A retrospective study of utilisation and uptake of visual inspection with acetic acid (VIA) as a cervical cancer screening method at a specific hospital in Zimbabwe

by

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FEBRUARY 2019

DECLARATION

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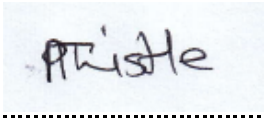
I declare that **A RETROSPECTIVE STUDY OF UTILISATION AND UPTAKE OF VISUAL INSPECTION WITH ACETIC ACID (VIA) AS A CERVICAL CANCER SCREENING METHOD AT A SPECIFIC HOSPITAL IN ZIMBABWE** is my own work and all sources used or quoted have been indicated and acknowledged in the list of sources and that this work has not been submitted before for any other degree at any institution.



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A RETROSPECTIVE STUDY OF UTILISATION AND UPTAKE OF VISUAL INSPECTION WITH ACETIC ACID (VIA) AS A CERVICAL CANCER SCREENING METHOD AT A SPECIFIC HOSPITAL IN ZIMBABWE

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ABSTRACT

The purpose of this study was to describe the factors that determine the utilisation of VIA, and to investigate the socio-economic status of women who undergone VIA. A retrospective document analysis of 323 clinical records was conducted at a specific rural hospital in Zimbabwe. A retrospective, cross-sectional, non-experimental, descriptive, analysis of clinical records was conducted using a checklist to extract data from the records of women who have undergone VIA for cervical screening at the specific rural hospital. The results revealed that 70% (N=225) were from outside the catchment area, 73% (N=234) were poor, 54% (N=173) were of high parity, 85% (N=275) were ill with conditions that included lower back and abdominal pains, excessive vaginal discharge and vaginal bleeding after intercourse. The study further revealed that 72% (N=226) had no prior cervical cancer screening and 87% (N=277) were screened by chance. The conclusion drawn was that socio-economic and logistical constraints hinder cervical cancer screening among rural women. It is recommended that VIA screening and health education on cervical cancer be offered to all women visiting healthcare facilities. Furthermore, the government should consider funding in order to prioritise women's health issues.

KEY TERMS

Cervical cancer, cervical cancer screening, human papillomavirus, pre-cancerous lesions, socio-economic status and visual inspection with acetic acid.

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DEDICATION

I dedicate this dissertation to my parents, Mr and Mrs Gutu Kasanga, who value nurses most highly and believe in education. Without doubt, the unwavering stance of my parents with regard to the place and value of nursing as well as their belief in education became my sources of motivation that subsequently led me to pursue the Master's Degree in Nursing Science, thereby enhancing my profession as a nurse.

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AIDS	Acquired immunodeficiency syndrome
CDC	Centre for disease control
CKC	Cold knife conization
CIN	Cervical intraepithelial neoplasia
CO_2	Carbon dioxide
DNA	Deoxyribonucleic acid
FIGO	International Federation of Gynaecology and Obstetrics
GAVI	Global Alliance for vaccine and immunisation
HPV	Human Papillomavirus
HIV	Human Immunodeficiency Virus
ICT	Information communication technology
LBC	Liquid Based Cytology
LEEP	Loop electrosurgical procedure
MCH	Maternal and Child Health
N	Number or frequency
OPD	Out Patients Department
RNA	Ribonucleic acid
SCJ	Squamocolumnar junction
SPSS	Statistical package for social sciences
USB	Universal service bus
Unisa	University of South Africa

VIA	Visual Inspection with Acetic Acid
VILI	Visual Inspection with Lugol’s Iodine
WHO	World Health Organisation

CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION

Worldwide cervical cancer is the fourth commonly diagnosed cancer and the fourth leading cause of death among women who die from cancer (Islami, Torre, Drope, Ward & Jemal 2017:444). Furthermore, Islami et al (2017:444) noted that in developing countries cervical cancer is the second leading cancer and that 90% of the worldwide cervical cancer deaths occur in developing countries. Louie, de Sanjose and Mayaud (2009:27), in a study on epidemiology and prevention of human papillomavirus and cervical cancer in sub-Saharan Africa, noted that the coverage for screening of cervical cancer in sub-Saharan Africa ranges from 2% to 20% in urban areas and from 0.4 to 14% in rural areas. Sankaranarayanan, Sauvaget, Ramadas, Ngoma, Teguete, Muwonge, Naud, Nessa, Kuhaprema and Qiao (2011:21) in a study conducted in Southern Africa, India and Sri Lanka to determine feasible and effective ways for early detection and prevention of cervical cancer found that sub-Saharan African countries have a high burden of cervical cancer and more than 90% of these cases present at advanced clinical stages and thereby curtail the chances of a cure. In sub-Saharan African countries alone, it was estimated that around 75 000 women develop cervical cancer every year and 50 000 of them die from it (Sankaranarayanan et al 2011:21).

According to Ferlay, Shin, Bray, Forman, Mathers and Parkin (2010:2893) low resource countries have made efforts to implement effective cervical cancer screening programmes based on Papanicolaou (Pap) smears since the early 1980s but these programmes were not successful because they were expensive and labour intensive. Developed countries have effective cervical cancer screening programs that result in early identification and treatment of pre-cancerous lesions (Ndejjo, Mukama, Musabyimana & Musoke 2016:2).

Adamson, Huchko, Moss, Kinkel and Medina-Marino (2015:2) in a study conducted in South Africa on acceptability and accuracy of cervical cancer screening using a self-collected tampon for HPV messenger-RNA testing among HIV-infected women, found that most developed countries managed to reduce the burden of cervical cancer through expensive cervical screening using Pap smears. Another screening method similar to Pap smear is liquid based cytology (LBC).

Liquid based cytology (LBC) involves taking a small volume of cells from the cervix, which are preserved in a special solution and taken to a laboratory for microscopic examination (WHO 2014:254). LBC still poses challenges for low resource settings because of the need for specialised facilities and expertise in doing the tests (Elfström, Herweijer, Sundström & Dahlström 2014:121). Implementing alternate screening methods such as Human Papilloma Virus deoxyribonucleic acid (HPV DNA) testing has been shown to be more effective than the Pap smear for cervical cancer screening (Catarino, Petignat, Dongui & Vassilakos 2015:281).

However, this method still poses a challenge in low-resource settings as it requires better healthcare infrastructure and laboratory supplies which are not readily available in low-resource settings (Catarino et al 2015:283). Schmeler (2012:1258) maintained that HPV tests pose several challenges in low-resource settings as they are expensive, require infrastructure for processing and involves a waiting time of one or more days for the results. Waiting for HPV test results for one or more days is a challenge as women may fail to return for follow-up due to socio-cultural, financial, practical and logistical barriers (Ezechi, Petterson, Gabajabiamila, Idigbe, Kuyoro, Ujah & Ostergren 2014:1). According to Andrea, Anderson and Lambert (2012:900) it is now possible to do primary prevention of cervical cancer through the use of prophylactic vaccination against HPV. However, this method cannot be easily utilised in low-income countries due to the high cost of the vaccine. Studies done on HPV vaccine in Zimbabwe show that apart from being unaffordable, the current HPV vaccine Cervarix 16 and 18, are not effective in providing protection against HPV genotypes that are common causes of cervical cancer in Zimbabwean women (Chin'ombe, Sebata, Ruhanya & Matarira 2014:2).

Despite that, Pap smear, HPV DNA testing and HPV vaccines have shown to be effective in reducing cervical cancer, however, due to financial constraints and manpower challenges, they have been found not financially feasible in low-resource settings.

Elfström et al (2014:121) found that there is very low uptake to screening and women are lost to follow up in low resource countries. Fokom-Domgue, Combescure, Fokom-Defo, Tebeu, Vassilakos, Kengne and Petignat (2015:1) in a study on performance of alternate strategies for primary cervical cancer screening in sub-Saharan Africa, found that alternative methods such as LBC and HPV vaccine, have been developed. However, VIA/ VILI was found to be feasible and effective in resource constraint countries.

Visual inspection with Lugol's iodine (VILI) uses Lugol's iodine instead of acetic acid and gives a mustard stain to pre-cancerous lesions making them visible to the naked eye (Finocchario-Kessler, Wexler, Maloba, Mabachi, Ndikum-Moffor & Bukusi 2016:3). Lugol's iodine is more difficult to procure than acetic acid so it poses challenges of expense and erratic supply in a rural setting. VIA is a technique similar to colposcopy which involves an examination of the uterine cervix after acetic acid is applied, but without the use of a colposcope (Keshavarzi, Nankali, Fakheri, Rezaei, Khoshay, Eslamizadeh & Bookani 2013:60). Furthermore, colposcopy is a confirmatory diagnostic technique used to verify the findings of VIA/VILI screening. However, in the absence of cytology, colposcopy may also be used as a primary method for cervical cancer screening (Adedeji 2017:119). The procedure is undertaken by a specially trained gynaecologist who examines the cervix with high magnification and usually a small piece of tissue (biopsy) sample may be excised from where the cervix shows abnormalities (WHO 2014:137). In case a biopsy was done the woman may require a follow-up visit to collect the biopsy results. In such cases where a return visit is required, most women are lost to follow-up which the researcher assumes that it might be due to lack of financial resources to return to health care centre.

VIA does not require sophisticated equipment but only a good light source, a speculum, 3%-5% acetic acid and a trained health care provider (Keshavarzi et al 2013:61).

VIA has been found to be a simple, affordable, and sensitive test that identifies any pre-cancerous changes of the cervix so that treatment such as cryotherapy, cone biopsy, trachelectomy or hysterectomy can be provided (Paul, Winkler, Bartolini, Penny, Huong, Nga, Kumakech, Mugisha & Jeronimo 2013:1278).

The World Health Organisation (WHO) recommended that nurses who make up the majority of health care workers in developing countries be trained to do VIA screening (Bhavana, Dalal, Durdi, Pujar & Dhumale 2010:325). For example, in Zimbabwe 70% of the population lives in rural areas where nurses are the key health providers, running clinics and rural hospitals (The National Health Strategy for Zimbabwe 2013:3). Therefore, the use of VIA as a cervical cancer screening method in Zimbabwe seems appropriate as any trained healthcare worker for example a nurse can do the procedure in the absence of a medical doctor (Paul et al 2013:1279).

Zimbabwe as a sub-Saharan African country in a low-resource setting, also experiences similar challenges that are typical of low-resource countries such as economic hardships and poverty among others. There is lack of infrastructure, expertise and resources to implement an organised cytology-based cervical-cancer-screening programme at a specific rural hospital in Zimbabwe. Furthermore, coupled with the healthcare-centre-based challenges women in the specific rural area have financial, socio-cultural, practical and logistical problems that would further impede cervical-cancer-screening services (The National Health Strategy for Zimbabwe 2013: 3). Despite VIA being simple and affordable, there is a tendency for women who attend this specific health facility to report when the disease is at an advanced stage. Further, another problem is that women who were screened, at the facility are lost to the follow-up after screening. This led the researcher to conduct a retrospective analysis of the clinical records of women who had undergone VIA/VILI in order to investigate the socio-economic characteristics of women at a specific rural hospital in Zimbabwe and to identify and describe the factors that determine VIA as a method of choice for screening.

1.2 BACKGROUND TO THE STUDY

Zimbabwe is in Southern Africa, a region of the world identified as having the highest incidence and mortality from cervical cancer (Ntekim 2012:52).

Worldwide, the highest incidence and mortality of the disease occur in Eastern, Western and Southern Africa as well as South-Central Asia and South America. Conversely, the lowest rates are in Western Asia, Australia and New Zealand (Ntekim 2012:52). According to The National Health Strategy for Zimbabwe (2013:24), cervical cancer has also been reported as the most common cancer, accounting for 32.1% of all cancers among Zimbabwean black women.

Finocchario-Kessler et al (2016:2), reported that South Africa is the only country in Sub-Saharan Africa with a national cytology-based screening programme since 2001. However, in other African countries most screening activities are done as pilot or research projects which are discontinued on completion. Ferlay et al (2010:2847) noted that in most countries of sub-Saharan Africa there are poor indicators of cervical cancer at local level because of poor systematic reporting and poor information-collection. This makes it difficult to raise cervical cancer as a priority health issue if national policy makers or advocates are not aware of the depth of the problem in their home country (Ferlay et al 2010:2847).

A study on the uptake of cervical cancer screening and its associated factors among rural women in Uganda revealed that rural women in Africa are among the underserved populations with the highest risk of developing cervical cancer but are not likely to be screened. The lack of screening and treatment in rural areas is attributed to poor access to health facilities due to economic, geographical and cultural constraints (Ndejjo et al 2016:8).

The World Health Organization (WHO) (2014:15) in an effort to reduce morbidity and mortality from cervical cancer recommended early screening and detection through down-staging of VIA by trained nurses and paramedical workers so that abnormal cases can be referred to tertiary centres for further evaluation. According to Keshavarzi et al (2013:63) down-staging entails the direct visualisation of the cervix by a trained nurse or trained paramedical worker. VIA has been recommended by WHO as a method of choice for cervical cancer screening in low-resource countries (Huchko, Sneden, Sawaya, McCune, Maloba, Abdulrahim, Bukusi & Cohen 2014:392).

The researcher noted that VIA is the only method utilised for screening for cervical cancer at the specific rural hospital in Zimbabwe. VIA at this specific rural hospital is done by trained nurses and medical doctors.

This method of screening is used at a specific rural hospital because it is simple and affordable. The researcher, as a trained nurse, noted that women from the specific rural setting rarely made voluntary visits to hospital for cervical cancer screening. This led to an assumption by the researcher that the women either lacked knowledge or were socio-economically challenged to the extent that they saw no need to come for screening. The women come to the hospital when they are sick or for other reproductive services. The implementation of low-cost strategies like down-staging with acetic acid and visual inspection with Lugol's iodine has made cervical cancer screening possible at this specific hospital. An advantage of this screening method is that it provides immediate results. This is a positive development in that the women can be referred for immediate treatment and subsequent follow-up based upon the abnormal results. Patients with results showing irregular changes of the cervical cells are, referred to the obstetrician and gynaecologist for further assessment and treatment.

Sankaranarayanan, Nessa, Esmy and Dangou (2012:221) in a study on visual inspection methods for cervical cancer prevention, concluded that VIA is an effective, practical and affordable alternative screening approach compared to cytology-based screening especially in a low-resource rural setting. Huchko et al (2015:392) maintained that VIA screening with 3%–5% acetic acid (VIA) has been proven to be a safe, feasible, and cost-effective approach for cervical cancer screening. However, irrespective of its being safe, feasible and cost-effective, the screening still poses socio-economic challenges to women attending this specific hospital. According to The National Health Strategy for Zimbabwe (2013:3), the economy of Zimbabwe is projected to remain poor for a while, with high levels of unemployment. The women attending the specific hospital live under this harsh economic environment.

The researcher's view is that a retrospective analysis of the documents of the women who have undergone VIA to screen for cervical cancer will be useful in determining the socio-economic characteristics of their utilisation of VIA in a specific rural hospital in Zimbabwe.

This might assist the government in supporting the women socio-economically, and may also heighten awareness on the importance of cancer screening as well as promoting and improving rural women's utilisation of VIA for early detection and prevention of cervical cancer.

1.3 PROBLEM STATEMENT

Despite the successful use of other screening methods in detecting and reducing the incidence of cervical cancer in developed countries, low- resource countries have not readily embraced these other screening methods. The researcher being a trained nurse working at the maternal and child health unit in a specific hospital noted that women are afflicted with socio-economic problems and lack knowledge in the area of cervical cancer-screening in general, irrespective of appropriateness, affordability and suitability of VIA. Except for reproductive health services, women do not routinely visit the hospital for cervical cancer screening. Cervical cancer screening is generally incidental because they visit the hospital for other reasons. Most women will only visit a health facility when they are very sick or after they have exhausted alternative traditional sources of healthcare. The women who approach this specific rural hospital suffering from cervical cancer present late with advanced stages of the disease. In this context, it is too late for screening and higher-level care is required. The current economic hardships in Zimbabwe and the deterioration of healthcare facilities and infrastructure are also a deterrent to cervical cancer screening. Therefore, an affordable and practical means for cervical cancer screening, VIA is utilised at some rural hospitals in Zimbabwe, including the specific rural hospital at which this study was conducted. This is done in order to promote screening and early detection of pre-cancerous changes and thereby prevent cervical cancer.

Available literature supports evidence that VIA is an acceptable, feasible and cost effective cervical cancer screening method in a rural setting (Levine, Chudnoff, Taylor, Baganizi & Banks 2011:171). VIA has been implemented at the Maternal and Child Health (MCH) department of a specific hospital in Zimbabwe since December 2012. This study was conducted in order to obtain scientific information on the socio-economic factors affecting cervical cancer screening at a specific rural hospital in Zimbabwe. Furthermore, the study addressed knowledge of women regarding VIA screening.

This information was obtained through a retrospective analysis of clinical records of women who undergone VIA at the specific rural hospital. The study was conducted in order to improve and promote cervical cancer screening services at the specific rural hospital.

1.4 PURPOSE OF THE STUDY

The purpose of the study was to evaluate the factors that determine the utilisation of VIA as a method of choice for cervical cancer screening. The study investigated the socio-economic status of women who have undergone VIA by conducting a retrospective document analysis of their clinical records at a specific rural hospital in Zimbabwe.

1.5 RESEARCH OBJECTIVES

The objectives of this study were to:

- identify and describe the factors that determine utilisation of VIA as a method of choice for cervical cancer screening.
- investigate the socio-economic status of women who undergo VIA screening.
- determine the extent of VIA uptake in a chosen rural community in Zimbabwe.
- determine the ability of VIA to identify pre-cancerous changes.

1.6 RESEARCH QUESTIONS

- What are the factors that determine VIA as a method of choice for cervical cancer screening at a specific hospital in Zimbabwe?
- What is the socio-economic status of women who undergo VIA as a method for cervical cancer screening?
- What is the extent of VIA uptake in a chosen rural community?
- What is the ability of VIA in determining the identification of pre-cancerous changes?

1.7 DEFINITIONS OF CONCEPTS

1.7.1 Cervical cancer

Cervical cancer is the malignant uncontrolled growth of cervical cells which starts with malignant changes on the transformation zone of the ectocervix due to infection by oncogenic Human Papilloma viruses (HPV), (WHO 2014:36).

1.7.2 Down staging

Down staging is the direct visualisation of the cervix by trained nurses and paramedical workers so that abnormal cases can be referred to higher centres for further evaluation (Kamal, Lumb, Swamy & Durdi 2011:63).

1.7.3 Human Papilloma virus:

Schiffman and Wentzensen (2010:177) defined Papilloma viruses as 8000 base-pair double stranded circular Deoxyribonucleic (DNA) viruses some of which are carcinogenic and infect many species. HPV is directly associated with cervical pre-cancer and squamous cervical cancer (WHO 2014:37).

1.7.4 Pap smear

A screening method in which the sample of cells taken from the cervix is smeared onto a glass slide, fixed and examined under a microscope (WHO 2014:254).

1.7.5 Sensitivity

In relation to cervical cancer, sensitivity is the ability of a test to detect pre-cancerous (cervical intraepithelial neoplasia) and cancerous cervical lesions (Firnhaber, Mayisela, Mao, Williams, Swarts, Faesen, Levin, Michelow, Omar, Hudgens, Williamson, Allan, Lewis & Smith 2013:3).

1.7.6 Visual Inspection with Acetic Acid (VIA)

Visual inspection with acetic acid (VIA) is a method of screening for cervical cancer which involves visualisation and examination of the cervix after application of 3-5% acetic acid to identify abnormal areas without the use of a colposcope (Orang'o, Wachira, Asirwa, Busakhala, Naanyu, Kisuya, Otieno,Keter, Mwangi & Inui 2016:1).

1.8 OPERATIONAL DEFINITIONS

1.8.1 Clinical records

Clinical records refers to the records of women who undergo VIA at a specific rural hospital, and are kept at the hospital.

1.8.2 Sensitivity

For the purpose of this study, sensitivity implies a positive result where it is recorded that aceto white lesion was identified on the cervix by a VIA.

1.8.3 Socio-economic accessibility

In this study socio-economic accessibility is measured in terms of the employment status, level of education, and source of income.

1.8.4 VIA Uptake

For the purpose of this study VIA uptake is measured in terms of the number of women eligible for cervical cancer screening who have undergone VIA screening.

1.9 RESEARCH SETTING

The study was conducted at a specific rural hospital in Zimbabwe's Maternal Neonatal and Child Health Department (MCH). The hospital is in a remote area of northern Zimbabwe approximately 124 miles from Harare, the capital of the country. The hospital is licensed for approximately 150 beds and on an average workday 10-20 surgeries are done and 200-300 outpatients are seen. The patient population is drawn from the entire country as people seek

affordable, reliable, compassionate healthcare. The specific rural hospital provides both acute and chronic medical and surgical care services. The hospital has both inpatient and outpatient departments. The specific hospital was chosen because it is rural and there is a high incidence of women suffering from reproductive health illnesses. This is supported by the relevant literature which corroborates findings that the highest incidence of cervical cancer is among rural women.

1.10 RESEARCH DESIGN AND METHODS

1.10.1 Research design

According to Saunders, Lewis and Thornhill (2010:136), research design is a plan on how to answer research questions, and it contains clear objectives derived from the research questions, specifying the sources from which data is to be collected, the constraints in data collection and the ethical issues that will be discussed. A retrospective, non-experimental, cross-sectional, descriptive analysis of the clinical records of women was executed through the use of a checklist to extract data from the clinical records of women who have undergone VIA screening at a specific rural hospital in Zimbabwe, from the 1st of January 2016 to the 28th of February 2017. In retrospective studies both the proposed cause and effect have already occurred (Burns & Grove 2009:240). Polit and Beck (2008:272) explained that a retrospective design involves collecting data on an outcome occurring in the present and then linking it to antecedents or determinants occurring in the past. This was done in order to investigate the socio-economic characteristics of women who had undergone VIA screening at a specific rural hospital. It was also done to identify and describe the factors that determine VIA as a method of choice for cervical cancer screening.

1.10.2 Research methods

A quantitative method which is described as a formal objective systematic study process was used to describe and test the relationships and to examine cause and effect interactions among variables (Burns & Grove 2009:717). Furthermore, according to Burns and Grove (2009:429) quantitative research data collection involves obtaining numerical data to address the research objectives, questions, or hypotheses. Thus, this research adopted a

quantitative method. A retrospective design was applicable to the study because in a retrospective study both cause and effect have already occurred.

The study used clinical records of women who undergone VIA and data was collected numerically to identify and describe the factors that determine VIA as a method of choice for cervical cancer screening and to investigate the socio-economic status of women who undergo VIA screening. The independent variables of women who undergo VIA and the results were measurable and quantifiable as documented on the clinical records. The data collected from existing clinical records of women who underwent VIA from the 1st of January 2016 to the 28th of February 2017 was extracted from the women's clinical records.

1.10.2.1 Population

Gray, Grove & Sutherland (2017:330) states that a population is the entire group of interest. The population in the study was the clinical records of all the women who attended maternal and reproductive health services and undergone VIA at a specific hospital in Zimbabwe from the 1st of January 2016 to the 28th of February 2017.

1.10.2.2 Sample and sampling procedure

According to Burns and Grove (2009:721), a sample is a subset of the population selected for a particular study. The researcher targeted 2000 clinical records of all women enrolled for the VIA programme from 1st January 2016 to 28th February 2017. The sample size of 323 hospital records was calculated according to Raosoft formula which is an online sample calculator (Rao soft sample size calculator. From: http://www.raosoft.com (accessed 22 April 2016).

Systematic random sampling was used to select the 323 clinical records. Systematic random sampling is the selection of sample members in which every kth (for example tenth) person or element in a sampling frame is selected (Gray et al 2017:342). The sample frame in this case was all clinical records of women who underwent VIA from the 1st of January 2016 to the 28th of February 2017 which were a total of 2000 records. Therefore, every sixth record was selected.

1.10.2.3 Inclusion criteria

- Records of all women between ages 18-59 years who attended gynaecology clinic. Panganayi and Gono (2017:12) recommended this age range for VIA in Zimbabwean women;
- Records of all women who attended family planning clinic, and maternal health services and
- Records of women who underwent VIA and whose records are kept at a specific hospital in Zimbabwe.

1.10.2.4 Exclusion criteria

The exclusion criteria are records of:

- minor,(Under 18 years of age);
- pregnant women;
- mentally retarded/disabled persons and
- women who underwent VIA screening, but whose data collection form was not completed and placed in the medical record.

1.10.2.5 Data collection

1.10.2.5.1 Development and pre-testing of a check list

A self-designed structured checklist based on WHO (2014:20) recommendations was used to obtain information to cover the research objectives and to answer the research questions (Annexure 6)**.** The checklist included the demographic data, age, physical address, level of education, employment status, communication means, mode of sanitation, source of water supply, monthly income, obstetric history, parity, gravidity, last menstrual period, medical history, HIV status, diagnosis, previous cervical cancer screening status and date of the screening (Annexure 6). Validity of the checklist was attained by submitting the checklist to the study supervisors who are research and content experts. The checklist was also submitted to a statistician as well as to nurses working in the Out-Patient Department who are involved in cervical cancer screening and an obstetrician oncologist/gynaecologist who has years of experience with cervical cancer screening.

This was intended to ascertain whether the information was relevant and whether or not it adequately addressed the constructs being measured. The checklist was pre-tested with ten randomly-picked clinical records in order to identify weaknesses and correct ambiguities and enhance reliability. After pre-testing a checklist modification was done and extra information was added in preparation for the main study. In order to prevent contamination of the study results the randomly-picked clinical records were not used for the main data collection.

1.10.2.5.2 Data collection method and approach

Data collection was commenced after approval to conduct the study by the Research and Ethics committee of the Department of Health studies at the University of South Africa (Unisa) (Annexure 1). Permission to conduct the study at the specific hospital was granted by the medical superintendent of a specific rural hospital in Zimbabwe on behalf of the Ministry of Health and Child Care of Zimbabwe (Annexure 3**).** Informed consent to use clinical records was obtained from the medical superintendent of the hospital, thus giving permission to conduct the study as it involved the use of clinical records that were hospital property (Annexure 3**)**.Furthermore, permission to access the records (Annexure 5) was granted by the medical superintendent of the hospital. This permission of access to clinical records was granted after the researcher requested its access (Annexure 4).

The researcher was responsible for the data collection to ensure consistency. Secondary sources of data which consist of data gathered by others were used throughout the research. These were obtained from the clinical records of women who consented to cervical cancer screening through VIA. Data from the existing clinical records of women who have undergone VIA screening during the predetermined period from the 1st of January 2016 to the 28th of February 2017 were extracted from the women's records. The clinical records were accessed by the researcher from the hospital records office, after working hours and during the weekends in order to maintain privacy. The researcher was given access to the records office by an office clerk who also locked up the office afterwards. No clinical records were removed from the hospital records office. Data were collected by using a pre-tested checklist (refer to Annexure 6) and clinical records were filed back into their original places by the administrator.

Confidentiality of the documents during data collection was maintained through the allocation of numbers to the documents so that the women's names did not appear on the checklist. The researcher had access to 2000 clinical records but only collected data from 323, the required sample size. Data were collected over a three months period from 10th June 2017 to 11th September 2017 in about 108 hours as the researcher was only given permission to access records after hours and during weekends.

Data on both the results of VIA (both positive and negative) which had already been obtained in the past (1st of January 2016 to February 28th 2017) and the independent variables were collected at the same time. These included demographic data: age, physical address, level of education, employment status, monthly income, obstetric history, parity, gravidity, last menstrual period, medical history: HIV status, diagnosis, and previous cervical cancer screening status (Annexure 6). Data was stored on a Universal service bus (USB) memory stick for safekeeping. More on data collection will be discussed in the research design and methodology chapter being chapter three.

1.10.2.6 Data analysis

Descriptive statistics were used to describe and synthesise the data into averages and percentages which were then used to make inferences or draw conclusions from the information obtained about a population (Ellis 2013:103). Through the service of a statistician (Annexure 7) the use of statistical software, the Statistical Package for Social Sciences (SPSS) Version 20 for Windows was used to analyse the data and give meaning to the statistics by using tables, graphs and diagrams. SSPS 20, the Pearson correlation and Chi-Square tests established the quantitative measures that tested consistency, stability and predictability of the results. This was done to establish whether the means of measurement were sufficiently accurate to measure what they were intended to measure.

1.11 VALIDITY AND RELIABILITY

1.11.1 Validity

Heale and Twycross (2015:1), assert that validity attests to whether the research has truly measured what it was intended to measure and to how truthful the results are.

The researcher referred to the research objectives and research questions in formulating the checklist. The use of SSPS 20.0 and the Pearson correlation and Chi-Square tests established the quantitative measures that tested the consistency, stability and predictability of the results to establish whether the means of measurement accurately and actually measured what they were intended to measure.

1.11.1.1 Content validity

Content validity refers to the extent to which the instrument adequately captures the full content for the concept being measured (Gray et al 2017:376). The checklist was submitted to the researcher's supervisors, to nurses working in the Out-Patients Department (OPD) involved in cervical cancer screening and to an oncologist/gynaecologist to ascertain whether the information was relevant and if it adequately addressed the research questions. The questions and the response options were assessed to ensure that they were appropriate for specifying the factors needed to determine the socio-economic characteristics of women who undergone VIA at a specific hospital in Zimbabwe. A statistician was consulted to assess the checklist to determine if there were any irregularities that could hinder data analysis.

1.11.1.2 Design validity

According to Burns and Grove (2009:221), design validity is a measure of the truth or accuracy of a claim and it is central in determining whether the study findings are sufficiently valid to add to the evidence base for patient care. The opportunity for observer bias was diminished as this study used clinical records where information had already been routinely and independently collected in the past two years by professionals without any specific hypothesis. The use of retrospective data was efficient in terms of sample size and availability of information. It was also comparatively inexpensive compared with prospective data collection. Moreover, the data were collected in a way that is standardised which, permitted comparisons over time and between different countries.

