

An analysis of the relationship between HIV-testing and cervical cancer screening uptake among females of reproductive age (15-49 years old) in South Africa

By

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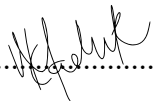
A research project submitted to the Faculty of Humanities, School of Social Sciences, University of Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Arts in Demography and Population Studies

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Supervisor: Prof. Nicole De Wet-Billings

DECLARATION

I, Koketšo Madubye, declare that this report is my own work. It is being submitted to the Faculty of Humanities, University of the Witwatersrand, in partial fulfilment of the degree Master of Arts in Demography and Population Studies. This research report has not been submitted, in part or in whole, to any other Institution or University as a requirement for any other qualification.

Signature:.....

Date: 24/06/2024.....

ABSTRACT

Background: Higher income countries (HIC) have threefold testing coverage over lower to middle income countries (LMIC). Cervical cancer is the 4th most prevalent cancer among females globally, and a key contributor to mortality in Southern Africa. In LMIC, including South Africa, only 9% of the eligible screening cohort had ever undergone cervical cancer screening. This study examined the gap in understanding the relationship between HIV testing behaviours and the uptake of cervical cancer screening.

Methods: The study was conducted in South Africa, utilising the 2016 South African Demographic and Health Survey (SADHS), as a secondary data source. The sample size of this study was a weighted (n) distribution of 4,199 females. The study design is cross-sectional, the outcome variable of interest in this study was the uptake of cervical cancer screening and the predictor variable is HIV Testing. The data by SADHS (2016) was analysed through the three phases: univariate, bivariate and multivariate. At the bivariate level, contingency tables were employed, using the Pearson chi-square test of association which examined the strength of crude relationships between cervical cancer screening and the study of independent variables. In addition, a multivariate analysis through the employment of a binary logistic regression as the outcome of the study was categorised with 'yes' and 'no' binary responses.

Results: The findings of this study indicated that 33% of females of reproductive age had ever undergone cervical cancer screening, while 62.5% responded affirmatively to having tested for HIV. Females who tested for HIV displayed a higher propensity to having undergone cervical cancer screening, 37.43% female respondents who tested for HIV had undergone screened for cervical cancer, as opposed to those who didn't test, which only 10.19 % screened for cervical cancer.

Conclusions: 37.43% female respondents who tested for HIV had undergone screened for cervical cancer. Among those who did not test for HIV, 10.19 % screened for cervical cancer. There is still much to be done to improve cervical cancer screening among females, while HIV testing remains high, cervical cancer screening is alarmingly low. The 2017 Cervical Cancer Prevention and Control Policy functions as a mediating apparatus, additional supplementations targeting females below the age of 30 remain a necessity.

Keywords: Cervical cancer screening, HIV Testing behaviour, South Africa

DEDICATION

To my dearest mother, Tumelo Sylvia Madubye, and grandparents Emmanuel Madimmetja Madubye and Lydia Rramasela Madubye, thank you for empowering me to reach for the impossible. Lehono ke moto, ka baka la lena. Bakwena we, dikgadi dinkwe dinthamaga tsa go dula maswikeng.

To my husband, Emmanuel Tshimama Mukadi, thank you for pushing me to embrace every challenge and seize every opportunity.

Ezer

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List of Acronyms

ANC: African National Congress

ART: Antiretroviral Therapy

CCPP: Zambian Cervical Cancer Prevention Program

CD4 T-cells: Cluster of Differentiation 4 counts

CIN: Cervical Intraepithelial Neoplasia

DBE: Department of Basic Education

EA's: Enumeration Areas

FIGO: International Federation of Gynaecology and Obstetrics

HAART: Highly Active Antiretroviral Therapy

HBM: Theory of Planned Behaviour, and Health Belief Model

HIC: Higher Income States

HIV: Human Immunodeficiency Virus

HPV: Human Papillomavirus

LMIC: Lower and middle income countries

MSF: Master Sample Frame

NACOSA :National AIDS Convention of South Africa

NDoH: National Department of Health

NSP: South African National Strategic Plan

Pap Smear: Papanicolaou Smear

PSU: Primary Sampling Units

SADHS: South African Demographic and Health Survey

SAMRC: South African Medical Research Council

SCT: Social Cognitive Theory

SDH: Social Determinants of Health Theory

SSU: Secondary Sampling Units

STI: Sexually Transmitted Infections

USAID: United States Agency for International Development

VIA: Visual Inspection Of The Cervix With Acetic Acid

CHAPTER ONE

1.1 Introduction

This chapter provides contextual background for this study, it focuses on the prevalence of cervical cancer in South Africa, and the contributing dynamics that sustain cervical cancer among females of reproductive age. This chapter proceeds to establish the problem statement, justification and objectives of this study.

