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FACTORS ASSOCIATED WITH AN INCREASE IN CERVICAL CANCER AMONG WOMEN OF CHILDBEARING AGE AT WILKINS INFECTIOUS DISEASES HOSPITAL, HARARE, ZIMBABWE

BY

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Abstract

Cervical cancer is the uncontrolled growth of cells on the cervix caused by the Human Papillomavirus (HPV). Cervical cancer is the third most common cancer in women worldwide. The Zimbabwe National Cancer Registry shows that cervical cancer is the most common female cancer in women aged 15 to 44 years. Prevention of cervical cancer is largely multifaceted, with primary prevention dominated by vaccination and secondary prevention by screening and treatment. In Zimbabwe, secondary prevention is conducted through Visual Inspection with Acetic acid and Cervicography. Between 2016 and 2018, Wilkins Infectious Diseases Hospitals saw an increased VIAC positivity rate and it was therefore imperative to establish the factors associated with the increased positivity rate.

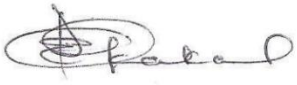
Seventy-three (73) cases and 73 controls were recruited into a 1:1 unmatched case control study conducted at Wilkins Infectious Diseases Hospital. The study sample included women aged 20 - 44 years. A Case was defined as a woman aged 20-44 years who had been screened for cervical cancer through VIAC at WIDH and had a positive VIAC result and a control was defined as a woman aged 20-44 years who had been screened for cervical cancer through VIAC at WIDH and had a negative VIAC result. The results of the study indicated that being in the 30 to 35-year age group [AOR=14.51(95%CI 1.69 – 124.55)]; using combined oral contraception for family planning [AOR=11.26(95% CI 1.43 – 88.62)]; an HIV positive status [AOR=12.96(95% CI 2.05 – 81.84)] and perceiving that the individuals risk of developing cervical cancer is low [AOR= 26.58(95%CI 4.06 – 173.86)]. However, being formally employed was determined to be a protective factor against developing cervical hyperplasia [AOR= 0.10(95% CI 0.01 – 0.87)]. The researcher therefore concluded that low levels on knowledge on cervical cancer in women of childbearing age has led to them not realizing and appreciating the magnitude of risk that they are under. They are therefore unaware that their age, HIV status and their choice of contraception may determine their risk to cervical cancer. There is therefore a need to increase integrated health promotion activities especially health education on cervical cancer among women of childbearing age.

Key words: Cervical Human Papilloma Virus VIAC Infectious Cancer

Declaration

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

Farai Chikupe — 08/04/2021
Student — Signature — Date



Elliot Chikaka — 8/02/2021
Academic Supervisor — Signature — Date

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Dedication

I wish to dedicate this to my family for their support during this project.

List of acronyms and abbreviations

AOR	Adjusted Odds Ratio
AUREC	Africa University Research ethics Committee
AIDS	Acquired Immunodeficiency Syndrome
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
CIN	Confidence Interval
COC	Combined Oral Contraceptive
GLOBOCAN	Global Cancer Incidence, Mortality and Prevalence
FIGO	International Federation of Gynaecology and Obstetrics
FTP	Full Term Pregnancy
HIV	Human Immunodeficiency Virus
HPV	Human Papillomavirus
IARC	International Agency for Research on Cancer
ITECH	International Training and education Centre for Health
IUCD	Intra-Uterine Contraceptive Device
LEEP	Loop electrosurgical excision procedure
LMICs	Low- and Medium-Income Countries
MoHCC	Ministry of Health and Child Care
MOR	Matched Odds Ratio
NVD	Normal Vaginal Delivery
OR	Odds Ratio

STI	Sexually Transmitted Infection
VIAC	Visual Inspection with Acetic Acid and Cervicography
WHO	World Health Organization
ZIMPHIA	Zimbabwe Population-Based HIV Impact Assessment

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CHAPTER 1 INTRODUCTION

1.1 Introduction

Cervical cancer is the uncontrolled growth of cells on the cervix (World Health Organisation [WHO], 2006). It is unique because it can take 10 to 20 years for invasive cancer to develop after mild dysplasia is identified (WHO, 2006). It is due to the abnormal growth of cells that have the ability to invade or spread to other parts of the body (WHO, 2006). Human papillomavirus (HPV) infection is a well-established cause of cervical cancer and there is growing evidence of HPV being a relevant factor in other anogenital cancers (anus, vulva, vagina and penis) as well as head and neck cancers (HPV Information Centre, 2019). HPV types 16 and 18 are responsible for about 70% of all cervical cancer cases worldwide (HPV Information Centre, 2019). Most infections resolve spontaneously within one to two years, but some persist, becoming chronic, which drives the cells of the cervix to grow abnormally, resulting in early precancerous lesions (HPV Information Centre, 2019). Host factors like early sexual debut (before age 16); closely spaced, frequent births; and behavioural and environmental factors may facilitate cervical cancer development (WHO, 2006).

The early stages of cervical cancer may be completely free of symptoms (Kumar, Abbas, Fausto, & Mitchell, 2007). Vaginal bleeding contact bleeding (one most common form being bleeding after sexual intercourse), or (rarely) a vaginal mass may indicate the presence of malignancy. Also, moderate pain during sexual intercourse and vaginal discharge are symptoms of cervical cancer. In advanced disease, metastases may be present in the abdomen, lungs, or elsewhere (Kumar et al., 2007).

Symptoms of advanced cervical cancer may include loss of appetite, weight loss, fatigue, pelvic pain, back pain, leg pain, swollen legs, heavy vaginal bleeding, bone fractures, and (rarely) leakage of urine or faeces from the vagina. Bleeding after douching or after a pelvic exam is a common symptom of cervical cancer.

Cervical cancer is staged by the International Federation of Gynaecology and Obstetrics (FIGO) system, which is based on clinical examination, rather than surgical findings. It allows only these diagnostic tests to be used in determining the stage: palpation, inspection, colposcopy, endocervical curettage, hysteroscopy, cystoscopy, proctoscopy, intravenous urography, and X-ray examination of the lungs and skeleton, and cervical conization (Bhatla, N., Berek, J. S., Fredes, M. C., Denny, L. A., Grenman, S., Karunaratne, K., Kehoe, S. T., Konishi, I., Olawaiye, A. B., Prat, J & Sankaranarayanan, R, 2019) . Cervical cancer stage ranges from stages I (1) through IV (4). As a rule, the lower the number, the less the cancer has spread. A higher number, such as stage IV, means a more advanced cancer. And within a stage, an earlier letter means a lower stage. Cancers with similar stages tend to have a similar outlook and are often treated in much the same way. (Bhatla et al., 2019).

Treatment of cervical cancer depends on stage. Treatment includes surgery, radiation and chemotherapy. Medical procedures include teletherapy, brachytherapy, Loop electrosurgical excision procedure (LEEP), radiation therapy and cervical conization

Cervical cancer can also be treated using chemotherapy. Surgical procedures to treat cervical cancer include hysterectomy, cervicectomy, cryosurgery, lymph node dissection and retroperitoneal lymph node dissection.

Cervical cancer is the third most common cancer in women worldwide with an estimated 569 847 new cases and 311 365 deaths in 2018 (Global Cancer Incidence, Mortality and Prevalence [GLOBOCAN], 2019). The majority of the cases are squamous cell carcinoma followed by adenocarcinomas (Clifford, Franceschi, Munoz & Villa, 2006). In 2018, the International Agency for Research on Cancer (IARC), recorded 569 847 new cases of cervical cancer which is 3.2% of the 18 078 957 new cases of all cancers combined. The age standardized (world) incidence for Southern Africa for 2018 is 43.1 per 100 000 population while the mortality rates for Southern Africa for the same period is 20 per 100 000 population (WHO, 2018).

Globally, in 2018, Southern Africa had the highest age standardized incidence rate of 43.1 per 100 000 population with Western Asia having the lowest incidence at 4.1 per 100 000 population. Eastern Africa had the highest age standardized mortality rate at 30.0 per 100 000 population while Australia and New Zealand age standardized mortality rate at 1.7 per 100 000 population (GLOBOCAN, 2019). An estimated 90% of the globally recorded cervical cancer-related deaths are in low-and middle-income countries (LMICs), for which 8 in 10 are recorded within the Sub-Saharan African region (WHO, 2018). Disparities in cervical cancer incidence and mortality exist because of a relative lack of effective prevention and early detection and treatment programmes in low to middle income countries compared with the high-income countries (Ministry of Health and Child Care [MoHCC], 2019).

All women are at risk for cervical cancer but occurs most often in women over age 30 (Centre for Disease Control and Prevention [CDC], 2019). The biggest risk factor of

cervical cancer is human papillomavirus (HPV), commonly detected in cervical tumour specimens (CDC, 2019). Sexually transmitted infection, genital warts that are caused by high-risk HPV subtypes, have been shown to present with a 99% chance of progressing to cervical cancer. Most sexually active people will have HPV at some point in their lives (CDC, 2019).

While HPV infections are very common in the general population and most women with healthy immune systems will clear these infections over time, women with compromised immune systems (such as women living with HIV) are far less likely to clear an HPV infection. This means that once they have been infected with HPV, women living with HIV are more likely to develop pre-invasive lesions that can, if left untreated, quickly progress to invasive, life-threatening cervical cancer (CDC, 2019). The World Health Organization (WHO) recommends screening and providing adequate treatment to all women living with HIV as soon as they know their status and if they have started sexual relations (WHO, 2013).

Several studies have shown a higher prevalence of pre-invasive and invasive cervical pathology among HIV positive population compared to their HIV negative cohorts (Lawal, Agida, Offiong & Oluwole, 2017). In HIV negative women with competent immune systems, most of the infections are cleared spontaneously because of a cell mediated immune response regulated by CD4+ lymphocytes (Nweke, Nwadike, Kalu & Ojide, 2014). However, in HIV co-infected individuals, there is a higher risk of persistent HPV infection largely due to their impaired ability to clear HPV. They are therefore, at

increased risk of developing cervical dysplasia and cancer (Firnhaber, Zungu, Levin, Michelow, Montaner, McPhail, Williamson, Allan, Van der Host, Rinas & Sanne, 2009).

1.2 Background of the study

Zimbabwe has one of the highest rates of cervical cancer in the world (GLOBOCAN, 2019). Data from the National Cancer Registry shows that cervical cancer is the most common cancer in women of all ages. Cervical cancer is also the most common female cancer in women aged 15 to 44 years in Zimbabwe (National Cancer Registry, 2018). From the 3.96 million women aged 15 years and above who may be at the risk of developing cervical cancer, it is estimated that every year 2270 women are diagnosed with cervical cancer and 1451 (about 4 women per day) die from the disease. (Human Papilloma and Related Diseases, 2019).

Table 1 below shows Cervical Incidences in Zimbabwe, Eastern Africa and the rest of the world (estimates for 2018).

Table 1: Cervical cancer incidence in Zimbabwe (estimates for 2018: Source: Human Papillomavirus and Related Diseases in Zimbabwe. Summary Report 17 June 2019)

Indicator	Zimbabwe	Eastern Africa	World
Annual number of new cases	3 186	52 633	569 847
Crude incidence rate	36,7	24,1	15,1
Age standardized incidence rate	62,3	40,1	13,1
Cumulative risk (%) at 75 years old	7	4	1

Table 2 below shows cervical cancer incidence for the period 2010 to 2012 by the cancer registry.

Table 2: Cervical cancer incidence, 2010 to 2012 (Source: National Cancer Registry)

Cancer Registry	Period	N cases	Crude rate	ASR
Harare (African)	2010-2012	906	40,3	86,1

The HIV/AIDS pandemic has worsened the picture of the cervical cancer disease. The HIV prevalence is currently estimated at 16% among women in Zimbabwe (Zimbabwe Population-Based HIV Impact Assessment [ZIMPHIA], 2015/2016). Women with HIV have been found to have an increased incidence of cervical intraepithelial neoplasia (CIN), the precursor lesion for cervical cancer. Presently due to greater access to antiretroviral therapy and aggressive treatment of opportunistic infections, the life expectancy of women living with HIV/AIDS has significantly increased. The paradox of this success is that women living with HIV/AIDS are now living long enough to develop cervical cancer.

Harare City's Health Department has 8 health districts which are the Central/ South Eastern, Northern, Eastern, Southern, South Western, West South Western, Western and North Western districts. The City of Harare's Department of Health has a total of 2 infectious diseases hospitals, 12 poly clinics (one of which is an enhanced polyclinic), 6 family health service clinics and 23 satellite clinics.

