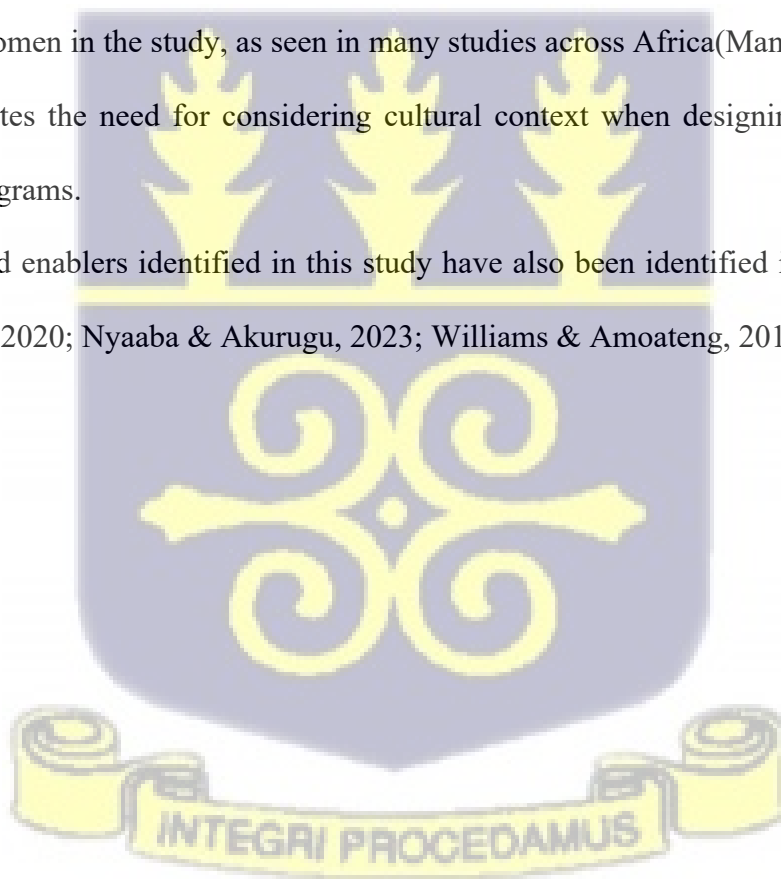
A far distance to health facilities was identified as a barrier to screening and vaccination. Community health outreaches could serve as a potential tool to bring the facility closer to the

people. Mobile screening vans could also be considered a viable solution, as they have been utilised to great success in other countries (Badve et al., 2025).

Most illiterate women or women with lower levels of education often believe misconceptions about screening and vaccination, which are peddled through social media and by other ill-informed persons. Such information dissuades them from participating in screening and vaccination. Hence, there is a need to consider the educational background of women when designing education drives and other interventions for CxCA (Williams et al., 2018).

Although inanimate, cultural and religious beliefs shape the way of life of an individual and affect the decisions people make, with health-seeking behaviour being no exception. Cultural and religious beliefs were identified as reasons for abstaining from screening and vaccination among some women in the study, as seen in many studies across Africa (Mantula et al., 2024). This demonstrates the need for considering cultural context when designing screening and vaccination programs.

The barriers and enablers identified in this study have also been identified in similar studies (Ampofo et al., 2020; Nyaaba & Akurugu, 2023; Williams & Amoateng, 2012).



5.2 STUDY IMPLICATIONS

This study identified and gave nuance to factors affecting the acceptability of CxCA screening and HPV vaccination, as well as the uptake of both. This provides more insight into ways to make screening and vaccination more acceptable to Ghanaian women and increase uptake of both. This will be important in reducing CxCA mortality and morbidity.

5.3 STUDY LIMITATIONS

The study employed a cross-sectional design and relied on self-reports of screening and vaccination status. Hence, this is likely to introduce recall bias into the study. Some concepts and words did not have direct Ga or Twi translations; thus, some concepts might have lost nuance in translation.



CHAPTER 6

6.0 CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

The study estimated the acceptability of early CxCA screening to be 64.35% while uptake was 4.65%. Acceptability of prophylactic HPV vaccination was 56.48% with 1.39% uptake. The study revealed poor knowledge of CxCA among participants, although most had heard of it.

Screening and vaccination were seen as beneficial by participants, with some having the misconception that vaccination eliminated the need for screening.

Many participants who knew a screening facility, were aware of vaccination, and had good knowledge of CxCA found screening and vaccination to be acceptable compared to those who did not.

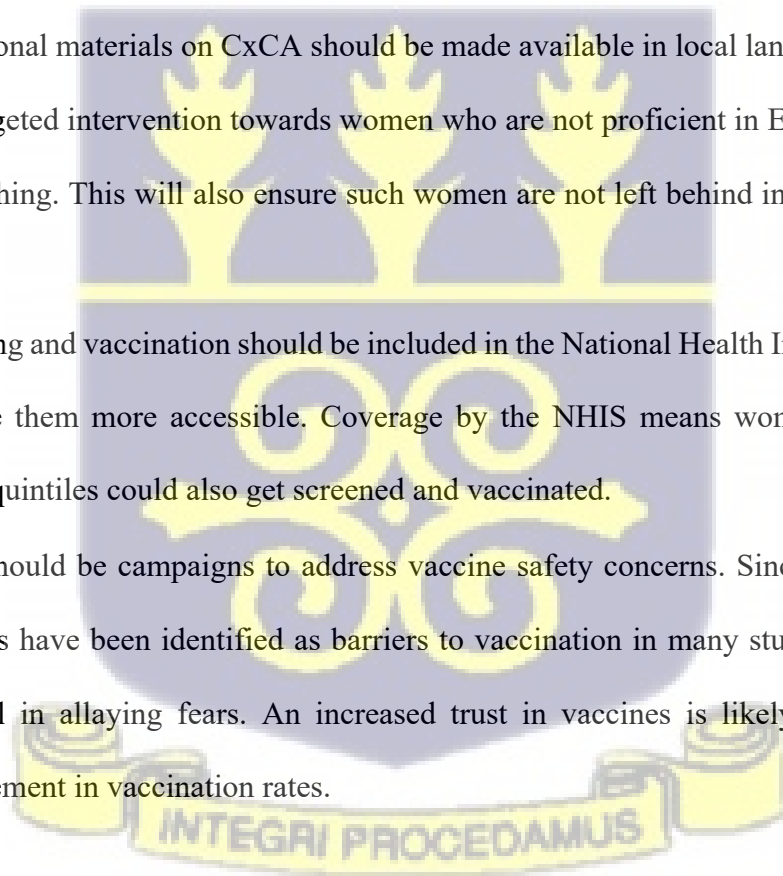
Being in a union, being aware of screening and having good knowledge of screening were associated with screening uptake, while awareness of vaccination was associated with both screening and vaccination uptake. Other determinants of vaccination and screening that were identified included being financially stable, education and awareness of CxCA and a desire to stay healthy.

Lack of awareness on CxCA, fears, beliefs, cost of test and safety concerns were identified as barriers to screening and vaccination.

It can be concluded that high acceptability, positive perception and the knowledge of screening and vaccination facilities do not translate into high screening and vaccination rates. The factors which affect the decision to get screened or vaccinated are much more complex and layered. Hence, simply improving the acceptability and perception of screening and vaccination might not be enough to increase uptake.