1.11.1.3 Instrument validity

The structured checklist designed was required to collect medical and socio-economic data from the clinical records obtained from the hospital.

Validity of the instrument was attained by submitting the checklist to the research supervisors, a statistician, and obstetrician gynaecologist. This was done so that it could be ascertained whether the information on the checklist was relevant and whether it adequately covered the abstract construct being measured (Burns & Grove 2009 221).

1.11.1.4 Internal validity

Salkind (2012:394) defines internal validity as the accuracy in concluding that the results of an experiment are due to the independent variable. In this study, there are no threats to internal validity due to maturation as this is a retrospective study where information already exists from the past. No unplanned changes would influence the findings on the clinical records as they are already there. The checklist was pre-tested before data collection so that necessary changes could be made. This was done to ensure consistency so that there is no threat to instrumentation with regard to internal validity (Parahoo 2014:198).

1.11.1.5 External validity

External validity refers to the degree to which the results of the study can be generalised to other people and other settings (Parahoo 2014:199). The findings of this study are only generalized to a specific hospital in Zimbabwe and to its rural community. However, VIA is currently being introduced as a national programme for cervical cancer screening in Zimbabwe. It is, therefore, contended that the results and recommendations from this study can be of benefit to women in general and health care providers in similar health care institutions in particular as well as to scholars who may want to engage in a similar study. It should be noted though, that situational factors may influence the results of similar studies that may be conducted on the same topic in other health institutions.

1.11.2 Reliability

According to Saunders et al (2010:156), reliability refers to the extent to which data collection techniques or analysis procedures yield consistent findings. Reliability is also described as the consistency with which an instrument measures the target attribute, yielding the same results when tested again on the group or on another group (Polit & Beck 2010:373).

A pre-test of the checklist was done prior to the data collection of the main study to identify weaknesses and correct ambiguities thereby enhancing reliability. The checklist was pre-tested using ten clinical records which were not used for the main data collection. The ten pre-test clinical records were not used in the main study to prevent the contamination of the study findings from inaccurate assumptions based on the results of the pilot data (Gray et al 2017:54). The same kind of information was collected from each clinical record, and in each case, the instrument was found reliable for the targeted objectives.

1.12 ETHICAL CONSIDERATIONS

1.12.1 Researcher- specific ethical considerations

1.12.1.1 Permission to conduct the research

An approval to conduct the study was granted by the Ethics Committee of the University of South Africa (Unisa) Health Studies Department for Ethical Clearance (Annexure 1). The permission to conduct the study (Annexure 3) and permission to access clinical records (Annexure 5) was granted by the medical superintendent of the specific hospital in Zimbabwe on behalf of the Ministry of Health and Child Care of Zimbabwe. This permission of access to clinical records was granted after the researcher requested its access (Annexure 4).

1.12.2 Records- specific ethical considerations

1.12.2.1 Confidentiality and anonymity

During analysis of the quantitative data, the researcher maintained confidentiality with regard to the information from the records of the women. This was done by allocating numbers to each record so that the names of the women were not revealed and therefore did not appear on the checklist. No identifiers appeared on the checklist. The collection of data was done by the researcher in a specific rural hospital records office in Zimbabwe, which is physically separate and secure location where clinical records are kept. The researcher was solely responsible for the data collection.

1.12.2.2 Informed consent

According to Burns and Grove (2009:205), the documentation of informed consent depends on the level of risk involved in the study and the discretion of the researcher and those reviewing the study. For the purpose of this research, consent from research respondents was waivered as mainly secondary descriptive data were analysed. The waiver posed no harm to the women, and involved no procedures for which consent was required outside of the research context. Permission from the Medical superintendent of the specific rural hospital was obtained (refer to Annexures 3) since the study was retrospective and only involved a review of documents that are hospital property.

1.12.2.3 Scientific honesty

The researcher acknowledged the authors from all sources referenced in the research. Clinical records were reviewed and data transcribed accurately and correctly from the data collection sheet to a database for statistical analysis. Utmost care and close scrutiny was applied to the data analysis to ensure reliability and reproducibility of the results.

1.13 SIGNIFICANCE OF THE STUDY

The study was significant in that it advocated for improvement of access to cervical cancer screening and early detection and treatment for pre-cancerous changes in an effort to prevent and reduce morbidity from cervical cancer. The research is also capable of adding to the existing literature the notion that VIA is a more effective and affordable cervical screening method in low resource settings. It is also capable of creating awareness among the Government and the public in the rural areas of Zimbabwe of the importance of supporting early detection and prevention against cervical cancer by creating awareness in the community of the utilisation of VIA as a cheaper and affordable screening method.

1.14 SCOPE AND LIMITATION OF THE STUDY

This study is a descriptive analysis of the clinical records of a sample of women who underwent VIA screening for cervical cancer at a specific rural hospital in rural North-eastern Zimbabwe from the 1st of January 2016 to the 28th of February 2017.

According to Zimbabwe national statistics agency (2013:1) a specific rural area population is 7623 and the population of women of child bearing age is 15-24 but the district catchment area includes 33 640 people and 30,000 patients seen yearly. The limitations of the study include the fact that the sensitivity of VIA as a screening test may be operator-dependent. Another limitation is that there were no data available on the baseline incidence and prevalence of cervical cancer at the specific rural hospital prior to the introduction of free VIA screening in the year 2013. Since screening was offered to women who were symptomatic and asymptomatic, there may be a higher rate of abnormalities in the study population.

1.15 STRUCTURE OF THE STUDY

Chapters	**Chapter name**	**Description**
Chapter 1	Orientation to the study	Introduction, background, problem statement, purpose, objectives and methodology was discussed
Chapter 2	Literature review	Literature was presented and discussed on cervical cancer and cervical cancer screening methods by scholars.
Chapter 3	Research design and methodology	Presented a discussion of research paradigm and design, sampling approach, sample size, data collection method, data analysis, design validity and reliability and ethical considerations.
Chapter 4	Data analysis, presentation and interpretation of the results	Presented the data analysis, and interpretation of the results.
Chapter 5	Discussion of the results, limitations, conclusion and recommendations	Comprised of the discussion of the results limitations, conclusion and recommendations.

1.16 CONCLUSION

This chapter provided an overview of the study. The purpose and the objectives of the study were addressed. The research design and the methodology were discussed. Validity and reliability were also discussed. Furthermore ethical principles were considered. The next chapter is a review of the literature.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The first chapter gave an insight regarding burden of cervical cancer both worldwide and in sub Saharan Africa. The research question, methodology and ethical issues were discussed. This chapter reviewed and discussed literature from prior studies conducted by scholars and experts on the subject of VIA as a screening test for cancer of the cervix. Existing and available sources of information such as articles on cancer of the cervix, pertinent text books, online sources and research papers produced by recognised authors who specialised in cervical cancer screening and treatment were used.

The following topics are discussed:

- Cervical cancer as a disease.
- Development of cervical cancer.
- Pre-cancerous cervical changes (cervical Intraepithelial lesions).
- Signs and symptoms.
- Risk factors associated with cervical cancer.
- Prevention and screening
- Papanicolaou (Pap) smear.
- Human Papillomavirus Deoxy-ribonucleic acid (HPV DNA) testing.
- Visual inspection with Acetic acid/Visual Inspection with Lugol's iodine (VIA/VILI).
- Human Papillomavirus Vaccine.
- Treatment of pre-cancer and cervical cancer.
- Diagnosis and staging of cervical cancer.

The benefits, shortfalls, and challenges for each way of detecting cancer of the cervix was carefully analysed according to how it was presented in different research articles.

This was done in order to broaden understanding of cervical cancer and encourage appreciation of the need to provide screening services for cervical cancer that rural women can afford and easily access.

2.2 CERVICAL CANCER AS A DISEASE

O'Toole (2013:273) indicated that the term cancer is used to describe malignant autonomous changes that take place in cells and tissues which is uncontrolled. In cervical cancer, the cells of the epithelium which line the squamocolumnar junction of the cervix go through these uncontrolled cancerous changes. Brooker and Nicol (2012:790) highlighted that the abnormal cells will then grow in an uncontrollable way, to form cancerous lesions that affect the epithelium in its full thickness. A short discussion of the structure and position of the cervix is useful in understanding the aetiology of cancer of the cervix**.**

2.2.1 Development of cervical cancer

According to Kuguyo, Matimba, Tsikai, Magwali, Madziyire, Gidiri, Dandara and Nhachi (2018:1) cervical cancer is the fourth most common cancer in women worldwide, and the second most common cancer among women in developing countries. However, cervical cancer can be prevented through early screening and detection.

The cervix forms the lower third of the uterus. The ectocervix forms the lower part of the cervix which lies within the vagina and is visible on speculum examination. The endocervix lie superior to the vagina and cannot be seen on examination. The area where epithelial cells from the ectocervix and endocervix meet is known as the squamocolumnar junction (SCJ) which is present at birth. At around the age of 30 years as the woman matures, an additional SCJ is formed due to expected physiological processes. The space between the old and the new additional SCJs becomes the transformation zone. This is the part of the cervix which is infected by HPV and most cervical cancers start in this area. HPV causes irregular cellular changes in the epithelium which lines the transformation zone which makes them precancerous. If a woman is repeatedly infected by oncogenic HPV-types such 16 and 18 they may cause precancerous changes. This may later develop cervical cancer.

More than 200 types of HPV are known to exist but HPV 16 and 18 are the most common types that are associated with about 70% of cervical cancer in women. The irregular changes that infection by HPV causes on the cervix are referred to as pre-cancer or cervical intraepithelial neoplasia (CIN) (Broutet, Eckert, Ulrich & Bloem 2014:35; Hoque, Ghuman, Coopoosmay & Van Hal 2014:1; Odendal 2011:4).

2.2.2 Cervical intraepithelial lesions/pre-cancerous lesions

Cervical intraepithelial lesions refer to changes in the in the squamous cells of the cervix, which are prone to develop in the transformation zone as a result of persistent with different HPV infections (Odendal 2011:2). However, not all women who test positive have pre-cancer.

Behtash and Mehrdad (2006:683), Denny (2009:5); WHO (2014:136); Lindeque (2009:63) explained that pre-cancerous lesions are detected using a medical test such as Pap smear or VIA. Therefore, a subsequent diagnostic test such as colposcopy, biopsy or endocervical curettage is required to confirm a pre-cancer diagnosis. Since the late 1800s it has become common knowledge that cervical cancer is preceded by peculiar irregular changes that can be observed on the cells of the epithelium which are not invasive in nature. Since 1968 the irregular peculiar pre-cancer cells have been termed cervical intraepithelial neoplasia (CIN) a phrase interchangeable with the word dysplasia which means that there is irregular maturation of the cell. CIN-1 was equated to mild irregular cellular changes, CIN-2 referred to moderate irregular cellular changes and CIN-3 described severe irregular changes also known as carcinoma in situ. The identification of cells that have irregular changes that are peculiar to cervical cancer is useful for instituting measures to prevent the lesions from growing into cancer of the cervix.

In an area with low resources women can only be screened effectively for pre-cancer if the method used is cheap for them and within their access such as is the case with VIA.

2.2.2.1 CIN-1

According to Peralta-Zaragoza, Deas, Gómez-Cerón, Garcia-Saustegui, Fierros-Zārate and Herrera (2013:7) this is a mild form of pre-cancerous lesions of which about to 91% of CIN-1 regresses without any intervention and clears off within a period of 2-3 years. For this reason, no treatment is required for CIN-1 when it is identified because it is likely to disappear spontaneously without any treatment. Use of condoms in women diagnosed with CIN-1 has been observed to help cervical lesions to disappear. However, it has been observed that a small percentage (10%) of women with CIN-1 will further develop CIN-2 (Odendal 2011:3). Peralta-Zaragoza et al (2013:7) indicated that, women who are found to have CIN-1 should be advised to repeat cervical cytology screening every 6-12 months and where available have follow-up HPV DNA testing every 6 to 12 months to detect progressing to CIN-2.

Cervical cytology and HPV DNA are not available at the specific rural hospital in Zimbabwe. Therefore, women who were found to have CIN-1 at a specific hospital in Zimbabwe are advised to return screening with VIA every 6 to 12 months to check on the state of the lesion.

2.2.2.2 CIN-2

This refers to moderate irregular pre-cancer changes and 50% of CIN-2 lesions resolve on their own without any intervention within 2 years (Odendal 2011:3). Denny (2009:6) highlighted that in most developing countries, women who have CIN-2 will be treated on the same day without them having a biopsy to confirm the diagnosis by histopathology, a practise known as the ‘see and treat approach’. The ‘see and treat approach’ means that a medical test such as VIA is paired with an immediate pre-cancer treatment such as cryotherapy for a positive result without confirming a pre-cancer diagnosis (Huchko, Sneden, Sawaya, McCune, Maloba, Abdulrahim, Bukusi & Cohen 2015:392). The 'see and treat' approach is currently practised at a specific hospital in Zimbabwe. Denny (2009:7) in a study conducted in Cape Town comparing cervical intraepithelial neoplasia in “see and treat” versus punch biopsy found that the outcomes in the final specimen of women who undergo 'see and treat', compared to women who first undergo a punch biopsy were the same as no CIN was found in both groups (Denny 2009:7).

2.2.2.3 CIN-3

CIN-3 are severe pre-cancerous lesions involving cervical glandular cells and these are also referred to as carcinoma in situ (CIS) (Lonky, Penner & Diedrich 2014:247; Brooker &Nicol 2012:212; Denny 2009:6). In CIN-3, more than 75% or two thirds of the epithelium lining the cervix has severe irregular changes which may be present in the whole lining of the cervical epithelium. CIN-3 lesions are rare but their presence mean that there is a very high likelihood for the woman to develop cervical cancer. If, left untreated severe pre-cancerous lesions develop into cervical cancer. It may take on average 10 to 20 years for the lesions to progress to cancer. Further it has been observed that 5% of women with HPV infection will suffer from severe pre-cancer in about 3 years. Whilst only 20% progress may progress to invasive cancer within 5 years. Screening with VIA is therefore beneficial for early detection and treatment of pre-cancerous lesions before the development of cervical cancer.

2.2.3 Signs and symptoms of cervical cancer

Broutet et al (2014:156) indicated that most women may not show any signs or experience any symptoms of cervical cancer before the disease is at an advanced stage, except if they have regular screening for cancer of the cervix. The fact that symptoms show up when the cancer is advanced means that women who do not get screened only get to know when it's too late for treatment and this contributes to the increase in the number of deaths from cervical cancer.

WHO (2014:157) divided the signs and symptoms of cervical cancer into the following two categories:

2.2.3.1 Early signs and symptoms

The early signs and symptoms of cervical cancer are:

- Discharge from the vagina, which is sometimes mal-odorous due to necrosis and infection of tumour.

- Unexpected abnormal vaginal bleeding of any frequency or duration in women of reproductive age usually due to trauma or pressure from intercourse, douching or bearing down during defecation.
- Vaginal bleeding or slight bleeding following coitus in women of all age groups, even young women due to trauma or pressure on the cervix during intercourse.
- Post-menopausal spotting or bleeding due to depleted levels of oestrogen (Osborn, Wraa, Watson & Holleran 2014:1272). In the case of abnormal peri-menopausal bleeding, the recommendation is that cervical cancer should always be considered, particularly if the bleeding does not stop after the woman has been put on treatment.

Some signs like foul smelling discharge can be mistaken for sexually transmitted diseases in women who are active sexually. In order to be careful not to miss pre-cancer changes or cancer of the cervix, a meticulous gynaecological examination must be carried out (WHO 2014:157).

2.2.3.2 Advanced signs and symptoms

Brooker and Nicol (2012:213) outlined signs and symptoms of advanced cervical cancer as follows:

- An urge to pass urine repeatedly within short intervals as the tumour advances to the bladder.
- Lower back pain which is very severe and may extend down the buttock due to involvement of sacral nerves once the tumour spreads to the fundus of the uterus.
- As the tumour grows it exerts pressure to surrounding structures and cause severe pain in the lower abdomen.
- Discharge from the vagina worsens in amount, texture, colour and smell as it becomes thicker, brown more offensive, more continuous with episodes of heavy bleeding.
- As condition deteriorates, muscle wasting due to poor eating and anaemia will ensue which usually is accompanied by fever due to secondary infection and abscesses that develop in the tumour.
- Obstruction of the ureters by the growing tumour will cause diminished passage of urine or renal failure.

- As normal tissue is replaced by the growing tumour, fistulae form resulting in Incontinence of urine or faeces.
- Venous return to the legs is blocked as well as the pudendal nerves resulting in severe oedema of the legs and
- Shortness of breath due to anaemia, possible collection of fluid in the lungs or rarely lung metastases.

These symptoms are associated with a very poor chance for survival because they indicate that the cervical cancer has spread to other parts of the body. At this point the prognosis is poor and treatment may not be successful.

2.2.4 Risk factors associated with cervical cancer

WHO (2014:136) highlighted the risk for cervical cancer posed to women by sexual intercourse due to the possibility of HPV infection. Cancer of the cervix is predominant among women aged 30 to 50s although HPV is acquired during the teen years. HPV prevalence among teenagers is about 43% with a rate of 1 to 2 cases of cervical cancer in in 15 to 19 year old girls. HPV exposure and infection often begin in the teenage years in girls who indulge early in sexual intercourse with multiple partners. Peculiar irregular pre-cancer changes will take place and eventually cervical cancer will develop if HPV infection is not cleared (Lonky et al 2014:247; Osborn et al 2014:1262).

The risk for developing cervical cancer is therefore high among women with no previous history of screening. Further, women who initiated sexual intercourse at an early age and those who had children at a young age. Also included on the high risk for cancer of the cervix are grand multiparous women with more than 5 viable children. Those who have many different sexual partners. Women who are smokers and poor who have a less affluent lifestyle as they cannot afford healthcare services (Brooker & Nicol 2012:211). In addition, women with HIV infection have been reported, to have a five times higher risk for cancer of the cervix especially when they have a low CD4 count below 200 cells per cubic millimetre. The low CD4 count indicates lowered immunity and it increases the risk for HPV infection. Women who are HIV infected are presumed to have an impaired response to HPV infection and they are repeatedly infected by a wide range of different HPV genotypes. Compared

with women in the general population, HIV-infected women have a higher prevalence of high-grade dysplastic precursor lesions. Hence, it is important that women who are HIV infected be screened more frequent in an effort to avoid progression to cancer (Boardman 2012:2; Odendal 2011:2; Forahn, Godfrey, Watts, & Langley 2015:S350).

2.3 PREVENTION AND SCREENING

Screening for cancer of the cervix is conducted using tests such as Pap smear and VIA in women who are asymptomatic so that precancer or cancer can be identified (Broutet et al 2014:123). Lindeque (2009:23) emphasised that the only way by which existing precursor cervical lesions can be detected and managed is through screening. Screening is important for the detection of pre-cancer lesions as well as to reduce the number of women who are suffering or dying from cancer of the cervix. Screening methods for cervical cancer are divided into three groups which include cytology-based methods (Pap smear and liquid-based cytology), molecular method (HPV DNA test) and visual methods (VIA/VILI).

The primary prevention of cancer of the cervix can be achieved by protecting women from HPV infection before they resume sexual activity. This can be done through the administration of a prophylactic vaccine against HPV for girls who are 9 years to 13 years of age before they indulge in sexual intercourse (Denny 2009:8; Elfström, Herweijer, Sundström & Dahlström 2014:121).

According to WHO (2014:48) primary prevention also involves educating both boys and girls in an age appropriate and culturally sensitive manner on sexuality issues. Abstinence from sex and avoiding high risk sexual behaviours in order to prevent HPV and other sexually transmitted infections is promoted for primary prevention. To those who are already sexually active, primary prevention also entails promoting consistent correct use of condoms and provision of the condoms. Health education is also given on male circumcision and warning against smoking which is a risk factor for cervical cancer.

When women are already sexually active and exposed to HPV they can still be prevented from getting cervical cancer by proper history taking and examination, screening and treating them for any irregular changes on the cervix that are precancerous (WHO 2014:49; Lonky et al 2014:242).

2.3.1 Papanicolaou (Pap) smear

A Pap smear involves the collection of a sample of cells from the cervix using a spatula and a small brush or just using a small brush only. The cells are spread onto a glass slide so that they can be examined in a laboratory by a technician who has specialised in cytology. In countries with high resources, Pap test has been used for more than 50 years and it has reduced the number of women who die from cervical cancer by over 80%. In countries that have well-functioning health care delivery systems such as in developed countries, cytology based screening methods have effectively decreased the prevalence of cervical cancer (Broutet et al 2014:135; Hasanzadeh, Esmaeili, Tabaee & Samadi 2011:1802).

Literature on the screening for cancer of the cervix indicates that the use of Pap-smear in developing countries is problematic because the process needs trained healthcare staff and laboratories that are certified which are not readily available in those countries. According to Luciani, Munoz, Gonzales, Delgado and Valcarcel (2011:53) in Peru, there were an estimated 4400 new cases of cervical cancer and 2100 deaths in 2008, despite the country's screening efforts using the Pap test. South Africa is at an advanced stage than most countries in sub-Saharan Africa in that there is a well, set and organised national Pap-smear screening programme that recommends three Pap smears for all women from 30years of age that are taken at 10 year intervals. However, this organised national screening program is not well utilised because a study conducted in Cape Town on the utilization and outcomes of cervical cancer services showed that women are not forthcoming in utilising the Pap-smear screening program (Batra, Kuhn & Denny 2010:39). Screening with Pap-smear had not been a success at the specific hospital in Zimbabwe because women could not afford it and the infrastructure was not up to standard for Pap-smear tests.

2.3.2 Liquid-based cytology test

Liquid-based cytology uses the same sample collection technique as Pap smear but the difference is that instead of spreading the sample onto a slide, in LBC the sample is soaked in a preservative then delivered to a laboratory where it is processed by a cytotechnician who then examines it under a microscope. Thus, LCB has challenges similar to those of Pap test whereby it is too expensive and requires resources that are not available in a low resource context (Broutet et al 2014:136).

2.3.3 Human Papilloma Virus- Deoxyribonucleic acid (HPV-DNA) testing

Mukakalisa, Bindler, Allen and Dotson (2014:1068) stated that HPV-DNA test is a more recent method for cervical cancer screening which is able to detect high risk strains of HPV. Where the HPV-DNA test has been used, death has been reduced in women who had severe lesions in advanced invasive cancer of the cervix and in women living with human immunodeficiency (HIV). HPV-DNA testing is reported to a high sensitivity which ranges from 66% to 95% for all women who have gone through the test. Developed countries like the USA that can afford the test have opted to use HPV-DNA as a first line screening test to detect high-grade lesions, in women aged 30 years or older (Moyer 2013:852). Women can collect their own samples using self-collecting tampons. Collection of the sample involves inserting a cytological brush into the cervix and rotating it 360 degrees in the endometrium of the cervical canal. Once tissue sample has been collected using a spatula, it is picked up and placed in a tube containing sterile saline using a cyto brush. The sample will then be examined in a laboratory by a cytotechnician. The HPV-DNA test is costly, it can only be done where there is a laboratory, and the test is lengthy requiring more than 7 hours to process. HPV-DNA cannot be easily implemented in Sub-Saharan countries like Zimbabwe because of its cost which is not affordable and the equipment needed which is difficult to procure (Mukakalisa et al 2014:1068).

2.3.4 Care HPV

Brown and Trimble (2012:239); Stormo, Altamirano, Castelles, Espey, Padilla, Panameno, Soria, Santos, Saraiya and Luciani (2012:802); Campos, Tsu, Jeromino, Mvundura, Lee and Kim (2015:38); Mukakalisa et al (2014:1069) noted that instead of HPV-DNA testing, care HPV test which is a DNA test is a cheaper option that can be used to detect HPV infection in countries that are resource poor. Care HPV test, HPV infection is detected with cervical or vaginal swabs. Sample collection is similar to that of HPV-DNA where the woman either collects, the cervical swab specimen or the health care provider collects it for her. The sample can be processed immediately on site if there is a laboratory and trained personnel or can be sent to a laboratory in a container with a solution to preserve the sample. A portable compact unit with a battery is operated by workers with minimal laboratory training. The test is suitable for low resource areas as it is made so that it can be used in areas where there is no reliable access to clean water or electricity because no refrigerator, electricity, or running water is required. Care HPV was evaluated in studies conducted in China where Care HPV proved to have a better sensitivity of 90% compared to VIA which had a sensitivity of 41%. However, Care HPV still poses a challenge in low resource settings regarding cost to obtain equipment.

2.3.5 Colposcopy

According to WHO (2014:260) colposcopy is the examination of the cervix with an instrument that provides a strong light and magnification known as the colposcope. The examination is done in 1 to 2 minutes after applying acetic acid to allow colour changes to occur on the abnormal parts of the cervix. It helps the examiner to locate the site of the lesion and to determine its size. It is used following an abnormal Pap test result or positive aceto-white VIA result to guide biopsies and to confirm the state of areas that appear abnormal. Colposcopy also assists with endo-cervical curettage and treatment of pre-cancer using cryotherapy or LEEP.

2.3.6 Visual Inspection with acetic acid /Visual Inspection with Lugol's iodine (VIA/VILI)

Visual inspection of the cervix using acetic acid (VIA) is a cheap screening method that requires less expertise as compared to Pap test. VIA is easy to perform once a healthcare provider has been trained, it does not have to be done by a physician only. During a VIA, 3-5% acetic acid commonly known as vinegar is applied high up in the vagina and onto the cervix. Cervical tissue which is normal is not changed by vinegar, it will remain pink but irregular cells, including dysplastic and cancerous cells, will change into a white color. No high technology is used in a VIA but it is instrumental in reducing suffering and death of women from cancer of the cervix in countries that have resource constraints (Mukakalisa et al 2014:106; Paul et al 2013:1279).

Levine, Chudnoff, Taylor, Baganizi and Banks (2011:171) cited that VIA has become popular in developing countries because it has been shown to be able to screen for pre-cancer with much ease in such settings than Pap smear. Several large clinical studies conducted to evaluate VIA's ability to detect severe pre-cancer of the cervix have shown that VIA is just as good as Pap test in picking up high grade pre-cancer lesions (Paul et al 2013:1279). VIA screening method allows the health care provider to diagnose and treat abnormal cells immediately in a health center. For a see and treat approach, VIA has commonly been followed by cryotherapy right away, so that any precancerous lesions noted on VIA can be treated with cryotherapy (Huchko, Sneden, Sawaya, McCune, Maloba, Abdulrahim, Bukusi & Cohen 2014:392).

At the location of this study, if irregularities are observed on VIA, women are referred to the gynaecologist for a colposcopy so that a biopsy can be done if a lesion is found. Cryotherapy is also available on site, if there is need to treat pre-cancer cells. The World Health Organization (WHO) has identified and recommended VIA as a method of choice for screening of cervical cancer in low-resource settings thus making it suitable for the research site which is a low resource rural setting. Through research it has been observed that VIA is a widely used low-cost cancer screening technique (Huchko et al 2014:392).

VILI is similar to VIA but instead of acetic acid it uses Lugol's iodine. The use of VILI alongside VIA is recommended where available because it has been shown to improve the

test performance of VIA and better than using VILI alone (Huchko, Sneden, Zakaras, Mc Cune, Sawaya, Maloba, Bukusi & Cohen 2015:2). According to Denny and Anorlu (2012:1), VILI is contraindicated in women with iodine allergy and it can be used in all other women. Apparently studies have reported VILI to have the same sensitivity as VIA in picking up irregular changes on the cervix but VIA has been shown to have a lower specificity than VILI.

Research has reported that healthcare providers prefer to use VILI rather than VIA because they have deemed it easier to interpret the mustard colour patterns produced by Lugol's iodine staining rather than VIA's acetic acid. Although VILI may appear to be an easier test, Lugol's iodine is not as easy to buy as acetic acid is readily available and cheap to buy. VILI would therefore not be user friendly because of the difficulty in procurement which would compound the problems in a rural health care centre especially in sub Saharan Africa. With VILI there is also a waiting period of up to an hour for the iodine stain to fade before performing another test such as colposcopy or VIA if it is required which is not the case with VIA where another test can be performed right away. VILI is not usually alone, it is rather used as a follow up confirmatory test if VIA does not clearly show or exclude changes on the transformation zone (Huchko et al 2015:2).

2.3.7 Cryotherapy

Most women who have a VIA positive result can be treated with cryotherapy which is a relatively simple freezing technique, to destroy lesions that show pre-cancer on the cervix. During cryotherapy pre-cancer areas are destroyed by freezing them with very cold metal disc through which liquid carbon dioxide (CO2) will be circulating. The freezing can either be done over five minutes as a single treatment or it can be done for 2-3 minutes and repeated for the same length of time after the metal disc has been allowed to cool. The metal disc is placed directly over the pre-cancer cells but some normal cells are also destroyed during the process. The procedure does not need anaesthesia and roughly takes about 15 minutes with the woman experiencing slight pain on the cervix. Sometimes women have complained of feeling some warmth that spreads above to the upper body and the face (Garcia 2012:579).

After cryotherapy, normal epithelium will grow over the areas where the pre-cancer was destroyed. Cryotherapy can be done at any level of care as long as the healthcare providers have been trained on the procedure and are skilled in pelvic examination (Broutet et al 2014:142).

Treatment by cryotherapy is only effective when lesions are at the cervical os, pre-cancer cells that are high up in the cervical canal require the use of other types of treatment such as cone biopsy.

Demonstration projects and randomized controlled trials for screening of cancer of the cervix have shown that the approach of doing VIA and cryotherapy on the same visit is a highly effective and efficient way to screen for cervical cancer and to treat any abnormalities. Acquiring liquid carbon dioxide is not complicated and no electricity is required for cryotherapy thus it is an appropriate treatment mode in a low-resource setting (Stormo et al 2012:802).

As a challenge, VIA's high sensitivity can lead to some false positive results and unnecessary treatment but cryotherapy is a safe procedure with very low tolerable side effects (Mukakalisa et al 2014:1069).