Figure 1 below shows Harare City's Department of Health Districts

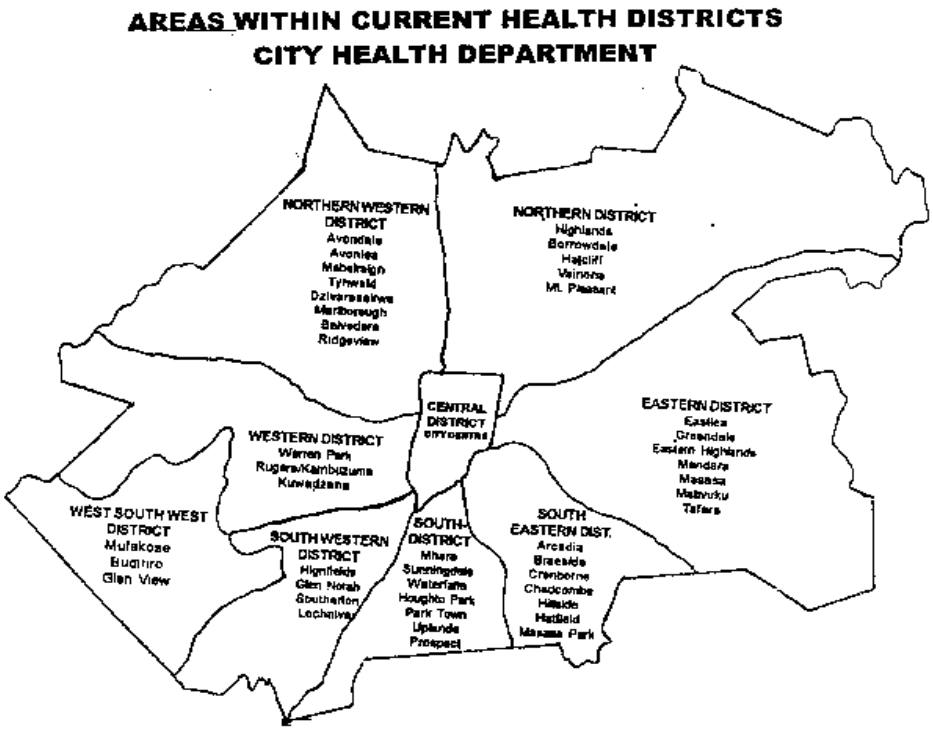

Figure 1: Harare City Department of Health Districts

Prevention of cervical cancer is largely multifaceted, with primary prevention dominated by vaccination and secondary prevention by screening and treatment. In Zimbabwe secondary prevention through Visual Inspection with Acetic acid and Cervicography (VIAC) forms the foundation of cervical cancer prevention and treatment (MoHCC, 2019).

The City of Harare's Department of Health in partnership with The International Training and Education Centre for Health (ITECH) is currently offering VIAC services at 9 of its health facilities namely Marlborough Satellite Clinic, Warren Park Polyclinic, Wilkins Infectious Diseases Hospital's Genitourinary Unit, Glen Norah Satellite Clinic, Mbare Polyclinic, Hatcliffe Polyclinic, Mabvuku Satellite Clinic, Highfields Clinic and Budiriro Polyclinic.

Of the nine health facilities from the City of Harare's Department of Health that provide VIAC services, the polyclinics and the Wilkins Infectious Disease Hospital's Genitourinary Unit are high volume sites compared to the other sites. Averages of 350 women are screened every month. Data from Wilkins Infectious Disease Hospital's Genitourinary Unit (VIAC site) for the period June 2015 to May 2018 shows that there was increase in the number VIAC positive cases aged between 20 and 44 years. Figure 2 below shows the number of VIAC positive women (20-44 years) and the positivity rate for the period June 2015 to May 2018 at Wilkins Infectious Diseases Hospital's VIAC unit.

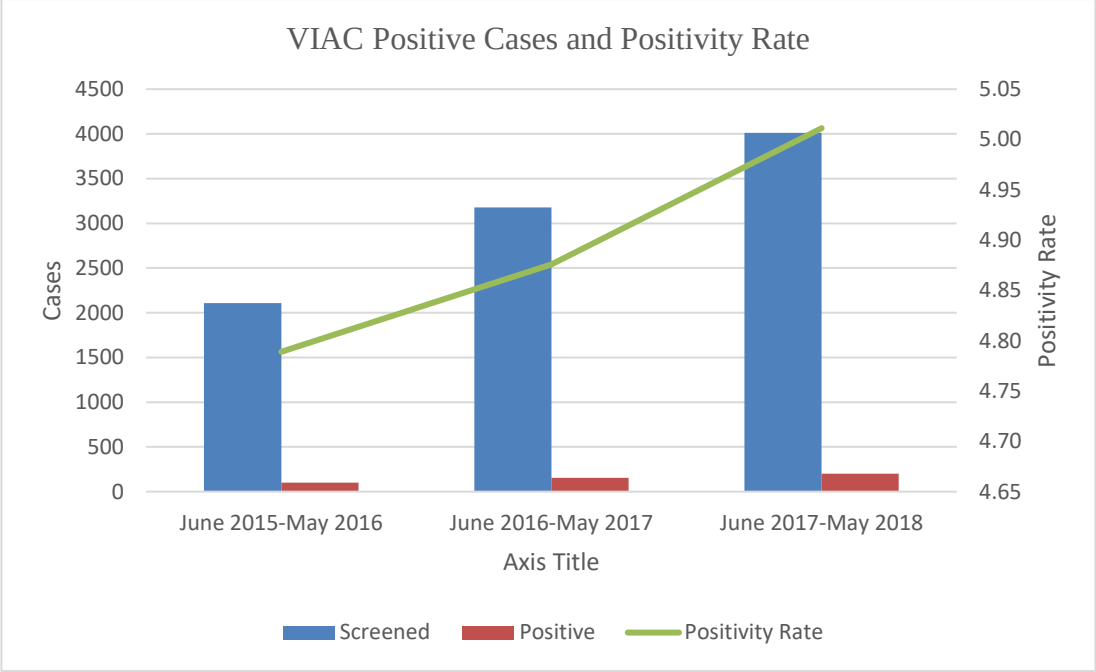

Figure 2*:* Number of VIAC positive women ad positivity rate

As shown in figure 2 above, there was a 53% increase from the period June 2015 –May 2016 to the period June 2016 –May 2017 while there was a 30% increase in the number of cases from period June 2016 -May 2017 to the period June 2017 –May 2018. There was also an increase in the positivity rate.

Presently due to greater access to antiretroviral therapy and aggressive treatment of opportunistic infections, the life expectancy of women living with HIV/AIDS has significantly increased. The paradox of this success is that women living with HIV/AIDS are now living long enough to develop cervical cancer. Given that almost all cases of cervical cancer are preventable, cases of cervical cancer represent some of the greatest public health failures of our times.

Most women who die from cervical cancer are in the prime of their life, thus robbing families, communities and countries of their immense contribution to social and economic development. It has also put a heavy burden on the health delivery system.

1.3 Statement of the problem

Cervical cancer is preventable and screening services have been provided thus it is not expected that cases continue to increase. There was an increase in the positivity rates after VIAC among women aged between 20 and 44 years during the period June 2015 to May 2018. This study therefore sought to establish the factors associated with the increase in the VIAC positivity rates among women aged 20 to 44 years and came up with recommendations.

1.4 Study objectives

1.4.1 Broad objective

The broad objective of the study was to determine the factors associated with the increase in cervical cancer cases among women aged 20 to 44 years attending Wilkins Infectious Diseases Hospital, Harare, from January to March 2020.

1.4.2 Specific objectives

The study sought specifically to:

- assess the socio-demographic and socio-cultural factors associated with the increase in cervical cancer positivity rates among women aged 20-44 years (childbearing age).
- determine the health-related factors associated with the increase in cervical cancer positivity rates among women aged 20-44 years (childbearing age).

- assess the perceived susceptibility to cervical cancer among women aged 20-44 years (childbearing age)

1.5 Research question

- What are the factors associated with increase in cervical cancer positivity among women aged 20-44 years?

1.6 Hypotheses

- There is no association between socio-demographic, socio-cultural factors and institution related factors and developing cervical cancer.
- There is an association between socio-demographic, socio-cultural factors and health related factors and developing cervical cancer.

1.7 Justification

Cervical cancer is preventable and the government together with its partners have made prevention and control services available for women aged from 15 years and above. Screening services have been provided to identify potential cervical cases thus the number of women who eventually develop cervical cancer/ the number of cervical cancer cases is not expected to continue to increase.

The study therefore sought to bring out possible factors for the increase in cervical cancer cases among women in the age group 20-44 years with an aim of improving cervical cancer services programming in the city of Harare and Zimbabwe at large to reduce the incidence of cervical cancer.

The findings from this study also increased the body of knowledge on cervical cancer to help in the prevention and treatment of patients. Knowledge on risk factors associated with cervical cancer among women will help in the reduction of cervical cancer morbidity and mortality.

Lastly the findings of this study were used to advocate for more resources to be allocated to the prevention and control of cervical cancer among women.

1.8 Delimitations of the study

The study was carried out in the city of Harare. The study participants will be selected from the VIAC registers at Wilkins Infectious Diseases Hospital

1.9 Summary

Cervical cancer is the uncontrolled growth of cells on the cervix. Cervical cancer is caused by infection with the human papillomavirus (HPV). HPV types 16 and 18 are responsible for about 70% of all cervical cancer cases worldwide. In Zimbabwe secondary prevention through VIAC forms the foundation of cervical cancer prevention and treatment. The City of Harare's Department of Health is currently offering VIAC services at 9 of its health facilities. Data from Wilkins Infectious Diseases Hospital is showing an increase in the number of cervical cancer cases over a period of 3 years. This study seeks to determine the risk factors associated with an increase in the number of cervical cancer cases among women aged 20-44 years.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1 Introduction

Some constructs for the health belief model will be used to guide the review of the available literature. The same constructs were also be used to guide the data collection and analysis.

2.2 Theoretical Framework and Variables

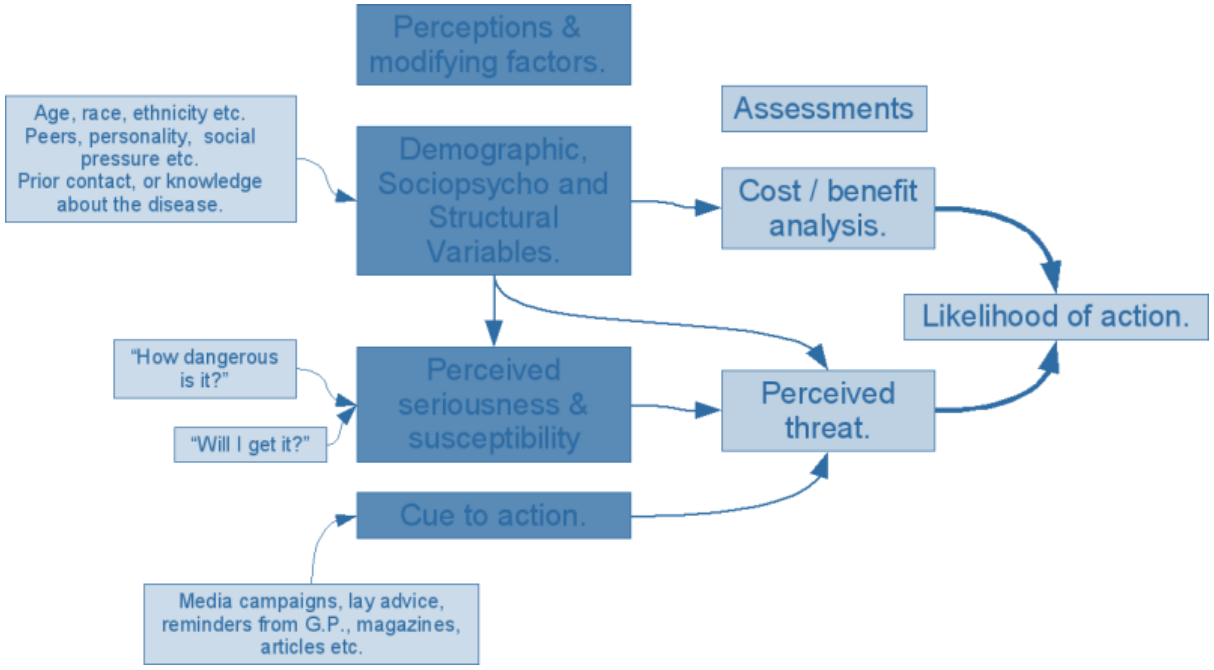

Figure 3: The Health Belief Model

The above conceptual framework was used for the purpose of the study. The association of the above mentioned factors with being VIAC positive was examined. The constructs of the framework were adopted from the Health Belief Model which entails that; in order, say, for a person to elicit a (BEHAVIOR) for health reasons (OUTCOME), he/she must believe that they would benefit him/her (OUTCOME EXPECTATION) and also that

he/she is capable of eliciting the BEHAVOIR (EFFICACY EXPECTATION), (Rosenstock, Strecher, & Becker, 1988). The choice of the theoretical framework was based on the need to determine the factors associated with the increase in cervical cancer cases among women aged 20 to 44 years attending Wilkins Infectious Diseases Hospital, Harare, from January to March 2020. These factors were mainly socio-demographic and behavioural.