6.2 RECOMMENDATIONS

- Vaccination and screening policies and programs should be introduced to increase the uptake of both. These policies and programs must be culturally appropriate to ensure these policies achieve the desired outcomes. A lack of cultural appropriateness will be counterproductive since there will be low patronage of screening and vaccination, which could lead to a collapse of the program.
- Education and awareness campaigns on CxCA in local languages should be increased. Local language campaigns ensure that women who are not proficient in English will receive the intended message/intervention. Hence, those women will not be left behind in the fight against CxCA.
- Educational materials on CxCA should be made available in local languages. This will be a targeted intervention towards women who are not proficient in English, making it far-reaching. This will also ensure such women are not left behind in the fight against CxCA.
- Screening and vaccination should be included in the National Health Insurance Scheme to make them more accessible. Coverage by the NHIS means women in the lower wealth quintiles could also get screened and vaccinated.
- There should be campaigns to address vaccine safety concerns. Since vaccine safety concerns have been identified as barriers to vaccination in many studies, this will be essential in allaying fears. An increased trust in vaccines is likely to result in an improvement in vaccination rates.



REFERENCES.

- Abotchie, P. N., & Shokar, N. K. (2009). Cervical Cancer Screening Among College Students in Ghana: Knowledge and Health Beliefs. *International Journal of Gynecological Cancer : Official Journal of the International Gynecological Cancer Society*, 19(3), 412. <https://doi.org/10.1111/IGC.0B013E3181A1D6DE>
- Adams, A. R., Nortey, P. A., Dorte, B. A., Asmah, R. H., & Wiredu, E. K. (2019). Cervical Human Papillomavirus Prevalence, Genotypes, and Associated Risk Factors among Female Sex Workers in Greater Accra, Ghana. *Journal of Oncology*, 2019. <https://doi.org/10.1155/2019/8062176>
- Adegoke, O., Kulasingam, S., & Virnig, B. (2012). Cervical Cancer Trends in the United States: A 35-Year Population-Based Analysis. *Journal of Women's Health*, 21(10), 1031–1037. <https://doi.org/10.1089/jwh.2011.3385>
- Aggarwal, P. (2014). Cervical cancer: Can it be prevented? *World Journal of Clinical Oncology*, 5(4), 775. <https://doi.org/10.5306/wjco.v5.i4.775>
- Ahmed, H. G., Bensumaidea, S. H., Alshammari, F. D., H Alenazi, F. S., ALmutlaq, B. A., Alturkistani, M. Z., & Aladani, I. A. (2017). Prevalence of Human Papillomavirus subtypes 16 and 18 among Yemeni Patients with Cervical Cancer. *Asian Pacific Journal of Cancer Prevention : APJCP*, 18(6), 1543. <https://doi.org/10.22034/APJCP.2017.18.6.1543>
- Akhatova, A., Azizan, A., Atageldiyeva, K., Ashimkhanova, A., Marat, A., Iztileuov, Y., Suleimenova, A., Shamkeeva, S., & Aimagambetova, G. (2022). Prophylactic Human Papillomavirus Vaccination: From the Origin to the Current State. *Vaccines*, 10(11). <https://doi.org/10.3390/VACCINES10111912>
- Ampofo, A. G., Adumatta, A. D., Owusu, E., & Awuviry-Newton, K. (2020). A cross-sectional study of barriers to cervical cancer screening uptake in Ghana: An application of the health belief model. *PLOS ONE*, 15(4), e0231459. <https://doi.org/10.1371/JOURNAL.PONE.0231459>
- Ansari, N., Jehangir, F., Ansari, R., Ali, H. S., Aslam, S., & Salman, B. (2023). Visual Inspection with Acetic Acid, a Low-Cost Screening Method for Cervical Cancer in Low-Resource Settings, and Low Socioeconomic Strata: Primary Health Care Physicians and General Practitioners—An Appropriate Entry Point for Screening. *Journal of The Society of Obstetricians and Gynaecologists of Pakistan*, 13(3), 313–318. <https://jsogp.net/index.php/jsogp/article/view/635>
- Appiah, E. O., Appiah, S., Ani-Amponsah, M., Agyekum, B. S., Acquah, J., Gyasi, A. N. A., & Ofori-Appiah, C. (2023). Female students' perspectives on cervical cancer screening inclusion in pre-admission university requirements in Ghana. *PLOS Global Public Health*, 3(6), e0001029. <https://doi.org/10.1371/JOURNAL.PGPH.0001029>
- Asante, V., Gariba, B. B., Appiah-Brempong, E., & Sarpong, H. L. (2023). Factors influencing the health seeking behaviour of persons who have diabetes in the Kumasi metropolis. *Ghana Journal of Science*, 64(1), 25–33. <https://doi.org/10.4314/GJS.V64I1.3>
- Athanasiou, A., Veroniki, A. A., Efthimiou, O., Kalliala, I., Naci, H., Bowden, S., Paraskevaidi, M., Arbyn, M., Lyons, D., Martin-Hirsch, P., Bennett, P., Paraskevaidis, E., Salanti, G., & Kyrgiou, M. (2022). Comparative effectiveness and risk of preterm birth of local treatments for cervical intraepithelial neoplasia and stage IA1 cervical cancer: a systematic review and network meta-analysis. *The Lancet Oncology*, 23(8), 1097–1108. [https://doi.org/10.1016/S1470-2045\(22\)00334-5](https://doi.org/10.1016/S1470-2045(22)00334-5)
- Australian Government Department of Healthcare. (2024). *National Cervical Screening Program* | Australian Government Department of Health and Aged Care. <https://www.health.gov.au/our-work/national-cervical-screening-program#>