1.1 Background

Health testing remains essential to the effective prevention, detection, and treatment of diseases. For cervical cancer, testing behaviours assist in determining coverage estimates which provide substantiated material required for treatment (Bruni et al., 2022). According to Bruni et al., (2022), higher income countries (HIC) have threefold testing coverage over lower and middle income countries (LMIC). Cervical cancer is the 4th most prevalent cancer among females globally, and a key contributor to mortality in Southern Africa (Arbyn et al., 2020; Sung et al., 2021). Cervical cancer screening is specific to females aged 30-49 years old as they are considered to be at higher risk of developing Cervical Intraepithelial Neoplasia (CIN), which facilitates the development of cervical cancer (Cohen et al., 2019). According to Arbyn et al., (2020), in LMIC, including South Africa, only 9% of the eligible screening cohort has ever undergone cervical cancer screening.

Health testing behaviours are also related. Research has found that HIV-testing can be used as a monitoring indicator of testing behaviours as it displays a pattern of positive health outcomes for females who frequently make use of testing facilities (Bogale et al., 2021, Mwanahamuntu et al., 2013). HIV testing reflects initiatives to exercise sexual and reproductive agency with the primary intention of maintaining sexual and reproductive health, in turn including, and contributing to cervical cancer screening uptake. In 2017, 82% of females, aged 15-49 years old, were been tested for HIV in South Africa, while 37% of females aged 15-49 years old had ever undergone cervical cancer screening (SADHS, 2016). Globally, 39 million individuals are living with HIV and 1.3 million individuals were newly diagnosed with HIV, however this burden is particularly strive in South Africa (UNAIDS, 2023). Regionally, sub, Saharan Africa accounts for 77,5% of accumulated global cases, comparatively South Africa maintains the highest rates for HIV/AIDS (UNAIDS, 2023; Zuma et al 2022). Young females between the ages of 15 and 25 continue to be the cohort with highest annual new infections, despite 48% of

females not being aware of their HIV status (Dhokotera et al., 2022; Grebe et al., 2018). Barriers to routine testing are largely related to subjective norms relating to testing, as well as resource restrictions with regards to access to healthcare and availability of resources in LMIC (Williams, Rhodes, & Conner, 2019).

Globally, 139 countries have successfully mandated cervical cancer screening through Human Papillomavirus (HPV) testing, cytology, and visual assessment using acetic acid (VIA) in regions with limited resources. While 169 countries have determined at least one cervical cancer screening among female of reproductive age (Bruni et al., 2022). Unlike HPV testing and VIA cervical cancer screenings, or Papanicolaou smears are a cytology based technique, it entails the speculum removal of cells from the epithelium walls within the vagina (NDoH, 2017). According to the Lancet initiatives for cervical cancer screening and estimates of age-specific prevalence, out of the 139 countries with mandated cervical cancer screening in 2022, 88% of the states provided free primary screening test within their public health facilities (Bruni et al., 2022; Chao et al., 2019). The primary purpose for screening is to detect physiological abnormalities which may indicate cancer development (Chao et al., 2019). Cervical cancer screening is intended to determine precursor lesions as early as possible, in order to lessen the chance of disease, as well as mitigate cervical cancer related mortalities (Chao et al., 2019; Bruni et al., 2022).