2.3 Socio-demographic factors

Socio-demographic factors refer to a group defined by its sociological and demographic characteristics. Demographic characteristics include age, sex, place of residence, religion, educational level and marital status. Sociological characteristics are more objective traits, such as membership in organizations, household status, interests, values and social groups Pre-cancer lesions (VIAC positive) were most likely to be prevalent in the following individuals: women aged 30 – 35 years, married women, women with lower levels of education, women of lower socioeconomic status, women of single parity and gravidity, women who had their first pregnancy before the age of 20 years and women who had their first sexual contact before the age of 20 years (Makuza, Nsanzimana, Muhimpundu, Pace, Ntaganira & Riedel., 2015). VIAC positivity was also likely to be found who self-reported to be HIV positive, women who had had more than five sexual partners and in women who smoked tobacco.

Makuza et al., 2015, also posited that being unmarried was the only risk factor associated with cervical cancer [OR=2.6, 95% CI= (1.05-6.69)]. With multivariate regression, the risk of developing any cervical cancerous lesion decreased with increasing party [OR=0.42, 95% CI= (0.23-0.76)]. Being older than 40 decreased risk [OR=0.52, 95% CI=

(0.28-0.97)]. The risk increased if age of the first sexual intercourse was less than 20 years old [OR=1.75, 95% CI = (1.01-3.03)]. The risk of cervical cancer also increased in participants who live alone (single, divorced and widowed) [OR=3.29, 95% CI = (1.26-8.60)]. The risk was increased with age of the first pregnancy less than 20 years old [OR=2.10, 95%CI = (1.20-3.67)]. The total number of pregnancies was not associated with cervical cancer (Makuza et al., 2015).

Data from the cancer registries indicate that more than 75% of cervical cancers develop in women above the age of 35 years (Juneja, Sehgal, Mitra & Pandey, 2003). Accordingly, the age parameter defines a `high risk' group relevant for the screening activities and providing health care facilities. They also reported that women belonging to the lower social class are at much higher risk of development of cervical cancer (Juneja et al., 2003).

According to Teame, Addissie, Ayele, Hirpa, Gebremariam, Gebreheat & Jemal (2018), age group, history of STD, lifetime sexual partners of the women, and having other life-time sexual partners of the husband were found to be significantly associated with precancerous cervical cancer. Women who had a history of STD were three times more likely to have cervical precancerous lesion than those who did not [AOR = 3.20, 95% CI (1.26–8.10)]. Women who had two or more lifetime sexual partners were significantly associated with cervical precancerous lesions [AOR = 2.17, 95% CI= (1.01–4.67)]. Having a husband with two or more other lifetime sexual partners was also significantly associated with cervical precancerous lesions [AOR = 3.03, 95% CI= (1.25–7.33)] (Teame et al., 2018).

Parity and number of vaginal deliveries were associated with an increased risk of invasive cervical cancer. The higher the number of vaginal deliveries, the higher the risk of developing cervical cancer [AOR = 6.2, 95% CI = (1.7-22.6)] for 7 or more deliveries compared with 0-2 deliveries as the referent group (Hsieh, You, Kao & Chen, 1999). Increased cervical cancer risk was also significantly associated with the history of chronic cervicitis [AOR = 2.1, 95% CI = (1.1-3.8)]. They also found that the use of diaphragm for contraception was found to be associated with a decreased risk of cervical cancer [AOR = 0.4, 95% CI = (0.1-1.0)], (Hsieh et al., 1999).

Age (Matched Odds Ratio (MOR)=1.1, p-value<0.01), depression or anxiety (MOR=11.6, p-value=0.04) and ever smoking (MOR=4.2, p-value=0.02) were found to be risk factors for the development of cervical cancer It was also found that older age at first intercourse (MOR=0.6, p-value=0.02) was found to be a protective factor (Bassal, Schejter, Bachar, Perri, Korach, Jakobson-Setton, Ben-David, Cohen & Keinan-Boker, 2016).

Low economic status revealed significant association as risk factor for cervical cancer (p=0.004) (Baskran, Kumar, Santha & Sivakamasundari, 2019). It was also found that high parity (4-6 full term pregnancies) showed significant association as risk factor for cervical cancer (p=0.033) (Baskran et al., 2019). In another study on Risk factors for Cervical Cancer in Thailand it was found that limited education, increasing number of sexual partners and a history of venereal diseases were risk factors associated with the development of cervical cancer (Chichareon, Herrero, Muñoz, Bosch, Jacobs, Deacon, Santamaria, Chongsuvivatwong, Meijer & Walboomers, 1998).

In a cross-sectional study on the prevalence and factors associated with VIA positive result among clients screened at Family Guidance Association of Ethiopia, south west area office, Jimma model clinic, Jimma, Ethiopia 2013; a significant association was observed on bivariate logistic regression between VIA positive and age of clients and age at first intercourse (Deksissa, Tesfamichael, & Ferede, 2015). On multivariable logistic regression, clients who started intercourse at less than 16 years were 2.2 times [AOR=2.2, 95 % CI= (1.1, 4.3)] more likely to have VIA positive as compared to those who started intercourse at the age of 16 or more years (Deksissa et al., 2015).

In another case-control study on risk factors of cervical cancer; odds ratio is higher for women who were less educated than the women who were educated which means women with less education have more probability to get cervical cancer (Kashyap, Krishnan, Kaur & Ghai, 2019).

In another case-control study on risk factors for cancer cervix among rural women of a hilly state; it was found that illiteracy [OR= 1.64, 95% CI =(1.0616-2.245)] and low socioeconomic status [OR =1.39, 95% CI= (1.256-2.647)] were associated with the development of cervical cancer (Thakur, Gupta, Gupta & Chauhan, 2015). Illiteracy is a common factor that not only lowers the age at marriage and encourages high parity but also influences genital hygiene, menstrual hygiene, dietary deficiencies, and utilization of health services which predispose one to cervical cancer (Thakur et al., 2015).

2.4 Socio-cultural factors

In a study carried out to assess cervical cancer risk factors and feasibility of visual inspection with acetic acid screening in Sudan it was found that there was a statistically significant association between a positive VIAC result and female genital mutilation [OR 4.78; 95% CI=(1.13–20.1)] (Ibrahim, Rasch, Pukkala & Aro, 2011).

In another study on sociocultural factors associated with cervical cancer in Bendel State, Nigeria; on 50 patients treated for cervical cancer showed that 80% of the patients had no formal education and came from lower socioeconomic groups (Emovon, 1977). Most of the patients (88%) married before the age of 20, and 76% reported frequent coitus. Another cross sectional and qualitative on socio-economic and cultural vulnerabilities to cervical cancer and challenges faced by patients attending care at Tikur Anbessa Hospital; it was found that there has been a consistent association between low socio economic status as defined by education, income and occupation and cervical cancer in multiple researches (Tadesse, 2015) . Cervical Cancer is often referred to as a disease of "poor, uneducated and underserved women". Though the association made between socio-economic status and cervical cancer is not a direct association for the risk of cervical cancer, it has a significant implication for the exposure to HPV and development of cervical cancer. Several factors are involved in making this association; a women's level of education, income, and occupation are generally thought to influence the level of decision making and exposure to information women have. Women with low education and income are more likely to have less awareness of cervical cancer and preventive mechanisms which consequently may lead to inadequate screening and gynecological follow up.

It was also posited that women who are uneducated, unemployed or underemployed are more likely to be dependent on their husbands economically (Tadesse, 2015). According to various studies conducted early age at first sexual intercourse and having multiple sexual partners are considered as factors that make women susceptible to the exposure of HPV. Early age at first sexual intercourse predisposes women to HPV infection due to the lack of development of the cervix. In addition, having several sexual partners and being in a polygamous marriage also puts women at a higher risk of acquiring the HPV infection (Tadesse, 2015).

In a study on factors associated with high and low risk of cervical neoplasia; the risk of cervical neoplasia was increased in women who were less than 40 years of age; were of poverty or low-income status; and were separated, divorce, or widowed (Fasal, Simmons & Kampert, 1981). In another cross-control study on causes of cervical cancer in the Philippines; it was found that high parity, low socioeconomic status, and smoking were associated with cervical cancer (Ngelangel, Muñoz, Bosch, Limson, Festin, Deacon, Jacobs, Santamaria, Meijer & Walboomers, 1998).

2.5 Health related factors

In a study to assess the Prevalence and risk factors for cervical cancer and pre-cancerous lesions in Rwanda, women with HIV had a higher frequency of cervical pre-cancer lesions (8.2%), although the association was not statistically significant (Makuza et al., 2015).

However, there is literature that indicates that women who are HIV positive have higher frequencies of HPV co-infection and pre-cancer and cervical cancer rates are also likely

to be higher. For instance, it was found that there was a higher prevalence of cervical cytology abnormalities among HIV positive women compared to their HIV negative counterparts (Lawal, Agida, Offiong & Oluwole, 2017). The prevalence of cervical dysplasia was 26.6% among HIV positive women. HIV positive women are said to carry a high-risk HPV at higher rate (67%) and have higher rates of cervical dysplasia (Lawal et al., 2017).

Several studies have demonstrated the association of HIV with HPV (Ntekim, 2012). The prevalence of CIN has been estimated to be as high as 20–40% in HIV-positive women. A study from Tanzania showed that the prevalence of HIV-1 was much higher among the cervical cancer patients (21.0%) than among the controls (11.6%). HIV-1 was a significant risk factor for cancer of the cervix [OR=2.9, 95% CI= (1.4–5.9)] (Moodley, Hoffman, Carrara, Allan, Cooper, Rosenberg, Denny, Shapiro, & Williamson, 2006).

There was a highly statistically significant association between cervical cancer and uterine cervix laceration [OR=18.6, 95% CI= (4.64–74.8)] (Ibrahim et al., 2011). Assisted vaginal delivery was also strongly related to cervical cancer [OR 13.2; 95% CI= (2.95–54.9)]. Risk of cervical cancer was significantly higher among parous than among nulliparous women [OR=5.78, 95%CI= (1.41–23.7)] (Ibrahim et al., 2011). The same authors also posited that there was a statistically significant association between episiotomy and a positive VIA results [OR= 5.25, 95% CI= (1.15–23.8)].

In a study by Momenimovahed and Salehiniya (2017) titled “Incidence, mortality and risk factors of cervical cancer in the world”, it was found out that sexually transmitted

infections increase the risk of cervical cancer. Infections or previous infections of HPV, chlamydia trochomatis, HIV and Herpes Simplex Virus (HSV) increase the risk of cervical cancer. In another study on the incidence and risk factors for HPV-associated cancers in women with end-stage renal disease; major risk factors associated with the development of any HPV-associated cancer included smoking (adjusted relative risk=1.89), alcohol use (1.87), HIV (2.21), and herpes infection (2.02) (Han, Waller, Colombo, Spearman, Young, Kheda, Mohammed, Bollag, Nahman & Baer, 2020). Smoking, HIV, and herpes infection were prominent risk factors for cervical cancer. For cervical cancer, the presence of HIV and herpes are important comorbidities (Han et al., 2020).

Multiple sexual partners, multi-parity and; the current and recent use of combined oral contraceptive (OC) methods is associated with an increased risk of cervical cancer (Momenimovahed and Salehiniya, 2017). In another study to assess the risk factors for cervical cancer among young women, it was found out that the most important risk factors for cervical cancer in young women are the early initiation of sexual life, multiple sexual partners and infection with human papilloma virus, often simultaneously with many of its types (Wężowska, Giedrys-Kalemba, Szymaniak, Borowiec-Chłopek, Konstanty-Kurkiewicz & Menkiszak, 2013).

In a study by Luhn, Walker, Schiffman, Zuna, Dunn, Gold, Smith, Mathews, Allen, Zhang, Wang & Wentzensen, 2013). on the role of co-factors in the progression from human papillomavirus infection to cervical cancer it was found that the development of cervical cancer was associated with long-term OC use (10+ years) [OR= 2.42, 95% CI = (1.13–5.15)]. According to Luhn et al., 2013, multiparity (3+ live births) [OR=1.54, 95%

CI= (1.04–2.28)] and smoking [OR=1.95, 95% CI= (1.48–2.58)] were also associated with the development of cervical cancer.

Fasal et al., 1981 posited that the decrease in risk of cervical neoplasia was associated with nulli-parity, ever use of oestrogens for relief of menopausal symptoms, and ever use of the diaphragm. Smoking and obesity (obese women with body mass index (BMI ≥30) and overweight women (BMI ≥25) was 2-fold higher than for other women) also increase the risk of cervical cancer (Momenimovahed & Salehiniya, 2017). In a case-control study of 235 cases and 486 controls by Shields et al., 2004 on risk factors for invasive cervical cancer among U.S. women exposed to oncogenic types of human papillomavirus; smoking was associated with an increased risk of cervical cancer, with a greater elevation in risk for current than former smokers. There were trends of increasing risk with greater number of cigarettes smoked and greater number of years smoked. In a model containing variables for number of cigarettes and years of smoking among smokers, both trends of increasing risk remained significant and were apparent in both former and current smokers.