- Badve, R., Reddy, S., Zalasini, S., Zamora, K., Yalniz, C., & Woodard, S. (2025). Clinical opinion spotlight: A sustainable model for improving access to mobile mammography for underserved populations. *Current Problems in Diagnostic Radiology*, 54(2), 121–126. <https://doi.org/10.1067/J.CPRADIOL.2024.10.004>
- BCMj. (2019, June 6). *Origins of the Pap test*. British Columbia Medical Journal. <https://bcmj.org/blog/origins-pap-test>
- Beddoe, A. M. (2019). Elimination of cervical cancer: Challenges for developing countries. *Ecancermedicalscience*, 13. <https://doi.org/10.3332/ECANCER.2019.975>
- Brooks, Geo. F., Carroll, K. C., Butel, J. S., Morse, S. A., & Mietzner, T. A. (2013). Jawetz, Melnick & Adelberg's Medical Microbiology, 26th Edition. In *Journal of Chemical Information and Modeling* (Issue 9). <https://doi.org/10.1017/CBO9781107415324.004>
- Castellsagué, X. (2008). Natural history and epidemiology of HPV infection and cervical cancer. *Gynecologic Oncology*, 110(3), S4–S7. <https://doi.org/10.1016/J.YGYNO.2008.07.045>
- CASTLE, P. E., & MAZA, M. (2016). Prophylactic HPV vaccination: past, present, and future. *Epidemiology and Infection*, 144(3), 449–468. <https://doi.org/10.1017/S0950268815002198>
- Chang, H. K., Myong, J. P., Byun, S. W., Lee, S. J., Lee, Y. S., Lee, H. N., Lee, K. H., Park, D. C., Kim, C. J., Hur, S. Y., Park, J. S., & Park, T. C. (2017). Factors associated with participation in cervical cancer screening among young Koreans: a nationwide cross-sectional study. *BMJ Open*, 7(4), e013868. <https://doi.org/10.1136/BMJOPEN-2016-013868>
- Chen, M. M., Mott, N., Clark, S. J., Harper, D. M., Shuman, A. G., Prince, M. E. P., & Dossett, L. A. (2021). HPV Vaccination Among Young Adults in the US. *JAMA*, 325(16), 1673–1674. <https://doi.org/10.1001/JAMA.2021.0725>
- Chung, S. H., Franceschi, S., & Lambert, P. F. (2010). Estrogen and ERα: Culprits in Cervical Cancer? *Trends in Endocrinology and Metabolism: TEM*, 21(8), 504. <https://doi.org/10.1016/J.TEM.2010.03.005>
- Coleman, M. A., Levison, J., & Sangi-Hagheykar, H. (2011). HPV vaccine acceptability in Ghana, West Africa. *Vaccine*, 29(23), 3945–3950. <https://doi.org/10.1016/J.VACCINE.2011.03.093>
- David, G., Mike, B., Richard, S., & Irving, W. (Eds.). (2012). *MEDICAL MICROBIOLOGY* (18th ed.). Churchill Livingstone. <https://doi.org/9780702040900>
- De Vuyst, H., Alemany, L., Lacey, C., Chibwesha, C. J., Sahasrabudde, V., Banura, C., Denny, L., & Parham, G. P. (2013). The burden of human papillomavirus infections and related diseases in sub-saharan Africa. *Vaccine*, 31 Suppl 5(0 5). <https://doi.org/10.1016/J.VACCINE.2012.07.092>
- Dzinamarira, T., Moyo, E., Dzobo, M., Mbunge, E., & Murewanhema, G. (2022). Cervical cancer in sub-Saharan Africa: an urgent call for improving accessibility and use of preventive services. *International Journal of Gynecologic Cancer*, 33(4), ijgc-2022-003957. <https://doi.org/10.1136/IJGC-2022-003957>
- Effah, K., Alberio, G., & Bruni, L. (2022). *FACT SHEET: WESTERN AFRICA* www.hpvcentre.net. <https://www.hpvworld.com/articles/fact-sheet-western-africa-www-hpvcentre-net-human-papillomavirus-and-related-cancers/>
- Ellingson, M. K., Sheikha, H., Nyhan, K., Oliveira, C. R., & Niccolai, L. M. (2023). Human papillomavirus vaccine effectiveness by age at vaccination: A systematic review. *Human Vaccines & Immunotherapeutics*, 19(2). <https://doi.org/10.1080/21645515.2023.2239085>
- Eun, T. J., & Perkins, R. B. (2020). Screening for Cervical Cancer. *The Medical Clinics of North America*, 104(6), 1063. <https://doi.org/10.1016/J.MCNA.2020.08.006>

- Fentie, A. M., Tadesse, T. B., & Gebretekle, G. B. (2020). Factors affecting cervical cancer screening uptake, visual inspection with acetic acid positivity and its predictors among women attending cervical cancer screening service in Addis Ababa, Ethiopia. *BMC Women's Health*, 20(1), 1–10. <https://doi.org/10.1186/S12905-020-01008-3/TABLES/3>
- Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving Integration in Mixed Methods Designs—Principles and Practices. *Health Services Research*, 48(6pt2), 2134–2156. <https://doi.org/10.1111/1475-6773.12117>
- Frick, C., Rungay, H., Vignat, J., Ginsburg, O., Nolte, E., Bray, F., & Soerjomataram, I. (2023). Quantitative estimates of preventable and treatable deaths from 36 cancers worldwide: a population-based study. *The Lancet Global Health*, 11(11), e1700–e1712. [https://doi.org/10.1016/S2214-109X\(23\)00406-0](https://doi.org/10.1016/S2214-109X(23)00406-0)
- Gadducci, A., Barsotti, C., Cosio, S., Domenici, L., & Riccardo Genazzani, A. (2011). Smoking habit, immune suppression, oral contraceptive use, and hormone replacement therapy use and cervical carcinogenesis: a review of the literature. *Gynecological Endocrinology*, 27(8), 597–604. <https://doi.org/10.3109/09513590.2011.558953>
- Gallego, L. S., Dominguez, A., & Parmar, M. (2024). Human Papilloma Virus Vaccine. *Pediatric Vaccines and Vaccinations: A European Textbook: Second Edition*, 147–157. https://doi.org/10.1007/978-3-030-77173-7_15
- Garland, S. M., Kjaer, S. K., Muñoz, N., Block, S. L., Brown, D. R., DiNubile, M. J., Lindsay, B. R., Kuter, B. J., Perez, G., Dominiak-Felden, G., Saah, A. J., Drury, R., Das, R., & Velicer, C. (2016). Impact and Effectiveness of the Quadrivalent Human Papillomavirus Vaccine: A Systematic Review of 10 Years of Real-world Experience. *Clinical Infectious Diseases*, 63(4), 519–527. <https://doi.org/10.1093/cid/ciw354>
- Gates, A., Pillay, J., Reynolds, D., Stirling, R., Traversy, G., Korownyk, C., Moore, A., Thériault, G., Thombs, B. D., Little, J., Popadiuk, C., van Niekerk, D., Keto-Lambert, D., Vandermeer, B., & Hartling, L. (2021). Screening for the prevention and early detection of cervical cancer: protocol for systematic reviews to inform Canadian recommendations. *Systematic Reviews* 2020 10:1, 10(1), 1–22. <https://doi.org/10.1186/S13643-020-01538-9>
- GHS. (2024). *Greater Accra Region – Ghana Health Service*. <https://ghs.gov.gh/greater-accra/>
- Goldie, S. J., O'Shea, M., Campos, N. G., Diaz, M., Sweet, S., & Kim, S. Y. (2008). Health and economic outcomes of HPV 16,18 vaccination in 72 GAVI-eligible countries. *Vaccine*, 26(32), 4080–4093. <https://doi.org/10.1016/J.VACCINE.2008.04.053>
- Gonçalves, A. K., Cobucci, R. N., Rodrigues, H. M., De Melo, A. G., & Giraldo, P. C. (2014). Safety, tolerability and side effects of human papillomavirus vaccines: a systematic quantitative review. *Brazilian Journal of Infectious Diseases*, 18(6), 651–659. <https://doi.org/10.1016/J.BJID.2014.02.005>
- Harper, D. M., & Paavonen, J. (2008). Age for HPV vaccination. *Vaccine*, 26(SUPPL. 1), A7–A11. <https://doi.org/10.1016/J.VACCINE.2008.01.013>
- Huh, W. K., Jaura, E. A., Giuliano, A. R., Iversen, O. E., de Andrade, R. P., Ault, K. A., Bartholomew, D., Cestero, R. M., Fedrizzi, E. N., Hirschberg, A. L., Mayrand, M. H., Ruiz-Sternberg, A. M., Stapleton, J. T., Wiley, D. J., Ferenczy, A., Kurman, R., Ronnett, B. M., Stoler, M. H., Cuzick, J., ... Luxembourg, A. (2017). Final efficacy, immunogenicity, and safety analyses of a nine-valent human papillomavirus vaccine in women aged 16-26 years: a randomised, double-blind trial. *Lancet (London, England)*, 390(10108), 2143–2159. [https://doi.org/10.1016/S0140-6736\(17\)31821-4](https://doi.org/10.1016/S0140-6736(17)31821-4)
- Hung, M. C., Liu, M. T., Cheng, Y. M., & Wang, J. Der. (2014). Estimation of savings of life-years and cost from early detection of cervical cancer: A follow-up study using nationwide databases for the period 2002-2009. *BMC Cancer*, 14(1), 1–6. <https://doi.org/10.1186/1471-2407-14-505/FIGURES/2>