A systematic review in support of the Canadian Task Force on Preventive Health Care guideline update, by Pierson et al. (2013) showed that cytology screenings considerably lessened the threat of cervical cancer diagnosis compared to females who did not screen. The data collected from 24 studies equally revealed an aspect of defence was provided for by the cytology screenings, specifically that detections of cervical abnormalities were not limited to cervical cancer mitigation but other risk such as cervicitis, cervical polyps, cervical stenosis and cervical ectropion (Pierson et al., 2013). Consistent screening of at least 5 years exhibits improved cervical cancer survival outcomes (Bruni et al., 2022; Pierson et al., 2013). As of 2017, the World Health Organisation has established a global scheme to eradicate cervical cancer as a public health concern in the twenty-first century (WHO, 2017). In doing so, the document proposes a global eradication threshold of 4/100 000, accompanied by programmatic efforts to immunise 90% of girls before the age of 15 against the Human Papillomavirus (HPV), and ensure 70% screening rates among females aged 35 and lower. In addition it intends to

ensure additional screening at the age of 45, and a 90% global outcome of effective detection and treatment of cervical related disorders (Bruni et al., 2020).

1.2 Problem statement

According to Sung et al.. (2021) in 2020, 604 000 cases of cervical cancer were recorded globally, 56.6% resulted in mortality, while in 2018 Southern Africa recorded 14 409 cases, and 45% mortality rate (Sung et al., 2021; Arbyn et al., 2020:193). Southern Africa maintains one of the highest age standardised incidence rates (ASIR), Globally for cervical cancer, 43.1 cases per 100 000 female population (Jedy-Agaba et al., 2020; Arbyn et al., 2020; Abotchie & Shokar, 2009). In 2020, South Africa reported 6 426 new cases, while 6 181 new cases in 2018 (NICD 2020; NICD 2018). An increase in cases can be attributed to barriers such as individual attitudes and misconceptions regarding cervical cancer screening, in addition to access to health facilities and availability resources (Guillaume, Chandler & Igbinoba, 2020). The persistent gap persisting research is the absence of studies highlighting the relationship between health behaviors in South Africa, specifically examining how women who test for HIV are more likely to undergo cervical cancer screening. In 2017, 82% of females, aged 15-49 years old, were tested for HIV in South Africa, while 37% of females aged 15-49 years old had ever undergone cervical cancer screening (SADHS, 2016).

Globally, poor screening is related to cervical cancer perceived risks, socio-economic factors and demographic characteristics that negatively affect the ability to exercise positive reproductive agency (Endeshaw et al., 2018). While in Southern Africa, and more specifically in South Africa, poor screening is affected by poor perceived behavioural control, inadequate access to resources, including knowledge/information- and availability of health resources for screening (Akokuwebe et al., 2021; Lyimo & Beran 2012; Hoque et al., 2014).

1.3 Research questions

1.3.1 Main Research Question

What is the association between HIV testing and cervical cancer screening uptake, among females of reproductive age (15-49 years old) in South Africa?

1.3.2 Sub Questions

1.3.2.1 What is the percentage of cervical cancer screening uptake among females of reproductive age (15-49 years old) in South Africa?

1.3.2.2 What are the demographic and socio-economic factors associated with cervical cancer screening?

1.3.2.3 What is the association between HIV testing and cervical cancer screening uptake among females of reproductive age in South Africa?

1.4 Research Objectives

1.4.1 Main Research Objective

To investigate the association between HIV testing and cervical cancer screening uptake, among females of reproductive age (15-49 years old) in South Africa.

1.4.2 Sub-Objectives

1.4.2.1 To examine the levels of cervical cancer screening among females of reproductive age (15-49 years old) in South Africa.

1.4.2.2 To investigate the demographic and socio-economic factors associated with cervical cancer screening.

1.4.2.3 To examine the association between HIV testing and cervical cancer screening uptake, among females of reproductive age (15-49 years old) in South Africa.

1.5 Justification of the Study

Females of reproductive ages between 21-49 years old in South Africa are at a higher risk of developing cervical cancer, while equally being the cohort with the leading mortality rate (NDoH, 2017; Akokuwebe et al., 2021). This is due to the high HIV rates and increased risk of HIV infection in South Africa. Women between the ages 15 and 24 years old are less likely to undergo cervical cancer screening due to agency restrictions facilitated by demographic characteristics and socioeconomic factors (Akokuwebe et al., 2021). Women's health remains a priority as the state of good health is a contributing factor to poverty mitigation and financial upturn, as females are then able to maintain employment opportunities which afford them an improved standard of living (Onarheim, Iversen, & Bloom, 2016). South Africa maintains one of the highest cervical cancer incidence rates and high cancer related deaths, among young women (Abotchie & Shokar, 2009). The 2017 Cervical Cancer Prevention and Control Policy, instituted by the National Department of Health (NDoH), as part of the Sexual and Reproductive Health (SRH) program, offers programmatic means to address cervical cancer, including three free cervical cancer screenings over the span of ten years for females aged 30-65 (NDoH, 2017). However, the screenings offered by the Cervical Cancer Prevention and Control Policy excludes females of reproductive age below the age of 30, that is an estimated

15% of population, and fails to provide alternative measures of preventative care (Statista, 2023).