In a study on smoking, diet, pregnancy and oral contraceptive use as risk factors for cervical intra-epithelial neoplasia in relation to human papillomavirus infection; prolonged oral contraceptive use and sexual history were associated with cervical cancer (Kjellberg et al., 2000). Smoking was also found to be associated with cervical cancer [OR=2.6, 95% CI= (1.7–4.0)], the effect was dose-dependent (P = 0.002).

Cofactors of cervical cancer include hormonal factors (prolonged hormonal contraceptive use, higher number of childbirths), smoking, immune system deficiency diseases (HIV

infection, oncological diseases), another sexually transmitted diseases (herpes simplex virus type 2, *Chlamydia trachomatis*, HIV), nutrition and nutritional factors, chronic non-communicable diseases and metabolic disorders, and the absence of cervical cytology (Szaboova, Svlhrova & Hudeckova, 2014).

The risk of development of cervical cancer increased with the onset of sexual activity. The incidence of cervical cancer is also shown to decline if the age of marriage increases (Juneja et al., 2003). The results revealed that average age of women was 13.6 years for cases of cancer cervix whereas it was 15.6 years for the control group. Multiple sexual partners also increase the risk of developing cervical cancer. The risk associated with 10 or more partners has been reported to be nearly three to four times higher than associated with one partner (Juneja et al., 2003). The population attributable risk that can be associated to having two or more partners is approximately 36%. Some of the studies have also found independent effect of early age at marriage and multiple sexual partners.

In another study by Bosch, Munoz, De Sanjose, Izarzugaza, Gili, Viladiu, Tormo, Moreo, Ascunce, Gonzalez, Tafur, Kaldor, Guerrero, Aristizabal, Santamaria, Alonso De Ruiz & Shah (1992) on risk factors for cervical cancer in Colombia and Spain. Early age at first intercourse [OR = 4.3, 95% CI=(2.1–9.0)] for age < 16 vs. 24+) and early age at first birth [OR = 5.0, 95% CI= (1.8–14.2) for age < 16 vs. 24+) were associated with increased risk of cervical cancer; these effects were independent of one another.

According to Juneja et al., 2003, the risk of cervical cancer is influenced not only by woman's sexual behaviour but also by male behaviour. This hypothesis is based on the observations that there have been clusters of cervical and penile cancers and husbands of

cervical cancer patients reported significantly more sexual partners. Poor penile hygiene of male partners has also been hypothesized as a risk factor for cervical cancer.

In another study by Mukherjee et al., 1994, early age at marriage was found to be the single best predictor of the disease status. However, those who married late but gave birth to a large number of children were generally found to be suffering from cervical cancer. The results support the hypothesis that it is not so much parity *per se* that enhances the risk, but the rapidity of multiple pregnancies that matters. Logistic analysis also revealed the independent influence of birth interval on the risk of cervical cancer.

In another study by Yoo, Kang, Koo, Park, Kim, Park, Song, Kang & Lee (1997), cervical cancer risk was higher in women with a less educated spouse (p=0.0003), women with a family history of cervical cancer [Adjusted Odds Ratio=2.20., 95% CI= (1.21-4.01)], women of shorter height (p=0.02), women with early age at first full term pregnancy (p=0.0005), and women who have had multiple full term pregnancies (p=0.006) by the multiple linear logistic analysis.

In a study on prevalence and risk factors of cervical cancer among women in an urban community of Kwara State, north central Nigeria; the identified risk factors for cervical cancer among the respondents were coitarche, age at marriage, number of sexual partners, and family history of cervical cancer among others (Durowade, Osagbemi, Salaudeen, Musa, Akande, Babatunde, Raji, Okesina, Fowowe, Ibrahim & Kolawole, 2012). (Durowade et al., 2012). Coitarche ($\beta = 0.300$), tobacco smoking ($\beta = 0.100$), number of sexual partners ($\beta = 0.650$) and family history of cervical cancer ($\beta = 0.100$) were

significant predictors of risk for cervical cancer with p values of 0.002, 0.001, 0.02 and 0.01 respectively. Of these four significant predictors of risk and indeed of all the risk factors for cervical cancer, number of sexual partners had the highest regression coefficient (Durowade et al., 2012).

Kassa (2018), found that there is a significant association between using oral contraception and developing precancerous cervical lesion. Women who were using oral contraception were two times at risk for developing of precancerous cervical lesion than who were not using [COR = 2.059; 95% CI= (1.006, 4.216)]; (AOR = 2.342; P < 0.025). According to Kassa (2018), the history of STIs has a significant association for developing of precancerous lesion. Women who had a history of STI were two times at risk of developing precancerous cervical lesion than who had no history of STI [COR = 2.187; 95% CI = (1.078, 4.440); (AOR = 2.485; P < 0.015). It was also found that initiation of sexual intercourse before the age of 15 years has 5.6 risks to develop precancerous cervical lesion [COR = 5.625; 95% CI = (1.9245, 16.271)]; (AOR = 6.703; P < 0.00). Having more than five sexual partners has six times risk to develop precancerous cervical lesion [COR = 6.121; 95% CI= (2.818, 13.294)]; [AOR = 5.864; 95% CI= 2.677, 12.843)]; (P < 0.00).

A study titled “Cervical cancer and hormonal contraceptives: collaborative reanalysis of individual data for 16,573 women with cervical cancer and 35,509 women without cervical cancer from 24 epidemiological studies”, found that among current users of oral contraceptives the risk of invasive cervical cancer increased with increasing duration of use (relative risk for 5 or more years' use versus never use, [OR=1·90, 95% CI = (1·69–

2·13)]. The risk declined after use ceased, and by 10 or more years had returned to that of never users (Appleby, Beral, Berrington de González, Colin, Franceschi, Goodhill, Green, Peto, Plummer & Sweetland, 2007).

Another study on risk factors for cervical cancer in criminal justice settings, inconsistent use of a barrier during sexual intercourse ($p<0.05$) and a lower frequency of barrier use when having sexual intercourse ($p<0.05$) were associated with the development of cancer of the cervix. A history of any STI ($p<0.01$), including chlamydia ($p<0.05$) and genital warts ($p<0.05$), was significantly associated with the development of cervical cancer. According to Binswanger, Mueller, Clark & Cropsey, 2011, a history of any gynaecologic infection ($p<0.01$) including candidiasis ($p<0.05$) and bacterial vaginosis ($p<0.05$), was significantly associated with the development of cervical cancer

It was also posited that after controlling for age and race, there were significant associations between the development of cervical cancer and inconsistent use of barrier protection [OR=2.01, 95% CI=(1.18-3.43)], having a history of gynaecologic infections [OR=1.68, 95% CI =(1.05-2.67)], and having a history of STIs [OR =1.92, 95% CI =(1.17-3.15)] (Binswanger et al., 2011). Reid (2001) in a study on women's knowledge of Pap smears, risk factors for cervical cancer, and cervical cancer found that cervical cancer is associated with early sexual debut, number of lifetime sexual partners, non-use of condoms, and infection with human papillomavirus. Reid (2001) also posited that cigarette smoking facilitates development of cervical cancer.

A case-control study of diet in patients with cervical cancer or pre-cancerosis in Wufeng, a high incidence region in China, found that green tea intake was a protective factor

against cervical cancer (P=0.022), [OR=0.551, 95% CI= (0.330-0.919)]. They also found that more fresh vegetables may decrease the risk of cervical cancer (P=0.035), [OR=0.896, 95% CI= (0.809- 0.993)] (Jia, Hu, Hang, Yang, Li, Chen, Mei, Zhang, Huang, Xiang, Pan, Yan, Wang, Wang, Hang, Tang, Liu, Zhou, Xi, Wang, Lu, Ma, Wang & Li, 2012). However, intake of fruit, meat/egg/milk, soybean foods, onion/garlic, staple foods or pickled foods was not associated with cervical cancer (P≥0.05). In another study on sub site (cervix/ endometrium) -specific risk and protective factors in uterus cancer; it was found that habitual smoking and experience of pregnancy increased the risk of cervical cancer (Hirose, Tajima, Hamajima, Takezaki, Inoue, Kuroishi, Kuzuya, Nakamura & Tokudome, 1996). Greater body mass index (>20), daily intake of fruit and more frequent intake of boiled or broiled fish (>1–2 times/week) decreased the risk of cervical cancer. Daily intake of milk decreased the risk of cervical cancer (Hirose et al., 1996).

The presence of STIs was significantly associated with cervical cancer (P = 0.004). Participants who reported a history of genital warts had 1.5-fold increased risk of developing cervical cancer as compared to women who had no history of genital warts. Not maintaining personal hygiene and increased use of old cloth during menstruation were also found to be risk factors for cervical cancer (Kashyap et al., 2019).

Age at birth of first child <19 years [OR =2.91, 95% CI=(1.846-3.529)], spacing between two children <2 years [OR =2.88, 95% CI =(1.846-3.629)], age at marriage <18 years [OR 1.93, 95% CI=(1.271-2.798)] and poor genital hygiene [OR=1.69, 95% CI=(1.0716-2.265)] were also found to be significant risk factors for the development of cervical cancer (Thakur et al., 2015). The possible explanation for the significance age at marriage is the fact it results in more frequent and prolonged sexual activity and prolonged hormonal stimulation, and the young cervical tissue is more susceptible to oncogenic

change. In addition, those marrying at younger age are exposed to sexually transmitted diseases including HPV which is the prime factor in this disease. According to Thakur et al., (2015), spacing between pregnancies was found to be one of the significant factors with a relative risk of nearly 3 times (OR = 2.88). Trauma to cervix during delivery as well as increased susceptibility to infection can be given as the possible explanations. Immunosuppression, hormonal influences, and dietary deficiencies due to repeated pregnancies are the other possible alternative mechanisms.

Women with greater numbers of live births were at increased risk of cervical cancer and women with a younger age at first birth were at somewhat increased risk relative to women with an older age at first birth (Shields, Brinton, Burk, Wang, Weinstein, Ziegler, Studentsov, McAdams & Schiffman, 2004). In another case-control study by Gessesse, Tadesse, Alemayehu, Hiruye, Getachew, Derbew, Mariam, Mammo, Yebyo & Michael (2015) on determinant factors of visual inspection with acetic acid (VIA) positive lesions among HIV positive women in Mekelle Hospital, Northern Ethiopia, it was found that HIV positive women who had CD4 cells less than 350/mm3 were two times more likely to have precancerous cervical lesion compared to those with CD4 cells above 350/mm3. Women with two [(AOR = 3.6; 95% CI= (1.7- 7.7)] and three [AOR = 2.5; 95% CI= (1.2, 5.4) sexual partners were four and three times more likely to have precancerous cervical lesion, respectively, as compared to those who had one sexual partner.

In a cross-sectional study to determine the prevalence of precancerous cervical cancer lesion among HIV-infected women in southern Ethiopia; out of 448 study participants, 99 (22.1%) were found to be positive for precancerous cervical cancer. According to

Gedefaw, Astatkie & Tessema, 2013; being currently on highly active antiretroviral treatment [AOR=0.52, 95% CI=(0.35-0.92)], history of sexually transmitted disease [AOR=2.30, 95% CI=(1.23-4.29)] and having only one lifetime sexual partner [AOR=0.33, 95% CI=(0.20-0.56)] were factors associated with precancerous cervical cancer lesion (Gedefaw et al., 2013).

In a Systematic Review and Meta-Analysis on Precancerous Cervical Lesion Among HIV-Positive Women in Sub-Saharan Africa by Weldegebreal and Worku (2019); Precancerous Cervical Lesion Among HIV-Positive Women in Sub-Saharan Africa; the pooled prevalence of precancerous cervical lesion among HIV-positive women in sub-Saharan Africa was 25.6% [95% CI=(19.4%-31.8%)]. Having more than 2 lifetime sexual partners (odds ratio [OR=4.77; 95% CI=(1.35-16.93)], having had a history of sexually transmitted infections (STIs); [OR=1.92; 95% CI=(1.03-3.57)], having more than 2 births [OR=1.84; 95% CI=(1.33-2.53)], and CD4 count <200 cells/mm^3 [OR=1.765; 95% CI=(1.23-2.535)] were significantly associated with precancerous cervical lesions. According to Weldegebreal and Worku (2019); the prevalence of precancerous cervical lesion among HIV-positive women was high. One in 4 HIV-infected women suffers from precancerous cervical lesion. Lower CD4 cell count, STIs, multiple sexual partnering, and histories of multiple births and abortions were the foremost contributing factors for this burden.