2.3.8 Human Papillomavirus Vaccine

Brooker and Nicol (2012:211) highlighted that HPV only causes cancer in human beings and the main route of transmission (99.7%) is through sexual intercourse. Broken mucosa facilitates entrance of HPV. HPV infection does not mean that a woman will automatically have cancer of the cervix. The majority (90%) of HPV infections will clear on their own and about 5% will develop moderate to severe pre-cancer within a period of 3 years after acquiring HPV. Further, 20% of those with severe pre-cancer (CIN-3) lesions will suffer from cancer of the cervix within 5 years (Boardman 2012:2).

Andrea, Anderson and Lambert (2012:900) noted that it is possible to protect women from contracting infection from HPV through immunization with a vaccine.

Two types of vaccines are available which are bivalent (Cervarix) which protects against HPV 16 and 18, and quadrivalent (Gardasil) which offers protects against HPV 6, 11,16 and 18 (Harries, Moodley, Barone, Mall & Sinanovic 2009:39; Sinanovic, Moodley, Barone, Mall, Cleary & Harries 2009:6196).

Women often become infected by HPV shortly after becoming sexually active. At least 87% of cases of cervical cancer are caused by seven types of the 40 HPV genotypes that infect the vaginal tract. Two types, HPV 16 and 18, are responsible for 70% of all cases of HPV infections. The majority of women who suffer from cancer of the cervix are infected mainly by two types, HPV 16 and 18 and as such, the HPV vaccine is targeted for these two genotypes (Mukakalisa et al 2014:1070; Synman, Dreyer, Botha, van der Merwe & Becker 2015:115).

In South Africa the three doses of HPV vaccine is recommended by the South African HPV advisory Board and is supposed to be completed in six months. However, if there are any challenges with the third dose, it can still be safely given within twelve months from the initial dose of HPV vaccine (Denny 2008:1).

According to Synman et al (2015:116) a more recent preventative approach for cervical cancer involves the immunisation of girls between the ages of 9 to 11 years with Human Papilloma Virus (HPV) vaccine before initiation into sexual activity. However, few governments and even fewer women in developing countries can afford either vaccines. Evidence suggests that countries with established cervical screening programmes and can afford the vaccines have been able to successfully reduce the number of women with pre-cancer, cancer and those who die from cancer of the cervix. The Global Alliance for Vaccine and Immunization (GAVI) together with some committed pharmaceutical companies advocated for developing countries and managed to make HPV vaccine available at a cheaper price of $15 for all the three recommended doses from $335 (Youngblood 2013:1688). Paul, et al (2013:1278) stated that in many countries, governments have approved HPV vaccination as a first line preventive measure for cancer of the cervix. It is important to bear in mind that HPV vaccines only protect against cancer caused by the specific HPV genotypes contained in the vaccine such as HPV 16 and18, not against all cervical cancers.

Therefore girls who are vaccinated will still need to access screening services at older ages because they are not protected against HPV types that they were not immunised against. Moreover vaccination will not protect women who are already exposed to the viruses, therefore older women who are sexually active need screening and treatment services (Andrea et al 2012:900; Paul et al 2013:1278; Mukakalisa et al 2014:1071).

Markowitz, Dunne, Saraiya, Chesson, Curtis, Gee. Bocchini and Unger (2014:1) highlighted that vaccination is beneficial to women of up to 26 years of age as they are also vulnerable to HPV infection. Research has shown that women who once had HPV infection but have cleared it, can be completely protected by vaccination against the specific genotypes proffered by the HPV vaccine (Markowitz et al 2014:1; Skinner, Szarewski, Romanowski, Garland; Ponce & Salmeron 2014:2213).

Another approach which is being used in the prevention of cervical cancer is the vaccination of boys in order to reduce the spread of HPV to their future female sexual companions. The HPV vaccination has reduced genital warts disease among boys which in turn should reduce the spread of HPV to girls through contact. Centre for Disease Control and Prevention (CDC) has recommended vaccination against HPV for boys aged 11 -12 years to prevent cancer of the oral, anal and genital areas. Vaccination of boys is a very necessary strategy in preventing cervical cancer but it is not a feasible option because of costs that are prohibitive for developing countries such as in Sub-Saharan Africa. Developed countries that have the financial capacity have adopted and implemented the strategy of vaccinating boys (Chaturvedi, Engels, Pfeiffer, Hernandez, Xiao, Kim, Jiang, Goodman, Sibug-Saber, Cozen, Liu, Lynch, Wentzensen, Jordan, Altekruse, Anderson, Rosenberg & Gillison 2011:4295).

2.4 DIAGNOSIS AND STAGING OF CERVICAL CANCER

According to the WHO the diagnosis of invasive cancer of the cervix is only certain if it has been confirmed by a biopsy which has been through histopathologic examination. Biopsy refers to the removal of a small piece of the affected area of the cervix so that the tissue is examined in a special laboratory by pathologists in order to confirm the diagnosis of cancer (WHO 2014:153). This means that even if a woman presents with severe abnormality or large growth on the cervix, a biopsy is still needed to confirm cervical cancer.

Waiting for results of a biopsy can take up to a month which means if the woman has cancer, there is seemingly an unavoidable delay in starting treatment. If at a primary care centre and biopsy results confirm cervical cancer, the patient is either referred to a gynaecologist for further tests and management or to a higher level of care for further evaluation and treatment. (Broutet et al 2014:156).

2.4.1 Stages of cervical cancer

Broutet et al (2014:160) explained that the already existing Federation of Obstetrician Gynaecologists (FIGO) staging systems are used to determine the stage of cervical cancer its extent of invasion and whether the cancer has or has not yet metastasised. Staging systems give guidelines for managing the woman and determining the possible outcome of the cervical cancer. Odendal (2011:8) described the stages of cervical cancer according to FIGO in the following way:

2.4.1.1 Stage 0

Stage 0 is commonly referred to as carcinoma in situ which describes the presence of severe irregular changes on the cervical epithelium (CIN-3). It is diagnosed when pre-cancer cells are found in the innermost lining of the cervix (Odendal 2011:8).

2.4.1.2 Stage I

In stage I cancer cells are present but they are only found on the cervix. In Stage IA, the cancer is not deeper than 5mm and it does not exceed 7mm wide, it cannot be seen by the naked eye, it is only seen microscopically. Stage IA1 stroma which supports the cervix is invaded to maximum 3mm depth and 7mm horizontal spread.; stage IA2 the invasion of the foundation supporting the cervix is greater than 3mm to less than 5mm with 7mm horizontal spread, stage IB the cancer is visible to the naked eye and appears confined to the cervix or the lesion can be seen under a microscope and it is greater than stage 1A2. Stage IB1is visible to the naked eye and its largest measurement does not exceed 4cm, then IB2 which is also visible to the naked eye does not exceed 4cm on its largest measurement (Boardman 2012:2).

2.4.1.3 Stage II

In Stage II the cancer grows beyond the uterus but it does not affect walls of the pelvis or the lower part of the vagina (lower third).

In Stage IIa the connective tissue around the uterus is not affected. In Stage IIA1 the cancerous area which is visible to the eye is 4cm or less in its largest measurement. Stage IIA2 can be visualised with the naked eye with its largest measurement exceeding 4cm. In Stage IIB the cancer has affected the top two thirds of the vagina as well as the tissues around the uterus but the side walls of the pelvis are not affected (Odendal 2011:8).

2.4.1.4 Stage III

In Stage IIIA, the cancer has affected the lower third of the vagina, but the side walls of the pelvis are not affected. In Stage IIIB, the cancer has affected the side walls of the pelvis and sometimes the cancerous growth is so large that it causes blockage of the ureters which will lead to enlargement of the affected kidney and ultimately failure of the kidney (Odendal 2011:9).

2.4.1.5 Stage IV

In stage IV the cancer will have affected organs that surround the uterus and some distant tissue. In stage IVA the cancer affects the urinary bladder or walls of the rectum and may have affected lymph nodes in the pelvis. In Stage IVB in addition to the pelvic organs and lymph nodes, the cancer extends to the upper body and affects the abdomen, liver gastrointestinal tract or lungs (Odendal 2011:9).

2.5 TREATMENT OF PRE-CANCER AND CERVICAL CANCER

Treatment of pre-cancer involves ablative methods whereby abnormal tissue is destroyed by burning or freezing and surgical method whereby abnormal tissue is removed by excision (WHO 2014:141). Lindeque (2009:63) stated that there are four ways in which pre-cancer is managed.

These are:

- The woman gets no treatment she is just observed.
- Large loop excision of the transformation zone which is known as loop electrosurgical procedure (LEEP).
- Treatment of the irregular area of the cervix without excising it.
- Surgical removal of the affected cervical tissue.

Lindeque (2009:64) suggests that the factors that determine the choice of treatment for CIN lesions include:

- Age of the woman
- Number of children the woman had
- Patient's reproductive history including whether the woman is presently pregnant
- General physical wellbeing and HIV status of the woman
- The woman’s ability to come to hospital for review appointments
- The outcome and reliability of the colposcopy findings
- The presence of copious cervical discharge or bleeding
- The size of the area which is turned white by the acetic acid and
- The extent of affected areas that look like they might have invasive cancer on inspection with the naked eye inspection and the results from cytology.

2.5.1 Treatment of cervical pre-cancerous lesions

Odendal (2011:2) mentioned that the majority (90%) of cases of mild cervical changes CIN-I will clear up without any treatment and the same will happen to about 50% of the moderate cervical pre-cancer. Mild to moderate pre-cancer can be destroyed by freezing with liquid carbon dioxide (cryotherapy) but if they are severe and much larger, they are excised using loop electrosurgical excision procedure (LEEP) or cold knife conisation (CKC). Cryotherapy destroys pre-cancerous lesions by freezing the abnormal tissues and destroying them. LEEP involves the removal of affected tissue from the cervix using a loop made of thin wire powered by an electrosurgical unit. In cold knife conisation part of the cervix which is cone-shaped is removed including portions of the outer and inner cervix.

In cases where CIN-3 lesions are extensive, the uterus is removed especially if the woman is post-menopausal. In areas with high resources women with severe cervical pre-cancer have access to other modes of treatment such as the loop electrosurgical excision procedure, laser conisation, or cold knife conisation. These methods are not applicable in low-resource settings because of lack of both human and material resources (Broutet et al 2014:145).

The low-resource setting where the study was conducted offers cryotherapy, LEEP, CKC and excisional methods for pre-cancer treatment. It is a mission hospital and it is privileged to have a missionary obstetrician gynaecologist working on site. Therefore, if a woman has a positive result for VIA a colposcopy can be done and appropriate treatment can be offered thus making the cervical cancer screening programme feasible.

2.5.2 Treatment of cervical cancer

Odendal (2011:8) highlighted that the four different stages of cervical cancer require different means of treatment. The goal of treatment in cancer of the cervix is to reduce the cancer prevent it from worsening and provide comfort through pain relief. Depending on how big the cancer growth is, treatment could be radiotherapy, chemotherapy and palliative care or a combination of any of these treatment modes. A surgical operation to remove cancerous tissue and its surroundings can also be done as part of treatment. Surgical procedures include removing both the tissue that surrounds the cervix and the cervical canal (cone biopsy), removal of the uterus (simple hysterectomy), and removal of the uterus, uterine tubes, ovaries and the parametrial tissue (radical hysterectomy) as well as salvage surgery which is done after radiation to prevent the cancer from resurfacing (WHO 2014:166).

Cone biopsy is done on women who still anticipate getting pregnant and have cancer that only affects the epithelial layer of the cervix. A large circle of tissue surrounding the cervix including the cervical canal is removed. In a simple hysterectomy the whole uterus as well as the cervix is removed in women who have ceased menses and in young women who do not wish to conceive. Radical hysterectomy is used to remove the uterus, tissue around the uterus, lymph nodes in the pelvis and around the aorta, and tubes and ovaries in order to get rid of early invasive cancer.

Salvage surgery in which radical surgery and removal of a portion of the vagina is done to decrease the recurrence of cancer. Palliative surgery is done in women who are dying from advanced cancer to relieve obstruction of the bowels or to repair fistulae (WHO 2014:167).

Radiotherapy uses high energy rays of light that are discharged onto the area affected by cancer to destroy the cancer cells. Tele-therapy is another form of radiation which is administered to the pelvis from a distance. It uses a special instrument that beams radiation above the patient, on the pelvis where the cancer is. The patient requires treatment sessions every day for a few minutes over a period of 5 to 6 weeks. Another radiation type is brachytherapy where a catheter device is used to place radioactive substance into the cervical canal close to the tumour. The patient has to be admitted for 1 to 2 days and only requires 2 treatments that are one week apart. The radiation itself does not cause any pain but it has side effects that can cause discomfort to the woman which include skin changes, nausea and vomiting. In Africa, there are not many radiotherapy services and 15 African countries have no radiation services at all. Radiotherapy in Africa is still considered high technology medicine and in countries where it is available, it is only found in central government hospitals and in private hospitals that are located in the cities. There is a large number of women with cervical cancer that is advanced who require radiotherapy treatment. Statistics have shown that there are 80 000 new cases of cervical cancer per year and 55% of these women require radiotherapy but it is only available and accessed by a few women. Apart from the radiotherapy being limited, the machines are often non-functional or poorly maintained (Broutet et al 2014:168; Denny & Anorlu 2012:1436).

Odendal (2011:8) cited that treatment for Stage 0 of cancer of the cervix is the same as that for severe pre-cancer (CIN-3) and it includes cryotherapy, LEEP and or hysterectomy. The treatment for stages I and stage II of cancer of the cervix require a combination of internal and external radiation therapy, radical hysterectomy where lymph nodes are removed and chemotherapy. Treating stages III and IV of cancer of the cervix requires both internal and external radiation therapy plus chemotherapy. WHO (2014:168) defines chemotherapy as giving the woman toxic drugs to destroy the cancer cells that will be rapidly dividing in order to reduce the size of the cancer growth. Chemotherapy is usually used alongside radiotherapy and less often with surgery. Smaller cancer growths have been seen to respond better to radiation as opposed to large bulky growths.

Palliative care is rendered to women dying from advanced cancer of the cervix to provide pain relief and to help women cope with the distressing symptoms of the disease. Palliative care is designed to improve the quality of life of the patient and to offer psychological support to the family to help them cope with the illness of their loved one and to prepare for the anticipated loss. Radiation and chemotherapy can both be used in palliation to alleviate the pain and suffering experienced by women with advanced cancer of the cervix which has affected other organs. Surgery can be provided at the low-setting rural hospital, but radiotherapy and chemotherapy are only done at central hospitals in the city and it is expensive such that women can neither access it nor afford it. Preventive measures are therefore very essential if deaths of women from cancer of the cervix is to be reduced (Broutet et al 2014:182).

2.6 THE WAY FORWARD

Although VIA has proved to work in the screening of cancer of the cervix, some problems related to the interpretation of VIA results and the place where the VIA have been observed in some studies. Patil, Lumb, Swamy and Durdi (2011:63) highlighted that the differences in interpretation of VIA can lead to some false positive results. Health workers therefore need comprehensive practical training by medical staff who have specialised in oncology or other health workers who have been trained in VIA so that they can be competent in carrying out the procedure. Besides well trained staff, availability of acetic acid should be ascertained as well as a good white source of light and sometimes these can be a challenge to get in a rural set-up. A study conducted in Zimbabwe, on VIA revealed that the quality of the test was poor because of lack of good equipment such as proper examination tables, specula and good white light source. The addition of VILI has been suggested by some studies, as it is easier to learn and use. Lugol's iodine would stain the cervix and improve the sensitivity and specificity of VIA (Patil et al 2011:63).

In this setting where there was no set program for screening for cancer of the cervix, the researcher considered the use of VIA to encourage rural women to be screened for cervical cancer. Compared to cytological screening methods such as Pap smear VIA is relatively cheap since it is a free service and it is a simple and convenient service as women get the test result and treatment on the same day.

Patil et al (2011:63) highlighted the challenges of poor service delivery conditions in a previous study on VIA in Zimbabwe which has provided a learning opportunity in coming up with ways to overcome these challenges. The use of a generator to back up the power source and the provision of proper examination table and specula has been considered so as to improve the quality of VIA. Every eligible woman who visits the hospital is offered the opportunity for screening of cancer of the cervix with VIA, no matter what their reason for visiting the hospital may be. This will ensure that no opportunity for screening is missed among women in the population targeted for screening who seek health services. Thus this should help in the prevention of cancer of the cervix if pre-cancer changes are detected early. Hopefully the free service and availability of VIA should be a solution to rural women's poor socio-economic status and promote screening for cancer of the cervix.

Having a gynaecologist and an operating room that works makes it possible for procedures such as colposcopy, cryotherapy, LEEP and hysterectomy to be available and can be accessed by clients who need these services. This will further help overcome socio-economic barriers to accessing screening and decrease loss to follow up because of the 'see and treat' approach. Only women with histology that confirms cancer of the cervix will incur costs for referral to a tertiary centre. Cytology-based cervical screening methods such as Pap test remain the best but in a setting where women otherwise would not be screened, it is better for women to be screened with VIA than not to be screened at all. Thus VIA will be a feasible option for a rural community in Zimbabwe.

2.7 CONCLUSION

In this chapter, cancer of the cervix was reviewed from the precancer state to development of advanced cancer of the cervix. In Sub-Saharan Africa and globally, the two types of HPV that have been singled out as the main causes of precancer changes of the cervix are types 16 and 18. Discussion included screening for cancer of the cervix before precancer changes take place and treatment after changes are noted. Literature has made it apparent that there is limited accessibility to screening tests and that most women are not able to meet the expenses to be screened for cancer of the cervix in low-resource areas such as in most countries of Sub-Saharan Africa. Discussion also included ways of treating different stages of pre-cancer and that of cervical cancer at its different stages.

The review of literature revealed that treatment of cancer of the cervix with radiotherapy in Sub-Saharan Africa is scarcely available and rural women cannot access or afford it. VIA was identified as a suitable screening method for cancer of the cervix in resource constrained areas because of its relative simplicity and affordability. Furthermore, VIA is convenient in that results and treatment can both be provided on the same day. The chapter that follows addresses research design and methods.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

Chapter 2 discussed the aetiology and how cancer of the cervix will progress from precancer to advanced cancer if not treated. Different cervical cancer screening methods and prevention levels were discussed. Treatment options for cervical cancer which consist of surgery, radiotherapy, chemotherapy and palliative care were discussed. This chapter presents a discussion on the research design and methods that guided sampling approach and technique, sample size as well as data collection and analysis.

3.2 RESEARCH SETTING

The study was conducted at a specific rural hospital in Zimbabwe. The hospital is in a remote area of northern Zimbabwe approximately 124 miles from Harare, the capital of the country. The hospital is licensed for approximately 150 beds and on an average workday 10-20 surgeries are done and 200-300 outpatients are seen. The patient population is drawn from the entire country as people seek affordable, reliable, compassionate healthcare. The specific hospital provides services for the treatment of both acute and chronic illnesses to all age groups of both sexes. It was chosen because it is rural and there is a high incidence of women suffering from reproductive health conditions. This high incidence supported by literature on the subject which holds that the highest incidence of cervical cancer is among rural women. The data used in this study was collected at the hospital's Maternal Neonatal and Child Health Department (MCH).

3.3 RESEARCH DESIGN

Gray et al (2017:192) explained that a research design is the overall plan used by the researcher to address a research question and it includes strategies for enhancing the study's integrity. A research design is the blueprint for conducting a study that maximizes control over factors that could interfere with the validity of the findings (Burns & Grove 2009:696). A retrospective, non-experimental, cross-sectional, descriptive document

analysis was used to extract data from the clinical records of women who have undergone VIA for cervical cancer screening at that specific hospital. The design was used to investigate the socio-economic characteristics of women who utilised VIA as a method for cervical cancer screening at that specific rural hospital in Zimbabwe and to identify and describe the factors that determine the utilisation of VIA as the method of choice for cervical cancer screening.

3.3.1 Quantitative design

Quantitative research is a formal, objective, rigorous systematic way of gathering empirical information either directly or indirectly by using a formal instrument to collect the needed data (Grove, Gray & Burns 2014:32). This study used a quantitative method to examine and determine the relationships between VIA uptake and VIA results with the various medical, and socio-economic independent variables. Quantitative research was used in this study in order to determine the association between utilisation of VIA and the medical and socio-economic status of women. Quantitative research requires numerical data in order to address the research objectives and research questions thus it was relevant for this study (Ellis 2013:66). The quantitative method was further used because the independent variables of women who underwent VIA and the VIA results could be numerically obtained, and were measurable and quantifiable (Burns & Grove 2009:429). Clinical records were the data source used to produce the results in this study.

3.3.2 Non-experimental design

In a non-experimental study the researcher cannot manipulate the variables, and only the relationship between variate and criterion variables is stated (Pandey & Pandey 2015:102). The researcher relied on an interpretation of the relationship between VIA results and the medical and socio-economic status of women as documented on the clinical records in order to come to a conclusion. The non-experimental design has a high level of external validity. This means that it can be generalised to a larger population. This study used an existing retrospective data from the clinical records of preceding years (1st of January 2016 to 28th of February 2017) to extract information on medical and socio-economic characteristics of women who undergone VIA.

3.3.3 Descriptive design

This is a scientific method in which information is collected without influencing it in any way. Accordingly, events or situations are portrayed accurately (Polit & Beck 2014:379). Descriptive research gathers quantifiable information that can be used for statistical inference through data analysis (Grove et al 2013:33). It utilises closed-ended questions. Nominal data were collected using a checklist to identify and describe the socio-economic characteristics of women who underwent VIA as a screening method for cervical cancer at a specific rural hospital in Zimbabwe. Descriptive statistics from the study were used to describe and synthesise data from the checklist into averages. Percentages were used to draw a conclusion about a population (Polit & Beck 2014:220).

3.3.4 Cross-sectional design

A cross-sectional study is essentially a snapshot of events occurring at a point in time which uses a single point of data collection and allows the researcher to look at numerous things at once (Ellis 2013:85). Gray et al (2017:207) stated that in a cross-sectional design, the researcher records information that is present in a population without manipulating the variables. A cross-sectional design is used to describe the characteristics that exist in a community and allows the making of inferences about possible relationships (Suresh 2014:173). In this study the socio-economic characteristics of women who utilised VIA for cervical cancer screening at a specific rural hospital during the prescribed period were investigated and described.

3.3.5 Retrospective document analysis

According to Burns and Grove (2009:240), in a retrospective document analysis, both the cause and the proposed outcome have already occurred. The researcher is interested in a present outcome or effect and attempts to determine antecedent factors that caused it (Suresh 2014:173).

The study used the clinical records of women who had undergone VIA in the past year, from the 1st of January 2016 to the 28th of February 2017 in order to identify and describe the factors that determine VIA as the method of choice for cervical cancer screening and investigate the socio-economic status of women who undergone VIA at a specific rural hospital in Zimbabwe. A self-designed structured pre-tested checklist (Annexure 6), which was based on WHO recommendations was used to extract data from women's results who had undergone VIA as reflected in their clinical records to address the research objectives and to answer the research questions. The researcher was solely responsible for collecting data on the checklist in order to ensure consistency.

3.4 RESEARCH METHODOLOGY

3.4.1 Population

The target population for the study comprised of the entire clinical records of women who had undergone VIA from the 1st of January 2016 to 28th February 2017 at a specific hospital. A representative sample was used which addressed the objectives of the study. Total of 2000 clinical records of women who underwent VIA from 1st January 2016 to 28th February 2017, were available.

3.4.2 Sampling procedure and sample

A sample is a subset of the defined population and the elements of a sample are the units that are analysed in a research (Ruel, Wagner & Gillespie 2016:124). These elements of can be people, places, things or events. The sample for this study were clinical records of women enrolled for the VIA programme. Sampling involves selecting a portion of the population to represent the entire population (Gerrish & Lathlean 2015:25). Burns and Grove (2009:35) stated that sampling includes selecting subjects, events, behaviours or elements with which to conduct the study. Sample in the study consisted of all the clinical records of women who undergone VIA for the period of 1st January 2016 to 28th February 2017. The sampling frame consisted of 2000 clinical records of the women who underwent VIA. The sample size of 323 records was calculated using the Rao soft formula.

The sample size of 323 records was adequate and the standard deviation of less than 0.05 was expected from the sample size. The Rao soft formula was used to calculate a sample size of 323 records as follows:

(Rao soft sample size calculator. From: http://www.raosoft.com (accessed 22 April 2016)

$x = Z(^{c}/_{100})^{2} r (100 - r)$

$n = {}^{Nx}/_{((N-1)E^{2} + x)}$

$E = \text{Sqrt} [{}^{(N-n)x}/_{n(N-1)}$

Where N = Population size

E = Margin of Error

CI = Confidence Level

x = Z score value

r = response distribution

The Rao Soft formula above was applied to the research as follows:

Population size N = 2000

Margin of Error E = 5 %

Confidence Level (CI) = 95 % Z score 1.96

Response Distribution = 50%

Using the equation,

Sample size n =

x= (1.96) ² x (50%) x (100%50%)

x = 0.9604

n = 322.3954

n = 323

According to Ruel et al (2016:135), systematic random sampling is done by first selecting an element of the population at random. Following that, every *k*th element for example every 10th is chosen until the predetermined sample size is obtained. Burns and Grove (2009:352) states that the value of *k* is calculated as follows:

K=Population size ÷ Sample size

The formula was applied for this study as follows:

K=2000÷323

2000÷323=6.1919505

Therefore, every 6th record was selected out of the available 2000 records to obtain 323 records on VIA for the period of 1st January 2016 to 28th February 2017. In adhering with systematic random sampling, the first record was randomly picked.

3.4.3 Inclusion criteria

Inclusion criteria means the criteria that the study population had to meet (Moule, Aveyard & Goodman 2017:166).

- records of women between 18-59 years who attended gynaecology clinic during the specific period,
- records of women who attended family planning clinic and maternal health services and
- records of women who undergone VIA, whose records are kept at a specific hospital in Zimbabwe.

3.4.4 Exclusion criteria

Exclusion criteria refers to the criteria that explains why specified members of the population were not considered for the study (Moule et al 2017:166).

Records of:

- minors (Under 18 years of age),
- pregnant women and
- incomplete clinical records that had missing information.

3.4.5 Development and pre-testing of an instrument

A self-designed structured checklist based on WHO (2014:20) recommendations and literature was used to obtain information to address the research objectives and to answer the research questions (Annexure 6).

A checklist was used to extract data on the medical, social and economic characteristics from clinical records of women who had undergone VIA from 1st January 2016 to 28th February 2017. The checklist was examined for content validity by the researcher's supervisors, OPD nurses and oncologist/gynaecologist to ensure that the questions and response options adequately captured the socio-economic characteristics of women who undergone VIA at a specific hospital. The researcher's supervisors also checked the instrument's reliability by assessing the accuracy of the questions for measuring the socio-economic characteristics of women who underwent VIA. The checklist has advantages of being objective and accurate because questions directly address the required information and cannot be manipulated (Polit & Beck 2010:212). The checklist was comprised of:

- Demographic data which addressed age and physical address;
- Socio-economic status questions that included: marital status, highest level of education attained, employment status, monthly income, water supply source, means of communication, mode of sanitation;
- Obstetric history addressed: number of pregnancies, number of miscarriages, parity
- Medical history addressed: any present illness, HIV status, any signs or symptoms of cervical cancer and
- Cervical cancer screening history: prior cervical cancer screening, VIA results, findings after 3 minutes, quadrants involved stage of cancer if invasive, whether biopsy was taken and action taken.

The checklist was pre-tested by using clinical records that were randomly selected on the 30th of March 2017. The purpose of pre-testing the checklist was to identify weaknesses and correct ambiguities detected in order to enhance validity and reliability. In order to prevent contamination of the results of the study from inaccurate assumptions based on the results of the pre-testing, the ten pre-test clinical records were not used in the main study (Polit & Beck 2010:67). The researcher was allowed access to the records office once the relevant permission has been obtained. An office clerk who was responsible for the records office locked up the office afterwards. No clinical records were removed from the hospital records office. Clinical records were filed by the clerk into a lockable cupboard separate from their original places in order to avoid reuse in the main study.

After pre-testing a checklist modification was done and extra information was added in preparation for the main study. The modification of the checklist addressed, the sub-heading 'socio-economic status' was added. A number of indicators which included marital status, water supply source, mode of sanitation, and communication means were added. Some indicators that were originally under demographic data were put under socio-economic status. These included education, monthly income and employment status. This also led to changes in the numbering of items on the checklist.

Pre-testing the instrument proved to be a very valuable exercise because additional changes covered all the objectives of this study. The purpose of the study was changed from determining the effectiveness and affordability of VIA as a cervical cancer screening method to describing the factors that determine the utilisation of VIA as the method of choice for cervical cancer screening and to investigate the socio-economic factors of women who have undergone VIA. A fourth objective directed at determining the ability of VIA to identify cervical pre-cancerous changes was affixed (Annexure 6). No other flaws were detected in the rest of the checklist and therefore no further corrections were made.

3.4.6 Data collection

According to Grove et al (2014:47) data collection refers to the precise, systematic gathering of information relevant to the research purpose or the specific objectives, questions, or hypotheses of a study. In this study, empirical evidence was gathered using retrospective document analysis.

Data collection commenced after Ethical clearance was granted by the Research and Ethics committee of the Department of Health studies at the University of South Africa (Annexure 1). Informed consent was obtained from the medical superintendent by granting permission to conduct the study since it involved the use of clinical records that were hospital property (Annexure 3). Furthermore, permission was granted by the medical superintendent to access the clinical records (Annexure 5). This was granted after the researcher's request to use the clinical records (Annexure 4).

Data were extracted from clinical records of women who undergone VIA at a specific rural hospital from 1st January 2016 to 28th February 2017. A retrospective document analysis was conducted using data from the results of women who undergone VIA. A checklist was used. The results were obtained from 323 clinical records of women who underwent VIA at a specific rural hospital from 1st January 2016 to 28th February 2017. The clinical records were accessed by the researcher from the hospital records office, after working hours and during the weekends in order to maintain privacy and to avoid interrupting the hospital records clerk.