- IARC. (2024). *Anatomical and pathological basis of visual inspection with acetic acid (VIA) and with Lugol's iodine (VILI)*. <https://screening.iarc.fr/viavilichap1.php?lang=1>
- II. *Complementary data on cervical cancer prevention*. (2023). www.hpvcentre.net
- Johnson, R. E., Grove, A. L., & Clarke, A. (2019). Pillar Integration Process: A Joint Display Technique to Integrate Data in Mixed Methods Research. *Journal of Mixed Methods Research*, 13(3), 301–320. https://doi.org/10.1177/1558689817743108/ASSET/A6B9085E-34B6-4654-816F-3FF2CAD0B46F/ASSETS/IMAGES/10.1177_1558689817743108-IMG1.PNG
- Kamolratanakul, S., & Pitisuttithum, P. (2021). Human Papillomavirus Vaccine Efficacy and Effectiveness against Cancer. *Vaccines*, 9(12), 1413. <https://doi.org/10.3390/vaccines9121413>
- Kaur, P., Mehrotra, R., Rengaswamy, S., Kaur, T., Hariprasad, R., Mehendale, S., Rajaraman, P., Rath, G., Bhatla, N., Krishnan, S., Nayyar, A., & Swaminathan, S. (2017). Human papillomavirus vaccine for cancer cervix prevention: Rationale & recommendations for implementation in India. *Indian Journal of Medical Research*, 146(2), 153. https://doi.org/10.4103/ijmr.IJMR_1906_16
- Kavanagh, K., Pollock, K. G., Cuschieri, K., Palmer, T., Cameron, R. L., Watt, C., Bhatia, R., Moore, C., Cubie, H., Cruickshank, M., & Robertson, C. (2017). Changes in the prevalence of human papillomavirus following a national bivalent human papillomavirus vaccination programme in Scotland: a 7-year cross-sectional study. *The Lancet. Infectious Diseases*, 17(12), 1293–1302. [https://doi.org/10.1016/S1473-3099\(17\)30468-1](https://doi.org/10.1016/S1473-3099(17)30468-1)
- Koliopoulos, G., Nyaga, V. N., Santesso, N., Bryant, A., Martin-Hirsch, P. P., Mustafa, R. A., Schünemann, H., Paraskevaidis, E., & Arbyn, M. (2017). Cytology versus HPV testing for cervical cancer screening in the general population. *Cochrane Database of Systematic Reviews*, 2018(7). <https://doi.org/10.1002/14651858.CD008587.pub2>
- Kraft, P., & Kraft, B. (2021). Explaining socioeconomic disparities in health behaviours: A review of biopsychological pathways involving stress and inflammation. *Neuroscience & Biobehavioral Reviews*, 127, 689–708. <https://doi.org/10.1016/J.NEUBIOREV.2021.05.019>
- Krings, A., Dunyo, P., Pesic, A., Tetteh, S., Hansen, B., Gedzah, I., Wormenor, C. M., Amuah, J. E., Behnke, A. L., Höfler, D., Pawlita, M., & Kaufmann, A. M. (2019). Characterization of Human Papillomavirus prevalence and risk factors to guide cervical cancer screening in the North Tongu District, Ghana. *PLOS ONE*, 14(6), e0218762. <https://doi.org/10.1371/JOURNAL.PONE.0218762>
- Kumar, V., Abbas, A. K., & Aster, J. C. (2018). *Robbins Basic Pathology* (10th ed.). Elsevier.
- LaVigne, A. W., Triedman, S. A., Randall, T. C., Trimble, E. L., & Viswanathan, A. N. (2017). Cervical cancer in low and middle income countries: Addressing barriers to radiotherapy delivery. *Gynecologic Oncology Reports*, 22, 16. <https://doi.org/10.1016/J.GORE.2017.08.004>
- Lin, Y., Zhou, J., Dai, L., Cheng, Y., & Wang, J. (2017). Vaginectomy and vaginoplasty for isolated vaginal recurrence 8 years after cervical cancer radical hysterectomy: A case report and literature review. *Journal of Obstetrics and Gynaecology Research*, 43(9), 1493–1497. <https://doi.org/10.1111/JOG.13375>
- Luhn, P., Walker, J., Schiffman, M., Zuna, R. E., Dunn, S. T., Gold, M. A., Smith, K., Mathews, C., Allen, R. A., Zhang, R., Wang, S., & Wentzensen, N. (2013). The role of co-factors in the progression from human papillomavirus infection to cervical cancer. *Gynecologic Oncology*, 128(2), 265–270. <https://doi.org/10.1016/j.ygyno.2012.11.003>
- Ma*, K., Li*, S., Wu, S., Zhu, J., & Yang, Y. (2023). Impact of smoking exposure on human papillomavirus clearance among Chinese women: A follow-up propensity score matching study. *Tobacco Induced Diseases*, 21(March), 1–11. <https://doi.org/10.18332/tid/161026>