Both HIV testing and cervical cancer screening are indispensable for individual health management, disease prevention and public health measures targeted at reducing the burden of disease globally (Bruni et al., 2022; Cohen et al., 2019). Health testing behaviours are related, therefore, this study intends to present the factors which determine positive testing outcomes, by relating HIV testing to cervical cancer screening uptake (Bogale et al., 2021; Mwanahamuntu et al., 2013). A few HIV testing facilities offer HIV counselling which is accompanied by sexual and reproductive apprise -specifically for females-, this includes information regarding the necessity of cervical screening and the opportunity to screen (Hopkins et al., 2021). However, it is key to note that the NDoH is yet to mandate integrated HIV and cervical cancer health services throughout all healthcare facilities. This research intends to contribute to monitoring and evaluation policies which facilitate positive sexual and reproductive practise which aligns with Sustainable Development Goal 3- Good Health and well-being. In addition, it intends to reflect the effectiveness of the Cervical Cancer Prevention and Control Policy implemented by the NDoH's Sexual and Reproductive Health (SRH) program.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Cervical cancer has become one of the leading global health subjects that signifies one of the principal sources of mortality and morbidity among females. The weight of cervical cancer diagnoses effects including socially, economically and psychologically are not isolated to the individual alone, however go on to include families, communities and healthcare systems (Dau et al., 2023). Despite the existence of universal efforts to mitigate cervical cancer, such as Human Papillomavirus immunisation targets and cervical cancer screenings programs, early detection remains a primary and essential foundation for moderating cervical cancer (Yimer et al., 2021).. HPV immunisation functions as a form of primary prevention, cervical cancer screenings, or commonly recognised termed Papanicolaou smears -pap smears-, function as secondary means to combatting cervical cancer (Yimer et al., 2021). Although secondary, it has been observed that cervical cancer screening diminishes the incidence rate by 50-60%, early detection of the cancer offers females improved outcome probabilities, and more significantly recurrence in cases in cervical cancer (Jansen et al., 2020). Despite efforts to improve cervical cancer screening uptake among females, obstacles related to uptake continue to prosper. This is largely due to challenges related to effective dissemination of information, sustainable implementation of programs and an assortment of social and demographic features which function to negatively affect screening outcomes.

This chapter elucidates a review of international and domestic sources that account for the factors surrounding cervical cancer, cervical cancer screening and the subsequent relatability of testing behaviours. With the support of existing literature this section will discuss how social and demographic factors have influenced cervical cancer screening uptake. The literature provided in this chapter establishes the cause of cervical cancer screening by equally accounting for associative variables, such including HIV testing behaviours, age, marital status, population group and level of education; amongst others. Furthermore, the chapter will outline a medical framework detailing the physiological impacts of cervical cancer. The literature review will substantiate the studies objective by exploring HIV testing behaviour, showcasing advancements in HIV testing, and highlighting the disparity in testing rates between HIV and cervical cancer among females. With the support of exiting literature chapter will additionally explore the impact of cervical

cancer on females living with HIV and further expand on the implications of HPV immunisation on cervical cancer outcomes. This chapter ensues a discussion of the theoretical and conceptual framework directing this study.