The clinical records were identified using a VIA register from MCH which indicated all the names and hospital numbers of the clinical records of those who undergone VIA. The researcher was guided around the records office by an office clerk who locked the office afterwards. The clerk worked extra hours and those hours were granted back by giving time off by the medical superintendent. No clinical records were removed from the hospital records office. To maintain confidentiality no identifiers appeared on the checklist.

The researcher upheld to maintain confidence with results of VIA from the records of the women by allocating numbers to each record so that the names of the women were not revealed and therefore did not appear on the checklist. Each and every clinical record had its own checklist. After the data collection the clinical records were filed back into their original places by the clerk. The researcher had access to 2000 clinical records but only collected data from 323 records which were the required sample size. The data were collected over a three-month period from the 10th of June 2017 to the 11th of September 2017. It took a total of 108 hours to collect the data as the researcher was only given access to the records after hours and on weekends. After the data collection, a USB memory stick was used for the safe-keeping of the data in preparation for analysis purpose.

3.4.7 Data analysis

Data from the checklist were coded and captured on Microsoft Excel. Coding replaced names and labels in the main data file. Data-coding was done by the researcher in order to maintain confidentiality.

The data processing included pasting labels with unique identifiers on each clinical record, coding information on occupation, uptake of VIA, then screening and capturing the data. The age of the respondents was divided into two groups comprising of reproductive respondents aged between 18 and 49 years (Group 1) and the non-reproductive group of 50 years of age and beyond. Through the services of a statistician, all data were analysed with the Statistical package for Social Sciences (SPSS) Version 20 (Annexure 7). SPSS was used to obtain descriptive statistics. These included the mean age of the respondents and the frequencies for the various variables. Associations between variables were established through Chi-square tests for association between the socio-demographic variables which were comprised of parity, gravidity, previous cancer screening, water supply status, communication status and other medical conditions and VIA uptake variables.

Both the positive (aceto-white cervical lesion) and negative (no aceto white cervical lesion) VIA tests and the number of women treated for pre-cancerous and cancerous cervical changes as a result of the VIA programme were analysed. Statistical inferences were generated in order to determine the socio-economic characteristics of women utilising VIA protocol at a specific rural hospital in Zimbabwe. When the data processing was completed, the statistics editing rules were applied to the data to check for accuracy and to flag improbable cases for investigation. Finally, the data were presented in tables, graphs and figure format.

3.5 VALIDITY AND RELIABILITY

3.5.1 Validity

According to Heale and Twycross (2015:1), validity is whether the research has truly measured what it was intended to measure and includes how truthful the results are. In this research, the objectives and research questions guided in formulating the checklist to ensure that findings would be valid, it measured what it was intended for.

3.5.1.1 Content validity

Content validity refers to the extent to which the instrument adequately captures the full content for the concept being measured (Polit & Beck 2010:212). The checklist was submitted to the researcher's supervisors, nurses working in Out Patient Department (OPD) and oncologist/gynaecologist to ascertain whether the information was relevant and adequately and whether it actually addressed the research questions. The questions and the response options were assessed to ensure that they were appropriate for spelling out the factors needed to determine the socio-economic characteristics of women who had undergone VIA at a specific rural hospital in Zimbabwe. A statistician was consulted to assess the checklist to determine if there were any irregularities that may hinder data analysis.

3.5.1.2 Design validity

According to Burns and Grove (2009:221), design validity is a measure of the truth or accuracy of a claim and it is central in determining whether the study findings are sufficiently valid to add to the evidence base for patient care. Observer bias was diminished as this study used clinical records where information had already been routinely and independently collected in the past two years by professionals with no specific hypothesis. The use of retrospective data was efficient in terms of sample size and availability of information. It was comparatively inexpensive compared with prospective data collection and moreover the data were collected in a standardised way, permitting comparisons over time and between different countries.

3.5.1.3 Instrument validity

The researcher fragmented and delimited phenomena into measurable or common categories that can be applied to all the subjects or wider and similar situations (Polit & Beck 2010:205). The methods involved the use of standardised measures so that the varying perspectives and experiences of women could be fitted into a limited number of predetermined response categories to which numbers were assigned (Burns & Grove 2009:380). A checklist was used for data collection as a predetermined schedule or numbers as an instrument in the method of research.

Thus, the checklist was used to collect data from the clinical records in a standardised manner following the questions on the checklist for each of the 323 records used in the study according to predetermined procedures. Therefore the checklist measured the socio-economic characteristics of women who underwent VIA from the 1st of January 2015 to the 28th of February 2016. In the broadest sense, devising a test or the validity of an instrument was on focus (Heale & Twycross 2015:1). The significance of this test was to ensure replicability or repeatability of the results.

In this study, the records were checked for consistency and correct labelling by the researcher. All the available data were used as a sample of items pertaining to the construct being measured. The validity of the instrument was attained by submitting the checklist to the research supervisors who are content experts, a statistician and to an obstetrician gynaecologist who is experienced with cervical cancer screening. This was done so that it could be ascertained whether the information on the checklist was relevant and adequately covered the abstract construct being measured. A WHO-recommended checklist for cervical cancer screening obtained from the literature was also used in this study for the development of the checklist new instrument. The researcher scrutinised all the completed clinical records used in the study and thereby maintained the competency of the screening recording. Internal and external quality-control measures were put in place with regard to the record-keeping pertaining to women and VIA screening.

3.5.1.4 Internal validity

According to Parahoo (2014:198) internal validity is the extent to which the effects detected in a study are a true reflection of reality rather than the result of extraneous variables. It is a determination of the extent to which it can be inferred that the independent variable is truly causing or influencing the dependent variable and not some other confounding variable (Lobiondo-Wood & Haber 2014:71). For this study this involves a determination of the extent to which it can be generalised that the medical and socioeconomic characteristics of women at a specific rural hospital truly influences the uptake of VIA. The design used in this study was in the form of a retrospective document analysis which involved collection of information that already existed from the past.

Thus there was no threat to maturation, with regard to internal validity, no unplanned changes would influence the findings on the women's clinical records as they were already there (Burns & Grove 2009:222). According to Gray et al (2017:692) a selection threat which stems from differences in the process by which subjects for a study are chosen and grouped is the most challenging threat to internal validity of non- experimental designs. There was no selection threat to this study since there was a systematic random selection of the sample from the sample frame which represented the clinical records of women who undergone VIA for different reasons. There was no threat to internal validity because of the retrospective nature of the study where both the cause and the effect have already happened and so cannot be manipulated.

3.5.1.5 External validity

External validity refers to the extent to which the findings of a study can be applied or generalised to other similar populations (Parahoo 2014:199).The results of this study can only be generalised to the specific rural setting under study. However, VIA is currently being introduced as a national programme for cervical cancer screening. It is therefore contended that the results and recommendations from this study will benefit women and health care providers in similar health institutions and scholars who may want to engage in a similar study. It has to be noted though, that situational factors may influence the results of similar studies that may be conducted on the same topic in other health institutions.

3.5.2 Reliability

Reliability refers to the extent to which data collection techniques or analysis procedures yield consistent findings even if tested again on the same group or on another group (Saunders et al 2010:156). Only 16 hospital records, which is less than 2% of the 2000 clinical records, had missing information which meant that the clinical records reported well the information that was required to measure the medical and socio-economic characteristics of women who underwent VIA at a specific hospital. It is assumed based on the fact that if data collection and analysis is repeated on the same clinical records, the same information would still be available and results should be replicable (Grove et al 2014 287).

3.5.2.1 Instrument reliability

The reliability and validity of an instrument are not independent qualities (Gray et al 2017: 53). A measuring device that is unreliable cannot be valid. It is essential that an instrument is both reliable and valid because if the instrument has low reliability values, it is not valid because its measurement is inconsistent (Grove et al 2014:226). Pre-testing the checklist was done to enhance the reliability of the checklist because any ambiguities were identified and sorted out before engaging in the main study. Internal consistency as a measure of the instrument's reliability, addressed the degree to which the subparts of the instrument were measuring the same attribute or dimension (Brown 2017:678). The aspect of reliability tested in this study was internal consistency because the variable measured was the socio-economic characteristics of women utilising VIA. Reliability was further enhanced by the fact that the same kind of information was collected from the clinical records, that is, from the demographics, the obstetric history, medical history, economic history and cervical cancer screening history. Finally, bias was removed by selecting a sample from all the available data for the period from 1st January 2016 to the 28th February 2017 instead of using part of the data. The sample used in this study was representative of the population it was drawn from.

3.6 ETHICAL CONSIDERATIONS

Ethical considerations are measures taken to ensure that the rights of research subjects are protected to the fullest possible extent (Wood & Ross-Kerr 2011:226). According to Polit and Beck (2010:170), the question of ethics in research involves a set of moral values that ensures that professional, legal and social obligations to the study participants are adhered to during research procedures. In order to remain guided by ethical principles in this study the following considerations were adhered to:

3.6.1 Researcher- specific ethical considerations

3.6.1.1 Permission to conduct the research

Approval to conduct the study was granted by the Ethics and Research Committee of the University of South Africa (Unisa) The Department of Health Studies (Annexure 1).

Permission to conduct the study was granted by the Ministry of Health and Child Care of Zimbabwe through the medical superintendent of the specific hospital in Zimbabwe (Annexure 3). A formal request to access clinical records was submitted to the medical superintendent (Annexure 4) and permission was granted (Annexure 5).

3.6.2 Respondents'-focused ethical considerations

3.6.2.1 Confidentiality and anonymity

During the researcher's analysis of the quantitative data, the researcher protected the information from the records of the women. This was done by allocating numbers to each record so that the names of the women were not revealed and did not appear on the checklist. In order to maintain confidentiality, no identifiers appeared on the checklist. The collection of data was done specifically by the researcher in a specific rural hospital records office in Zimbabwe, which is separate and secure location for the clinical records. The fact that only the researcher could execute the data collection enhanced the confidentiality levels. The data were captured and stored on a universal service bus (USB) memory stick which was secured by the researcher for the purpose of maintaining confidentiality.

3.6.2.2 Informed consent

According to Burns and Grove (2009:205), the documentation of informed consent depends on the level of risk to the respondents involved in the study, the discretion of the researcher and those reviewing the study. The researcher sought permission from the medical superintendent of a specific rural hospital since the study was retrospective and only involved an analysis of clinical records that are hospital property (Annexure 3). This served as an informed consent. For the purpose of this study, consent from the women was waivered as mainly secondary descriptive data were used. No procedures were involved for which consent was required outside of the research context as there was minimal risk of harm to the women.

3.6.3 Scientific honesty

All the sources referenced in the research were acknowledged. Clinical records were reviewed and data transcribed accurately and correctly from the data collection sheet to a database for statistical analysis. Integrity in the data was ensured through systematic random selection of the sample, the records were kept in a secure place and only the researcher had access to the records. According to Polit and Beck (2010:493) integrity is shown by on-going self-reflection and self-scrutiny to ensure that interpretations are valid and grounded in the data. Thus the researcher was honest and reported facts without manipulating them and without plagiarism. Utmost care and close scrutiny were applied to the data analysis to ensure reliability and reproducibility of the results.

3.7 CONCLUSION

The research used a quantitative design in the form of a retrospective document analysis. A checklist, was used to collect data from the clinical records of women who underwent VIA from the 1st of January 2016 to the 28th of February 2017. Data analysis was done with the help of a statistician. The researcher ensured that ethical principles were adhered to. The next chapter presents and analyses the results.

CHAPTER 4

DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF THE RESULTS

4.1 INTRODUCTION

Chapter 3 discussed the research methods and design that guided the sampling approach, sampling technique, sample size, data collection and data analysis. This chapter focuses on data presentation, analysis, and interpretation of the results. The analysis was based on the objectives of the study.

4.2 DATA MANAGEMENT AND ANALYSIS

Descriptive statistics were used to describe and synthesise data into averages and percentages. These were used to make statistical inferences or draw conclusions about a population (Polit & Beck 2010:556). Through the service of a statistician, the statistical software, Statistical Package for Social Sciences (SPSS) version 20 for Windows was used to analyse data and give meaning to the statistics by using tables, graphs and figures. SPSS 20 and a Chi-Square test were used to establish quantitative measures that tested consistency, stability and predictability of the results. The results of the study are presented and interpreted from an excel spreadsheet on which all the data from 323 checklists was entered.

4.3 RESEARCH RESULTS

The following research results are presented and discussed:

- Demographic information
- Socio-economic status
- Obstetrical history
- Medical history
- Cervical cancer screening history
- VIA screening

4.3.1 Sample characteristics

The number of clinical records that were targeted was 2000 with 323 being the calculated sample which were extracted from the 10th of June 2017 to the 11th of September 2017 for data collection purpose. The response rates are indicated in tables 4.1 and 4.2 in the form of demographic information.

4.3.2 Demographic information

Item 1.1 Age of the women (N=322)

Table 4.1 Age of the women in years (N=322)

Age in years			**Karanda catchment**		**Outside Karanda catchment**	
	Frequency (n)	Percentage (%)	Frequency(n)	Percentage (%)	Frequency(n)	Percentage (%)
18-49	255	79%	86	27%	169	52%
50 and above	67	21%	11	3%	56	17%
Total	**322**	**100%**	**97**	**30%**	**225**	**70%**

Table 4 .1 shows the age distribution of the women. The majority of clinical records 79% (n=255) were of women aged between 18-49 years, 52% (n =169) from outside the Karanda catchment area and 27% (n=86) of those aged 18-49 years were from within Karanda catchment area. Furthermore, the majority of women who were 50 years and above 17% (n=56) were from outside Karanda catchment area, while only 3% (n=11) were from within Karanda catchment area. In total, most of the women 70% (n=225) from outside the Karanda catchment area. The ages of 18-49 years are the reproductive age group and they visited the hospital more frequently than those aged 50 years and above. This could be attributed to the fact that the reproductive age group visited the hospital for other reasons like family planning, child birth services, postnatal care and, treatment of other ailments.

Item 1.2 Residential area (N=323)

Table 4.2 Residential area (N=323)

Residential area			
Within Karanda catchment area		Outside Karanda catchment area	
Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
98	30%	225	70%

Table 4.2 shows the results of the women who underwent VIA according to their residential area. The residential area was divided into two categories consisting of those who lived within the Karanda catchment area and those who lived outside the Karanda catchment area. Of these women the majority, 70% (n=225) were from areas outside the Karanda Mission Hospital catchment area while only 30% (n=98) were from within Karanda catchment area. Those from Karanda catchment area were rural women, whereas those from outside Karanda catchment was comprised of women from urban, peri-urban, and other rural areas outside Karanda.

Although women from the within Karanda catchment area were within a walking distance from the hospital, only 30%, (n=98) were women from the Karanda catchment area whereas the rest, 70% (n=225) were from outside Karanda catchment and they would have needed transport to get to Karanda hospital. Louie, de Sanjose and Mayaud (2009:27) highlighted that in sub-Saharan Africa the coverage for cervical cancer screening range in urban areas is from 2% to 20% and from 0.4 to 14% in rural areas. This low coverage in rural areas is attributed to several factors which include poor access to health facilities, lack of finance as well as geographical and cultural constraints.

The low turn up of 30% (n=98) of the rural women from the Karanda catchment area suggests that these rural women are not forthcoming in seeking healthcare services, in particular cervical cancer screening services. This is indicative of a low use of screening by women in rural areas. The poor uptake of screening by the women from Karanda rural area concurs with the literature that rural women in Africa are not likely to be screened although they have the highest risk of developing cervical cancer (Ndejjo et al 2016:2).

4.3.3 Socio-economic status

Item 2.1 Marital status (N=323)

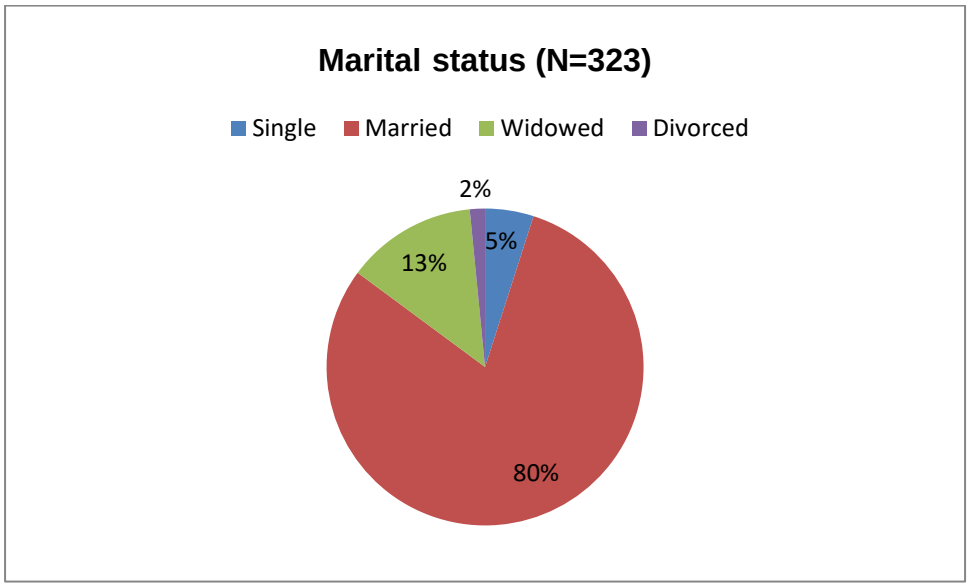


Figure 4.1 Marital status (N=323)

Figure 4.1 above shows the marital status of the women who utilised VIA. Women fell into four categories of marital status which included, single, married, widowed and divorced. The majority of the women 80% (n=259) were married while only 2% (n=5) were divorced. The other 13% (n=43) were widowed and 5% (n=16) were single. Married women were in the majority 80% (n=259) because they were in child bearing age. It was assumed they have accessed the hospital for postnatal visits and family planning. These results are from the study concurs with other studies where women were offered screening opportunistically as they report to the facility for other reasons other than screening (Ndejjo et al 2016:10).

Item 2.2 Educational level (N=322)

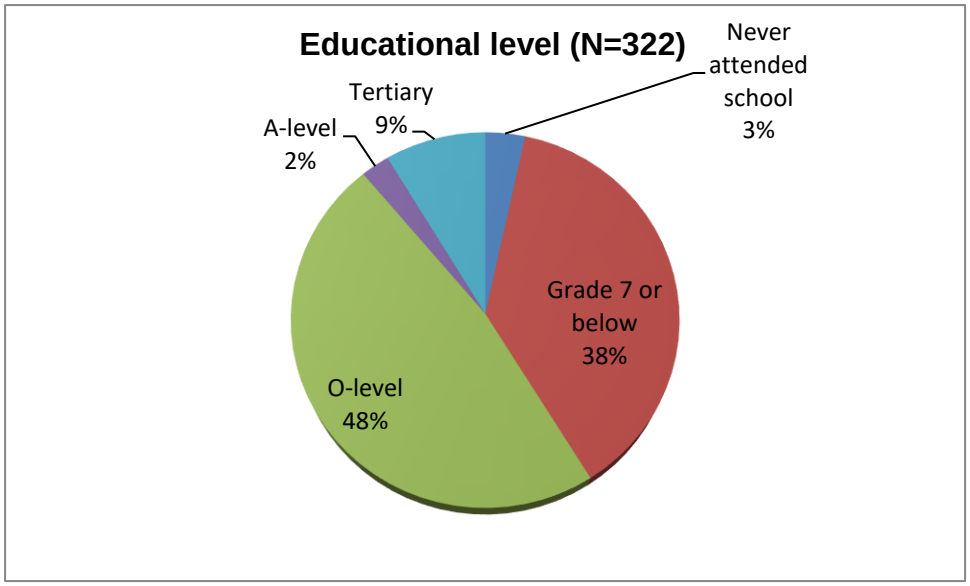


Figure 4.2 Educational level (N=322)

Figure 4.2 is a diagrammatic presentation of the highest educational level of the women who utilised VIA. The majority of the women 48% (n=154) had O-levels, 38% (n=122) had grade 7 or below, 9% (n=28) had attained tertiary education and 2% (n=7) had A-level. Only 3% (n=11) had never attended school. The results show that the majority of the women had some form of education because only 3% (n=11) had not received any form of education. The results do not show what level those who had grade 7 and below had reached. It is highly likely that most of the women from the Karanda catchment area fall into the grade 7 or below education level. This is because around Karanda rural area, girls marry young and have children at an early age before they get to high school. Mukakalisa, Bindler, Allen and Dotson (2014:1067) identified education as one of the keys in the prevention of cervical cancer and indicated that low literacy is a barrier to the prevention of cervical cancer.

Item 2.3 Employment status (N=321)

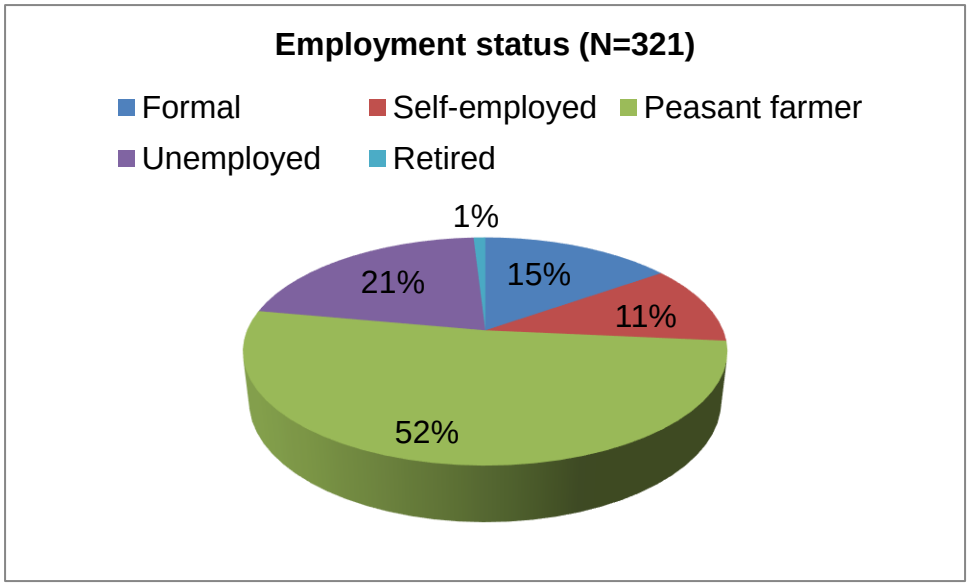


Figure 4.3 Employment status (N=321)

Figure 4.3 shows the employment status of the women. The clinical records of women revealed that peasant farming was the most common form of employment accounting for 52% (n=165). Those who were formally employed accounted for 15% (n=49), while 11% (n=36) were self-employed. The nature of the employment was not documented for both the formal and self-employed. Those who were unemployed were 21% (n=68) and a very low percentage of 1% (n=3) were retired. There were two of the clinical records with missing information on employment status.

Peasant farmers are not on a monthly salary, they only make money once per year after they have harvested their crops provided that there has been adequate rain and that they have good crops. These results suggest that peasant farmers are poor as they make less than a dollar a day. Furthermore the results show that the majority of the women, peasant farmers 52% (n=165), the self-employed 11% (n=36) and the unemployed 21% (n=68) lived in poverty as they made less than a dollar per day. The lack of finance could be attributed for delayed screening as women only come when they experience signs and symptoms of illness (Randall & Ghebre 2016:1).

Item 2.4 Monthly income (N=322)

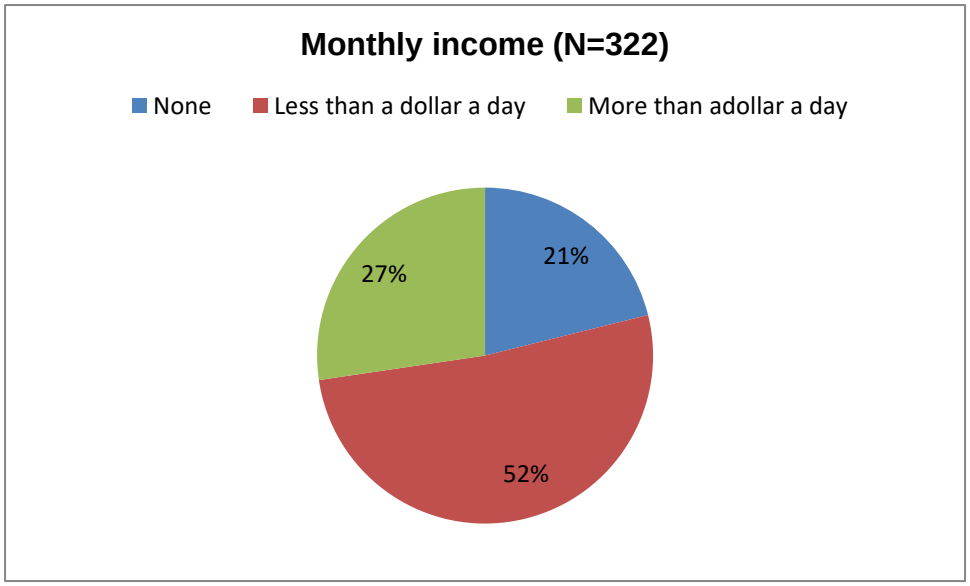


Figure 4.4 Monthly income (N=322)

Figure 4.4 shows the monthly income. The monthly income was divided into 3 options which were: none, less than a dollar (US) a day and more than a dollar (US) a day. The majority 52% (n=166) made less than a dollar per day, 27% (n=88) made more than a dollar a day and 21% (n=68) had no income. One clinical record had missing information on monthly income.

Although recently changed to US$1.90 per day, the international poverty line has in the past been roughly US$1 per day (Ferreira, Joliffe & Prydz 2016:5). This means those who made less than a US$1 per day 52% (n=166) and those who had no income 21% (n=68) lived in poverty. Therefore, 73% (n=234) of the study population lived in poverty. According to Zimbabwe Demographic and Health survey (2015:3) the economy of Zimbabwe was reported to be poor and projected to remain poor for a while, with high levels of unemployment. Therefore, women are generally poor because they live in a harsh economic environment and cervical cancer screening may not be a priority to them. Ndejjo et al (2016:2) highlighted economic constraints as one of the reasons for lack of screening and treatment in rural areas as poverty leads to poor access to health facility.

Item 2.5 Communication means (N=321)

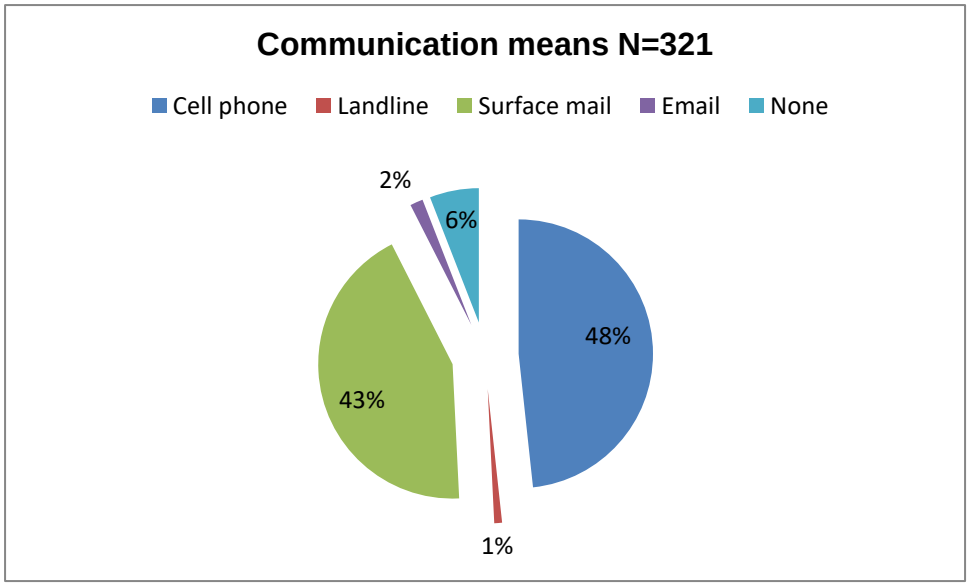


Figure 4.5 Communication means (N=321)

Figure 4.5 above shows the percentages for the different means of communication. Out of the 321 clinical records on which communication means was documented, the majority 48% (n=155) were cell phone users. A demographic health survey done in Zimbabwe reported that 87% of Zimbabwean households own mobile phones especially in the urban areas (Zimbabwe Demographic and Health Survey 2015:35). Postage letters (surface mail) was the next most used means of communication with 43% (n=139). The rest of the communication means had very low percentages, email 2% (n=5), landline telephone 1% (n=3) and no means of communication 6% (n=19). Given that the majority 70% (n=225) were from outside the Karanda catchment area, it is most likely that most of those who had cell phones were from urban areas. In rural areas, surface mail remains the main mode of communication although it is unreliable. This means that it is difficult to embark on follow-ups on the women if procedures requiring follow up are needed. With poor or no means of communication, cervical cancer screening uptake is poor.

Item 2.6 Water supply source (N=322)

Table 4.3 Water supply source (N=322)

Water supply source	Frequency (n)	Percentage (%)
Unprotected well	69	21%
Hand pump borehole	164	51%
Treated tap water	89	28%

Table 4.3 shows the number of women per water source. According to Ferreira et al (2016:9), the source of drinking water for a community or an individual is one of many non-financial determinants of socio-economic status. The majority of the clinical records 51% (n=164) revealed the use of hand-pump boreholes, and 28% (n=89) had access to treated tap water while the rest 21% (n=69) used unprotected wells. The 2015 demographic health survey for Zimbabwe reported that rural households had 69% access to improved water sources while urban areas had a 97% access to improved water (Zimbabwe Demographic and Health Survey 2015:35).

Although the results show a small percentage of 21% (n=69) for those using an unprotected well, the use of unprotected wells is a sign of poverty. The use of boreholes is commonly found in rural areas and there are no protected water sources in remote areas. Seemingly the majority of the clinical records 51% (n=164) indicated women who used boreholes were from rural areas while those with unprotected water sources were from remote rural areas according to their residential addresses.