- Mantula, F., Toefy, Y., & Sewram, V. (2024). Barriers to cervical cancer screening in Africa: a systematic review. *BMC Public Health* 2024 24:1, 24(1), 1–22. <https://doi.org/10.1186/S12889-024-17842-1>
- Marfo, E., Salami, B., Adjei, C., & MacDonald, S. (2024). Human papillomavirus (HPV) vaccination in a privately funded program in Ghana: A qualitative case study. *Human Vaccines and Immunotherapeutics*, 20(1). <https://doi.org/10.1080/21645515.2024.2397219>;JOURNAL:JOURNAL:KHVI19;PAGE:STRING:ARTICLE/CHAPTER
- Mariani, L., Preti, M., Cristoforoni, P., Stigliano, C. M., & Perino, A. (2017). Overview of the benefits and potential issues of the nonavalent HPV vaccine. *International Journal of Gynecology & Obstetrics*, 136(3), 258–265. <https://doi.org/10.1002/IJGO.12075>
- Medeiros, L. R., Rosa, D. D., Da Rosa, M. I., Bozzetti, M. C., & Zanini, R. R. (2009). Efficacy of Human Papillomavirus Vaccines: A Systematic Quantitative Review. *International Journal of Gynecologic Cancer*, 19(7), 1166–1176. <https://doi.org/10.1111/IGC.0B013E3181A3D100>
- Meites, E., Szilagyi, P. G., Harrell, J., Chesson, W., Unger, E. R., Romero, J. R., & Markowitz, L. E. (2019). *Morbidity and Mortality Weekly Report Human Papillomavirus Vaccination for Adults: Updated Recommendations of the Advisory Committee on Immunization Practices*. <https://www.cdc.gov/>
- Mishra, G. A., Pimple, S. A., & Shastri, S. S. (2011). An overview of prevention and early detection of cervical cancers. *Indian Journal of Medical and Paediatric Oncology : Official Journal of Indian Society of Medical & Paediatric Oncology*, 32(3), 125. <https://doi.org/10.4103/0971-5851.92808>
- Mullapally, S. K., Digumarti, L., & Digumarti, R. (2022). Cervical Cancer in Low- and Middle-Income Countries: A Multidimensional Approach to Closing the Gaps. *https://doi.org/10.1200/OP.22.00156*, 18(6), 423–425. <https://doi.org/10.1200/OP.22.00156>
- MyJoyOnline. (2020). *Checkout list of health centres that provide cervical cancer screening - MyJoyOnline*. <https://www.myjoyonline.com/checkout-list-of-health-centres-that-provide-cervical-cancer-screening/>
- Nartey, Y., Hill, P., Amo-Antwi, K., Asmah, R., Nyarko, K., Yarney, J., Damale, N., & Cox, B. (2018). Recommendations for cervical cancer prevention and control in Ghana: public education and human papillomavirus vaccination. *Ghana Medical Journal*, 52(2), 94. <https://doi.org/10.4314/gmj.v52i2.6>
- Nartey, Y., Hill, P. C., Amo-Antwi, K., Nyarko, K. M., Yarney, J., & Cox, B. (2017). Cervical cancer in the Greater Accra and Ashanti Regions of Ghana. *Journal of Global Oncology*, 3(6), 782–790. <https://doi.org/10.1200/JGO.2016.005744/ASSET/IMAGES/LARGE/JGO.2016.005744.T5.JPEG>
- NCI. (2018). *What Is Cancer?* <https://www.cancer.gov/about-cancer/understanding/what-is-cancer>
- NCI. (2023). *Cervical Cancer Screening*. <https://www.cancer.gov/types/cervical/screening#>
- Nelson, T. M., Borgogna, J. C., Michalek, R. D., Roberts, D. W., Rath, J. M., Glover, E. D., Ravel, J., Shardell, M. D., Yeoman, C. J., & Brotman, R. M. (2018). Cigarette smoking is associated with an altered vaginal tract metabolomic profile. *Scientific Reports*, 8(1), 852. <https://doi.org/10.1038/s41598-017-14943-3>
- Ntekim, A., & Ntekim, A. (2012). Cervical Cancer in Sub Sahara Africa. *Topics on Cervical Cancer With an Advocacy for Prevention*. <https://doi.org/10.5772/27200>
- Nyaaba, J. A., & Akurugu, E. (2023). Knowledge, barriers and uptake towards Cervical Cancer screening among female health workers in Ghana: A perspective of the Health Belief

- Model. *International Journal of Africa Nursing Sciences*, 19, 100587. <https://doi.org/10.1016/j.ijans.2023.100587>
- Nygård, M., Daltveit, A. K., Thoresen, S., & Nygård, J. F. (2007). Effect of an antepartum Pap smear on the coverage of a cervical cancer screening programme: a population-based prospective study. *BMC Health Services Research*, 7, 10. <https://doi.org/10.1186/1472-6963-7-10>
- Ong, S. K., Abe, S. K., Thilagaratnam, S., Haruyama, R., Pathak, R., Jayasekara, H., Togawa, K., Bhandari, A. K. C., Shankar, A., Nessa, A., Jugder, U., Agustina, J., Biglari, M., Yusuf, A., Tshomo, U., Fernando, E., Cairo, C., Kaung, K. K., Rath, B., ... Hwang, W. Y. K. (2023). Towards elimination of cervical cancer – human papillomavirus (HPV) vaccination and cervical cancer screening in Asian National Cancer Centers Alliance (ANCCA) member countries. *The Lancet Regional Health - Western Pacific*, 39, 100860. <https://doi.org/10.1016/j.lanwpc.2023.100860>
- Pangarkar, M. A. (2022). The Bethesda System for reporting cervical cytology. *CytoJournal*, 19, 28. https://doi.org/10.25259/CMAS_03_07_2021
- PDQ® Screening and Prevention Editorial Board. (2022). Cervical Cancer Screening (PDQ®): Health Professional Version. *National Cancer Institute*, 1–26. <https://www.cancer.gov/types/cervical/hp/cervical-screening-pdq>
- Petersen, Z., Jaca, A., Ginindza, T. G., Maseko, G., Takatshana, S., Ndlovu, P., Zondi, N., Zungu, N., Varghese, C., Hunting, G., Parham, G., Simelela, P., & Moyo, S. (2022). Barriers to uptake of cervical cancer screening services in low-and-middle-income countries: a systematic review. *BMC Women's Health*, 22(1). <https://doi.org/10.1186/S12905-022-02043-Y>
- Peto, J., Gilham, C., Deacon, J., Taylor, C., Evans, C., Binns, W., Haywood, M., Elanko, N., Coleman, D., Yule, R., & Desai, M. (2004). Cervical HPV infection and neoplasia in a large population-based prospective study: the Manchester cohort. *British Journal of Cancer*, 91(5), 942–953. <https://doi.org/10.1038/sj.bjc.6602049>
- Phaipichit, J., Paboriboune, P., Kunnavong, S., & Chanthavilay, P. (2022). Factors associated with cervical cancer screening among women aged 25–60 years in Lao People's Democratic Republic. *PLOS ONE*, 17(4), e0266592. <https://doi.org/10.1371/JOURNAL.PONE.0266592>
- Pimple, S., & Mishra, G. (2022). Cancer cervix: Epidemiology and disease burden. *CytoJournal*, 19. https://doi.org/10.25259/CMAS_03_02_2021
- Poli, U., Bidinger, P., & Gowrishankar, S. (2015). Visual inspection with acetic acid (via) screening program: 7 years experience in early detection of cervical cancer and pre-cancers in rural South India. *Indian Journal of Community Medicine*, 40(3), 203. <https://doi.org/10.4103/0970-0218.158873>
- Prempeh, E. A. K. (2018). Women's Awareness and Factors Affecting Utilization of Cervical Cancer Screening Services in the Ejisu-Juaben Municipality of Ghana. *Journal of Cancer and Tumor International*, 8(1), 1–11. <https://doi.org/10.9734/JCTI/2018/43971>
- Randall, T. C., & Ghebre, R. (2016). Challenges in Prevention and Care Delivery for Women with Cervical Cancer in Sub-Saharan Africa. *Frontiers in Oncology*, 6(JUN), 160. <https://doi.org/10.3389/FONC.2016.00160>
- Rositch, A. F., Gatuguta, A., Choi, R. Y., Guthrie, B. L., Mackelprang, R. D., Bosire, R., Manyara, L., Kiarie, J. N., Smith, J. S., & Farquhar, C. (2012). Knowledge and Acceptability of Pap Smears, Self-Sampling and HPV Vaccination among Adult Women in Kenya. *PLOS ONE*, 7(7), e40766. <https://doi.org/10.1371/JOURNAL.PONE.0040766>
- Saaka, S. A., & Hambali, M.-G. (2024). Factors associated with cervical cancer screening among women of reproductive age in Ghana. *BMC Women's Health* 2024 24:1, 24(1), 1–13. <https://doi.org/10.1186/S12905-024-03367-7>