2.1 Cervical cancer and Cervical Cancer Screening: Global Review

It is projected that 370 million (36%) of the 1 billion females in the world, between the ages of 30 and 49 years have ever undergone cervical cancer screening. Similarly, 160 million (15%) females screened in the last year of 2021, 292 million (28%) females screened within the last three years, and 330 million (32%) females screened within the last five years (Bruni et al., 2022). A key factor to analysing the efficacy of cervical cancer screening programs is the overall number of females who have screened, as well as the frequency of screening. It is recommended that females screen a meagre minimum of every five years. Globally, out of the the 2.3 billion females, 1.6 billion (67%) aged between of 20 and 70 years have never undergone cervical cancer screening or associative testing (Bruni et al., 2022). This consists of 57% females within the MIC cohort, 92% females within the LMIC cohort, and 90% of females within the LIC cohort (Bruni et al., 2022). Furthermore, in reference to lower-income states, higher-income states have coverage rates for cervical cancer screening and related tests on females that are at least three times higher over the course of a lifetime (Bruni et al., 2022). Lower-middle-income countries had estimated coverage from 4% to 9%, in the last year of 2021 over the course of a lifetime, while low-income countries had estimated coverage from 3% to 11% lifetime (Bruni et al., 2022). Higher income countries are associated with increased levels of development which often foster proximal and distal factors which contribute to improved population health outcomes (Bruni et al., 2022). Improved structures relating to social wellbeing, housing, employment and overall public health services and amenities will undoubtedly correspond with positive population health outcomes; or rather significantly improved population health outcomes. In LMICs, upper-middle-income countries had estimated cervical cancer screening coverage from 19%, in the last year that predicated the study, to 48% over the course of a lifetime (Bruni et al., 2022).

Countries which aligned with the Sustainable Development Goal (SDG), presented the highest coverage estimates of females who had ever screened over the course of a lifetime, the highest being New Zealand and Australia, which estimated 95% coverage, ever over the course of a lifetime (Bruni et al., 2022). In addition, European states and North America, had a coverage of 88% ever over the course of a lifetime, while Latin America and the Caribbean state followed suit with 75% coverage, ever over the course of a lifetime (Bruni et al., 2022). Of the states that have

mandated cervical cancer screening, females between the ages of 30-49 years were the cohort with the highest coverage of 70%, over the course of a lifetime (Bruni et al., 2022). However, of the 75 states which made up this percentage, none of the LMIC contributed to this percentage. Although, it was found that consistent screening within the prescribed five year screening and testing intervals -with accordance to the WHO cervical cancer elimination objective- in HIC and LMIC, by females aged 35-49 was irregular, with less than 70% (Bruni et al., 2022). Most notably all LMIC, with the exception of North Korea had a coverage estimate of below 21%, with regards to the prescribed five year screening and testing intervals. In order to reach the WHO cervical cancer elimination objectives, LMIC would need to ensure a 7 fold increase in screening outcomes (Bruni et al., 2022).

2.2 Cervical cancer and Cervical Cancer Screening in Sub Saharan Africa : Regional Review

Regionally, 18 (33%) African states have endorsed cervical cancer screening among females, this entails providing screening services as well as improving local knowledge of the importance of screening for cervical cancer (Bruni et al., 2022). WHO suggests screening is particularly essential for women living in LMIC between the ages of 30-49 (WHO, 2012). However, considering the incidence and prevalence rates for women living in LMIC countries, suggest supportive practises such as HPV immunisation and testing as a preventative measure to cervical cancer or related disorders (Bruni et al., 2022). According to records provided by the 2017 World Health Survey, lower to middle income countries had the poorest cervical cancer screening coverage (WHO, 2012). More specifically throughout sub-Saharan Africa cervical cancer screening coverage was merely 10%, with a screening coverage of less than 1% in four West African states (Yimer et al., 2021). In comparison to developed states, such as New Zealand, sub-Saharan Africa experienced drastic mortality outcomes, with 27.6 deaths per 100,000 females (Yimer et al., 2021; WHO, 2012). Developed states experienced less than 2 deaths per 100,000 females, evidentially this disproportionate burden of cervical cancer related death exemplifies the need for immediate intervention. Positive reproductive practice does not occur in isolation, studies by Lyimo & Beran (2012), and more recently by Yimer et al. (2021) determined an immediate correlation between education and levels of education, and positively informed reproductive practice. More particularly, while conducting research in Ghana, Yimer et al. (2021) observed a positive association between an increase in education level and cervical cancer screening, and frequent attendance to sexual and reproductive health facilities. It was also observed that exposure to knowledge offered females insight into appropriate future courses of action (Yimer et al., 2021). Attending to the lack of correspondence in cervical cancer cases and cervical cancer screening

outcomes between HIC's and LMIC's demands comprehensive approach methods, HIC's forms of public health support may not be very applicable or suitable in LMIC's due to the vastly opposing socio-economic and political contexts.