Item 2.7 Mode of sanitation (N=318)

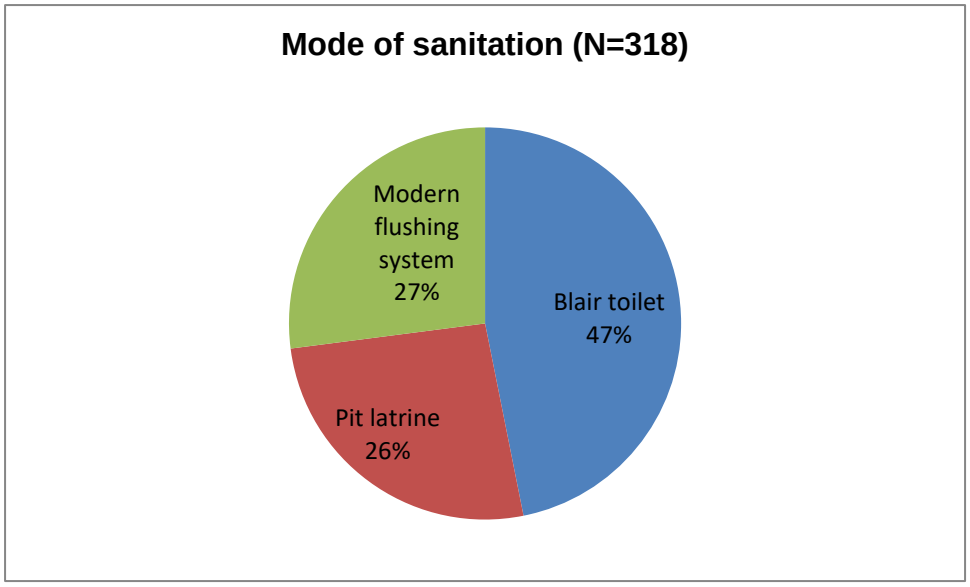


Figure 4.6 Mode of sanitation (N=318)

Figure 4.6 shows the different modes of sanitation. Use of the Blair toilet was the highest recorded mode of sanitation with 47% (n=149), the pit latrine 26% (n=83), modern flushing system 27% (n=86). Four clinical records had missing information on sanitation. A demographic health survey reported that only 37% of Zimbabwean households use improved sanitation (Zimbabwe Demographic and Health Survey 2015:35). These results show that only 27% (n=86) had a modern flushing system which implies that they were from urban areas with the rest of the women being from rural and peri-urban areas where Blair toilets and pit latrines are used.

4.3.4 Summary of the socio-economic status of the study results

The results of the study showed that out of 322 clinical records the women's ages were between 18 and 59 years with an average of 40.48 years of age. Broutet, Eckert, Ulrich and Bloem (2014:136) highlighted that cervical cancer is found in women whose age is from 30 years to the 50s. Typically women get HPV infection before 21 years of age but 10 to 20 years may pass from when a woman develops pre-cancer to when advanced cancer will manifest (Boardman 2012:1).

Of these women the majority, 70% (n=225) were from areas outside the Karanda Mission Hospital catchment area while only 30% (n=97) were from Karanda catchment area. The 225 who were from outside the Karanda catchment area included those from the urban areas 44% (n=141) and those from commercial farms and mining communities 26% (n=84). Cervical cancer screening in sub-Saharan Africa is reported to be low in general with a screening coverage of 2% to 20% in urban areas and a much lower percentage of 0.4% to14% among rural women (Louie, de Sanjose & Mayaud 2009:27). This low coverage in rural areas is attributed to several factors which include poor access to health facilities, lack of finance, and geographical and cultural constraints. The 30% (n=97) turn up of the rural women from Karanda catchment area was a low uptake which concurs with the literature that holds that there are challenges with cervical cancer screening in low-resource countries (Elfström, Herweijer, Sundström & Dahlström 2014:121).

4.3.5 Obstetrical history

Item 3.1 Number of pregnancies (Gravidity) (N=322)

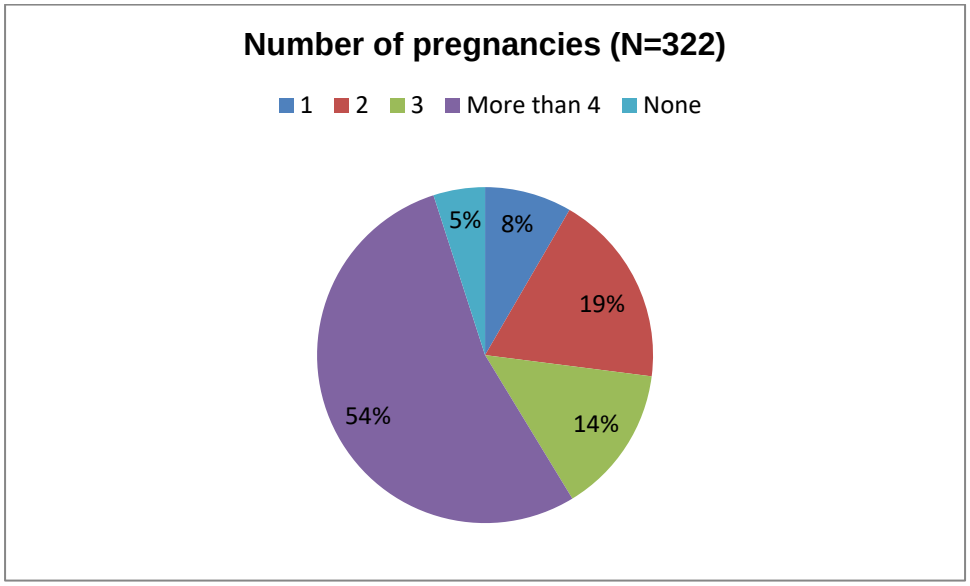


Figure 4.7 Number of pregnancies (N=322)

Figure 4.7 shows the percentages of the number of pregnancies which the clinical records indicated. This was put into five categories, those with one child, two children, three children, more than four children and those who had none.

The clinical records of women revealed that the majority 54% (n=174) had more than 4 pregnancies, 19% (n=61) had two pregnancies, 14% (n=45) had three pregnancies, 8% (n=26) had one pregnancy and 5% (n=16) had no pregnancy. Although the study did not enquire the age of the youngest child it is highly likely that the women visited the hospital for postnatal and family planning services. The results show a high frequency of pregnancies 54% (n=174) for those who had more than four pregnancies and 14% (n=45) for those who had three pregnancies.

Item 3.2 Number of miscarriages (N=322)

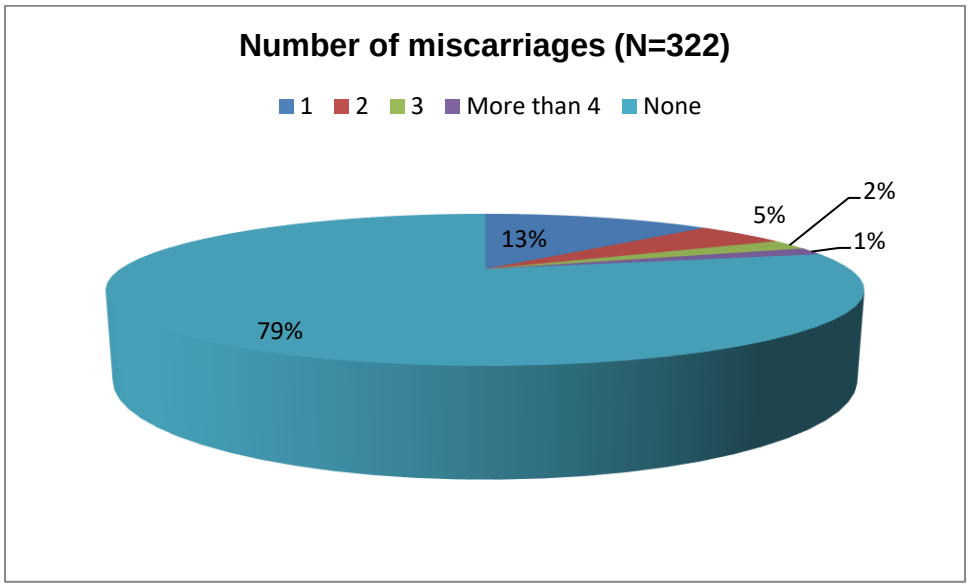


Figure 4.8 Number of miscarriages (N=322)

Figure 4.8 shows the number of miscarriages among the women.

The findings on the clinical records revealed that most of the women 79% (n=254) had no history of miscarriages. However, among the 21% (n=69) who had miscarriages, most of the women 13% (n=41) had 1 miscarriage, 5% (n=16) had 2 miscarriages, 2% (n=7) had 3 miscarriages, 1% (n=5) had more than 4 miscarriages. No evidence has yet linked cervical cancer to miscarriages although women tend to think that miscarriage predisposes to cervical cancer (Moore & Driver 2014:6).

Item 3.3 Number of children (Parity) (N=323)

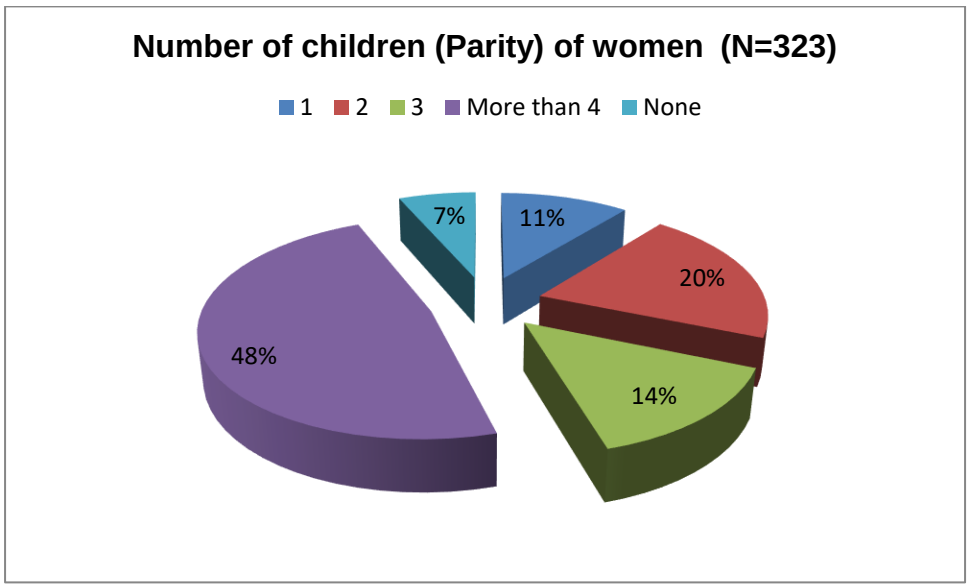


Figure 4.9 Number of children (Parity) (N=323)

Figure 4.9 shows the parity of the women. The parity of the women was investigated because having 5 children or more is identified as a risk factor for developing cervical cancer (Brooker & Nicol 2012:211). The majority of women 48% (n=155) had more than 4 children with likelihood of having even more children. Among the other women, 20% (n=66) had 2 children, 14% (n=46) had 3 children, 11% (n=35) had 1 child and 7% (n=21) had no children. These results show that the majority of the women had children as only 7% (n=21) each had no child. This is because the majority of the women 80% (n=255) were in the reproductive age group of 18 to 49 years.

4.3.6 Medical history

Item 4.1 Illness status (N=323)

Table 4.4 Illness status (N=323)

Illness status	**Frequency (n)**	**Percent (%)**
Illness present	275	85%
No illness	48	15%
Total	**323**	**100%**

Table 4.4 shows illness status of the women who undergone VIA. The illness status was recorded in order to determine whether women came for routine VIA or they had cervical cancer screening by chance because they had come to hospital due to illness. Out of the 323 women, the clinical records revealed that 85% (n=275) came to hospital because they had an illness for which they were seeking treatment. Only 15% (n=48) were not ill. This implies that under normal circumstances the 85% (n=275) women would not have had cervical cancer screening done if they had not been sick. This shows that there is a very low uptake for cervical cancer screening because only 15% (n=48) of the women intentionally sought screening for cervical cancer. Screening for cervical cancer is however advised in people who are asymptomatic as early diagnosis results in a better prognosis. Ezechi, Petterson, Gabajabiamila, Idigbe, Kuyoro, Ujah and Ostergren (2014:1) noted that women with cervical cancer in sub-Saharan Africa consult when the disease is at an advanced stage because they are identified late as they only report to a health centre when they are sick.

Item 4.2 HIV status (N=309)

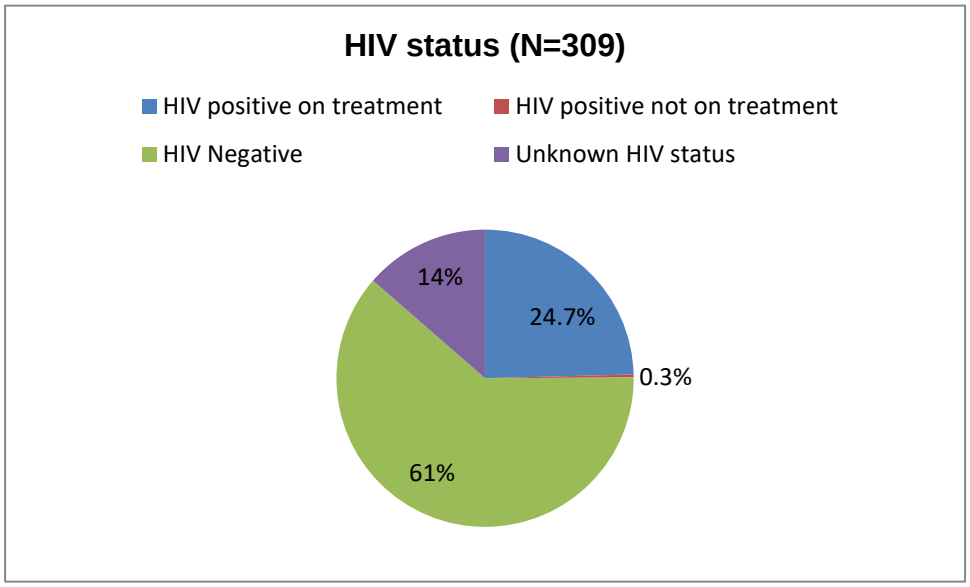


Figure 4.10 HIV status (N=309)

Figure 4.10 shows HIV status of the women. The HIV status was divided into 4 groups which included: HIV positive on treatment, HIV positive no treatment, HIV negative and unknown HIV status. HIV has been reported to increase the chance for contracting HPV infection by 5 times (Boardman 2012:1). A higher prevalence for high grade dysplastic precursor lesions

has been noted among HIV infected women as compared to women who are HIV negative (Forahn, Godfrey, Watts & Langley 2015:S350). The majority 61% (n=190) were HIV negative, 24.7% (n=76) were HIV positive on treatment, 0.3% (n=1) were HIV positive not on treatment and 14% (n=42) had unknown HIV result meaning they had not been tested for HIV. Fourteen clinical records had missing information on HIV status because the women concerned did not disclose their HIV status.

Item 4.3 Signs and symptoms experienced by the women who utilised VIA

Table 4.5 Signs and symptoms experienced among women.

(Note that the relative frequency was calculated using N=275 (total of those who were ill because signs and symptoms experienced is a multiple response variable)

Signs and symptoms experienced	Frequency	Relative %
Excessive vaginal discharge	108	39.27
Ulcers in the external anogenitalia	7	2.54
Pain during sexual intercourse	45	16.36
Lower back pain	133	48.36
Itching in external anogenitalia	16	5.81
Lower abdominal pain	144	52.36
Bleeding after intercourse	39	14.18
Intermenstrual bleeding	29	10.54

Table 4.5 shows the frequency of the different signs and symptoms experienced by the women. These signs and symptoms were specifically observed because sexually transmitted infections have similar clinical presentation to early signs and symptoms of cervical cancer such as excessive vaginal discharge, lower abdominal pain and post coital bleeding (WHO 2014:157). Clinical records revealed that women had multiple signs and symptoms. The highest documented signs and or symptoms were lower abdominal pain 52.36% (n=144), lower back pain 48.36% (n=133) and excessive vaginal discharge 39.27% (n=108) relative frequency.

Other documented signs and symptoms were ulcers in the external anogenitalia 2.54% (n=7), pain during sexual intercourse 16.36% (n=45), itching in the external anogenitalia 5.81% (n=16), bleeding after intercourse 14.18% (n=39) and intermenstrual bleeding 10.54% (n=29). These symptoms were high because they mimic cervical cancer.

4.3.7 Cervical cancer screening history

Item 5.1 Prior cervical cancer screening (N=313)

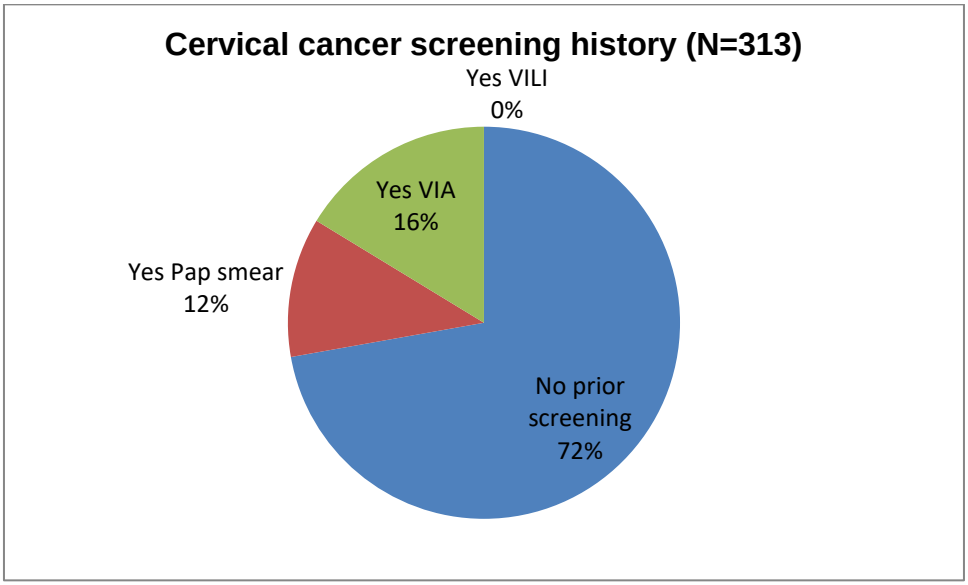


Figure 4.11 Cervical cancer screening history (N=313)

Fig 4.11 shows the information on prior cervical cancer screening status. The clinical records were checked for previous cervical cancer screening with Pap smear, VIA and VILI. The majority of the women 72% (n=226) had no history of prior cervical cancer screening. According to Brooker and Nicol (2012:211) women who have never been screened for cervical cancer have been identified to be most at risk for developing cervical cancer. VILI was never used as a cervical cancer screening method amongst the women. VIA had been used by 16% (n=51) and Pap smear by 12% (n=36). This shows that the majority 72% (n=226) either had neither been screened nor had knowledge about cervical cancer screening or they did not value cervical cancer screening as they had no previous history of being screened for cervical cancer.

Busingye, Nakimuli, Nabunya and Mutyaba (2012:262) in a study on acceptability of cervical cancer screening via visual inspection with acetic acid or Lugol's iodine at Mulago hospital in Uganda, highlighted that lack of awareness on reproductive health services led to poor uptake of cervical cancer screening services.

Item 5.1.1 Effect of educational level and employment status on prior cervical cancer screening (N=323).

Table 4.6 Effect of educational level and employment status on the decision to go for cervical cancer screening (N=323)

Socio-Economic factor	Global proportion of women (%) Prior cervical cancer screening			VIA Screening		
	No prior screening	PAP Smear	VIA Screening	VILI screening	Routine screening	By referral only
Highest educational level ***(χ^2=23.1402; P=0.0032)***						
Never attended school	4.00	2.86	0.00	0.00	0.00	3.61
Grade 7	40.00	45.71	25.00	0.00	35.71	37.55
O-Level	48.89	31.43	50.00	0.00	40.48	49.46
A-Level	1.33	2.86	7.69	0.00	7.14	1.81
Tertiary level	5.78	17.14	17.31	0.00	16.67	7.58
Employment status ***(χ^2=19.9276; P=0.0106)***						
Formal Employment	11.16	25.71	28.85	0.00	29.27	13.36
Self-Employment	11.16	11.43	7.69	0.00	2.44	12.27
Peasant Farmer	56.70	34.29	36.54	0.00	53.66	51.26
Unemployed	20.54	25.71	25.00	0.00	14.63	22.02
Retired	0.45	2.86	1.92	0.00	0.00	1.08

The history of the women pertaining to cervical cancer screening was investigated with the chi-square test. The effect of socio-economic factors on the prior decision to go for cervical cancer screening was evaluated. Women who had previously gone for cervical cancer screening were influenced by educational level (χ^2=23.1402; P=0.0032), employment status (χ^2=19.9276; P=0.0106), income levels (χ^2=13.0050; P=0.0113), communication status (χ^2=23.1252; P=0.0032) and water source (χ^2=10.9889; P=0.0267). All these factors are known indicators of the socio-economic status of women. However, the decision to go for cervical cancer screening prior to VIA was not influenced by the age of the women, HIV status, sanitation type, incidence of miscarriages and parity (P>0.05). The majority age group 53% (n=169) of the women were 18-49 years, the majority parity 48% (n=155) had more than 5 children, but those who did not have prior screening were 72% (n=226). These results of the study differ with literature as higher parity, HIV positive, incidences of miscarriage and reproductive age should be reasons for frequent screening (Broutet et al 2014:136 ; Forahn et al 2015:S350). However, it is evident that women in the specific rural hospital did not frequent screening services.

Table 4.6 shows the effect of educational level and employment status on the decision to go for cervical cancer screening and routine VIA screening. Women with O-level qualifications had a significantly higher tendency to go for cervical cancer screening in comparison with the other levels of education. Similarly, peasant farmers had a significantly higher tendency for cervical cancer screening compared to the women who had other forms of employment. The results of the study show that 85% (n=275) of women came to hospital due to illness and were screened by chance. This probably explains the significantly higher figures of peasant farmers who were screened. The results suggest that they were late reporting to hospital and only presented at hospital because they were seeking treatment for the illnesses that they had.

Item 5.1.2 Effect of income level on prior cervical cancer screening (N=323).

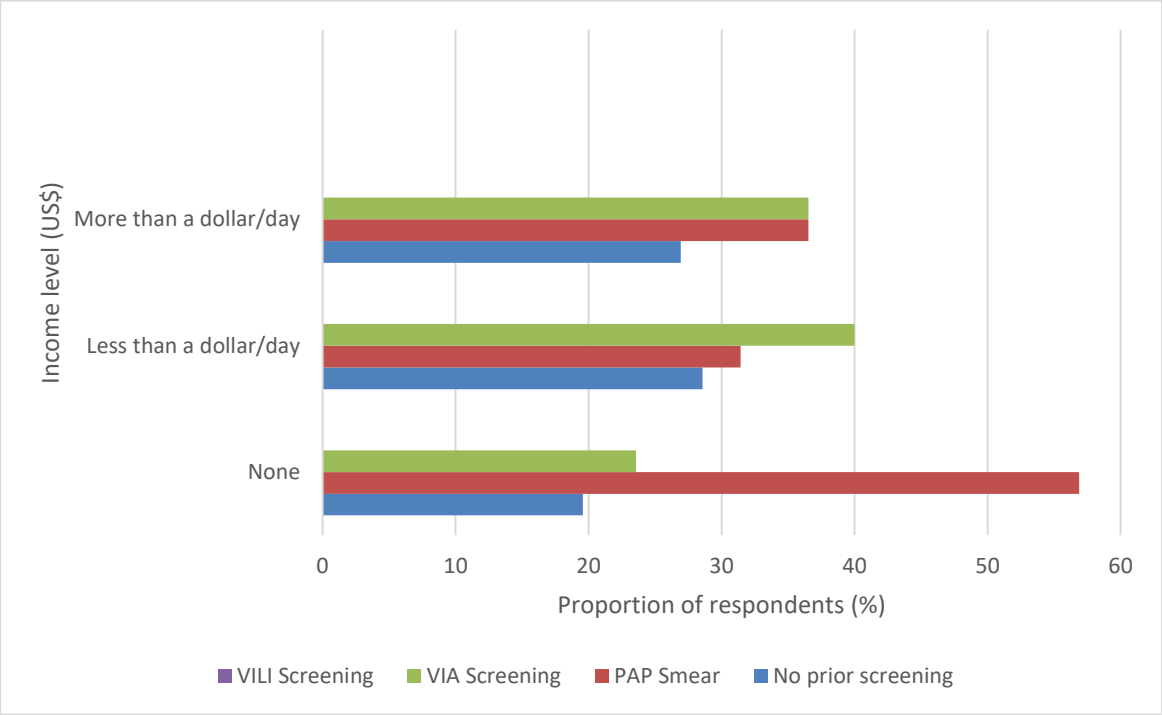


Figure 4.12 Effect of income level on decision to go for cervical cancer screening (N=323)

Figure 4.12 shows the effect of income level and communication status on the proportion of individuals that went through the cervical cancer screening process. Figure 4.12 indicates that the women with no income 57% (n=184) were more inclined to go for Pap smear than those receiving at least a dollar per day as income. However, on a relative basis, women earning at least a dollar per day were inclined to go for VIA screening than those with no income. Historically, prior to the rise of economic constraints, in the late 80s Pap smears were offered for free in the public health care sector in Zimbabwe to every eligible reproductive woman who visited a public health care facility for any reason. This is the reason why peasant farmers had an opportunity to be screened. This might have been a significant factor in the prior cervical cancer screening with Pap smear. However, Pap smear based cervical cancer screening programmes have been reported to have failed in low-resource countries since the 1980s because they were expensive and labour-intensive (Ferlay, Shin, Bray, Forman, Mathers & Parkin 2010:2893).

Item 5.1.3 Effect of communication status on decision for prior cervical cancer screening (N=323)

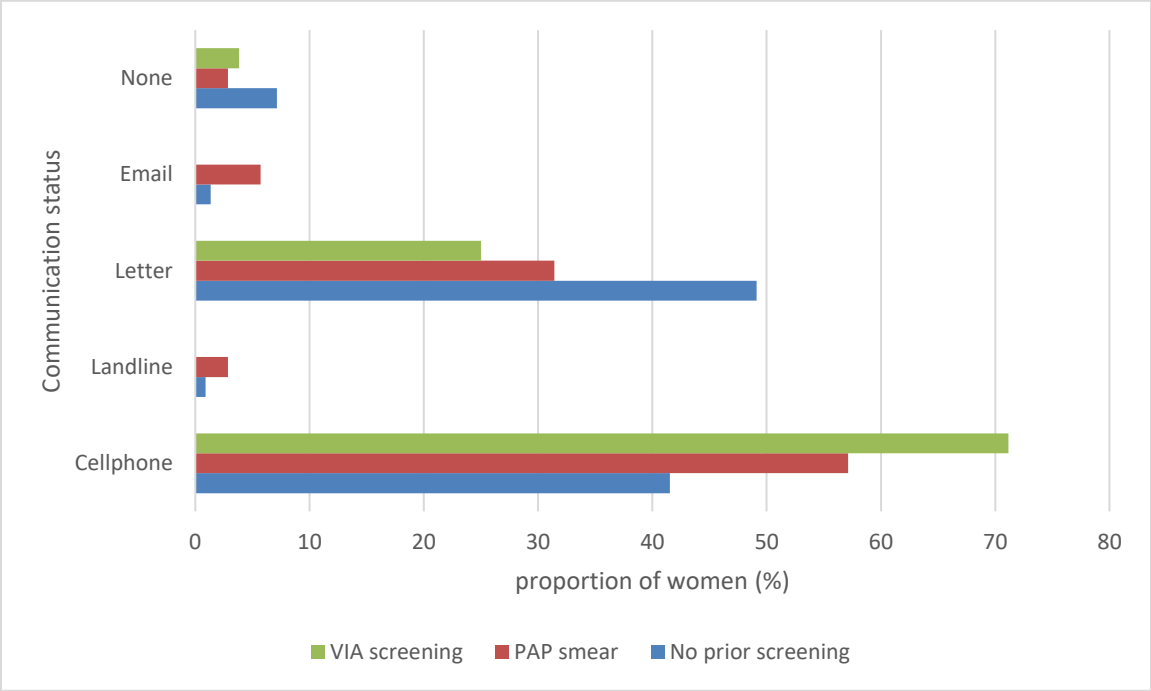


Figure 4.13 Effect of communication status on decision to go for cancer screening (N=323)

Figure 4.13 shows that VIA screening was significantly high among the women who communicated with mobile phones 48% (n=155) than those that used other form of communication methods (P<0.05). This was expected since mobile technology is known to have increased the exchange of information, including medical information among mobile phone users. However, email use was still heavily compromised as the study area is rural with very limited access to information communication technologies (ICT). Similarly, landline telephones as a means of communication on cancer issues was also very low as this technology has been marginalised by the introduction of mobile phones.

4.3.8 VIA screening

Item 6.1 Whether screening was routine or by referral (N=319)

Table 4.7 Referral status (N=319)

Referral status	Frequency (n)	Percent (%)
Routine	42	13%
Referred by nurse or doctor	277	87%
Total	319	100%

Table 4.7 shows the referral status of the women. The majority 87% (n=277) of the women were referred by either a nurse or a doctor to undergo VIA. According to Busingye, Nakimuli, Nabunya and Mutyaba (2012:262) cervical cancer screening among women in low-resource countries is opportunistic rather than systematic because of factors such as lack of awareness, economic constraints and cultural practices. Only 13% (n=42) had undergone VIA as a routine without being referred by a health practitioner. This suggests that 87% (n=277) of women came to the hospital for other healthcare services such as seeking treatment for illness and were therefore referred for VIA screening.