In a cross-sectional study was conducted to determine the prevalence and risk factors for cervical lesions using visual inspection with acetic acid (VIA) among 112 HIV positive and 161 negative women aged 18-69 years in Swaziland by Jolly, Mthethwa-Hleta,

Padilla, Pettis, Winston, Akinyemiju, Turner, Ejiawoko, Brooks, Preko, & Preko (2017). Jolly et al., (2017), it was found that the presence of cervical lesions was greater among HIV positive (22.9%) than HIV negative women (5.7%; $p < 0.0001$). The risk of cervical lesions among HIV positive women was 5.24 times higher when adjusted by age [OR=5.24, 95% CI= (2.31-11.88)], and 4.06 times higher in a full model [OR=4.06, 95% CI= (1.61-10.25)], than among HIV negative women. According to Jolly et al., (2017), the age-adjusted model women who had ≥2 lifetime sexual partners were 3 times more likely [OR=3.00, 95% CI=(1.02-8.85)] to have cervical lesions compared to women with one lifetime partner and the odds of cervical lesions among women with a history of STIs were 2.16 greater [OR=2.16, 95% CI=(1.04-4.50)] than among women with no previous STI. In the fully adjusted model women who had a previous cervical exam were 2.5 times more likely [OR=2.53, CI 1.06-6.05) to have cervical lesions than women who had not (Jolly et al., 2017).

2.6 Perceived susceptibility

Several studies have shown poor knowledge of cervical cancer in Africa, which cuts across different literacy levels (Ntekim, 2012). In 2004, in Lagos-Nigeria, 81.7% of 139 patients with advanced cervical cancer had never heard of cervical cancer before, and 20%, 30% and 10% respectively thought the symptoms they had were due to resumption of menses, lower genital infection and irregular menses. Almost all the women (98%) believed that their advanced disease was curable, 12% thought it was not a serious disease and only 9% understood that it was cancer and therefore serious (Ajayi & Adewole, 1998).

According to Ntekim (2012), education improves knowledge and acceptability of preventive measures against cervical cancer. In a study on knowledge and beliefs about cervical cancer screening, respondents seemed to understand that cervical cancer screening had benefits. Over 64 percent believed that the test could find cervical changes before they became cancerous while 78.5% thought those changes could be easily cured. While more than 68% perceived that young women were susceptible to cervical cancer, a lower percentage (52.5%) believed that they themselves were at risk for cervical cancer. About three quarters of respondents (73%) believed that cervical cancer was a serious disease that would make a woman's life difficult and about 62% of students also believed that there were effective cures for cervical cancer (Ntekim, 2012).

In a study by Garcés-Palacio and Scarinci (2012) on factors associated with perceived susceptibility to cervical cancer among Latina immigrants in Alabama, almost 36% of the participants did not perceive themselves as being susceptible to cervical cancer, 33.9% did not know if they were susceptible, and 30.4% perceived themselves as susceptible. According to Garcés-Palacio and Scarinci (2012), educational attainment, thinking they may have been exposed to an STI in the past, thinking they may be at risk of HPV currently, having had a Pap smear within the last year, and having a relative with cancer were significantly associated with perceived susceptibility to cervical cancer in the multinomial logistic regression. Greater knowledge about cervical cancer risk factors reduced the uncertainty about perceived susceptibility.

In another study on perceived susceptibility of cervical cancer screening among women attending Mahalapye District Hospital, Botswana; high susceptibility rates were

significantly associated with being married (x^2=9.44; p=0.051), employed (x^2 = 13.077; p < 0.001), monthly income more than $411 ($x^2$ = 15.457; p < 0.004) and peri-urban residential status (x^2 = 14.280; p = 0.001) (Ibekwe, Hoque & Ntuli-Ngcobo, 2010). Perceived susceptibility was significantly associated with cervical cancer screening.

In a randomised control study with 606 participants by Nadarzynski, Waller, Robb & Marlow, (2012) on perceived risk of cervical cancer among pre-screening age women (18-24 years): the impact of information about cervical cancer risk factors and the causal role of HPV; it was found that there were significant group by risk factor interactions for smoking status (p<0.001), age of first sex (p=0.018) and number of sexual partners (p<0.001). According to Nadarzynski et al., (2012), for participants with lower risk behaviours (i.e. those who were never-smokers, not sexually active or only sexually active >16 years old and not sexually active or less than three sexual partners), providing brief information about HPV as the cause of cervical cancer or about cervical cancer risk factors resulted in lower perceived risk of cervical cancer. Conversely, there were no significant information group differences in mean perceived risk of cervical cancer for those with higher risk behaviours (i.e., those who were smokers/ex-smokers, had sex at 16 years or younger and who had had more than five sexual partners), although there appeared to be a trend towards increased perceived risk among those given risk factor information. Nadarzynski et al., (2012) also posited that having had HPV vaccination, having had cervical screening in the past, frequency of condom use, diagnosis of an STI and previous HPV knowledge did not moderate the effect of information on perceived risk of cervical cancer.

A study by Asiedu, Breitkopf and Breitkopf (2014) on perceived risk of cervical cancer among low-income women found that estimated perceived lifetime risk of getting cervical cancer ranged from 0% to 100%. Risk estimates were associated with perceived prevalence of abnormal results ($p<.001$) and perceptions regarding the accuracy of the test ($p<.05$).

Sudenga, Rositch, Otieno and Smith, (2013) in a study with 488 participants on knowledge, attitudes, practices, and perceived risk of cervical cancer among Kenyan women; 65% of the participants felt they were at risk. Women who felt at risk for cervical cancer were older [OR=1.06, 95% CI=(1.02- 1.10)], reported a history of marriage [OR=2.08, 95% CI= (1.00-4.30)], were less likely to feel adequately informed about cervical cancer by healthcare providers [OR= 0.76, 95% CI= (0.18- 0.83)], and were more likely to intend to have cervical cancer screening in the future [OR= 10.59, 95% CI=(3.96-28.30)]. According to Sudenga et al., (2013), 57% of the participants reported that they would be willing to pay or to have free cervical screening, and only 5% of women reported that they would not be willing to undergo screening, regardless of cost.

2.7 Summary

Some constructs for the health belief model were used to guide the review of the available literature. Literature reviewed included studies on socio-demographic factors, socio-cultural factors, health related factors as well as perceived susceptibility to cervical cancer. Cofactors of cervical cancer include hormonal factors (prolonged hormonal contraceptive use, higher number of childbirths), smoking, immune system deficiency diseases (HIV infection, oncological diseases), other sexually transmitted diseases (herpes simplex virus

type 2, *Chlamydia trachomatis*, HIV), nutrition and nutritional factors, chronic non-communicable diseases and metabolic disorders, and the absence of cervical cytology.

CHAPTER 3 METHODOLOGY

3.1 Introduction

An unmatched 1:1 case control study was conducted. A structured questionnaire was used to extract the data for the respondents. Variables of interest were assessed and analysed in a similar way to the cases and for the controls in order to determine the factors associated with an increase in the number of cervical cancer cases among women aged 20-44 years.

3.2 Research design

An unmatched 1:1 case control study was conducted where VIAC positive patients were recruited into the study. An equal number of controls were also recruited into the study. Socio-demographic and social-cultural characteristic of the study participants were also determined. This was the most appropriate study design as it enabled the researcher to determine causality, that is, determine the association between the various independent risk factors and the development of cervical cancer.

3.3 Study setting

An unmatched 1:1 case control study was conducted where VIAC positive patients were recruited into the study. An equal number of controls were also recruited into the study. Socio-demographic and social-cultural characteristic of the study participants were also determined. This was the most appropriate study design as it enabled the researcher to determine causality, that is, determine the association between the various independent risk factors and the development of cervical cancer.

3.4 Study population

Women aged from 20-44 years who came for VIAC services from January to March 2020 were recruited into the study. Wilkins Infectious Diseases Hospital was one of the pioneer sites for VIAC services and it has big catchment population. The District Medical Officer responsible for cervical cancer as well as the nurse-in-charge for the VIAC site were conveniently recruited into the study as key informants.

3.5 Sample size and sampling procedures

3.5.1 Sample size

Using Epi-info version 7.2.2.6 STATCALC assuming 19% exposure in controls and 40% exposure in cases, using Odds Ratio of 2.9 (Chirenje, 2005), 95% confidence level, 80% power. The minimum sample size calculated was 146

This gave a sample size of 146 participants comprising 73 cases and 73 controls.

3.5.2 Definition of cases and controls

A Case was defined as a woman aged 20-44 years who had been screened for cervical cancer through VIAC at WIDH and had a positive VIAC result.

A Control was defined as a woman aged 20-44 years who had been screened for cervical cancer through VIAC at WIDH and had a negative VIAC result.

3.5.3 Selection of cases and controls

Selection of cases:

VIAC positive patients were treated as cases in this study. Cases were selected after being screened on weekdays over a three-month period from January to March 2020. Individual cases were randomly selected after getting their result until the required 73 cases were

selected. Every 3rd client who tests positive was recruited into the study (sampling interval=population/ sample size, assuming an average of 350 clients are screened per month and sample size of 146) until the 73 cases are selected.

Selection of controls

VIAC negative patients aged between 20 and 44 years were treated as controls in this study. Controls were selected after being screened on weekdays from January to March 2020. Individual controls were randomly selected after getting their result until the required 73 controls were selected. Every 3rd client who is VIAC negative will recruited into the study (sampling interval=population/ sample size, assuming an average of 350 clients are screened per month and sample size of 146) until the 73 controls were selected.

3.6 Data collection instruments

An interviewer administered questionnaire was used to collect data from the study participants. The questionnaire was designed in Shona then translated to English then back translated to Shona to ensure maintenance of meaning and linguistic power. Key informants were interviewed using an interview guide. The Likert scale was used to measure the perceived susceptibility of the participants to cervical cancer. Participants were asked questions using a Likert-type scale with four possible responses (*very sure, sure, unsure*, and *very unsure*) to measure their perceived susceptibility to cervical cancer as a result of socio-demographic factors, socio-cultural factors as well as some health-related factors associated with cervical cancer.

3.7 Pre-testing of instruments

The data collection tools were pre-tested at Budiriro Polyclinic to assess the ability of the tools to collect the data they were intended to collect. Budiriro Polyclinic was selected for pre-testing as it also screens an average of 350 clients per month. A total of 10 participants (5 cases and 5 controls) were interviewed. The data collection tools were reviewed and adjusted where necessary. Consenting participants were enrolled into the study. The investigator used a similar questionnaire to collect data from both the cases and the controls. The nurse-in-charge of the WIDH VIAC site and the Medical Officer responsible for VIAC were conveniently interviewed as key informants. They were interviewed using the key informant interview guidelines (see appendix 2).

3.9 Analysis and organization of data

Epi-info version 7.2.2.6 was used for the purposes of data entry and analysis. Graphical and tabular techniques which include frequencies and bar graphs were used to illustrate frequencies. For descriptive and data summary purposes, univariate techniques were applied to single sets of data. Bivariate methods were used to show the relationship between variables; contingency tables were used to describe relationships between categorical variables. Multivariate analysis was used to determine the association between socio-demographic, behavioural and clinical factors associated with cervical cancer. Binary and multinomial logistic regressions were used to show the association of any cervical cancerous lesion with different factors. Emphasis will also be on HIV negative VIAC positive clients to determine if there are any other overarching factors.

3.10 Ethical considerations

Permission was sought from the College of Health, Agriculture and Natural Sciences, Africa University; AUREC and the Director of Health, City of Harare, Department of Health. Informed written consent (signed portion on questionnaire) was sought from all the interviewees and they were assured of confidentiality. Participation was voluntary and participants were told that there were no monetary benefits for participating. Participants could opt-out of the study at any point in the study without giving any explanations for their decision. Participant's identity was kept confidential thus participants had study assigned numbers for identification on the data collection tools. For illiterate participants, the data collection tool was administered by the interviewer in the language that the study participant was comfortable with (usually vernacular). Those not able to write put a thump print as a way of signing and consenting to participate in the study.

Patients who were not able to consent were excluded from the study. Confidentiality was maintained and completed questionnaires and consent forms were always kept separate and safe under securely under lock. Only the investigator has access to the data. Study participants were assured that in the event that the results of the study were published, their names would not be published.

3.11 Summary

An unmatched 1:1 case control design was used for this study. A structured questionnaire was used to extract the data for the respondents. A minimum sample size of 146 participants (73 cases and 73 controls, EPI- Info Stat Calc) was recruited to take part in

the study. Study participants were randomly selected from patients who went for VIAC services Wilkins Infections Disease Hospital (WIDH) from January to March 2020. Data were collected through an interviewer administered structured questionnaires. Multivariate analysis was used to determine the socio-demographic, behavioral and clinical factors associated with cervical cancer. Binary and multinomial logistic regressions will be used to show the association of any cervical cancerous lesion with different factors, with emphasis on HIV negative VIAC positive clients.