2.3 Cervical cancer and Cervical Cancer Screening in South Africa : Domestic Review

In 2017 the National Department of Health instituted the Cervical Cancer Prevention and Control Policy in South Africa offers three free cervical cancer screenings over ten years for females aged 30-65 (NDoH, 2017). However this does not apply to females living with HIV due to the compromising nature of HIV on reproductive organs. Females living with HIV are recommended for frequent cervical cancer screenings at least every 3-5 years regardless, while females without HIV only every 5-10 years for females aged 30 years and above, with consistent papanicolaou smears every three years for females aged 21-29 years (Sawaya, Smith-McCune & Kuppermann, 2019).

While South Africa is considered LMIC, the public and private health systems offer adequate health care comparatively. Even so, South Africa continues to record poor screening outcomes, according to the District Health Barometers screening uptake reduced from 64.5% to 61.2% between 2017 and 2018 (Musonda et al., 2022). In addition, the province of Gauteng had the lowest cervical cancer screening uptake with only 47.7% of the cohort responding yes to having screened (Musonda et al., 2022). This is particularly alarming as Gauteng is one of the principal provinces in South Africa, in turn offering improved access to healthcare services and improved dissemination of sexual and reproductive health knowledge. Equally Musonda et al. (2022) revealed that females aged 21-29 years were the least screened. As a result of the reported in cervical cancer screening uptake there needs to be an increase in extensive mediation to improve knowledge about cervical cancer and the importance of frequent screening.