- Singh, D., Vignat, J., Lorenzoni, V., Eslahi, M., Ginsburg, O., Lauby-Secretan, B., Arbyn, M., Basu, P., Bray, F., & Vaccarella, S. (2023). Global estimates of incidence and mortality of cervical cancer in 2020: a baseline analysis of the WHO Global Cervical Cancer Elimination Initiative. *The Lancet Global Health*, 11(2), e197–e206. [https://doi.org/10.1016/S2214-109X\(22\)00501-0](https://doi.org/10.1016/S2214-109X(22)00501-0)
- Singh, G. (2018). Awareness about cervical cancer risk factors and symptoms. *Int J Reprod Contracept Obstet Gynecol*, 7(12), 4987–4991. <https://doi.org/10.18203/2320-1770.ijrcog20184953>
- Small, W., Bacon, M. A., Bajaj, A., Chuang, L. T., Fisher, B. J., Harkenrider, M. M., Jhingran, A., Kitchener, H. C., Mileskin, L. R., Viswanathan, A. N., & Gaffney, D. K. (2017). Cervical cancer: A global health crisis. *Cancer*, 123(13), 2404–2412. <https://doi.org/10.1002/cncr.30667>
- Smith, M., & Canfell, K. (2016). Impact of the Australian National Cervical Screening Program in women of different ages. *Medical Journal of Australia*, 205(8), 359–364. <https://doi.org/10.5694/mja16.00289>
- Stumbar, S. E., Stevens, M., & Feld, Z. (2019). Cervical cancer and its precursors: a preventative approach to screening, diagnosis, and management. *Prim Care*, 46(1), 117–134. <https://doi.org/10.1016/j.pop.2018.10.011>
- Ugwu, E. O., Obi, S. N., Ezechukwu, P. C., Okafor, I. I., & Ugwu, A. O. (2013). Acceptability of human papilloma virus vaccine and cervical cancer screening among female health-care workers in Enugu, Southeast Nigeria. *Nigerian Journal of Clinical Practice*, 16(2), 249–252. <https://doi.org/10.4103/1119-3077.110141>
- U.S. Department of Health and Human Services. (2019). *Increase the proportion of females who get screened for cervical cancer — C-09 - Healthy People 2030* | [health.gov](https://health.gov/healthypeople/objectives-and-data/browse-objectives/cancer/increase-proportion-females-who-get-screened-cervical-cancer-c-09). <https://health.gov/healthypeople/objectives-and-data/browse-objectives/cancer/increase-proportion-females-who-get-screened-cervical-cancer-c-09>
- Van Nagell, J. R., Greenwell, N., & Powell, D. F. (1983). Microvasive carcinoma of the cervix. *American Journal of Obstetrics and Gynecology*, 145(8), 981–989. [https://doi.org/10.1016/0002-9378\(83\)90852-9](https://doi.org/10.1016/0002-9378(83)90852-9)
- Vasileiou, K., Barnett, J., Thorpe, S., & Young, T. (2018). Characterising and justifying sample size sufficiency in interview-based studies: Systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology*, 18(1), 1–18. <https://doi.org/10.1186/S12874-018-0594-7/TABLES/3>
- Vodicka, E., Nonvignon, J., Antwi-Agyei, K. O., Bawa, J., Clark, A., Pecenka, C., & LaMontagne, D. S. (2022). The projected cost-effectiveness and budget impact of HPV vaccine introduction in Ghana. *Vaccine*, 40, A85–A93. <https://doi.org/10.1016/j.vaccine.2021.07.027>
- Wang, S., Dang, L., Liu, S., Rezhake, R., Yan, H., Duan, X., Zhang, L., Zhang, L., Zhang, L., Su, M., Guo, F., Yan, C., Liu, M., Cao, X., Sun, M., Qiao, Y., & Zhao, F. (2024). Cervical Cancer Screening via Visual Inspection With Acetic Acid and Lugol Iodine for Triage of HPV-Positive Women. *JAMA Network Open*, 7(3), e244090–e244090. <https://doi.org/10.1001/JAMANETWORKOPEN.2024.4090>
- WHO. (2018). *Cervical cancer* | WHO | Regional Office for Africa. <https://www.afro.who.int/health-topics/cervical-cancer#>
- WHO. (2024a). *Human papillomavirus and cancer*. <https://www.who.int/news-room/fact-sheets/detail/human-papilloma-virus-and-cancer>
- WHO. (2024b). *Recommendations to assure the quality, safety and efficacy of recombinant human papillomavirus virus-like particle vaccines, Annex 4, TRS No 999*. <https://www.who.int/publications/m/item/recombinant-hpv-like-particle-vaccines-annex-4-trs-no-999>

- Williams, M. S., & Amoateng, P. (2012). Knowledge and Beliefs about Cervical Cancer Screening Among Men in Kumasi, Ghana. *Ghana Medical Journal*, 46(3), 147. [/pmc/articles/PMC3645156/](https://pubmed.ncbi.nlm.nih.gov/23645156/)
- Williams, M. S., Kenu, E., Adanu, A., Yalley, R. A., Lawoe, N. K., Dotse, A. S., Adu, R. F., & Fontaine, K. (2018). Awareness and Beliefs About Cervical Cancer, the HPV Vaccine, and Cervical Cancer Screening Among Ghanaian Women with Diverse Education Levels. *Journal of Cancer Education* 2018 34:5, 34(5), 897–903. <https://doi.org/10.1007/S13187-018-1392-Y>
- Wilson, R. (2021). HPV vaccine acceptance in West Africa: A systematic literature review. *Vaccine*, 39(37), 5277–5284. <https://doi.org/10.1016/J.VACCINE.2021.06.074>
- Woo, C. G., Son, S. M., Hwang, H. K., Bae, J. S., Lee, O. J., & Lee, H. C. (2025). Sensitivity, Specificity, and Cost–Benefit Effect Between Primary Human Papillomavirus Testing, Primary Liquid-Based Cytology, and Co-Testing Algorithms for Cervical Lesions. *Diagnostic Cytopathology*, 53(1), 35–42. <https://doi.org/10.1002/DC.25410;WGROU:STRING:PUBLICATION>
- Zhang, S., Xu, H., Zhang, L., & Qiao, Y. (2020). Cervical cancer: Epidemiology, risk factors and screening. *Chinese Journal of Cancer Research*, 32(6), 720. <https://doi.org/10.21147/J.ISSN.1000-9604.2020.06.05>
- Zurales, K. R., Appiah-Kubi, A., Bell, S. G., Konney, T., Tawiah, A., Kobernik, E. K., & Lawrence, E. R. (2023). Attitudes and knowledge about HPV vaccination among Ghanaian women with cervical cancer. *Reproductive, Female and Child Health*, 2(1), 11–18. <https://doi.org/10.1002/RFC2.24>



APPENDIX

APPENDIX A

PARTICIPANT INFORMATION SHEET

CONSENT FORM

Title: FACTORS AFFECTING THE ACCEPTABILITY OF CERVICAL CANCER SCREENING AMONG YOUNG WOMEN (18-35 YEARS) IN THE GREATER ACCRA REGION, GHANA.

Principal Investigator: George Johnson

Address: School of Public Health, University of Ghana, P.O Box LG 13, Legon.