CHAPTER 4 DATA PRESENTATION, ANALYSIS AND INTERPRATATION

4.1 Introduction

Seventy-three (73) cases and 73 controls were recruited into the study from January to March 2020

4.2 Data Presentation and analysis

4.2.1 Socio-demographic factors

Table 3: Socio-demographic factors associated with cervical cancer in women of childbearing age at Wilkins Infectious Diseases Hospital, Harare

Variable	Category	Cases N=73 n (%)	Control N= 73 n (%)	OR (95%CI)	p-value
Age	Mean	32.32	30.05		
	Std. Dev.	+/- 4.06	+/-6.75		0.009*
Age Category	20 – 24 yrs.	9 (12.3)	24 (32.9)	1	
	25 – 29 yrs.	10 (13.7)	18 (24.7)	1.48 (0.50 – 4.40)	0.482
	30 – 35 yrs.	41 (56.2)	19 (26)	5.57(2.25 – 14.72)	<0.005*
	36 – 40 yrs.	13 (17.8)	10 (13.7)	3.47 (1.13 – 10.68)	0.050
	41 – 44 yrs.	0 (0.0)	2 (2.7)	-	-
BMI	Normal	25(34.3)	21 (28.8)	1	
	Overweight	20 (27.4)	15 (20.6)	1.12 (0.46 – 2.72)	0.803
	Obese	28 (38.4)	37 (50.7)	0.64 (0.30 – 1.36)	0.244
Marital Status	Single	7 (9.6)	5 (6.9)	1	
	Married	52 (71.2)	50 (68.5)	0.74 (0.22 – 2.50)	0.764
	Divorced	10 (13.7)	12 (16.4)	0.60 (0.14 – 2.47)	0.721
	Widowed	4 (5.5)	6 (8.2)	0.48 (0.09 – 2.63)	0.670
If Married, staying With partner	Yes	40 (76.9)	41 (82)		
	No	12 (32.1)	9 (18)	0.73 (0.28 – 1.93)	0.528

Highest level of Education	None/primary	4 (5.5)	3 (4.1)	1	
	Secondary	67 (91.8)	55 (75.3)	0.91 (0.20 – 4.26)	1.000
	Tertiary	2 (2.7)	15 (20.6)	0.10 (0.01 – 0.82)	0.038*
Employment status	None	9 (12.3)	5 (6.9)	1	
	Informal	9 (12.3)	4 (5.5)	1.25 (0.25 – 6.23)	1.000
	Formal	6 (8.2)	18 (24.6)	0.19 (0.04 – 0.77)	0.037*
	Housewife	49 (67.2)	46 (63)	0.59 (0.18 – 1.90)	0.407
Estimated household Income (US$)	0 – 100	67 (91.8)	64 (87.7)	1	
	101 – 400	4 (5.5)	4 (5.5)	0.96 (0.23 – 3.98)	1.000
	401 or more	2 (2.7)	5 (6.8)	0.38 (0.07 – 2.04)	0.441

*Statistically significant

Table 3 illustrates the socio-demographic factors associated with cervical cancer in women of childbearing at Wilkins Infections Diseases Hospital. There was a statistically significant difference between mean ages of the cases and the controls. The cases were older than the controls. In terms of the age groups, 30 to 35-year olds were more likely to have a VIAC positive result.

Having a higher level of education particularly tertiary level was determined to be a protective factor against having a VIAC positive result [OR=0.10, 95% CI= (0.01 – 0.82)]. Being formally employed as also significantly associated with not developing a VIAC positive result [OR=0.9, 95% CI= (0.04 – 0.77)].

4.2.2 Socio-cultural factors

Table 4: Socio-cultural factors associated with cervical cancer in women of childbearing age at Wilkins Infectious Diseases Hospital, Harare

Variable	Category	Cases N=73 n (%)	Control N= 73 n (%)	OR (95%CI)	p-value
Religion	Pentecostal	56 (76.7)	46 (63)	1	
	Catholic	9 (12.3)	15 (20.6)	0.49 (0.20 – 1.23)	0.126
	Apostolic faith	8 (11)	12 (16.4)	0.55 (0.21 – 1.45)	0.234
Ever used herbs or Unconventional Chemicals	Yes	11 (15.1)	6 (8.2)		
	No	62 (84.9)	67 (91.8)	1.98 (0.69 – 5.68)	0.199
Cultural or religious Practices involving Reproductive parts	Yes	4 (5.5)	2 (2.7)		
	No	69 (94.5)	71 (97.3)	2.06 (0.37 – 11.60)	0.406

Religion, use of herbs or unconventional chemicals and performing any cultural or religious practices involving the private parts was not significantly associated with a positive VIAC result (Table 2). Of the 11 study participants who used herbs or non-conventional chemicals, the majority of them had positive VIAC results and the reason given for the use of these was either to tighten vaginal muscles or to enhance the sexual experience.

4.2.3 Health related factors

Table 5: Health Related Factors Associated with Cervical Cancer in Women of Childbearing Age at Wilkins Infectious Diseases Hospital, Harare

Variable	Category	Cases N=73 n (%)	Control N=73 n (%)	OR (95%CI)	p-value
Number of pregnancies (Gravidity)	Mean	2.51	3.70		
	Std. Dev	+/-0.96	+/- 1.09		<0.005*
Number of live births (Parity)	Mean	2.38	3.19		
	Std. Dev	+/-0.94	+/- 1.14		<0.005*
Number of NVDs	Mean	2.14	3.07		
	Std. Dev	+/- 1.08	+/- 1.27		<0.005*
Number of assisted Deliveries	Mean	0.22	0.23		
	Std. Dev	+/- 0.51	+/- 0.61		0.736
Age of first pregnancy	Mean	22.78	23.10		
	Std. Dev	+/- 4.34	+/- 4.38		0.685
Age of sexual debut	Mean	20.92	20.77		
	Std. Dev	+/- 3.61	+/- 3.50		0.836
Number of sexual Partners to date	Mean	2.47	2.27		
	Std. Dev	+/- 1.32	+/- 1.32		0.350
Family planning method	Nothing	1 (1.4)	12 (16.4)	1	
	Barriers	2 (2.7)	14 (19.1)	1.71 (0.14 – 21.33)	1.000
	COCs	65 (89)	31 (42.5)	25.16 (3.13 – 202.29)	<0.005*
	Injectable	4 (5.5)	11 (15.1)	4.36 (0.42 – 45.26)	0.333
	Jadelle	1 (1.4)	5 (6.9)	2.45 (0.12 – 46.39)	1.000
Sexual partner	Yes	41 (56.2)	39 (53.4)		

Circumcised	No	32 (43.8)	34 (46,6)	1.12 (0.58 – 2.14)	0.740
HIV Status	Negative	40 (54.8)	59 (80.8)	1	
	Positive	30 (41.1)	11 (15.1)	4.02 (1.81 – 8.94)	<0.005*
	Unknown	3 (4.1)	3 (4.1)	1.48 (0.28 – 7.68)	0.687
History of STIs	Yes	23 (31.5)	32(43.8)		
	No	50 (68.5)	41 (56.2)	0.59 (0.30 – 1.16)	0.126
Tobacco smokers	Yes	3 (4.1)	3 (4.1)		
	No	70 (95.9)	70 (95.9)	1.00 (0.20 – 5.13)	1.000
Family history of Cervical cancer	Yes	13 (17.8)	16 (21.9)		
	No	60 (82.2)	57 (78.1)	0.77 (0.34 – 1.75)	0.535

Cases had a significantly higher mean number of pregnancies (gravidity), mean number of live births (parity) and mean number of normal vertex deliveries, all with levels of significance of <0.005. In addition, the use of combined oral contraceptives as the mode of family planning was significantly associated with a positive VIAC result [OR =25.16, 95% CI= (3.13 – 202.29)]. A positive HIV positive status was also significantly associated with having cervical hyperplasia [OR=4.02, 95% CI= (1.80 – 8.94)]

4.2.4 Perceived susceptibility to developing cervical cancer

Table 6: Perceived Susceptibility to Developing Cervical Cancer in Women of Childbearing Age at Wilkins Infectious Diseases Hospital, Harare

Variable	Category	Cases N=73 n (%)	Control N= 73 n (%)	OR (95%CI)	p-value
Low perceived risk For cervical cancer	Yes	68 (93.15)	37 (50.68)		
	No	5 (6.85)	36 (49.32)	13.24(4.78 – 36.61)	<0.005*

Cases were less likely to perceive that they were at risk of developing cervical hyperplasia as control and this association was determined to be statistically significant. In other words, perceiving that one was at risk of developing cervical cancer protected an individual from receiving a VIAC positive result. The study participants who perceived that they were a risk of developing cervical cancer stated that they thought they might be a risk because they had regularly engaged in unprotected sexual intercourse or their regular and/or long-term sexual partners were uncircumcised.

4.2.5 Independent Risk/ Protective Factors

The table below shows the independent risk and /or protective factors associated with Associated with Cervical Cancer in Women of Childbearing Age at Wilkins Infectious Diseases Hospital, Harare

Table 7: Independent Risk/Protective Factors associated with Associated with Cervical Cancer in Women of Childbearing Age at Wilkins Infectious Diseases Hospital, Harare

Variable	Adjusted Odds Ratio	95%CI	p-value
Age group – 30 -35 years	14.51	1.69 – 124.55	0.015
Employment status - Formally employed	0.10	0.01 – 0.87	0.037
Family planning method Combined oral contraceptive	11.26	1.43 – 88.62	0.021
HIV positive status	12.96	2.05 – 81.84	0.006
Low perceived cervical cancer risk	26.58	4.06 – 173.86	0.006

Logistic regression analysis was performed, and it was determined that the independent risk factors for the development of cervical hyperplasia were as follows: being in the 30 to 35-year age group [AOR=14.51, 95% CI =(1.69 – 124.55)]; using combined oral contraception for family planning [AOR=11.26, 95% CI = (1.43 – 88.62)]; an HIV positive status [AOR=12.96, 95%CI = (2.05 – 81.84)] and perceiving that the individuals risk of developing cervical cancer is low [AOR= 26.58, 95% CI = (4.06 – 173.86)]. However, being formally employed was determined to be a protective factor against developing cervical hyperplasia [AOR= 0.10, 95% CI = (0.01 – 0.87)].

4.3 Discussion and Interpretation

4.3.1 Socio-demographic factors

In this study the socio-demographic factors independently associated with developing cervical cancer were the 30 to 35-year age group and being formally employed. Older age

is a risk factor for developing cervical hyperplasia, and this finding is similar to the results from the study by Makuza et al., (2015) who found that women aged 30 to 35 years were more likely to develop cancerous lesions. The findings from this study are also similar to those of Juneja et al. (2003) which showed that data from the cancer registries indicated that more than 75% of cervical cancers develop in women above the age of 35 years. According to Juneja et al., (2003), the age parameter defines a `high risk' group relevant for the screening activities and providing health care facilities.

Formally employed women were found to be protected against developing cervical hyperplasia. This is in line with the findings by Makuza et al., (2015), where they found that women of lower socioeconomic status were at risk of cervical cancer. Formally employed women are likely to have better socioeconomic status, better access to healthcare and health information and therefore lower exposure to behaviours and behaviours that could lead to the development of cervical hyperplasia which when left untreated, eventually develops into cervical cancer. Juneja et al., (2003) also reported that women belonging to the lower social class are at much higher risk of development of cervical cancer. This also corroborates well with findings from this study which show that being formally employed thus a higher social class is protective from developing cervical cancer. This study also has similar findings [AOR=0.10, 95% CI= (0.01 – 0.87)] to those of Baskran et al., (2019) who found that low socio-economic status revealed significant association as risk factor for cervical cancer (p=0.004). In this study, being formally employed was found to be protective from cervical cancer. Being formally employed is associated with a high socio-economic status. Low economic status as risk factor for cervical cancer can be attributed to lack of screening and awareness about HPV infection

as well as cervical cancer. Moreover, lack of hygiene and poor nutrition might also play a contributing role as risk factors, which again reflect the low socio-economic status. Findings by Ngelangel et al., (1998) that low socioeconomic status is associated with cervical cancer also corroborate with the findings of the current study.

This study showed that being in the 30 to 35-year age group [AOR=14.51, 95% CI = (1.69 – 124.55)] was an independent risk factor for the development of cervical cancer. This is similar to the findings by Teame et al., (2018) in a study on factors associated with cervical precancerous lesions among women screened for cervical cancer in Addis Ababa, Ethiopia. It was found that incidence of cervical cancer was higher in those of older age compared to those aged 30 and years and below. The age difference among the women screened for cervical cancer could be due to the longer period for potential exposure to the HPV virus and due to the time required for a cervical precancerous lesion to develop. History of STIs and number of lifetime sexual partners was found not be statistically significant. This is contrast to the findings of Teame et al., (2018). The findings from this study also concur with those by Deksissa et al., (2015) where a significant association was observed between VIA positive and age of clients.

According to Tadesse (2015), early age at first sexual intercourse and having multiple sexual partners are considered as factors that make women susceptible to the exposure of HPV. Early age at first sexual intercourse predisposes women to HPV infection due to the lack of development of the cervix. In addition, having several sexual partners also puts women at a higher risk of acquiring the HPV infection. However, in the current study, age

at first sexual intercourse, several sexual partners and multi parity were not observed for the majority of the patients in the study.