Item 6.2 VIA results

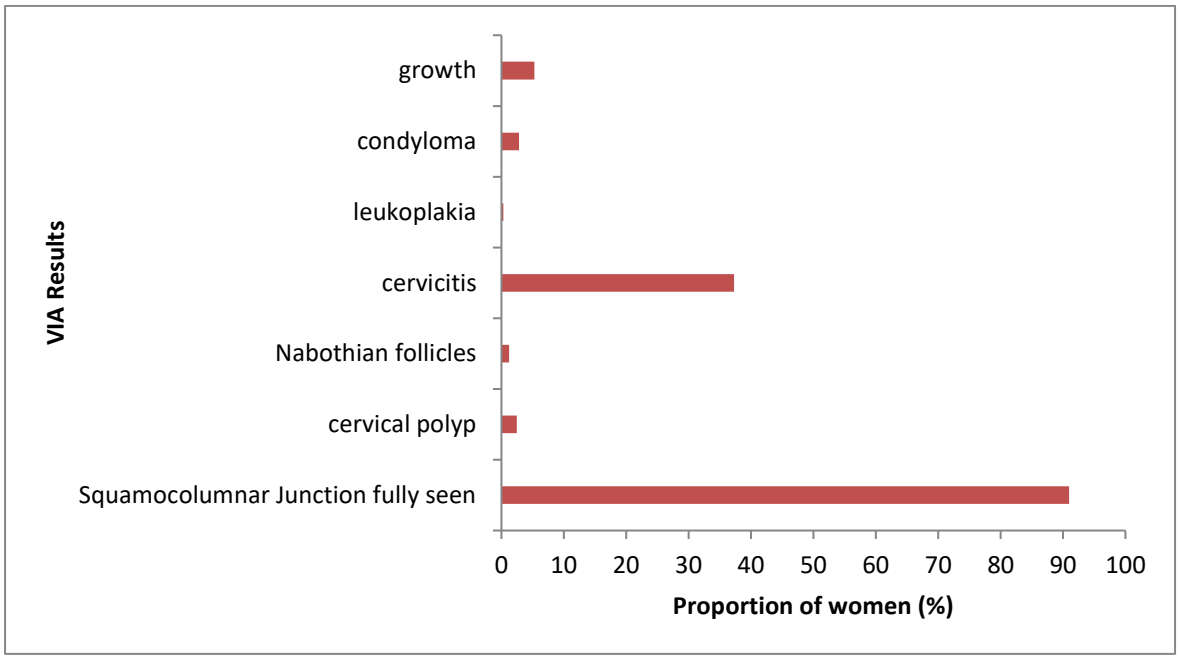


Figure 4.14 VIA results (N=323)

Figure 4.14 shows the relative percentages of VIA results. VIA results had multiple variables. Therefore the results were computed using relative frequency. The clinical records showed that the squamocolumnar junction (SCJ) was fully seen in 91% (n=293) of the women. A full view of the SCJ is of importance because acetowhite lesions adjacent to the SCJ are significant as most cervical cancers arise in this region (Herfs, Herran, Howitt, Laury, Nucu, Feldman, Jimenez, McKeon, Xian & Crun 2013:1311). Cervicitis was found in 37% (n=120), cervical polyps seen in 1.5% (n=5), Nabothian follicles were seen in 1% (n=3), leucoplakia 0.3% (n=1), condyloma 1.5% (n=5) and growths were found in 3% (n=10). These were typical clinical findings for a VIA for which the appropriate treatment was prescribed.

Item 6.3 Findings after 3 minutes of applying acetic acid (VIA) (N=321)

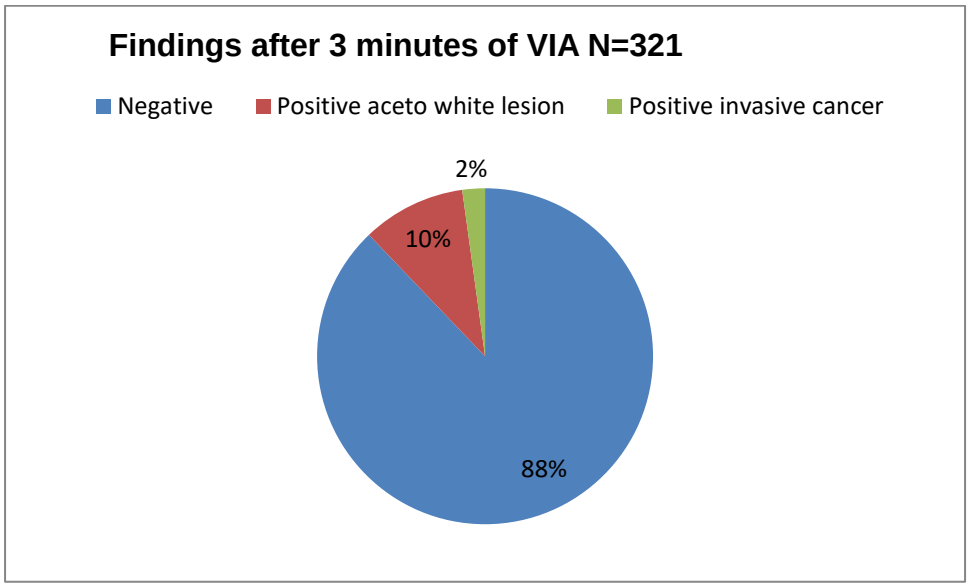


Figure 4.15 Findings after 3 minutes of VIA (N=321)

Figure 4.15 shows the findings after three minutes of application of acetic acid.

The results were categorised into negative result (meaning no lesion was detected), positive aceto white (meaning lesion was detected) and positive invasive cancer. Tissue which is normal is does not change when exposed to by vinegar/acetic acid but pre-cancer cells and cancerous cells will change to a white colour (Levine, Chudnoff, Taylor, Baganizi & Banks 2011:171).

The clinical records revealed that the majority 88% (n=282) had negative VIA results, meaning there were no aceto white lesions detected. Positive aceto white was documented on 10% (n=32) and positive invasive cancer 2% (n=7). Although most of the women had signs and symptoms which mimicked cervical cancer they had other conditions such as polyps, cervicitis and sexually-transmitted infections which utilisation of VIA detected. Cervical cancer typically has delayed signs and symptoms, women remain asymptomatic until the disease is advanced .This explains why it is more beneficial to screen for cervical cancer in order to detect pre-invasive disease (WHO 2014:157).

Item 6.4 If VIA positive did aceto white lesion extend to endocervical canal (N=32)

Table 4.8 Extent of aceto white lesion (N=32)

State of aceto white lesion	**Frequency (n)**	**Percentage %**
Lesion extending to endocervical canal	16	50%
Lesion not extending to endocervical canal	16	50%
Total	**32**	**100%**

In table 4.8 the clinical records revealed that 50% (n=16) of those who tested positive for aceto white lesions had lesions that extended to the endocervical canal. The other 50% (n=16) had no endocervical involvement. The location, extent and severity of a cervical lesion determines the treatment to be instituted (WHO 2014:141). Lesions extending to the endocervical canal require treatment such as cold knife conisation or Loop electrosurgical excision procedure where a specimen is obtained for histopathology in order to rule out invasive cancer (Broutet et al 2014:145). Lesions that are confined to the ectocervix are treated using cryotherapy which destroys the lesion and allows regeneration of normal epithelium (WHO 2014:145).

Item 6.5 Quadrants involved in the aceto white lesion(s) (N=32)

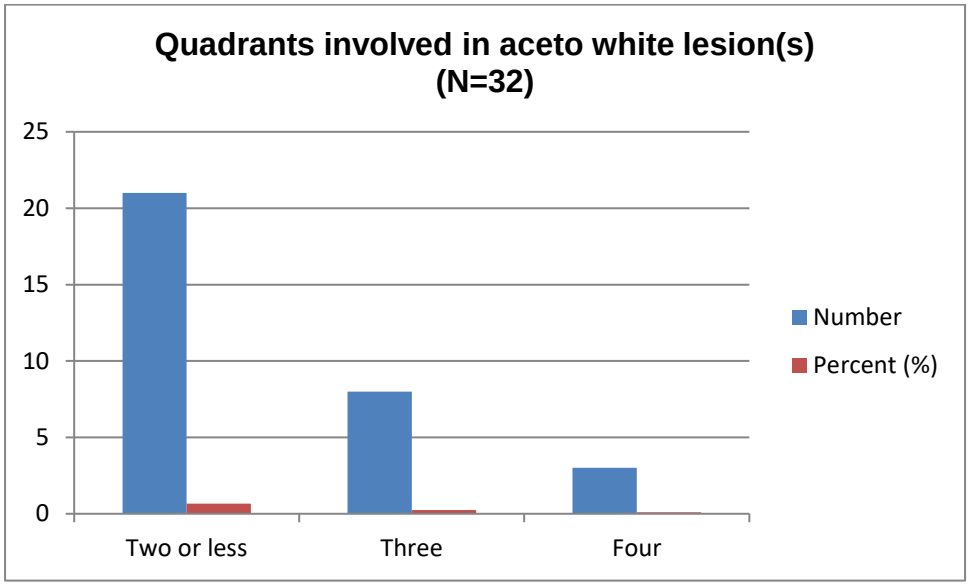


Figure 4.16 Quadrants involved in the aceto white lesion(s) (N=32)

As shown in Figure 4.16 the majority of women 66% (n=21) had two or less quadrants recorded, 25% (n=8) had three quadrants involved and the rest 9% (n=3) had four quadrants with aceto white lesions. The squamocolumnar junction is the area where epithelial cells from the endocervix and ectocervix meet to form the transformation zone which is prone to HPV infection (Broutet et al 2014:23). Therefore aceto white lesions within or close to the squamocolumnar junction are suspicious for pre-cancer. Severe pre-cancer which affects more than two thirds of the epithelium that covers the cervix may affect the whole epithelium of the cervix and will progress to cervical cancer if not treated (Brooker & Nicol 2012:212).

Item 6.6 Invasive cancer, stage (N=7)

The results from clinical records revealed that out of the 7% (n=23) women who had biopsy taken, only 2% (n=7) of the women revealed invasive cancer and were referred for staging as their stages were unknown. This means that the women were late in seeking health care services.

This is in line with (WHO 2014:156) which reported that women in resource constrained areas will only look for health services when they are experiencing pain or suffering which leads to an increase in the number of women who die from cancer of the cervix.

Item 6.7 Biopsy status (N=323)

Table 4.9 Biopsy status (N=323)

Biopsy status	Frequency (n)	Percent (%)
Biopsy taken	23	7%
Biopsy not taken	300	93%
Total	323	100%

Table 4.9 shows that out of all the women N=323, only 7% (n=23) needed to have biopsy taken. This is because a histopathological diagnosis is needed to confirm cervical cancer even if a woman has a gross cervical abnormality (WHO 2014:143). The majority 93% (n=300) of the women had no indication for a biopsy.

Item 6.8 Action taken regarding VIA results

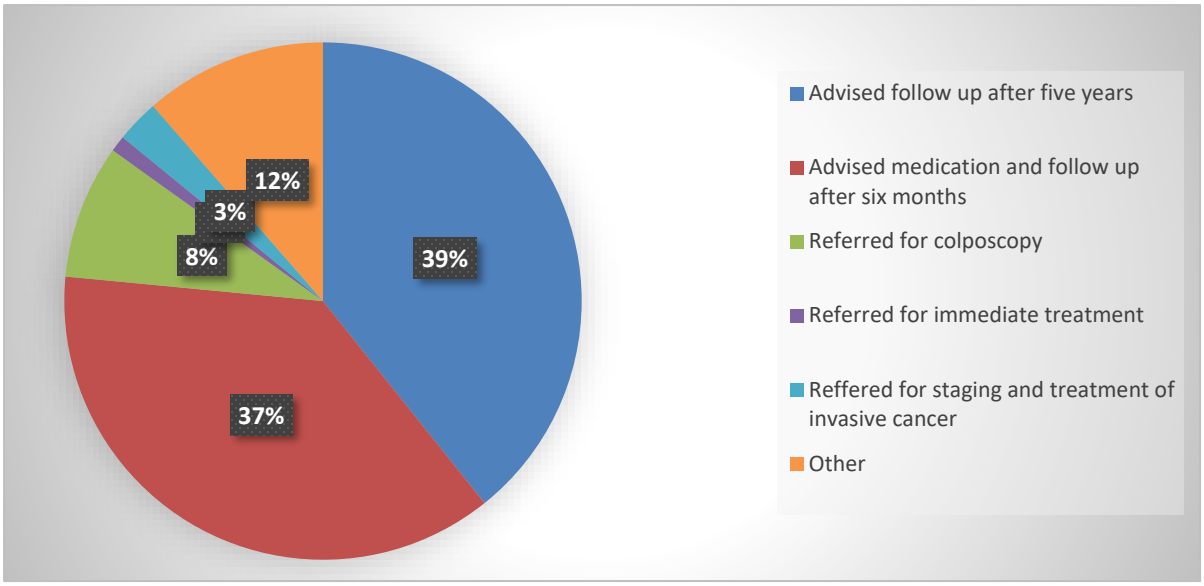


Figure 4.17 Proportion of the women by the action taken for the respective conditions (N=323)

The action taken had multiple response variables. Figure 4.17 shows the proportion of women who were evaluated by action taken for the respective conditions. The majority of the respondents 39% (n=126) were advised to visit for a follow-up after five years whilst others 37% (n=120) were recommended for medication and advised to make follow-ups after five years. Only a few 3% (n=10) after confirmation of cervical cancer were referred for staging and treatment of invasive cancer whilst an even fewer proportion 1% (n=3) was referred for immediate treatment with chemotherapy at a tertiary centre. Some 12% (n=38) of the women were referred for treatment of other conditions that included urinary tract infections, cervicitis, pelvic inflammatory disease and sexually transmitted infections as shown in table 4.10. Another 8% (n=26) were referred for colposcopy for better visualisation of the cervix in order to confirm a positive VIA result. Specific actions were taken for other women as shown in table 4.10.

Table 4.10 Specific treatment actions taken as indicated by other.

Other action taken	Frequency (n)	Proportion of the women (%)
Treated for lower abdominal pain	38	11.76
Treated for urinary tract infection	38	11.76
Treated for back pain	48	14.71
Treated for chest pain	9	2.94
Treated for STD	38	11.76
Treated for vaginal discharge	19	5.88
Treated for cervicitis	120	37.00
Treated for vaginitis	9	2.94
Referred for post-natal visit	42	13.00
Chronic HIV–recommended for review	9	2.94
Treated for foreign body on throat	1	0.30
Treated for hepatitis	3	1.00
Referred for polypectomy	5	1.54
Treated for abdominal distention	1	0.30
Infertility counselling	14	4.33
Referred for physiotherapy	39	12.0
Referred for colposcopy	26	8.00
Treated for Nabothian cyst	9	2.94
Treated for pelvic inflammation	17	5.26

Table 4.10 shows the proportions of results on other actions which were taken. The majority 14.71% (n=48) were treated for back pain while 11.76% (n=38) were treated for sexually transmitted infections, another 11.76% (n=38) were treated for lower abdominal pain and another 11.76% (n=38) were treated for urinary tract infection. These results could be attributed to the fact that the signs and symptoms mimic those of cervical cancer. Therefore, the women would have been referred for VIA to rule out cervical cancer.

Rather than seeking treatment when ill women need to be made aware of the risk factors and early signs and symptoms of cervical cancer in order to promote early help seeking (Al-Darwish, Al-Naim, Al-Mulhim, Al-Otaibi, Morsi & Aleem 2014:2530). Women were treated for some gynaecological conditions which included vaginal discharge 5.88% (n=19), Nabothian cyst 2.94% (n=9), polypectomy 1.54% (n=5), cervicitis 37% (n=120), vaginitis 2.94% (n=9) and pelvic inflammatory disease 5.26% (n=17). The other actions though non gynaecological were instituted as was deemed necessary for the women. These included treatment for chest pain 2.94% (n=9), hepatitis 1% (n=3), foreign body on throat 0.3% (n=1) and abdominal distension 0.3% (n=1). Some women were referred for other services which included postnatal care 13% (n=42), HIV treatment review 2.94% (n=9), physiotherapy 12% (n=39) and infertility counselling 4.33% (n=14).

4.3.9 Summary of VIA screening results

In table 4.7 the clinical records revealed that the majority 87% (n=277) were referred for screening because they had accessed health service to seek for treatment of different illnesses and only 13% (n=42) were routinely screened using VIA. The 87% (n=277) referral suggests that these women would not have been screened for cervical cancer if they were not sick. Thus they were referred by a nurse or doctor who identified the need for cervical cancer screening. Ezechi, Petterson, Gabajabiamila, Idigbe, Kuyoro, Ujah and Ostergren (2014:1) noted that women with cervical cancer in sub-Saharan Africa come to hospital at an advanced stage of the disease because they are identified late as they only report to a health centre when they are sick. Kuguyo et al (2017:2) attributed the high morbidity and mortality from cervical cancer in Sub-Saharan Africa to late presentation and diagnosis of women. Denny (2012:1) highlighted that women with cervical cancer in developing countries have poor survival rates because they present with advanced disease which is often too late for treatment.

A chi-square test was carried out to establish the variables that significantly influenced the decision to go for routine VIA screening. The significant influence of age (χ^2=67.3505; P=0.0059), educational level (χ^2=9.7318; P=0.0.052), employment status (χ^2=10.4153; P=0.0340) and HIV status (χ^2=8.2001; P=0.0421) were observed.

However, marital status, income level, communication status, water source, sanitation, gravidity, parity and the incidence of miscarriages had no significant (P>0.05) influence on the decision to either go for routine VIA screening or waiting to be referred to either a nurse or a doctor when the need arises. Figure 4.18 compares the trend in the frequency of either being routinely screened using VIA or waiting to be screened only when referred by a nurse or doctor as necessary.

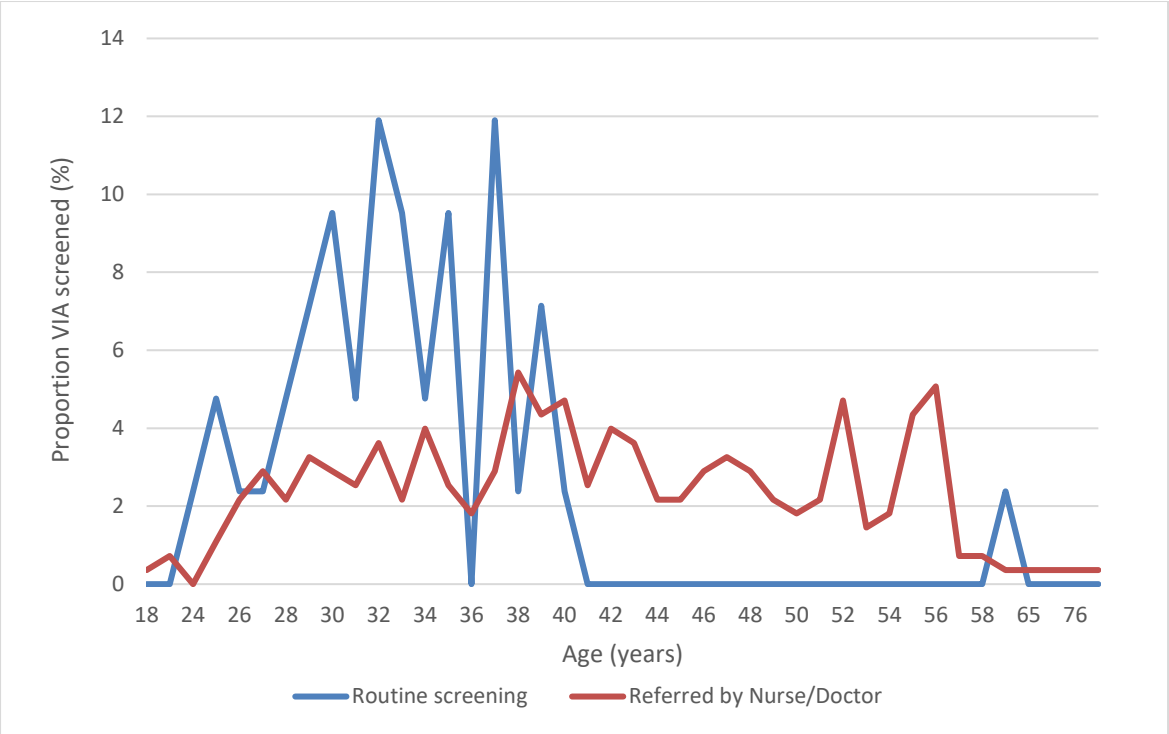


Figure 4.18 Proportion of women VIA-screened by age (N=323)

The trend in Figure 4.18 indicates that those on routine testing ceased to pursue the routine when about 41 years of age and then get probably once off screening at about 58 to 65 years. However, referrals were done through the years up to about 76 years of age and probably beyond. Most of the routine screening was done at 6 weeks postnatal visits which most likely explain why routine visits were high between ages 19 to 41years as they fall within the reproductive age.

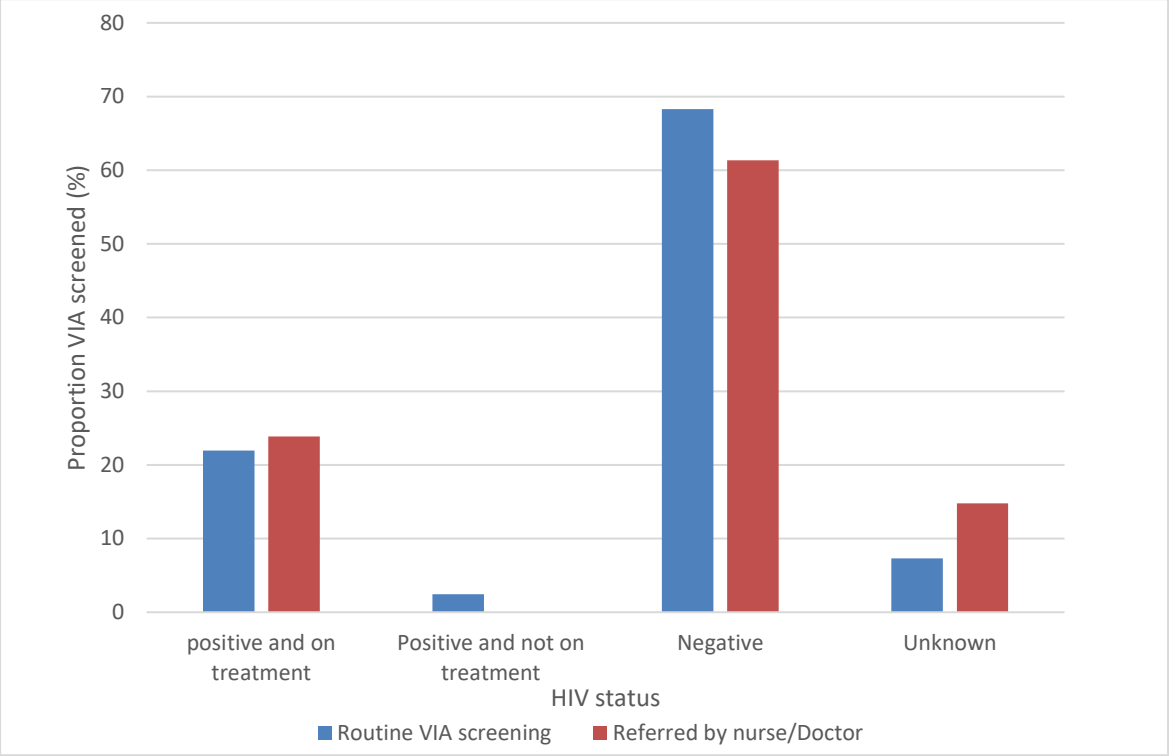


Figure 4.19 Effect of VIA screening on HIV status (N=323)

Fig 4.19 shows that a lot more HIV negative women 62% (n=190) were VIA-screened than their HIV positive counterparts 24% (n=77) and those whose status was not known 14% (n=42). Women who are HIV positive have been reported to have a higher risk for HPV infection, in this case only 24% (n=77) were HIV positive (Odendal 2011:2). The results of the study concurred with Odendal (2011:2) as all 2% (n=7) who had positive invasive cancer results on VIA as shown in Figure 4.15 were HIV positive.

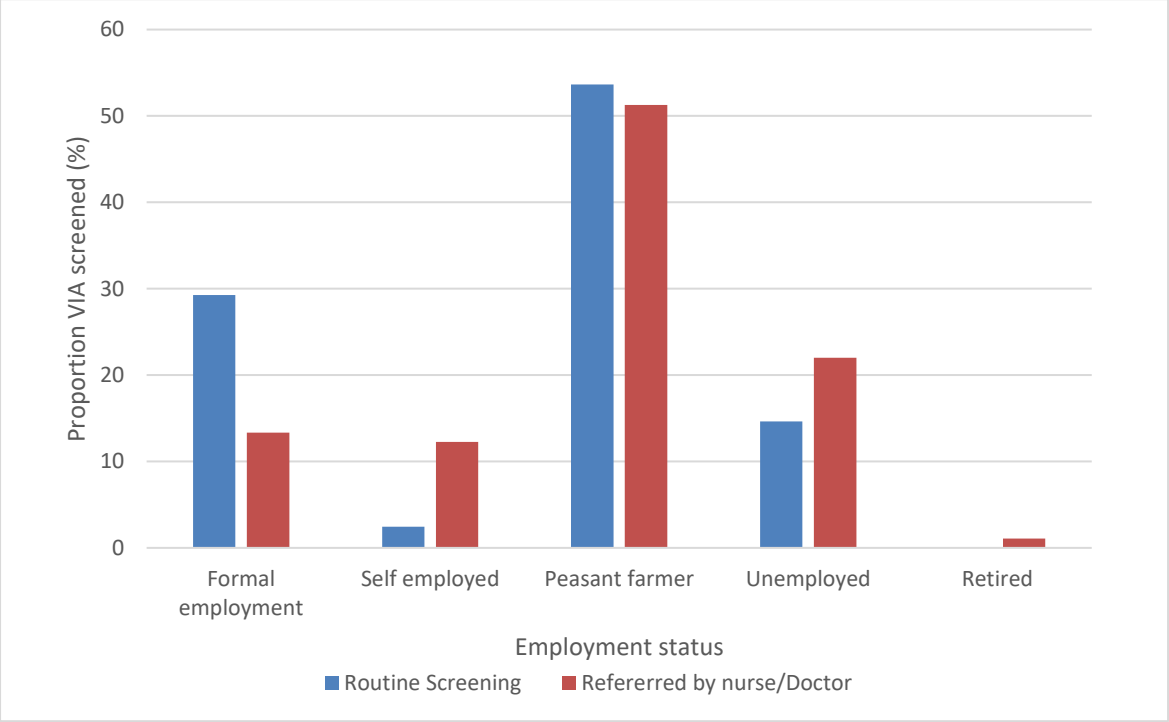


Figure 4.20 Frequency of VIA screening by employment status (N=323)

Figure 4.20 shows that women who were peasant farmers were the most VIA-screened 52% (n=165) than any other employment class of women in the study population. This can be attributed to the fact that they probably have a higher chance of ill health due to poverty status and having many children as is the case in this study. The high incidence of cervical cancer in Southern Africa has been associated with both economic and socio-cultural factors such as having many children and being a poor rural woman (Ntekim:2012:52).

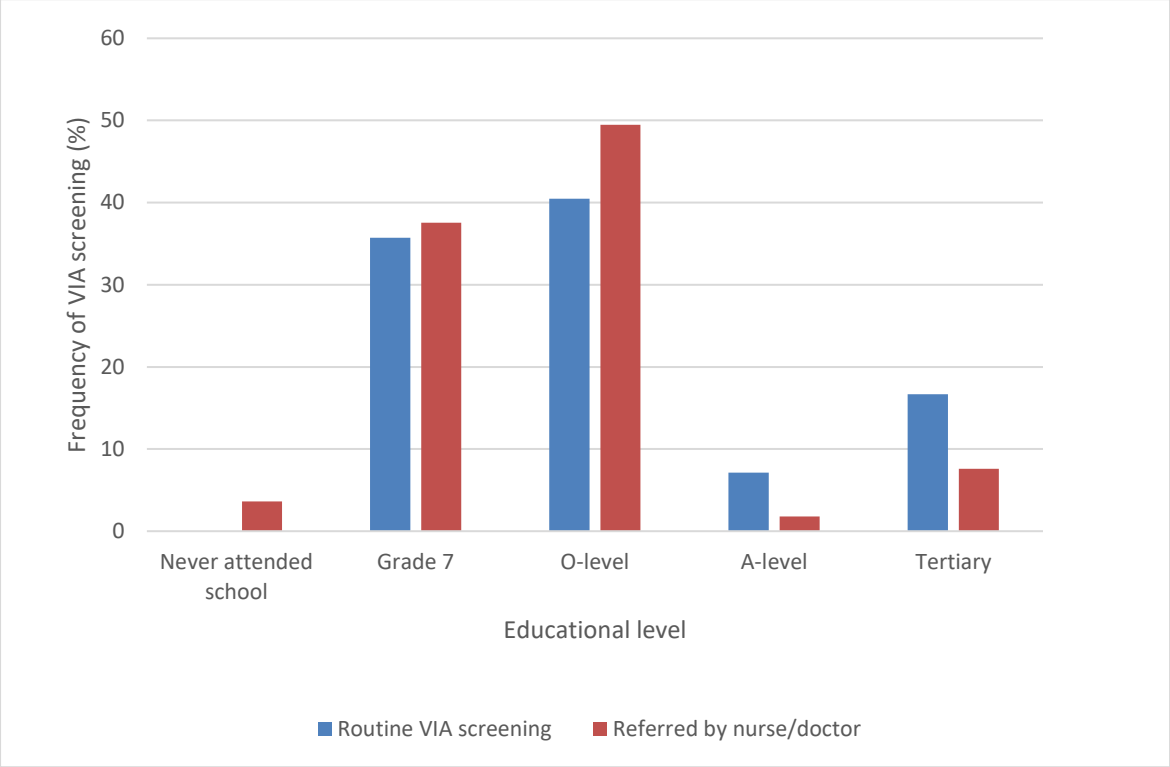


Figure 4.21 Frequency of VIA screening by educational level (N=323)

Fig 4.21 shows the frequency of VIA screening by educational level achieved. The fact that educational level influenced the decision to go for routine screening is quite obvious as supported by Mukakalisa et al (2014:1067) who identified education as one of the keys in the prevention of cervical cancer and indicated that low literacy is a barrier to the prevention of cervical cancer.