General Information about Research

Hello, My name is <interviewer name >. I am working with George Johnson, a Master of Public Health student from the School of Public Health, University of Ghana. Thank you for taking the time to speak with us. We invite you to join this research which seeks to assess the Factors affecting the acceptability of Cervical Cancer Screening among young women (18-35 years) in the Greater Accra Region, Ghana. This will involve a thorough investigation into the knowledge, perception, acceptability, and uptake of Cervical Cancer screening and HPV vaccination among the study participants. **You will be interviewed using a questionnaire or interview guide. The interview will be recorded with your permission.** You are free to join. You can stop taking part at any time. In order to be sure that you are informed about your being in this research, we are asking you to read (or have read to you) this consent form. You will also be asked to sign it (or make your mark in front of a witness). We will give you a copy of this form. The consent form might contain some words that are unfamiliar to you. Please ask us to explain anything you may not understand.

Possible Risks and Discomforts

Partaking in this study may pose emotional discomfort. You are at liberty to skip questions or withdraw consent if you feel uncomfortable or get emotionally upset while answering the questionnaire

Possible Benefits

There is no direct benefit to you from taking part in this study. However, participating in this study will contribute to scientific knowledge.

Confidentiality

Participants' privacy and confidentiality will be strictly protected throughout the research process. All data

collected, including survey responses and interview transcripts, will be anonymized and securely stored. Access to identifiable information will be restricted to authorized members of the research team.

Compensation

There would be no compensation for taking part of this study.

Additional Cost

Except time spent answering the questionnaire, no additional cost will be incurred in taking part in this study.

Voluntary Participation and Right to Leave the Research

Participation in this study is entirely voluntary. You have the right to withdraw at any point in the study should you choose to.

Contacts for Additional Information

You can ask any of the study staff questions as and when they arise at any point of the study.

Kindly contact the Principal Investigator for further clarifications and inquiries: George

Johnson g4george60@icloud.com 0209569241

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant, you can contact the IRB Office between the hours of 8am-5pm through the landline 0302916438 or email addresses: nirb@noguchi.ug.edu.gh



ETHICAL CLEARANCE



NOGUCHI MEMORIAL INSTITUTE
FOR MEDICAL RESEARCH (NMIMR)
COLLEGE OF HEALTH SCIENCES
INSTITUTIONAL REVIEW BOARD

2nd October 2024

ETHICAL CLEARANCE

FEDERALWIDE ASSURANCE FWA 00001824

IRB 00001276

NMIMR-IRB CPN 030/24-25

IORG 0000908

On 2nd October 2024, the Noguchi Memorial Institute for Medical Research (NMIMR) Institutional Review Board (IRB) at a full board meeting, reviewed and approved your protocol titled:

TITLE OF PROTOCOL : Factors affecting the acceptability of Cervical Cancer Screening among young women (18-35 years) in the Greater Accra Region, Ghana

PRINCIPAL INVESTIGATOR : Johnson George

Please note that a final review report must be submitted to the Board at the completion of the study. Your research records may be audited at any time during or after the implementation.

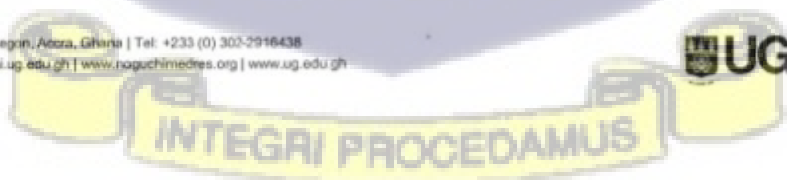
Any modification of this research project must be submitted to the IRB for review and approval prior to implementation.

Please report all serious adverse events related to this study to NMIMR-IRB within seven days verbally and fourteen days in writing.

This certificate is valid till 1st October 2025. You are to submit annual reports for continuing review.

Signature of Chair:
Dr. Abraham Hodgson
(NMIMR – IRB CHAIR)

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VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research title **FACTORS AFFECTING THE ACCEPTABILITY OF CERVICAL CANCER SCREENING AMONG YOUNG WOMEN (18-35 YEARS) IN THE GREATER ACCRA REGION, GHANA** has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

Date

Name and signature or mark of volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

Date

Name and signature of witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

Date

Name Signature of Person Who Obtained Consent



APPENDIX B

DATA COLLECTION INSTRUMENTS

I. Survey Questionnaire

Questionnaire

Title: FACTORS AFFECTING THE ACCEPTABILITY OF CERVICAL CANCER SCREENING AMONG YOUNG WOMEN (18-35 YEARS) IN THE GREATER ACCRA REGION, GHANA.

ID No.....

Date of Interview.....

A. SOCIO-DEMOGRAPHICS CHARACTERISTICS OF PARTICIPANTS.

1. The type of community participant was sampled from.
☐ Low-income ☐ Middle-Income ☐ High-Income
2. Age in years: _____
3. Marital Status: ☐ Single ☐ Married ☐ Divorced ☐ Co-habiting ☐ Widow
4. Which religion do you belong to? ☐ Christianity ☐ Islam ☐ African traditional religion
☐ Other(please specify).....
5. What is your highest level of education? ☐ No formal education ☐ Basic ☐ Secondary ☐ Tertiary ☐ Other(please specify).....
6. What is your current employment status? ☐ Unemployed ☐ Employed ☐ Student
7. Were you born in the Greater Accra Region? ☐ No ☐ Yes
8. If No, how long(in years) have you resided in the Greater Accra Region?.....
9. If employed, which industry are you employed in? (kindly ask for the respondent's profession and tick the corresponding category)
☐ Healthcare and social services ☐ Education and training ☐ Professional and financial services ☐ Retail and wholesale trade ☐ Manufacturing and production ☐ Information technology and telecommunications ☐ Hospitality and tourism ☐ Government and public administration ☐ Arts, entertainment, and media ☐ Agriculture, construction, and transportation ☐ Other(please specify).....
10. If employed, what monthly salary bracket do you fall in?
☐ 0 -1,499 GHS ☐ 1,500-2,999 GHS ☐ 3,000- 4,499 GHS ☐ 4,500-5,599 GHS ☐ > 6,000 GHS
11. Do you have any form of health insurance? ☐ No ☐ Yes
12. Age at first sexual intercourse
☐ Not yet ☐ < 18 years ☐ > 18 years

13. Number of lifetime sexual partners

☐ 1 ☐ 2 ☐ 3 ☐ >3

14. Gravidity?

☐ 1 ☐ 2 ☐ 3 ☐ >3

B. Awareness & Knowledge of Participants on Cervical Cancer.

1. Have you heard of cervical cancer / ☐ No ☐ Yes

2. What are some risk factors associated with cervical cancer? (Please tick as per the respondent's answer)

☐ Family History ☐ HPV infection ☐ Prolonged Use of Oral Contraceptives ☐ Multiple pregnancies ☐ Smoking ☐ Sexual activity ☐ Poor access to healthcare ☐ Other

3. What are some of the early symptoms associated with cervical cancer? (Please tick as per the respondent's answer)

☐ Dyspareunia ☐ Abnormal Vaginal Bleeding ☐ Abnormal Vaginal discharge ☐ Pelvic pain ☐ Pain during urination ☐ Longer or heavier periods ☐ Other

4. Are there ways to prevent/ lower the risk of cervical cancer?

☐ No ☐ Yes

5. If yes, what are some ways to prevent or lower the Cervical Cancer risk? (Please tick as per response)

☐ HPV vaccination ☐ Cervical cancer screening ☐ Abstinence from sex ☐ Use of barrier protection during sex ☐ Avoiding multiple sexual partners ☐ Avoiding prolonged use of oral contraceptives ☐ Other