4.3.2 Health related factors

Health related factors that were independently associated with cervical hyperplasia in this study were use of combined oral contraceptive for family planning and having a HIV positive status. Combined oral contraceptive (COC) use as a predisposing risk factor is in line with results from the study conducted by Momenimovahed and Selehinya (2018) who also determined that COC use was significantly linked to the development of cervical cancer. This could be attributed to that women who use COCs are unlikely to use condom for sexual encountered and therefore might be exposed to HPV during sexual encounters. HPV infection increases the likelihood of developing cervical cancer. Juneja et al., (2003) also found that there is high risk of cervical neoplasia with increasing use of pill (Combine oral contraceptives). Barrier methods of contraception have been recommended as the preventive measure for cervical cancer possibly because it offers against some of the STDs. However, protective effect was reported in relation to the use of barrier method of contraception. The findings from this study also corroborate with Kassa (2018) who found significant association between using oral contraception and developing precancerous cervical lesion. Women who were using oral contraception were two times at risk for developing of precancerous cervical lesion than who were not using [COR = 2.059; 95% CI= (1.006, 4.216)]; (AOR = 2.342; $P < 0.025$). This study's findings are also similar to those of Appleby et al., (2007) who found that among current users of oral contraceptives the risk of invasive cervical cancer increased with increasing duration of use (relative risk

for 5 or more years' use versus never use, [OR=1·90, 95% CI =(1·69–2·13)]. The risk declined after use ceased, and by 10 or more years had returned to that of never users.

In this study, the use of combined oral contraceptives was found to be an independent risk factor for the development of cervical cancer [AOR=11.26, 95% CI= (1.43 – 88.62)]. This also in agreement with the findings of Luhn et al., (2012) found that the development of cervical cancer was associated with long-term OC use (10+ years) [OR= 2.42, 95% CI = (1.13–5.15)]. This could be due to the increase in exposure to HPV when using combined oral contraceptives compared to the use of barrier methods of family planning. On another note, Thakur et al., (2015) did not find any association between cervical cancer with the use of barrier methods or oral contraceptive pills (OCPs). Only 1.33% of cases in their study had used OCPs for a period of 2 years or less.

In addition to this study, numerous other studies have determined that an HIV positive status predisposes women to cervical cancer. Makuza et al., (2015), Lawal et al., (2017), Ntekim (2012), Moodley et al., (2006); Momenimovahed and Selehinya, (2018) and Szaboova et al., (2014) all determined that HIV infection increases the risk of cervical cancer. According to Han et al., (2020); major risk factors associated with the development of any HPV-associated cancer included smoking (adjusted relative risk=1.89), alcohol use (1.87), HIV (2.21), and herpes infection (2.02). Smoking, HIV, and herpes infection were prominent risk factors for cervical cancer.

The findings from this study are also similar to those of Jolly et al., (2017) who found that was the presence of cervical lesions was greater among HIV positive (22.9%) than HIV

negative women (5.7%; $p < 0.0001$). The risk of cervical lesions among HIV positive women was 5.24 times higher when adjusted by age [OR=5.24, 95% CI= (2.31-11.88)], and 4.06 times higher in a full model [OR=4.06, 95% CI= (1.61-10.25)], than among HIV negative women.

This risk might be attributed to the fact that HIV infection lowers the immune system and compromises the body's ability to inhibit uncontrolled cellular replication. In addition, a comprised immune system might also be susceptible to HPV infection. Age of sexual debut and number of sexual partners were found not to be statistically significant in this study. This is in contrast with the findings of Juneja et al., (2003) who found that the risk of development of cervical cancer increased with the onset of sexual activity. Multiple sexual partners were also found to increase the risk of developing cervical cancer. Poor penile hygiene of male partners has also been hypothesized as a risk factor for cervical cancer.

4.3.2 Perceived susceptibility to developing cervical cancer

Low perception of risk is often closely linked with low knowledge levels and an inability to appreciate the magnitude of the situation. Ntekim (2012) observed that low levels of knowledge on cervical cancer and associated risk factors were associated with low perceived susceptibility. Garcés-Palacio and Scarinci (2012), also posited that educational attainment, thinking they may have been exposed to an STI in the past, and having a relative with cancer were significantly associated with perceived susceptibility to cervical

cancer. Greater knowledge about cervical cancer risk factors reduced the uncertainty about perceived susceptibility.

According to Sudenga et al., (2013) women who felt at risk for cervical cancer were older, reported a history of marriage were less likely to feel adequately informed about cervical cancer by healthcare providers; and were more likely to intend to have cervical cancer screening in the future. In this study, it was found that perceiving that one was at risk of developing cervical cancer protected an individual from receiving a VIAC positive result.

4.3.4 Key informants

According to the key informants, an average of 350 clients are screened every month at the VIAC site. The increase in the number of clients screened could be attributed to the health promotion activities being carried. Shortage of VIAC trained nurses remains a challenge.

Wilkins Infectious Diseases Hospital offers various services that include anti-retroviral therapy (ART), HIV testing services (HTS) thus offering of these services at one place encourages integration, make it a one stop shop thereby limiting loss to follow up. The site also offers services for VIAC positive women such as cryotherapy and LEEP thereby limiting the number of referrals to other sites, again reducing loss to follow up. The partnership with ITECH has seen an improvement in the availability of commodities and consumables as well as the availability of VIAC trained staff.

CHAPTER 5 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarises the discussion findings, conclusions reached and the recommendations made to the stakeholders.

5.2 Discussion

Older age is a risk factor for developing cervical hyperplasia, and this finding is similar to the results from the study by Makuza et al., in 2015 who found that women aged 30 to 35 years were more likely to develop cancerous lesions. This could be attributed to a longer period of exposure to HPV during unprotected sexual encounters. Formally employed women were found to be protected against developing cervical hyperplasia. This is in line with the findings by Makuza et al., (2015) in a study where it's stated that women of lower socioeconomic status were at risk of cervical cancer. Formally employed women are likely to have better socioeconomic status, better access to healthcare and health information and therefore lower exposure to behaviours and behaviours that could lead to the development of cervical hyperplasia which when left untreated, eventually develops into cervical cancer.

Combined oral contraceptive (COC) use as a predisposing risk factor is in line with results from the study conducted by Momenimovahed and Selehinya in 2018 who also determined that COC use was significantly linked to the development of cervical cancer. This could be attributed to that women who use COCs are unlikely barrier methods for sexual encounters and therefore might be exposed to HPV during sexual encounters. This is in line with the findings by Momenimovahed and Salehiniya (2017); where the recent

use of combined oral contraceptive (COC) methods is associated with an increased risk of cervical cancer.

An HIV positive status was found to be an independent risk factor for the development of cervical cancer. This is in line with the findings of Moodley et al., (2006), Ntekim (2012), Szaboova et al., (2014), Makuza et al., (2015), Jolly et al., (2017), Lawal et al., (2017); and Momenimovahed and Selehinya (2018) who all found that HIV infection increases the risk of cervical cancer. This risk might be attributed to that HIV infection lowers the immune system and compromises the body's ability to inhibit uncontrolled cellular replication. In addition, a comprised immune system might also be susceptible to HPV infection.

Low perception of risk was found to be linked with low knowledge levels and an inability to appreciate the magnitude of the situation. Ntekim (2012) also observed that low levels of knowledge on cervical cancer and associated risk factors meant that women were not aware of the which risk risky behaviours and practices to avoid and which services (like cervical cancer screening) were available to them and the severity and magnitude of having cervical cancer (a majority of women in the Ntekim study thought cervical cancer was easily curable).

In this study cases and controls were identified only via their current VIAC result; associated with the validity of this screening test, there could be misclassification of cases and controls. This might contribute to underestimating the estimation of cause effect relationship between some of the explanatory variables and the outcome of interest,

cervical precancerous lesion. Moreover, though we have restricted the interview to the newly screened women, recall bias could affect their response.

5.3 Summary

Cervical cancer is caused by infection with the human papillomavirus (HPV). HPV is one of the most common sexually transmitted infections (STIs). HPV types .16 and 18 are responsible for about 70% of all cervical cancer cases worldwide. Zimbabwe has one of the highest rates of cervical cancer in the world. Wilkins Infectious Diseases Hospital in Harare, Zimbabwe; has showed a 53% increase of cervical hyperplasia from the period June 2015 –May 2016 to the period June 2016 –May 2017 while there was a 30% increase in the number of cases from period June 2016 -May 2017 to the period June 2017- May 2018. Therefore, it was prudent to determine the reason for this upward trend in cases.

It was found that women of childbearing age who were aged 30 – 35 years; women of low socioeconomic status; those who used combined oral contraceptives, those who were HIV positive and those who perceived their risk to cervical cancer to be low; were the ones most at risk of developing cervical cancer.

5.4 Conclusion

We therefore concluded that low levels on knowledge on cervical cancer in women of childbearing age led to them not realizing and appreciating the magnitude of risk that they are under. They are therefore unaware that their age, HIV status and their choice of contraception may determine their risk to cervical cancer.

5.5 Recommendations

The researcher therefore recommends the following:

1. That the nurse in charge at Wilkins Infectious Disease Hospital should include health education on cervical cancer in the weekly schedule of topics that are discussed with the clients. The results of this study will be shared will be shared will the staff at WIDH so that every health worker appreciates the importance of this activity.
2. The family planning unit should be encouraged to conduct comprehensive contraceptive counselling to all the patients, including the risks associated with each method so that clients make informed decisions.
3. The nurse in charge and counsellors should reinforce that every woman who tests HIV positive should get a VIAC examination. This is already part of policy; however, emphasis should be made so that it's strictly enforced. Women with VIAC positive results should be linked with appropriate avenues of treatment, with this process being made as simple as is possible and at no cost to the client.

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Appendices

Appendix 1: English data collection tool

Section 1: Demographic information

a. Age _____

b. Weight_____

c. Height_____

d. Marital status

    1. Married 2. Divorced 3. Widowed 4. Single

e. If married, are you staying with your partner

    1. Yes

    2. No

f. Level of education

    1. Primary 2. Secondary 3. Tertiary 4. None

g. Employment status

    1. Formal 2. Informal 3. Housewife 4. None

Section 2: Socio-cultural

a. What is your religion

    1. Christianity (specify denomination) 2. Islam 3. African Tradition 4. Others (specify)

b. Have ever/ do you use herbs or non-conventional chemicals on your reproductive organ?

   1. Yes () 2. No ( )

c. If yes, what did you use and for what reason?

   ……

   ……

d. Do you have any cultural/ religious practices that deal with your reproductive system that you have participated in?

   1. Yes ( ) 2. No ( )

e. If yes, what are those?

   ……

   ……

Section 3: Health and behaviour

a. Number of pregnancies

   1. 1
   2. 2
   3. 3
   4. 4
   5. 5
   6. 6
   7. Other (specify)…….

b. Number of children born

   1. 1

2. 2
3. 3
4. 4
5. 5
6. 6
7. Other (specify)…….

c. NVD

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Other (specify)…….

d. Assisted

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. Other (specify)…….

e. Episiotomy

1. 1

2. 2
3. 3
4. 4
5. 5
6. 6
7. Other (specify)……

f. Age of first pregnancy

1. 18
2. 19
3. 20
4. 21
5. 22
6. 23
7. 24
8. 25
9. 26
10. 27
11. 28
12. 29
13. 30
14. Other (specify)……

g. Which family planning method do you use predominantly and for how long?

1. None
2. Combined oral contraceptives

3. Injectable
4. IUCD
5. Jadelle
6. Condoms
7. Others (specify)

h. Age of sexual debut

1. 16
2. 17
3. 18
4. 19
5. 20
6. 21
7. 22
8. 23
9. 24
10. 25
11. Other (specify)……

i. Number of sexual partners

1. 1
2. 2
3. 3
4. 4
5. 5
6. Other (specify)…….

j. Partner circumcised?

    1. Yes
    2. No

k. HIV status

    1. Negative
    2. Positive
    3. Unknown

l. VIAC result

    1. Positive
    2. Negative

m. History of STI

    1. Yes
    2. No

n. Do you smoke?

    1. Yes
    2. No

Section 4: Perceived susceptibility

a. Do you have family history of cervical cancer?

    1. Yes
    2. No

b. Do you think you are at risk of cervical cancer?

    1. very sure
    2. sure

3. unsure

4. very unsure

c. What is the reason for your answer in b. above?

……

……

d. Are going for a scheduled repeat visit?

1. Yes (give reasons)

……

2. No (give reasons)

……...

Appendix 2: Interview guide for the health care workers (service-related factors)

1. Age …… Gender ……Qualification ……. Position.....
2. How long you have worked at the VIAC site?
3. On average, how many clients do you screen per month? …….
4. How many health workers are trained in VIAC?.....
5. How big is your catchment population from?.....
6. What do you attribute the increase in the number of clients screened to?

   ……

   ……

   ……
7. What do you think are the challenges the site is facing in offering services?

   .....

   .....
8. What are the lessons learnt and best practices at this site?

   .....

   .....

   .....

THANK YOU

Appendix 3: Shona data collection tool

Section 1: Demographic information

a. Makore ekuzvarwa _____

b. Huremu_____

c. Hurefu_____

d. Nyaya dzewanano

    1. Ndakaroorwa 2. Ndakaparadzana nemurume 3. Ndakafirwa nemurume 4. Handina kuroorwa

e. Kana makaroorwa, murikugara mese here nemurume wenyu?