4.3.9.1 Incidence of findings (VIA results)

The data analysis for this section classified women into two age groups, the reproductive group of 18 to 45 years of age and the non-reproductive age group above 45 years of age. The influence of age, education level, employment status, income, communication status and source of water for the women on the incidence of each of the observed results was determined using a chi-square test for association.

Table 4.11 Proportion of the women's records with the listed findings by age (N=323)

VIA Result	Age of women (years)		χ^2-value	P-value
	18-45	>45		
Squamocolumnar fully seen	66.21	33.79	8.8644	0.0029
Cervical polyp	75.00	25.00	0.1545	0.6943
Nabothian follicles*	100.00	0.00	-	-
Cervicitis	68.33	31.67	0.0080	0.9287
Leucoplakia*	100.00	0.00	-	-
Condyloma	66.67	33.33	0.0166	0.8979
Growth*	76.47	23.53	-	-

***Responses were too few for appropriate analysis**

Table 4.11 shows the incidence of findings by age. There was a significant association between the probability of fully seeing the squamocolumnar junction and the age of respondents (χ^2=8.8644; P=0.0029). However, the incidence of all the VIA findings was not associated with the age of women who undergone VIA (P>0.05). Education level, income, age, communication status and water source had no influence on the incidence of cervical polyps (P>0.05). The incidence of cervicitis was associated with communication status (χ^2=10.7419; P=0.0296) being more common among cell phone users aged below 45 years. These results could be linked to the income status involved with owning a cell phone but is more likely due to the growing use of cell phones within Zimbabwe (Zimbabwe Demographic and Health Survey 2015:35). All the other variables had no influence on occurrence of cervicitis among the women.

4.3.9.2 VIA results after 3 minutes and biopsy

The results of VIA testing after three minutes were analysed using a Chi-square measure for association. VIA results after three minutes (refer to figure 4.15) were not associated in any way with age of the women, employment status, income, communication status and source of water (P>0.05). Negative results for all conditions were highest among those who had attained O-level education (χ^2=23.8992; P=0.0024).

Only about 7% (n=23) of all the women had biopsy taken, which was very low considering that the rest 93% (n=300) of the women had no biopsy taken as this was indicated in table 4.9 The results support the literature that education is one key in the prevention of cervical cancer while illiteracy is a barrier to screening for pre-cancer (Mukakalisa, et al 2014:1067). Results for aceto white lesions were not in any way associated with age of the women.

4.4 SUMMARY OF THE RESULTS

The study results as indicated in Table 4.2 showed that the majority 70% (n=225) of the women who utilised VIA screening were not from Karanda catchment area. Cervical cancer screening services were underutilised by the rural women around the Karanda catchment area as they only constituted 30% of the women who participated in VIA screening. VIA screening was mostly utilised by women within the reproductive age range of between nineteen to forty- one years. As shown in figure 4.3 the most popular 56.21% (n=181) employment status was peasant farming. Therefore, the majority of the women lived under the poverty margin with an income of less than a dollar a day. Which implies that they would not routinely come for screening unless they were ill. Prior cervical cancer screening was high among women who attained a high level of education, particularly those who had O-level of education. Women with no income had a high incidence of prior screening with Pap smear. This can be related to the fact that Pap test used to be offered for free to all reproductive women before the economic crisis in Zimbabwe. VIA screening was significantly high among women who communicated with cell phones probably because they could access information on screening through their phones.

A high number of the women in the study were referred for cervical cancer screening because they had come to hospital due to illness. They were referred for screening by nurses or doctors who recognised the women's need for cervical cancer screening. Routine VIA screening was particularly undergone by the postnatal women and chronic HIV patients whereas all other women were referred for screening because they were seeking treatment for an illness. VIA was effective in the detection of possible cervical cancer in 2% (n=7) women who showed up due to sickness. Figure 4.17 indicated that another 8% (n=26) were referred for colposcopy after testing positive for aceto white lesions.

All of the women 100% (n=323) whether referred or routine as shown in table 4.7 had action taken with regard to their VIA result. Most of the women were treated for sexually transmitted infections and urinary tract infections.

4.5 CONCLUSION

In this chapter retrospective data from 323 clinical records of women who had undergone VIA screening at a specific rural hospital in Zimbabwe were analysed. The results were analysed according to the checklist using SPSS 20 with the help of a statistician. The results were presented and interpreted with the use of illustrative tables and figures. The next chapter focusses on the discussion of the results.

CHAPTER 5

DISCUSSION OF THE RESULTS, LIMITATIONS, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

Chapter 4 focused on the data presentation and analysis of the research results of data collected from 323 clinical records of women who undergone VIA. This chapter discusses the study results, in relation to the study objectives. The recommendations emanating from the research results and the study limitations were also discussed. The discussion covers the research objectives and addressed the research questions with reference to the results.

5.2 SUMMARY OF THE RESEARCH RESULTS

5.2.1 Demographic information

5.2.1.1 Age of the women (N=322)

The results of the study revealed that 79% (n=255) of the women were aged between 18 to 49 years while 21% (n=67) were aged 50 years and above (refer to table 4.1). Broutet et al (2014:136) mentioned that cervical cancer is common in women in their 30s to 50s. HPV infection is contracted in the early sexual activity years and it takes 10 to 20 years to progress from pre-cancer to cervical cancer. The transformation zone which is prone to Human Papillomavirus (HPV) infection and from which most cervical cancer originates is distinct at about 30 years of age (WHO 2014:35).

However, Lonky, Penner and Diedrich (2014:247) explained that there are one to two cases of cervical cancer in 15 to 19 year old girls although this is not the case in the study. Furthermore, Lonky et al (2014:247) stated that 43% of HPV infection and cervical intraepithelial neoplasia (CIN) are found in teenagers. On average HPV infections take about 3 to 5 years to develop to cervical intraepithelial neoplasia-3 (CIN-3) lesions and about 10 to 20 years for the lesions to progress to cancer if there is no treatment (Lonky et al 2014:247).

The age groups of 18-49 years and those above 50 years which were used in this study captured the population in whom both pre-cancerous cervical changes and cervical cancer could have been detected through VIA. Furthermore, it captured both the reproductive age (18-49) and the non-reproductive age of above 50 years in order not to miss the teenage women who might have developed pre-cancer.

5.2.1.2 Residential area (N=323)

The results of the study showed a low uptake of VIA, 30% (n=98) by the women from around the Karanda rural catchment area, where as 70% (n=225) were from outside Karanda catchment area (refer to table 4.2). The assumption would have been that more women would have been from Karanda catchment area since they were within a walking distance from the hospital. The 30% (n=98) uptake of VIA by women from Karanda catchment area rules out distance as a factor that promotes cervical cancer screening. Irrespective of that women from Karanda rural area are near to the hospital, the results of the study support the literature that cervical cancer screening coverage is low in sub-Saharan Africa, particularly among rural women where the coverage is from 0.4 to 14% (Louie, de Sanjose & Mayaud 2009:27).

The low turn up of 30% (n=98) of the rural women from the Karanda catchment area suggests that rural women are not forthcoming in seeking healthcare, in particular, where cervical cancer screening service are concerned, either because of poverty or lake of knowledge. However, Busingye, Nakimuli, Nabunya and Mutyaba (2012:262) found that the reasons for poor uptake of cervical cancer screening services include the lack of awareness, economic and domestic factors. Further reasons for poor screening include gender power relations where the male partner dominates and makes all the decisions as well as cultural factors and health system factors. Furthermore, the low coverage of cervical cancer screening in rural women is attributed to sociocultural, practical and logistical challenges (Ezechi, Petterson, Gabajabiamila, Idigbe, Kuyoro, Ujah & Ostergren (2014:1). The 70% (n=225) women from outside the Karanda rural catchment area probably could not afford the healthcare services in hospitals within their own catchment areas. Hence, they came to the specific hospital where charges for treatment are minimal. It is highly likely that the 70% (n=225) were pursuing cheap affordable healthcare services.

5.2.2 Socio-economic factors

The results in figure 4.1 indicated that 80% (n=259) of the women were married, 13% (n=43) were widowed, 5% (n=16) were single and 2% (n=5) were divorced. By virtue of being married, widowed or divorced the women were at risk of cervical cancer as their marital status spoke to their sexual activity. WHO (2014:136) explained that all women who have been or are sexually active might have been affected by HPV and therefore have a risk for developing cancer of the cervix.

The results of the study revealed that 48% (n=154) of women had O-levels, 38% (n=122) had attained grade 7 or below, 9% (n=28) had tertiary education, 2% (n=7) had A-levels and only 3% (n=11) had never attended school (refer to fig 4.2). Mukakalisa et al (2014:1067) identified education as one key in the prevention of cervical cancer and indicated that low literacy is a barrier to the prevention of cervical cancer. Busingye et al (2012:264) in their study in Uganda on the acceptability of cervical cancer screening with VIA or VILI noted that women with post-secondary education readily took up VIA/VILI screening.

Higher levels of education are indicated to have positive association with cervical cancer screening and preventive measures as educated women have a basic knowledge of their internal and external anatomy and basic physiologic processes (Mukakalisa et al 2015:1067). The results, therefore, support the fact that education plays a key role in the prevention of cervical cancer. Although the women may not have come to hospital for cervical cancer screening, they had enough knowledge to seek healthcare services but only came when they were sick.

The results revealed that the majority of the women 52% (n=165) were peasant farmers, 15% (n=49) were formally employed, 11% (n=36) were self-employed, 1% (n=3) were retired and 21% (n=68) were unemployed, only 15% were formally employed (refer to figure 4.3). When consolidating the peasant farmers and the unemployed women together, they have accounted for 73% (n=233) of the women. This information shows that the majority 73% (n=233) could be classified as unemployed because the peasant farmers only farm during the rainy season once a year and make an income equivalent to less than a dollar a day. The majority 73% (n=233) of the women lived in poverty as 52% (n=166) made less than a dollar a day and 21% (n=68) had no income.

The international poverty datum line recently changed to US$1.90 per day but was in the past pegged at US$1.00 per day (Ferreira, Joliffe & Prydz 2016:5). The economy of Zimbabwe is reported to be poor and is projected to remain static for a long time with high levels of unemployment (Zimbabwe Demographic and Health Survey 2015:3). The results on the income status were congruent with the employment status, reflecting a harsh economic environment. Only 27% (n=88) of the women made more than a dollar a day. Unemployment and poverty are negative determinants of health which are of great significance as poor people tend to have more health problems and poorer access to health care (The National Health strategy of Zimbabwe 2013:33).

Ezechi et al (2014:6) support the results of the study as they found that women in rural areas are not gainfully employed, they depend on their spouses for their daily sustenance. A woman who is financially deprived and not feeling sick, is less likely to spend any money that she receives from her spouse which is intended to be used for her family to come to the hospital for cervical cancer screening. As revealed by the results of the study, most 85% (n=275) of the women were compelled to come to hospital because of illness. Furthermore, Ndejjo et al (2016:2) highlighted that economic constraints contribute to the lack of screening and treatment for cervical cancer among rural women in Africa. The lack of bus fare and/or consultation fees for health care contributes to the poor uptake of cervical cancer screening services.

The clinical records showed that 48% (n=155) of the women were cell phone users, 43% (n=139) used letters (surface mail), 2% (n=5) had email access, 1% (n=3) used a landline telephone and 6% (n=19) had no means of communication (refer to figure 4.5). The majority 70% (n=225) of the women were from outside Karanda catchment area which explains the high use of cell phones among the women as urban women tend to use cell phones more than rural women. Cell phone use among Zimbabwean households was reported to be 87% especially among urban households (Zimbabwe Demographic and Health Survey 2015:35). The population around the Karanda catchment area generally had poor communication means. They would, therefore, benefit from a screening method that requires no follow-up for the results such as VIA where results are provided on the same day that the test is done. The communication means is another socio-economic determinant which in this case suggests that rural women have a low socio-economic status (Ferreira et al 2016:9).

The records reflected that 51% (n=164) of the women used hand-pump borehole, 28% (n=89) used treated tap water and 21% (n=69) used unprotected water sources (refer to table 4.3). The use of unprotected water sources is a sign of poverty and or lack of knowledge. Ferreira et al (2016:9) highlighted that the source of drinking water for a community or an individual is a non-financial determinant of socio-economic status. The use of hand-pump borehole by 51% (n=164) of the women suggests that 51% (n=164) of the women were from rural and or mining community areas where hand pump boreholes are typically used in Zimbabwe. Rural households in Zimbabwe have been reported to have 69% access to improved water sources while urban areas have a 97% access to improved water source (Zimbabwe Demographic and Health Survey 2015:35).

The mode of sanitation for a community or an individual is yet another non-financial determinant of socio-economic status (Ferreira et al 2016:9). The study results revealed that 47% (n=149) of the respondents used Blair toilets, 26% (n=83) used pit latrines and 27% (n=86) used modern flushing system toilets (refer to figure 4.6). The use of Blair toilets and pit latrines in Zimbabwe is typically found in the rural areas. This information suggests that women in the study were mainly from rural or peri-urban areas and only 27% (n=86) of them who used modern flushing system toilets were from urban areas. This information also points to the fact that generally the women in this study were not affluent, they lived in poverty which predisposed them to cervical cancer (Brooker & Nicol 2012:211).

5.2.3 Obstetrical history

The results on the records indicated that 54% (n=173) of the women had more than 4 pregnancies, 14% (n=46) had 3 pregnancies, 19% (n=60) had 2 pregnancies, 8% (n=46) had one child and 5% (n=16) had no child (refer to figure 4.7). The study did not determine the age of the youngest child but based on these results it is likely that most of the women visited the hospital for reproductive health services. Therefore, their involvement with VIA screening would have been opportunistic rather than intentional because a health worker identified their need for cervical cancer screening.

The results showed that 78.5% (n=253) had no history of miscarriages, 13% (n=41) had 1 miscarriage, 5% (n=16) had 2 miscarriages, 2% (n=7) had 3 miscarriages and 1.5% (n=5) had more than 4 miscarriages (refer to figure 4.8).

The number of miscarriages was important for determining the number of pregnancies as culturally women tend not to include miscarriages when asked about the number of pregnancies they have had.

The results revealed that 48% (n=155) of the women were of high parity with 5 children or more. This means they were at risk of developing cervical cancer as high parity is now identified as one of the risk factors for developing cervical cancer (Brooker & Nicol 2012:211). Determining the parity proved to be significant as the results of the study showed that the majority 80% (n=255) of the women were in the reproductive age group of 18 to 49 years. Therefore, they would have had a chance to visit the hospital for reproductive health services thus affording them an opportunity for VIA screening.

5.2.4 Medical history

The clinical records indicated that 85% (n=275) of the women who had undergone VIA had come to hospital to seek treatment for various illnesses. Only 15% (n=48) of the women were not ill (refer to table 4.4). This means that illness provided an opportunity for VIA-screening for the majority 85% (n=275) of the women, which suggested that under normal circumstances they would not have intentionally sought to be screened for cervical cancer. In the context of cervical cancer if a woman presents with signs and symptoms it means screening opportunities were missed and it may be too late for effective treatment. Broutet et al (2014:156) highlighted that a lot of women with cervical cancer would not know early that they have cancer as no pain or suffering may be experienced until the cancer is advanced. Hence women need to be screened for cervical cancer routinely and not wait until they are sick.

Furthermore, Ezechi et al (2014:1) in a study in Nigeria on predictors of default from follow-up care in a cervical screening programme using visual inspection mentioned that women with cervical cancer are identified at an advanced stage of disease as they only seek healthcare services when they are sick. In this study there was no information on why 85% (n=275) women waited until they were sick to access cervical cancer screening services.

However, as shown by the results of this study factors like unemployment, lack of income, poverty, big families, lack of knowledge and poor communication systems could have contributed to women not intentionally seeking cervical cancer screening services. The results concurred with Mukakalisa et al (2015:1074) who highlighted that poverty, lack of knowledge and financial constraints were some of the obstacles for cervical cancer screening.

The HIV status of the women was determined as HIV is reported to increase the chance for contracting HPV infection by five times (Boardman 2012:1). In this study 61.5% (n=190) women were HIV negative, 24.6% (n=76) were HIV positive on treatment, 0.3% (n=1) was HIV positive but not on treatment and 13.6% (n=42) had unknown HIV status as they had not been tested for HIV (refer to figure 4.10). The results of this study showed that more HIV negative women were screened than their HIV positive counterparts and those whose status was not known. The results showed that there was no significant relationship between HIV status and VIA screening.

The clinical records revealed that most of the signs and symptoms experienced by women mimic early signs and symptoms of cervical cancer. These findings were in keeping with the early signs and symptoms of cervical cancer elaborated by WHO (2014:157). These included excessive vaginal discharge, ulcers in the external anogenitalia, pain during sexual intercourse, lower back pain, lower abdominal pain, bleeding after intercourse and intermenstrual bleeding. The women with these signs and symptoms were treated for urinary tract infections and sexually-transmitted diseases.

Women of reproductive age who are sexually active women may confuse some of the early signs of cervical cancer with sexually transmitted diseases for example the foul-smelling discharge. Broutet et al (2014:157) noted that in order to diagnose cancer of the cervix, it is important to do a thorough gynaecology examination and to screen so that pre-cancer can be seen early and treated before it advances to cancer.

5.2.5 Cervical cancer screening history (N=313)

The results from the records revealed that 72% (n=226) women had no previous history of cervical cancer screening (refer to figure 4.11). Women with no prior history of cervical cancer screening have been identified as being at risk of developing cervical cancer (Brooker & Nicol 2012:211). The results also indicated that 16.2% (n=51) women had previously undergone VIA and 11.5% (n=36) had previously undergone Pap smear. Compared to those who had previous Pap smear 11.5% (n=36) in this study, more women 16.2% (n=51) had previous VIA. Women previously screened using Pap smear, opted for VIA which means they valued cervical cancer screening.

The study revealed that the women who had prior cervical cancer screening had a good socio-economic status compared to the others as reflected by their high level of education, at O-level, A-level and tertiary level. Prior screening was also high 48% (n=155) among cell phone users, those with income above US$1 per day 27% (n=88) and had safe water supply. This concurs with the literature that low literacy and poverty are barriers to prevention of cervical cancer Mukakalisa et al (2015:1067).

5.2.6 VIA screening

5.2.6.1 Referral status (N=319)

The results indicated that 87% (n=277) were referred for VIA by either a nurse or a doctor who identified the need for the women to be screened for cervical cancer (refer to table 4.7). These results are closely related to the results on illness status which indicated that 85% (n=275) had come to the hospital due to illness. It is, therefore, justified to conclude that all those who came to hospital due to illness were then referred for VIA by health personnel. The only reason the 85% (n=275) women were screened is because they were ill and had been referred for VIA. These results concurred with Busingye et al (2012:262) who observed that cervical cancer screening is opportunistic rather than routine. Only 13% (n=42) of the women had a routine VIA screening, the rest 87% (n=277) had an opportunistic screening.

5.2.6.2 VIA results (N=323)

The clinical records showed that the squamocolumnar junction (SCJ) was fully seen in 91% (N=293) of the women (refer to figure 4.14). The SCJ is the area where the ectocervix and endocervix meet and form the transformation zone which is prone to HPV infection (Broutet et al 2014:35). Accordingly, any pre-cancerous changes and cervical cancer can be visualised at the SCJ. VIA facilitates observation of the cervix and vagina such that any other obvious abnormalities can be noted. In this study the records revealed that 37% (n=120) women had cervicitis, 5.5% (n=10) had growths, 1.5% (n=5) had cervical polyps, 1.5% (n=5) had Condyloma, 1% (n=3) had Nabothian follicles and 0.3% (n=1) had leucoplakia.

VIA proffers the advantage of an immediate diagnosis and treatment for CIN, cervical cancer and other conditions that the woman may not be aware of. The results revealed that specific actions were taken for the different VIA findings. For example, those with cervicitis were treated, those with polyps were referred for excision and those with growths were referred for biopsy.

5.2.6.3 Findings after 3 minutes (N=321)

After 3 minutes of applying acetic acid results showed that 88% (n=282) had negative results, 10% (n=32) had positive aceto white lesions and 2% (n=7) were positive for invasive cancer (refer to figure 4.15). VIA has been identified by the WHO as a simple, affordable and sensitive test for the identification of pre-cancerous changes of the cervix so that treatment such as cryotherapy can be instituted (Paul, Winkler, Bartolini, Penny, Huong, Nga, Kumakech, Mugisha & Jeromino 2013:6).

On the same day, within a period of about 5 minutes without having to wait for a repeat visit, the women had a cervical cancer screening service and got their results. For those who were aceto white positive or had invasive cervical cancer, the appropriate management was instituted. Since cryotherapy is available at a specific hospital in Zimbabwe, it was offered on the same day that the test was done and the results were available. Those who needed biopsy to confirm cervical cancer were scheduled for biopsy on the same day.

Keshavarzi, Nankali, Fakheri, Rezaei, Khoshay, Eslamizadeh and Bookani (2013:60) in their study on VIA as an alternative screening test for cervical cancer detection concurred that VIA can be performed in a short space of time after a short time education, and that it is cheap, available and requires little facilities. As a preventive measure and diagnostic method, the VIA positive results 10% (n=32) and the positive invasive cancer results 2% (n=7) determined the ability of VIA to identify pre-cancerous changes. In this study the positive aceto white results were followed by a colposcopy on the same day to confirm the results. Huchko, Sneden, Sawaya, McCune, Maloba, Abdulrahim, Bukusi and Cohen (2015:392) noted that the World Health Organisation (WHO) has recommended VIA as a method of choice for low resource settings such as Karanda because it is easy to use, has a low cost and results are available on a single visit.

5.2.6.4 Aceto white lesion extending to endocervical canal (N=32)

The clinical records revealed that there was extension of lesions into the endocervical canal in 50% (n=16) of those with acetowhite lesions (refer to table 4.8). If no treatment is provided for pre-cancerous lesions they may progress to cervical cancer although progression may take about 10 to 20 years (Lonky et al 2014:247). The 50% (n=16) women received appropriate treatment for the lesions in order to prevent cervical cancer. VIA as a method for cervical cancer screening was instrumental in instituting interventions to prevent cervical cancer. The other 50% (n=16) had no endocervical involvement.

5.2.6.5 Quadrants involved in acetowhite lesion (N=32)

The results showed that 66% (n=21) of those with aceto white lesions had two or less quadrants involved, 25% (n=8) had three quadrants involved and 9% (n=3) had four quadrants with aceto white lesions (refer to figure 4.16). When greater than two quadrants are involved it constitutes severe dysplasia and may involve the full thickness of the cervical epithelium (Brooker & Nicol 2012:212). Such lesions will progress to cervical cancer if not treated. Through VIA these findings mean that the women with severe dysplasia were prevented from dying from cancer, assuming that they consented and complied with the prescribed treatment.

5.2.6.6 Invasive cancer stage (N=7)

The clinical records indicated that all 100% (n=7) of the women who were diagnosed with invasive cancer were referred for staging of cervical cancer. This was the first time the cancer was diagnosed so the stage was unknown. This implies that these women had no prior cervical cancer screening or did not have regular cervical screening and had come to hospital because they were sick. They came too late for prevention and probably too late as well for treatment to be effective. Broutet et al (2014:156) explained that a lot of women with cancer of the cervix do not experience any pain or suffering until the cancer has progressed, they will only know about their cancer early if they regularly go for screening of cancer of the cervix.

5.2.7 Biopsy status (N=323)

The results revealed that only 7% (n=23) of the women had biopsy done for histopathological diagnosis or to treat cervical cancer. WHO (2014:166) highlighted that cone biopsy is used to treat cancer of the cervix which has not grown beyond the epithelium of the cervix and it is used in women who are still considering getting pregnant in the future. The results of this study did not specify the kind of biopsy done.

5.2.8 Action taken

The clinical records indicated that different actions were recommended for different findings. Women with multiple responses, 39% (n=126) were advised to return after five years for a follow up visit, 37% (n=120) were recommended for medicine to treat cervicitis and advised to follow up after six months, very few 3% (n=7) were referred for staging and treatment of invasive cancer and 1% (n=3) were referred for immediate treatment. Other actions taken included treatment for back pain 14.71% (n=48), treatment for sexually-transmitted diseases 11.76% (n=38), 11.76% (n=38) treated for lower abdominal pain and another 11.76% (n=38) were treated for urinary tract infections. There were also other specific actions taken but the highlighted ones were the main actions taken.

5.3 RECOMMENDATIONS

The findings of this study highlighted that VIA may not have been done in 87% (n=277) of the 323 women in the study. These were referred by health personnel who recognised the necessity since women had only come to seek treatment for their different illnesses. This suggests that there is a lack of knowledge about cervical cancer screening. Positive factors that promote the use of VIA as a screening method for cervical cancer at the specific rural hospital were identified. The socio-economic status of women were, therefore, generally determined to be due to poverty. It is against this background that the following recommendations are made in order to improve cervical cancer screening and reduce mortality due to cervical cancer.

5.3.1 Health education

- Health education to the community about cervical cancer screening and awareness on the risk factors and preventive measures.
- Health education on consistent correct condom use should be promoted among sexually active women for the prevention of sexually transmitted diseases which include HIV and HPV that predispose to cancer of the cervix.
- Men should be exposed to information pertaining to cervical cancer in order for them to offer support to their partners to access screening.

5.3.2 Health care practices

- Health care personnel should offer opportunistic cervical cancer screening to every eligible woman regardless of their purpose for visiting the hospital.
- Health care practitioners in primary care health centres should receive training on VIA since it is feasible and affordable in low resource settings.

5.3.3 Policies and procedures

- A policy should be enacted by policy makers, for every eligible woman to get a VIA screening test every 2-3 years unless advised otherwise.
- A policy should be put in place that VIA-screening should be offered for free in all health institutions in order to promote its uptake.

- Women's health issues should be prioritised and receive government funding in view of the generally poor socio-economic status of women so that they can afford to visit healthy women's clinic in order to be screened among other things for cervical cancer using VIA.

5.3.4 Health research

The results of the study revealed some factors that could promote the uptake of VIA as a cervical cancer screening method at a specific rural hospital. Although at a small scale, these results yielded some positive results in determining the extent of VIA uptake as a method for cervical cancer screening and the ability of VIA to identify pre-cancerous changes. The study should therefore be conducted on a larger scale so that the results can be significantly generalised to the wider population of Zimbabwe.

Although the findings cannot be generalised, the results and recommendations are relevant for promoting the uptake of VIA as a method for cervical cancer screening among women in rural areas.

5.4 LIMITATIONS OF THE STUDY

This study was conducted using samples from a specific rural hospital only, therefore the results cannot be generalised to any other hospital or community as the population and set up may be different.

Some of the clinical records (16 records) had missing information on some of the socio-economic factors, obstetrical history, referral status and VIA results so the missing information could not be analysed.

5.5 CONCLUDING REMARKS

Although cervical cancer remains a burden in sub-Saharan Africa, and cervical cancer screening is marred by socio-economic, cultural and logistical constraints. VIA seems to be a suitable choice for low-resource countries.

The unsophisticated, cheap and almost immediate result nature of VIA warrants an improvement in the screening of cervical cancer in rural areas such as Karanda. Effective implementation of VIA should help to prevent cancer of the cervix and, therefore, reduce the number of deaths and suffering from it.

LIST OF SOURCES

Adamson, PC, Huchko, MJ, Moss, AM, Kinkel, HF & Medina-Marino, A. 2015. Acceptability and accuracy of cervical cancer screening using a self-collected tampon for HPV messenger-RNA testing among HIV infected women of South Africa. *PloS One* 10(9):1-12.

Adedeji, OA. 2017. *Cancer in sub-Saharan Africa: current practise and future.* 2nd edition. Birmingham: Springer.

Al-Darwish, AA, Al-Naim, AF, Al-Mulhim, KS, Al-Otaibi, NK, Morsi, MS & Aleem, AM. 2014. Knowledge about cervical cancer early warning signs and symptoms, risk factors and vaccination among students at a medical school in Al-Alisa, Kingdom of Saudi Arabia. *Asian Pacific Journal of cancer prevention* 15(6) 2529-2532.

Andrea, B, Anderson, TM & Lambert, PC.2012. Screening and cervical cancer cure: population based cohort study. *British Medical Journal* 344:900-905.

Batra, P, Kuhn, L & Denny, L. 2010.Utilisation and outcomes of cervical cancer prevention services among HIV infected women in Cape Town. *South African Medical Journal* 100(1):39-44.

Behtash, N & Mehrdad, N. 2006: Cervical Cancer Screening and Prevention*. Asian Pacific Journal of Cancer Prevention* 7(2006): 683-686.

Bhavana, S, Dalal, A, Durdi, G, Pujar, Y & Dhumale, H. 2010. Cervical cancer screening by visual inspection with acetic acid: Interobserver variability between nurse and physician. *Asian Pacific Journal of Cancer* 11:323-326.

Boardman, CH. 2012.Cervical cancer. *Medscape medical.* http://www.medscape.com/article/253513 (accessed 1 September 2015).

Brooker, C & Nicol, M. 2012.*Alexander's nursing practise*. 4th edition. Toronto: Elsevier.

Broutet, N, Eckert, LO, Ulrich, A & Bloem, P. 2014. *Comprehensive Cervical Cancer Control: A guide to essential practice*. 2nd edition. Switzerland: The World Health Organization.

Brown, AJ & Trimble, CL.2012.New technologies for cervical cancer screening; Best practice. *Research in clinical obstetrics and gynaecology* 26(2):233-242.

Brown, SJ. 2017. *Evidence-based nursing: The research-practise connection.* 4th edition. Massachusetts : Jones & Bartlett.

Burns, N & Grove SK. 2009. *The practice of nursing research: Appraisal, synthesis, and generation of evidence*.6th edition. St Louis: Elsevier.