6. Have you heard of cervical cancer screening tests?

☐ No ☐ Yes

7. Do you know any facilities that offer cervical cancer screening tests?

☐ No ☐ Yes

8. Have you heard of HPV vaccination? ☐ No ☐ Yes

9. Do you know any facility that offers HPV vaccination services?

☐ No ☐ Yes

C. Uptake of Cervical Cancer Screening & Vaccination Among Participants.

1. Have you ever had a cervical cancer screening test? ☐ No ☐ Yes

2. If yes, what influenced your decision to get screened?

3. If yes which of the tests have you had? (Kindly ask respondents to describe what was done during the test and tick which test corresponds to the description)

[] Pap Smear [] HPV screening [] Visual Inspection with acetic acid/Iugols iodine [] Colposcopy [] Other (please specify)

4. If yes, what influenced your choice of test?.....

5. Have you been vaccinated against HPV?

[] No [] Yes

6. If yes, which vaccine did you take?

[] quadrivalent vaccine [] nonavalent vaccine [] Not Sure

7. If yes, what influenced your decision to get vaccinated?.....

D. Acceptability of Cervical Cancer Screening & Vaccination among Participants.

1. Are you willing to undergo cervical cancer screening? [] No [] Yes

2. Are you willing to undergo an HPV vaccination? [] No [] Yes

E. Intra Personal factors influencing acceptability of Cervical Screening among Participants.

Please tick the response that corresponds with the respondent's answer.

Will the following factors influence your decision to have or not have a Cervical Cancer Screening test?

FACTOR	RESPONSES		
	NO	NOT SURE	YES
1. Cost of the test			
2. Spousal Consent			
3. Sex of person performing the test			
4. Ability of test to detect cervical cancer.			
5. Religious beliefs			
6. Facility performing the test			
7. Comfort level/ pain associated with the test			
8. Opinion(s) of friends and family members.			
9. Introduction of a screening policy.			
10. Availability/ ease of getting tests.			

F. Intrapersonal influencing acceptability of HPV vaccination among Participants.

Please tick the response that corresponds with the respondent's answer.

Will the following factors influence your decision to receive or not HPV vaccination?

FACTOR	RESPONSES		
	NO	NOT SURE	YES
1. Vaccine Safety Concerns			
2. Advice of Healthcare Professionals			
3. Effectiveness of the vaccine			
4. Ease of access to vaccine			
5. Cultural and Religious beliefs			
6. Facility/personnel performing the vaccination			
7. Vaccination policies			
8. Opinion(s) of friends and family members.			
9. Personal beliefs and values			
10. Education on/about the vaccine			



II. In-Depth Interview Guide

IN-DEPTH INTERVIEW GUIDE.

Introduction.

- A. Introduce yourself to the informant (your name and your institution).
- B. Explain to the informant the purpose of the study.
- C. Explain how the interview would be conducted.
 - You can say anything you want if that is how you feel.
 - There are no right or wrong answers, only your ideas and opinions.
 - We will publish the findings of our study. However, be assured that I will not tell anyone what you as an individual say. Your name will not be used, and no one will be told about what any one person says. .
 - Would you be willing to talk with me for about one hour? You can continue your tasks if you wish, and I will follow you around. [If she declines to interview, ask why, try briefly to convince but do not pressure. Thank her and leave. If she is willing, continue.]
- D. Do you have any questions?

Interview Guide.

- A. Knowledge and perception of cervical cancer, screening and vaccination.
 - i. Can you tell me about cervical cancer?
 - a. Can you tell me how one gets it?
 - b. What are some risk factors associated with it?
 - c. Ways to prevent it?
 - d. Can something be done if you're diagnosed with it?
 - e. What can be done?
- B. Factors Affecting Acceptability of Cervical Cancer Screening
 - ii. Have you heard there are tests to help diagnose Cervical cancer?
 - a. What have you heard about it/What do you think about it?
 - b. Do you know some of those tests?
 - c. Do you know any facility you could get one done?
 - d. What will you consider when choosing a facility to be screened at?
 - e. Have you had one/willing to have one?
 - f. What will make people decide to get screened?
 - g. What will make people decide not to get screened?
 - h. What do you think the government can include in screening policies to get people to screen?
- C. Factors affecting the acceptability of HPV vaccination.
 - iii. Do you know there is a vaccine to help prevent Cervical cancer?
 - a. What do you think of it?
 - b. Do you know any facility you can get vaccinated?
 - c. Have you been vaccinated/ willing to be vaccinated?
 - d. What will you consider when choosing a facility to be vaccinated at?
 - e. In your opinion, what would convince people to get vaccinated?
 - f. In your opinion, what would prevent people from getting vaccinated?
 - g. What do you think the government can include in vaccination policies to get people to screen?

APPENDIX C

WORKPLAN.

TIMELINES

Table 20 Study Workplan

March	April-July	August- November	December	January	February- April
Proposal Development	Proposal Development/ Ethical clearance				
		Ethical Clearance			
			Data Collection		
				Data Collection and analysis	
					Data Analysis and submission of dissertation

The proposal for the study was developed from March through to April. All relevant documents and information used in developing the proposal were made available between March and April. The proposal was then submitted and awaited clearance from the Ethics Review Committee between August and November. Data was collected after clearance

was received in November, with data analysis conducted on the side. In February the data analysis continued and the final thesis was then submitted in April.



APPENDIX D

SUPPLEMENTARY TABLES

Supplementary Table 1 Barriers and Enablers of Screening and Vaccination

Themes & Sub-Themes	Illustration
Barriers	
Illiteracy & lack of awareness	“Because I don’t know there are measures or places put in place for screening or even vaccination. I only got to know of it during the survey.so I feel a lot of us don’t know about it.”
Cost-related	“if it is expensive I can’t do it. Unless it is free or less expensive that I can afford.”

Fear	“Personally, I don’t like going for screening. I get scared a lot. I get scared when I am going for screening or to the hospital. I don’t want them to mention any sickness or anything for me.”
Beliefs	“To be a typical Ghanaian, I would say that if you don’t something and you go looking for the thing, you will find the thing. Right now as I am sitting here I don’t think I have it but if I go and look for it I might find it and I am probably not ready to find it.”
Convenience-related Proximity	“I will be going to do it. I have not found the time.” “I live at East Legon and you tell me to go to korle-Bu for the vaccine. It is too far away for me so it might prevent me from going for it.”
Absence of screening facility	“Some people at places where there is no facility that offers cervical cancer screening”
Side effects & Safety concerns	“During COVID, we were asked to go for vaccines and some of us had side effects. So even if I say the government should bring measures to get people to do it, people will look back at COVID time.”
Enablers Desire to stay healthy	“as for me I am very conscious about my health. I believe your health is your wealth. I wouldn’t wait for the situation to escalate before going to the hospital and nothing can be done about it. So, whenever there is a health screening or anything that will protect me, I just go ahead and do it.”
Education and Awareness	“I always say the education. Because prevention is better than cure so, education should be more. Let the people understand. If there is a need for videos. Because people are mostly attracted to what they see. If there can be some small drama concerning this cervical cancer how it spreads and all that. I think when they see it they will be motivated to go and do. And they will even be scared seeing how dangerous it is when it becomes worse.”
Engaging in sexual intercourse	“If I ever engage or have engaged in sexual activity.”
Financial Stability	“If they are willing and they have the money they will go. People go to the hospital because they have the capacity.”