    1. Hongu

    2. Kwete

f. Makasvika padanho ripine dzidzo

    1. Primary 2. Secondary 3. Tertiary 4. Handina kubvira ndamboenda kuchikoro

g. Zvebasa

    1. Ndonoshanda 2. Ndinozviitira 3. Mudzimai wemumba 4. Handishandi

Section 2: Socio-cultural

a. Chitendero chenyu

    1. ChiKristu (taurai chechi yenyu) 2. Islam 3. Chivanhu 4. Zvimwe (zvidomei)

b. Munoshandisa kana kuti makombo shandisa mimwe mishonga isiri yekuchipatara panehengo yenyu yesikarudzi?

   1. Hongu ( ) 2. Kwete ( )

c. Kana mati hongu, chii chamakashandisa uye chikonzero chaiva chei?

   ……

d. Mune zvimwe zvetsika dzenyu kana chitendero chenyu zvine chekuita nesikarudzi yenyu zvamunoita kana zvamakamboita here?

   1. Hongu ( ) 2. Kwete ( )

e. Kana mati hongu, ndezvipi izvozvo?

   ……

   ……

Section 3: Health and behaviour

a. Makaita nhumbu/ pamuviri kangani?

   1. 1
   2. 2-3
   3. 4-5
   4. >5

b. Mune vana vangani?

   1. 1
   2. 2-3
   3. 4-5
   4. >5

c. Vana vamazvara zvakanaka pasina dambudziko

1. 1
2. 2-3
3. 4-5
4. >5

d. Vana vamakazvarwa muchibatsirwa

1. 1
2. 2-3
3. 4-5
4. >5

e. Vana vamakazvara masuwo awedzerwa

1. 1
2. 2-3
3. 4-5
4. >5

f. Nhumbu yenyuyekutanga makaiita mava nemakore mangani?

1. <20
2. 20-35
3. >35

g. Ndeipi nzira yekuronga mhuri yamunoshandisa nguva zhinji uye mava nenguva yakareba zvakadii muchishandisa nzira iyi?

1. Handina nzira yandinoshandisa
2. Mapiritsi ekuronga mhuri
3. Majekiseni ekuronga mhuri
4. IUCD

5. Jadelle
6. Makondomu
7. Dzimwenzira (Dzitaurei)

h. Makatanga kuita zvebonde mune makore mangani?

1. <20
2. >20

i. Mune shamwari ngani dzepabonde?

1. 1
2. 2-5
3. >5

j. Shamwari yenyu yepabonde yakachecheudzwa here?

1. Hongu
2. Kwete

k. Pamumire maringe neHIV

1. Negative
2. Positive
3. Handizivi

l. VIAC

1. Positive
2. Negative

m. Mune nhoroondo yezvirwere zvepabonde here?

1. Hongu
2. Kwete

n. Munoputa fodya here?

1. Hongu
2. Kwete

Section 4: Perceived susceptibility

a. Mumhuri menyu mune akamboita gomarara remuromo wechibereko here?
    1. Hongu
    2. Kwete
b. Munofunga kuti muripa njodzi yekuita gomarara remuromo wechibereko here?
    1. Hongu zvakanyanya
    2. Hongu
    3. Handinyatsoziva
    4. Handinyatsoziva zvakanyanya
c. Nechikonzero chei Mataura sekudaro pamuvhunzo wapfuura?

    ……

    ……
d. Muchadzoka here kuzoongororwa sezvamakurudzirwa?
    1. Hongu (ipai zvikonzero)

        ……
    2. Kwete (ipai zvikonzero)

        ……...

Ndatenda

Appendix 4: English consent form

Consent form: Factors Associated with Cervical Cancer in Women of Childbearing Age at Wilkins Infectious Diseases Hospital, Harare

Questionnaire No.....

Date…….

Good morning/afternoon. My name is Farai Chikupe. I am a Public Health Officer with the Africa University and currently attached to the City of Harare's Department of Health. I am conducting a study onFactors Associated with Cervical Cancer in Women of Childbearing Age at Wilkins Infectious Diseases Hospital, Harare.You have been selected to participate in this study due to the fact that you have been screened for cervical cancer at Wilkins Infectious Diseases Hospital. All data collected will be treated with confidentiality and privacy. Anonymity will be maintained. Participation in this study is voluntary and no payment in cash or in kind will be given to you for participating. Participating in this study does not put you in any risk. You are free to discontinue from participating in this study at any point in time during the course of the study. You are also free to ask me any questions pertaining this study before signing the consent form or even during the course of the study. The findings from this study will be used to make recommendations for interventions to resolve any challenges highlighted from this study. Data collected from this study will be stored under secure lock and no one will have access to it except myself. If you have any questions concerning this study or consent form beyond those answered by the researcher including questions about the research, your rights as a research participant, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact the Africa University Research Ethics Committee on telephone (020)20 60075 or 60026 extension 1156 email aurec@africau.edu. You can also contact the City of Harare's Department of Health on 0242 753326

Do you voluntarily/freely agree to participate?

……. Yes/No

Signed/ thump print by the participant…....……

(PLEASE DO NOT WRITE YOUR NAME)

Signed by the

Interviewer……

_____

Researcher's Signature

_____ _____

Signature of Witness Date (DD/MM/YYYY)

Appendix 5: Shona consent form

Questionnaire No.....

Zuva…….

Mangwanani/ Masikati.

Ini ndinonzi Farai Chikupe. Ndirikubvawo kuKanzuru yeGuta reHarare kubazi rezveutano uye ndiri mudzidzi kuAfrica University uko kwandiri kuita zvidzidzo zveMasters in Public Health. Ndiri kuita ongororo yezvikonzero zvinoita kuti madzimai ari pazera rekuzvara vaonekwe vane gomarara remuromo wechibereko muguta reHarare. Makasarudzwa kuti mupinde muongororo iyi sezvo mauya kuchipatara cheWilkins Infectious Diseases Hospital muchindoongororwa kuti mune gomarara remuromo wechibereko here. Zvese zvatichakurukura muongororo ino zvichachengetedzwa nekubatiswa, uye hapana umwe munhu wamusina kutendera achaziva nezvazvo. Handina basa nekuziva zita renyu. Kupinda kwenyu muongororo ino hakukuisei panjodzi yekukuwara uye makasununguka kuti mupinde kana kuramba kupinda muongororo yandiri kuita. Hapana mubhadharo wamunopihwa nekupinda kwamuchaita muongororo iyi. Nhaurirano yedu ichatora maminetsi anogona kusvika kumakumi matatu. Zvichabuda muongororo zvichashandiswa mumabasa ekuwedzera mashandiro ebazi rezveutano muguta reHarare, muzvipatara uye munyika yese yeZimbabwe. Kana pane zvamungada kunzwisisa pamusoro peongororo iyi makusununguka kundivhunza musati maisa runyoro rwenyu kana kuti ipi nguva zvayo patinenge tichiita nhaurirano iyi. Kana paine zvimwe zvakare zvamungada kunzwisisa makasununguka kufonera vanoongorora Mabasa etsvakurudzo veAfrica University Research Ethics Committee (AUREC) panumber dzinoti (020)20 60075 kana 60026 ext 1156 kana kutiaurec@africau.edu. Makusunguka zvekare kubata vebazi rezveutano kukanzuru yeguta reHarare panumber dzinoti 0242 753326. Makasununguka here kupinda muongororo ino zvisina kumanikidzwa kana tsvete……Hongu/ Kwete

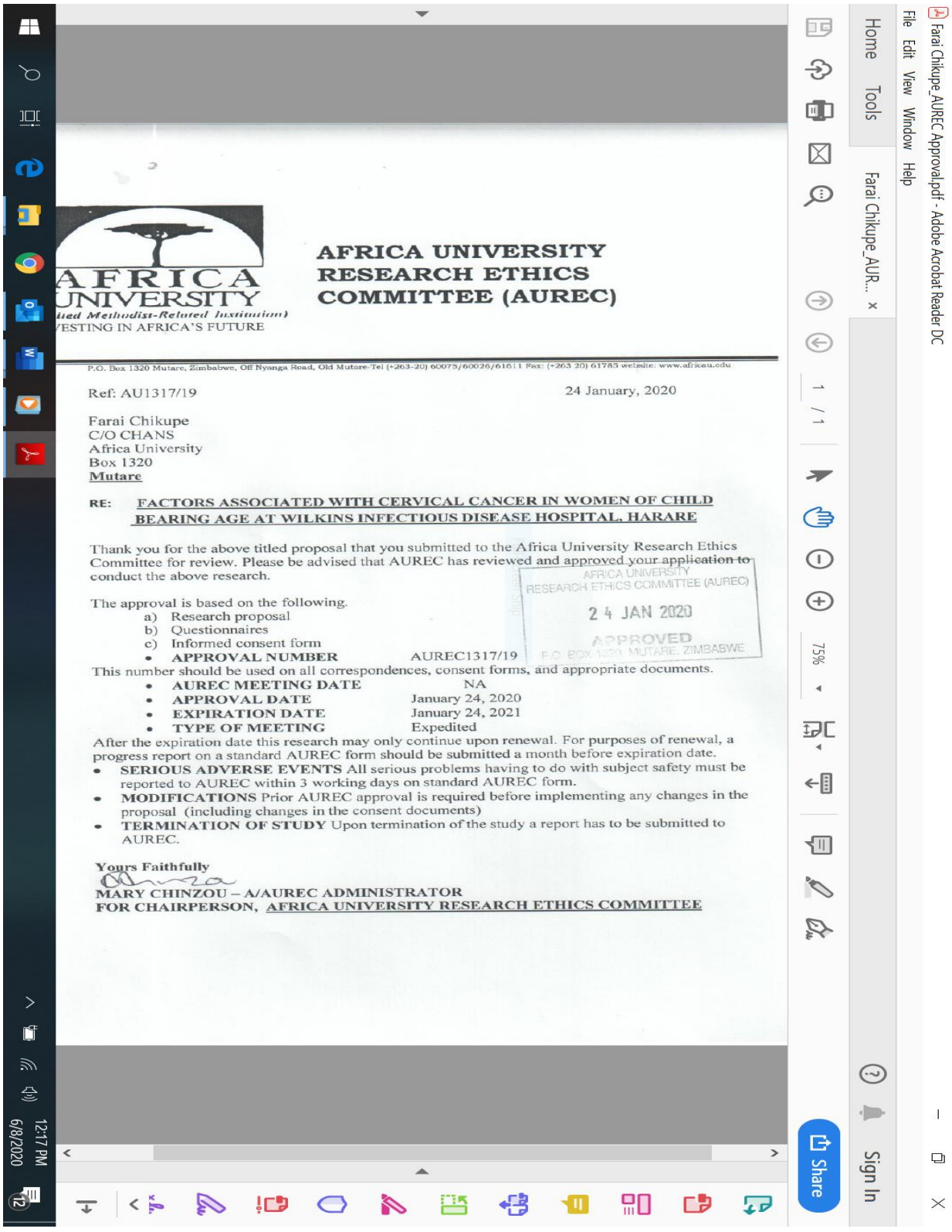
Runyoro rwenyu kana chidhindo chemunwe wenyu……..…...……

(NDAPOTA MUSANYORE ZITA RENYU)

Signed by the

Interviewer……

Appendix 6: AUREC approval form



AFRICA UNIVERSITY
(A United Methodist-Related Institution)
INVESTING IN AFRICA'S FUTURE

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 website: www.africau.edu

Ref: AU1317/19

24 January, 2020

Farai Chikupe
C/O CHANS
Africa University
Box 1320
Mutare

RE: FACTORS ASSOCIATED WITH CERVICAL CANCER IN WOMEN OF CHILD BEARING AGE AT WILKINS INFECTIOUS DISEASE HOSPITAL, HARARE

Thank you for the above titled proposal that you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

AFRICA UNIVERSITY
RESEARCH ETHICS COMMITTEE (AUREC)
24 JAN 2020
APPROVED
P.O. BOX 1320, MUTARE, ZIMBABWE

The approval is based on the following.

a) Research proposal
b) Questionnaires
c) Informed consent form

- **APPROVAL NUMBER** AUREC1317/19

This number should be used on all correspondences, consent forms, and appropriate documents.

- **AUREC MEETING DATE** NA
- **APPROVAL DATE** January 24, 2020
- **EXPIRATION DATE** January 24, 2021
- **TYPE OF MEETING** Expedited

After the expiration date this research may only continue upon renewal. For purposes of renewal, a progress report on a standard AUREC form should be submitted a month before expiration date.

- **SERIOUS ADVERSE EVENTS** All serious problems having to do with subject safety must be reported to AUREC within 3 working days on standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

Yours Faithfully

MARY CHINZOU – A/AUREC ADMINISTRATOR
FOR CHAIRPERSON, AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

Appendix 7: Plagiarism Report

Document Information

Analyzed document	FARAI CHIKUPE.docx (D72249515)
Submitted	5/21/2020 5:45:00 PM
Submitted by	Dr Eltony Mugomeri
Submitter email	mugomerie@africau.edu
Similarity	10%
Analysis address	mugomerie.africa@analysis.urkund.com