Busingye, P, Nakimuli, A, Nabunya, E & Mutyaba, T. 2012. Acceptability of cervical cancer screening via visual inspection with acetic acid or Lugol's iodine at Mulago Hospital, Uganda. *International journal of Gynaecology and obstetrics* 119(2012):262-265.

Campos, NG, Tsu, V, Jeromino, J, Mvundura, M, Lee, K & Kim, JJ. 2015. When and how often to screen for cervical cancer in three low and middle income countries: A cost effectiveness analysis*. Papillomavirus research* 2015(1):38-58.

Catarino, R, Petignat, P, Dongui, G & Vassilakos, P. 2015. Cervical cancer screening in developing countries at a crossroad: Emerging technologies and policy choices. *World journal of clinical oncology* 6(6):281-290.

Chaturvedi, AK, Engels, EA, Pfeiffer, RM, Hernandez, BY, Xiao, W, Kim, E, Jiang, B, Goodman, MT, Sibug-Saber, M, Cozen, W, Liu, L, Lynch, CF, Wentzensen, N, Jordan, RC, Altekruse S, Anderson WF, Rosenberg, PS, & Gillison, ML. 2011.Human papillomavirus and rising oropharyngeal cancer incidence in the United States. *Journal of Clinical Oncology* 29(32):4294-4301.

Chin'ombe, N, Sebata, N, Ruhanya, V & Matarira, HT. 2014. Human papillomavirus genotypes in cervical cancer and vaccination challenges in Zimbabwe. *Infectious agents of cancer :* 1-5.

Denny, LA. 2008. Guidelines: The HPV prophylactic vaccine. *South African society of obstetricians and gynaecologists.PUBMED* From: http://www.sasog.co.za/B_**HPV**PROPHYLACTIC**VACCINE** (accessed 6 July 2015).

Denny, LA. 2009. Cervical intraepithelial neoplasia. *South Africa journal of gynaecology oncology* 1(1):5-8.

Denny, LA & Anorlu, R. 2012. Cervical cancer in Africa. *American Association for cancer research* 001(10):1434-1438.

Elfström, KM, Herweijer, E, Sundström, K & Dahlström, LA. 2014. Current cervical cancer prevention strategies including cervical screening and prophylactic human papillomavirus vaccination: a review. *Current Opinion Oncology* 26(1):121-127.

Ellis, P. 2013.*Understanding research for nursing students: Key characteristics of quantitative research. Overview of quantitative methodologies.*1st edition. London: Sage.

Ezechi, OC, Petterson, KO, Gabajabiamila, TA, Idigbe, IE, Kuyoro, O, Ujah, IAO & Ostergren, PO. 2014. Predictors of default from follow-up care in a cervical cancer screening program using direct visual inspection in south-western Nigeria*. BioMedical Central Health Services Research* 14(143): 1-10.

Ferlay, J, Shin, HR, Bray, F, Forman, D, Mathers, C & Parkin, DM. 2010.Estimates of worldwide burden of cancer in 2010.*GLOBOCAN International Journal of Cancer 2010* 127(12):2893–917.

Ferreira, F, Joliffe, DM & Prydz, EB. 2016. The international poverty line has just been raised to $1.90 a day, but global poverty is basically unchanged. How is that even possible? http://blogs.worldbank.org/development/international. (accessed 20 June 2017).

Finocchario-Kessler, S, Wexler, C, Maloba, M, Mabachi, N, Ndikum-Moffor, F & Bukusi, E. 2016. Cervical cancer prevention and treatment research in Africa: A systematic review from a public health perspective. *BMC women's health* 16(29):1-7.

Firnhaber, C, Mayisela, N, Mao, L, Williams, S ,Swarts, A, Faesen, M, Levin, S, Michelow, P, Omar, T, Hudgens, MG, Williamson, AL, Allan, B, Lewis, DA & Smith, JS. 2013. Validation of cervical cancer screening methods in HIV positive women from Johannesburg South Africa. *PloS one* 2013*:* 8(1) 1-20.

Fokom-Domgue, J, Combescure, C, Fokom-Defo, V, Tebeu, PM, Vassilakos, P, Kengne, AP & Petignat, P. 2015. Performance of alternative strategies for primary cervical cancer screening in sub-Saharan Africa: systematic review and meta-analysis of diagnostic test accuracy studies. From: doi:10.1136/bmj.h3084 (accessed 20 June 2016).

Forahn, SE, Godfrey, CC, Watts, H & Langley, CL. 2015. A Systematic Review of the Effects of Visual Inspection with Acetic Acid, Cryotherapy, and Loop Electrosurgical Excision Procedures for Cervical Dysplasia in HIV-infected women in Low-and Middle-Income Countries. *Journal of Acquired Immune Deficiency Syndrome* 68(3):S350-S356.

Garcia, F. 2012. *Intraepithelial disease of the cervix, vagina and vulva.* In Berek JS, ed. *Berek and Novak's Gynaecology*.15th edition. Philadelphia: Lippincott, Williams and Wilkins.

Gerrish, K & Lathlean, J. 2015. *The research process in nursing*. 1st edition. London: Wiley Blackwell.

Gray, JR, Grove, SK & Sutherland, S. 2017. *The practise of nursing research: Appraisal, synthesis and generation of evidence.* 8th edition. Missouri: Elsevier.

Grove, SK, Gray, JR & Burns, N. 2014*. Understanding nursing research: Building an evidence-based practise*. 6th edition. Elsevier Saunders Missouri.

Harries, J, Moodley, J, Barone, MA, Mall, S, & Sinanovic, E. 2009. Preparing for HPV vaccination in South Africa: key challenges and opinion. *Vaccine.* 27(1):38-44.

Hasanzadeh, M, Esmaeili, H, Tabaee, S & Samadi, F. 2011.Evaluation of visual inspection with acetic acid as a feasible screening test for cervical neoplasia. *Obstetrics and Gynaecology* 37(12):1802-1806.

Heale, R & Twycross, A. 2015. Validity and reliability in quantitative studies. *BMJournal of evidence based nursing* 18(3):1-4.

Herfs, M, Herran, CP, Howitt, B, Laury, A, Nucu, MR, Feldman, S, Jimenez, CA, McKeon, FD, Xian, W & Crum, C. 2013. Cervical squamocolumnar junction-specific markers define distinct clinically relevant subsets of low grade squamous intraepithelial lesions. *The American journal of surgical pathology* 37(9): 1311-1318.

Hoque ME, Ghuman S, Coopoosmay R & Van Hal G. 2014. Cervical cancer screening amoung university students in South Africa. *International journal of infectious diseases* 21(1) 424.

Huchko, MJ, Sneden, J, Sawaya, G, McCune, KS, Maloba, M, Abdulrahim, N, Bukusi, EA & Cohen CR. 2014.Accuracy of visual inspection with acetic acid to detect cervical cancer precursors among HIV-infected women in Kenya. *International Journal of Cancer* 136 (2015): 392-398.

Huchko, MJ, Sneden J, Zakaras JM, McCune KS, Sawaya G, Maloba M, Bukusi EA & Cohen CR. 2015. A randomized trial comparing the diagnostic accuracy of visual inspection with acetic acid to visual inspection with Lugol's iodine for cervical cancer screening in HIV infectedwomen.*PLoSONE*10(14):[112].http://www.journals.plos.org/plosone/article?id=10.1371/journal.pone.0118568 (accessed 6 July 2015).

Islami, F, Torre, LA, Drope, JM, Ward, EM & Jemal, A. 2017. Global cancer in women: cancer control priorities. *Cancer epidemiology biomarkers & prevention* 26(4):458-470.

Kamal, P, Lumb, L, Swamy, LM & Durdi, G. 2011.Evaluation of Down staging, Visual Inspection with Acetic Acid and Lugol's Iodine in screening of cervical cancer. *Journal of South Asian Federation of Obstetrics and Gynaecology* 3(2): 63-66.

Keshavarzi, F, Nankali, A, Fakheri, T, Rezaei, M, Khoshay, A, Eslamizadeh, N, & Bookani, SN. 2013. Cervical visual inspection with acetic acid as an alternative screening test for cervical cancer detection. *International Journal of Collaborative Research on Internal Medicine & Public Health* 5(1):60-66.

Kuguyo, O, Matimba, A, Tsikai, N, Magwali, T, Madziyire, M, Gidiri, M, Dandara, C & Nhachi C. 2017. Cervical cancer in Zimbabwe: a situation analysis. *The Pan African medical journal* 2017(27):1-15.

Levine, LD, Chudnoff, SG, Taylor, K, Baganizi, M & Banks, E. 2011.A 5-day educational program for teaching cervical cancer screening using visual inspection with acetic acid in low-resource settings. *International journal of gynaecology and obstetrics* 115 (2011): 171-174.

Lindeque, BG. 2009. Management of premalignant lesions of the cervix. *Southern African journal of gynaecology oncology* 1(2):63-65.

Lobiondo-Wood, G & Haber, J. 2014. *Nursing research: Methods and critical appraisal for evidence based practise.* 8th edition. Toronto: Elsevier.

Lonky, NM, Penner, KR & Diedrich JT. 2014. Current aims and challenges associated with cervical cancer prevention. *Clinical obstetrics and gynaecology* 57(2):241-255.

Louie, KS, de Sanjose, S & Mayaud, P. 2009. Cervical cancer prevention in Africa. *Africa Health* 16(24):27-29.

Luciani, S, Munoz, S, Gonzales, M, Delgado, JM & Valcarcel, M. 2011. Effectiveness of cervical cancer screening using visual inspection with acetic acid in Peru. *International journal of gynaecology and obstetrics* 115(1):53-56.

Markowitz, LE, Dunne, EF, Saraiya M, Chesson, HW, Curtis, CR, Gee, J, Bocchini, JA & Unger, ER.2014. Human Papillomavirus vaccination: Recommendations of the

advisory committee on immunisation practises (ACIP). *Morbidity and mortality weekly report: Recommendations and reports* 63(5):1-30.

Moore, AR & Driver N. 2014. Knowledge of cervical cancer risk factors among educated women in Lome Togo: Half-truths and misconceptions.*D01:10.1177/2158244014557041 sgo.sagepubcom.* (accessed 18 May 2018).

Moule, P, Aveyard, H & Goodman, M, 2017. *Nursing Research.* 3rd edition. London: Elsevier.

Moyer, A. 2013. Screening for cervical cancer: U.S. Preventive services task force recommendation statement. *Annals of internal medicine* 158(11):852-868.

Mukakalisa, I, Bindler, R, Allen, C & Dotson, J. 2014. Cervical Cancer in Developing Countries: Effective Screening and Preventive Strategies with an Application in Rwanda. *HealthCare for Women International*. http://dx.doi.org/10.1080/07399332.2014.909433 (accessed 20 June 2015).

Ndejjo, R, Mukama, T, Musabyimana, A & Musoke, D. 2016. Uptake of cervical cancer screening and associated factors among women in rural Uganda: A cross sectional study. *PloS One* 11(2):1-13.

Ntekim, A. 2012. Cervical cancer in Sub Sahara Africa: Topics on cervical cancer with an advocacy for prevention. From: http://www.intechopen.com (accessed 10 July 2015).

Odendal, L. 2011. Cervical cancer in women with HIV.*HIV & AIDS Treatment in Practice (HATiP)* 174 (2011):2-13.

Orang'o, EO, Wachira, J, Asirwa, FC, Busakhala, N, Naanyu, V, Kisuya, J, Otieno, G, Keter, A, Mwangi, A & Inui, T. 2016. Factors associated with uptake of visual inspection with acetic acid (VIA) for cervical cancer screening in Western Kenya. *PloS One* 11(6):1-16.

Osborn, K, Wraa, CE, Watson, AB & Holleran, R. 2014. Medical-surgical nursing preparation for practice. 2nd edition. Toronto: Pearson.

O'Toole, MT. 2013. Mosby's dictionary of medicine nursing & health professionals. 9th edition. Canada: Elsevier.

Pandey, P & Pandey, MM. 2015. *Research methodology: Tools and techniques.* 1st edition. Romania: Bridge ceater.

Panganayi, T & Gono, C. 2017. Visual inspection with acetic acid screening for cervical cancer: perception of Zimbabwean women: A case of Kwekwe hospital. From: https://www.D01:10.31254/sportmed.1103 (accessed 21 June 2018).

Parahoo, K. 2014. *Nursing research principles, process and issues.* 3rd edition. New York: Palgrave Macmillan.

Patil, K, Lumb, L, Swamy, MK & Durdi, G. 2011.Evaluation of Down staging, Visual Inspection with Acetic Acid and Lugol's Iodine in Screening of Cervical Cancer*. Journal of South Asian Federation of Obstetrics and Gynaecology* 3(2): 63-66.

Paul, P, Winkler, JL, Bartolini, RM, Penny, ME, Huong, TT, Nga, LT, Kumakech, E, Mugisha, E & Jeromino, J. 2013. Screen-and-Treat Approach to Cervical Cancer Prevention Using Visual with Acetic Acid and Cryotherapy: Experiences, Perceptions, and Beliefs from Demonstration Projects in Peru, Uganda, and Vietnam. From http://dx.doi.org/10.1634/theoncologist.2013-0253 (accessed 20 June 2015).

Peralta-Zaragoza, O, Deas, J, Gómez-Cerón, C, Garcia-Saustegui, WA, Fierros-Zārate, GSF & Herrera, NJJ. 2013. HPV-Based screening, triage, treatment, and follow up strategies in the management of cervical intraepithelial neoplasia. *Obstetrics and Gynaecology international* 2013(912780):1-15.

Polit, DF & Beck, CT. 2008.*Nursing Research: Generating and Assessing evidence for Nursing Practise.7th edition.* London: Lippincott Williams & Wilkins.

Polit, DF & Beck, CT. 2010.*Nursing Research: Generating and Assessing evidence for Nursing Practise.*7th edition*.* London: Lippincott Williams & Wilkins.

Polit, DF & Beck, CT. 2014. *Essentials of nursing research appraising evidence for nursing practise.* 8th international edition. Philadelphia: Wolters Kluwer/ Lippincott Williams & Wilkins.

Randall, TC & Ghebre R. 2016. Challenges in prevention and care delivery for women with cervical cancer in Sub-Saharan Africa. *Frontiers in oncology and women's cancer.* 2016 (160): 1-6.

Rao soft sample size calculator. From: http://www.raosoft.com (accessed 22 April 2016).

Ruel, E, Wagner, WE & Gillespie, BJ. 2016. *The practise of survey research: Theory and applications.* California: SAGE publications.

Salkind, NJ. 2012. *Exploring Research*. 8th edition. New York: Pearson.

Sankaranarayanan, R, Sauvaget, C, Ramadas, KT, Ngoma, I, Teguete, R, Muwonge, Naud, P, Nessa, A, Kuhaprema, T & Qiao, Y. 2011.Clinical trials of cancer screening in the developing world and their impact on cancer healthcare*. Annals of Oncology* 22 (7): 20–28.

Sankaranarayanan, R, Nessa, A, Esmy, P & Dangou, J. 2012.Visual inspection methods for cervical cancer prevention. *Best Practice & Research Clinical Obstetrics & Gynaecology* 26(2): 221–232.

Saunders, M, Lewis, P & Thornhill A. 2010.*Research Methods for business students*.5th edition. New York: Prentice Hall.

Schiffman, M & Wentzensen, N. 2010.From Human Papilloma virus to Cervical Cancer. *Obstetrics & Gynaecology* 116(1):177-184.

Schmeler, KM. 2012. Preventing Cervical Cancer Globally. *Cancer Prevention Research* 5(11): 1257- 1259.

Sinanovic, E, Moodley, Barone, MA, Mall, S, Cleary, S & Harries, J. 2009. The potential cost-effectiveness of adding a human papillomavirus vaccine to the cervical cancer screening programme in South Africa. *Vaccine* 27(4):6196-6202.

Skinner, SR, Szarewski, A, Romanowski, B, Garland, SM, Ponce, EL, & Salmeron, J. 2014. Efficacy, safety and immunogenicity of the human papillomavirus 16/18 AS04 vaccine in women older than 25 years: 4year interim follow up of the phase 3, double blind, randomized controlled VIVIANE study. *The Lancet* 384(9961):2213-2227.

Stormo, AR, Altamirano, VC, Castelles, MC, Espey, D, Padilla, H, Panameno, K, Soria, M, Santos, C, Saraiya, M & Luciani, S. 2012. Bolivian Health Providers' Attitudes toward Alternative Technologies for Cervical Cancer Prevention: A Focus on Visual Inspection with Acetic Acid and Cryotherapy. *Journal of Women's Health* 21(8):801-808.

Suresh, S. 2014*. Nursing research and statistics.* New Delhi: Elsevier.

Synman, LC, Dreyer, G, Botha, MH, van der Merwe, FH & Becker PJ. 2015. The vaccine and cervical cancer screen (VACCS) project: Linking cervical cancer screening to HPV vaccination in the south-west district of Tshwane, Gauteng, South Africa. *South African Medical Journal* 105(2):115-120.

The National Health Strategy for Zimbabwe 2013. Equity and quality in health: A people's right. *Ministry of health and child care Zimbabwe* 2 (2013):1-130.

VanderStroep, SW and Johnson DD. 2010. *Blending Qualitative and Quantitative Approaches: Research Methods for Everyday Life*. New York: John Wiley and Sons.

World Health Organisation. 2014. *Comprehensive cervical cancer control. A guide to essential practise* (C4GEP). 2nd edition. Geneva: WHO.

Wood, MJ & Ross-Kerr JC. 2011. *Basic steps in planning nursing research: From question to proposal.* 7th edition. Boston: Jones and Bartlett.

Youngblood, R. 2013. GAVI injects new life into HPV vaccine rollout. *The Lancet* 381(9879):1688.

Zimbabwe Demographic and Health Survey. 2015 Final report. Zimbabwe national statistics agency and ICF international 2016. Rockville, Maryland, USA: Zimbabwe national statistics agency (ZIMSTAT and ICF international.

Zimbabwe national statistics agency (ZIMSTAT). 2013. *2012 Zimbabwe census population national report.* Harare Zimbabwe.

ANNEXURES

ANNEXURE 1 ETHICAL CLEARANCE CERTIFICATE

UNISA

UNIVERSITY OF SOUTH AFRICA
Health Studies Higher Degrees Committee
College of Human Sciences
ETHICAL CLEARANCE CERTIFICATE

REC-012714-039

HSHDC/392/2015

Date: 11 February 2015 Student No: 3599-464-9

Project Title: The implementation of cervical cancer screening program using Visual Inspection with Acetic Acid (VIA) in a specific rural hospital in Zimbabwe.

Researcher: Pedrinah Thistle

Degree: MA Nursing Science Code: MPCHS94

Supervisor: Dr KA Maboe
Qualification: D Litt et Phil
Joint Supervisor: Ms A Mosalo

DECISION OF COMMITTEE

Approved √ **Conditionally Approved**

Prof L Roets
CHAIRPERSON: HEALTH STUDIES HIGHER DEGREES COMMITTEE

Prof MM Moleki
ACADEMIC CHAIRPERSON: DEPARTMENT OF HEALTH STUDIES

PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRES

ANNEXURE 2

PERMISSION TO CONDUCT STUDY

Karanda Mission Hospital

Private Bag 2005

Mt Darwin

6 September 2014

The Medical Superintendent

Karanda Mission Hospital

Private Bag 2005

Mt Darwin

SIR/MADAM

Request to conduct study

I am Pedrinah Thistle a midwifery tutor at Karanda Midwifery School, a research student pursuing a Master's degree in Nursing Science at the University of South Africa. My student number is 35994649.

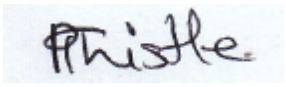
I hereby request permission to conduct a study at your institution. The title of my study is Cervical cancer screening: A Retrospective study of VIA program in a rural hospital in Zimbabwe. The purpose is to determine whether VIA is a feasible and affordable cervical cancer screening method at a rural hospital.

Data will be collected from hospital records of women who undergone VIA. Based on the results, the recommendations will be used to determine suitability of VIA in a rural setting. Kindly refer to an Ethical clearance certificate from UNISA as attached.

My supervisor is Dr KA Maboe and her contact details are: +27(0) 12 429 2392, email maboeka @unisa.ac.za and co- supervisor is Mrs Mosalo and her contact details are email mosala@unisa.ac.za

Your positive response will be highly appreciated.

Yours faithfully

Pedrinah Thistle 

ANNEXURE 3

PERMISSION TO CONDUCT STUDY

Mrs Pedrinah Thistle

Tutor Midwifery Schoo

Karanda Mission Hospital

05 May 2014

Dear Mrs Thistle

RE: PERMISSION TO CONDUCT RESEARCH AT KARANDA MISSION HOSPITAL

On behalf of the Ministry of Health and Child Care, I wish to inform you that you have been granted permission to conduct a research study on: **Cervical cancer screening: A retrospective study of VIA program in a rural hospital in Zimbabwe.**

Kindly take note of the following

1. You must inform this office before commencement of the research.

2. All institutional policies and guidelines must be adhered to during the course of this research.

3.You shall not compromise your teaching duties while you carry out this research.

4. You will be expected to give feedback to the chief medical officer and all medical staff when your study is complete.

Yours fathfully

Daniel A. Stephens, MD, FACS

Medical Director

MINISTRY OF HEALTH
Government Medical Officer
2016 -09- 14
Karanda Mission Hospital
Private Bag 2005
Mt Darwin

ANNEXURE 4

REQUEST FOR PERMISSION TO ACCESS CLINICAL RECORDS

Karanda Mission Hospital

Private Bag 2005

Mt Darwin

6 September 2014

The Medical Superintendent

Karanda Mission Hospital

Private Bag 2005

Dear Sir

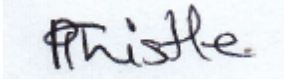
REQUEST TO ACCESS HOSPITAL RECORDS

I Mrs Pedrinah Thistle a midwifery tutor at Karanda Mission Hospital pursuing a Master's degree in Nursing Science hereby request access to hospital records of women who undergone VIA.

My student number is 35994649. The title of my study is cervical cancer screening: A Retrospective study of VIA program in a rural hospital in Zimbabwe. My supervisor is Dr KA Maboe and her contact details are: +27(0) 12 429 2392 email maboeka @unisa.ac.za and co- supervisor is Mrs Mosalo and her contact details are email mosala@unisa.ac.za

Your positive response will be highly appreciated.

Yours faithfully



Pedrinah Thistle

ANNEXURE 5

PERMISSION TO ACCESS CLINICAL RECORDS

Mrs Pedrinah Thistle

Tutor Midwifery Schoo

Karanda Mission Hospital

14 September 2014

Dear Mrs Thistle

RE: PERMISSION TO ACCESS HOSPITAL RECORDS AT KARANDA MISSION HOSPITAL

On behalf of the Ministry of Health and Child Care, authority is hereby given to you, to have access to hospital records for VIA for the period from 1 January 2013 to 31 December 2014 only, for your research study on: **Cervical cancer screening: A retrospective study of VIA program in a rural hospital in Zimbabwe.**

Please be informed that hospital records shall not be taken out of the records room. No one else is allowed to accompany you into the records room. You shall have access from 7am to 5pm during the week and from 7am to 1pm on Saturdays . Be sure to inform this office of your intended date of commencement for your study .

Yours faithfully,

Daniel A. Stephens, MD, FACS

Daniel A. Stephens, MD, FACS

Medical Director

MINISTRY OF HEALTH
Government Medical Officer
2016 -09- 14
Karanda Mission Hospital
Private Bag 2005
Mt Darwin

ANNEXURE 6

CHECKLIST

CHECKLIST

Enter the correct responses

Demographic Information-

1. Case/Serial Number [ ][ ] [ ][ ]
2. Date of cervical cancer screening
   (day (2 digits)-month (2 digits)-year (2 digits)) [ ][ ]-[ ][ ]-[ ][ ]

3. Age in years [ ][ ]
4. Residential area

☐ Within Karanda catchment area ☐ Outside Karanda catchment area

Tick the responses in the appropriate box

Socio-economic status

5. Marital status

Single	1	☐
Married	2	☐ -
Widowed	3	☐
Divorced	4	☐

6. Highest Education level

Never went to school	1	☐
Grade 7or below	2	☐
O-Level	3	☐

A-level 4 ☐

Tertiary level 5 ☐

7. Employment status

Formally employed 1 ☐

Self- employed 2 ☐

Peasant farmer 3 ☐

Unemployed 4 ☐

Retired 5 ☐

8. Monthly income

None 1 ☐

Less than a dollar (US) a day 2 ☐

More than a dollar (US) a day 3 ☐

9. Communication means

Cell phone 1 ☐

Land line 2 ☐

Letter (surface mail) 3 ☐

Email 4 ☐

None 5 ☐

10. Water supply source

Unprotected source 1 ☐

Hand pump borehole 2 ☐

Treated tap water 3 ☐

11. Mode of sanitation

Blair toilet 1 ☐

Pit latrine 2 ☐

Modern flushing system 3 ☐

None 4 ☐

Obstetrical History

12. Number of pregnancies (Gravidity)

1 ☐

2 ☐

3 ☐

More than 4 ☐

None ☐

13. Number of miscarriages the woman had?

1 ☐

2 ☐

3 ☐

More than 4 ☐

None ☐

14. How many children the woman have? (Parity)

1 ☐

2 ☐

3 ☐

More than 4 ☐

None ☐

Medical History

15. Did the woman come to the hospital due to illness? 1 ☐ No 2 ☐ Yes

16. What was the woman's HIV status?)

Positive on treatment	1	☐
Positive no treatment	2	☐
Negative	3	☐
Unknown	4	☐

17. Have the woman experienced any of the following?

1	☐Excessive vaginal discharge	5	☐Itching in the external anogenitalia
2	☐Ulcers in the external anogenitalia	6	☐Lower abdominal pain
3	☐Pain during sexual intercourse	7	☐Bleeding after intercourse
4	☐Lower back pain	8	☐Inter menstrual bleeding

Cervical Cancer Screening History

18. Did the woman have prior cervical cancer screening?

No	1	☐
Yes Pap Smear	2	☐
Yes VIA	3	☐

Yes VILI 4 ☐

19. **VIA Screening**

Routine 1 ☐

Woman was referred by Nurse/Doctor 2 ☐

20. VIA results

Squamocolumnar junction fully seen	1 ☐
Cervical polyp	2 ☐
Nabothian follicles	3 ☐
Cervicitis	4 ☐
Leucoplakia	5 ☐
Condyloma	6 ☐
Growth	7 ☐

21. Findings after 3 minutes of application of acetic acid (VIA)?

1 ☐Negative

2 ☐Positive aceto white lesion 3 ☐Positive invasive cancer

22. If VIA positive, did the aceto white lesion extend in to the endocervical canal?

1 ☐ Yes; 2 ☐ No

23. If VIA positive, how many quadrants were involved in the aceto white lesion(s)?

1 ☐ Two or less; 2 ☐Three; 3 ☐ Four quadrants

24. If invasive cancer, stage

1 ☐ IA; 2 ☐ IB; 3 ☐ IIA;

4 ☐ IIB; 5 ☐ IIIA; 6 ☐ IIIB;

7 ☐ IVA; 8 ☐ IVB; 9 ☐ Not known

25. Biopsy taken?

1 ☐ Yes; 2 ☐ No

26 .Action taken: (tick in the appropriate box)

1☐ Advised follow-up after five years;

2☐ Advised medication for Cervicitis and follow-up after six months;

3☐ Referred for colposcopy;

4☐ Referred for immediate treatment;

5☐ Referred for staging and treatment of invasive cancer;

6☐Other, specify _____

ANNEXURE 7

LETTER FROM STATISTICIAN

P. O. Box MP 167
Mount Pleasant
Harare, Zimbabwe
Telephone: 303211 Ext 15510
Telex: 26580 UNIVZ ZW
Telegrams: UNIVERSITY
Fax: (263) (4) 333 407
E-mail: vichikosi@gmail.com

UNIVERSITY OF ZIMBABWE

8 January 2018

Dr Maboe
University of South Africa (UNISA)
Republic of South Africa

RE: STATISTICAL ANALYSIS FOR MRS PEDRINAH THISTLE'S THESIS

Reference is made to the above. I do hereby confirm that I assisted the above-mentioned student with analysis of data for her studies.

Should you require any further information, please do not hesitate to contact the undersigned on email vichikosi@gmail.com or vichikosi@agric.uz.ac.zw , mobile +263 772 773 738 or phone +263 4 303211 ext. 15517.

Thank you.
Sincerely yours

Venancio Edward Imbabyarwo- Chikosi, PhD

ANNEXURE 8

LETTER FROM THE EDITOR

DAVID SUNSLY MUNGOSHI (Content and Technical Editor)
12 Shurugwi Road, Gweru East
Gweru
Zimbabwe
26 May 2018
E-Mail address: david.sunny.mungoshi07@gmail.com
Mobile Number: +263775187608
Sir/Madam
RE: CONTENT AND TECHNICAL EDITING OF UNISA MA STUDENT PEDRINAH THISTLE"S DISSERTATION
I hereby confirm editing Pedrinah Thistle's dissertation titled, **"CERVICAL CANCER SCREENING: A RETROSPECTIVE STUDY OF VISUAL INSPECTION WITH ACETIC ACID (VIA) IN A RURAL HOSPITAL IN** ZIMBABWE."
Accordingly, I confirm attending to the following critical issues:
 Cohesion and coherence within the student's overall write-up.

 Paragraphs

 Syntactical issues: tense, concord, the use of modal verbs, word order in sentence construction, spelling and punctuation.

 Weeding out expressions that were too obviously informal vis-à-vis register and making the necessary adjustments.

 Clearing vagueness where anaphoric reference was not properly-done.

In addition to the above, I also handle certain areas of concern that might require action by the student. Furthermore, I satisfied myself that there was clarity and easy access to intended meanings. Finally, I can without reservation say that Pedrinah Thistle's document in now fully examiner-friendly.
Yours faithfully
DS Mungoshi
David Sunsly Mungoshi
[MA Applied English Linguistics (UZ); Graduate Certificate in Education (UR); BA (UR)]