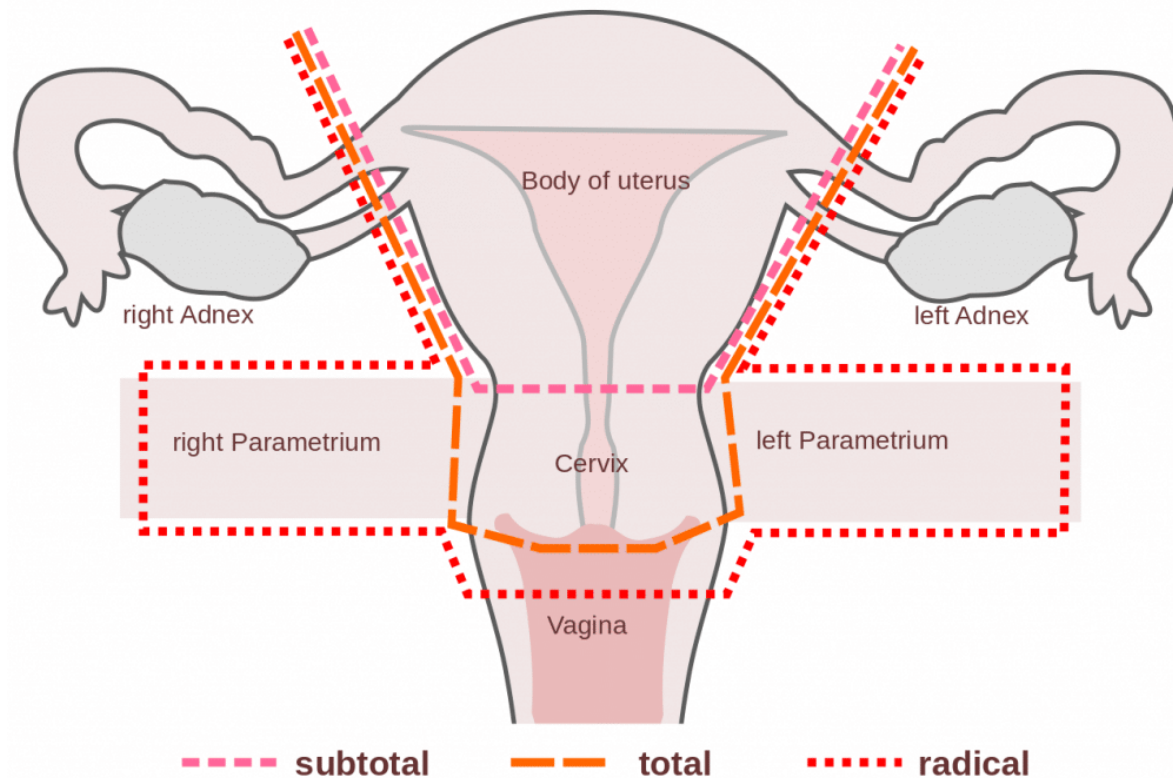
Symptoms and Treatment

Symptoms of cervical cancer differ according to the extent of the disease, particularly its progression. Symptoms of onset of cervical cancer include swelling in the lower limbs, due to the impairment of the lymphatics system (Cohen et al., 2019). As the disease progresses females may experience abnormal bleeding spells -often heavier, and longer than menstrual bleeding- , which are often accompanied by abdominal pain. With disease progression, females may experience pain during and post intercourse, as the disease begins to comprise the pelvic floor (Cohen et al.,

2019). Changes in the state of the vagina and cervix are often followed by changes in discharge and discharge discoloration, such changes are accompanied by an uncharacteristic odour.

Cervical cancer screening is carried out with the purpose of collecting epithelial cells in order to determine the health of the cervix. The test is considered as a pelvic floor exam as it is carried out through the insertion of a speculum, to open the vagina, and a brush-like medical tool, to collect the cervical sampling (NCI, 2022). The cervical sample is then sent to a lab to determine the state of the cervix, treatments options vary according to the stage of the cervical cancer. The treatment recommendations are reliant on ‘staging’, referred as the determination of the extent of the cancer; through size and degree of epithelial penetration (Cohen et al., 2019). According to the International Federation of Gynaecology and Obstetrics (FIGO) standards, staging is and must be accompanied by a physical examination through endoscopic procedures and examination of lymph nodes (Cohen et al., 2019). Staging can occur through clinical means or surgical means, each takes place differently, and often according to the resources available. Clinical staging determines the extent of progression, it is preceded by surgical staging. Stage IA1 requires a cone biopsy, this is the removal of the cervical cancer, with the primary purpose of conserving fertility, in the case that a patient is not interesting in conserving their fertility, a total abdominal - extrafascial- hysterectomy is performed (Cohen et al., 2019). A extrafascial hysterectomy requires a removal of the uterus including its outer wall, with this procedure patients will indefinitely be unable to conceive naturally or carry a foetus, regardless of its term (Hiramatsu, 2019). Stage 1A2 requires a radical hysterectomy, in which doctors remove the uterus as well as the cervix, this entails removal of the right and left parametrium which are the extended walls of the cervix. This procedure is particularly extensive as it may require removal of the upper vagina and apportion of the fallopian tubes (Cohen et al., 2019; Milligan, 2017).

Figure 2.1: Surgical staging of stage IA2 cervical cancer



Source: Milligan (2017)

An extrafascial hysterectomy bears extensive physiological challenges, including incontinence as a result of urinary dysfunction, this can result in vesicovaginal fistula which causes urine to spill through the fistula and into the vagina (Cohen et al., 2019). With this patients are more likely to experience frequent urinary tract infections such as cystitis and extended infections such as pyelonephritis which disrupt renal function.

Advancing stages of cervical cancer stage IIB-IVA require extensive and prolonged adjuvant pelvic radiotherapy, or chemoradiotherapy, this is often dependent on availability of medical resources. Chemoradiotherapy is the most applied form of intervention as adjuvant pelvic radiotherapy functions to inhibit recurrence of the disease, surgery alone at this stage is insufficient in extracting deep invasions (Cohen et al., 2019). Treatment of later stages of cervical cancer (IIB,III,IVA) includes neoadjuvant chemotherapy to reduce the size of the cancer prior to surgery, in addition this it is accompanied by the removal of pelvic lymph nodes to counter recurrence of the disease as metastatic. The lymphatic system in the body functions as a circulatory

system that scours and discards foreign and infectious matter, in turn entry into the lymphatic system introduces the risk of subsequent metastatic cancer in other organs. Treatment of advanced, and advancing cervical cancer remains effective, the overall five year survival outcome for females who have adhered to treatment is 70% (Cohen et al., 2019). Concurrent cervical cancer or metastases if often treated through cisplatin-based chemotherapy, cisplatin is administered through injection and functions to inhibit further growth of the cancer, however treatment and efficacy of recurring cervical cancer or metastases is highly dependent on previous interventions (Cohen et al., 2019).

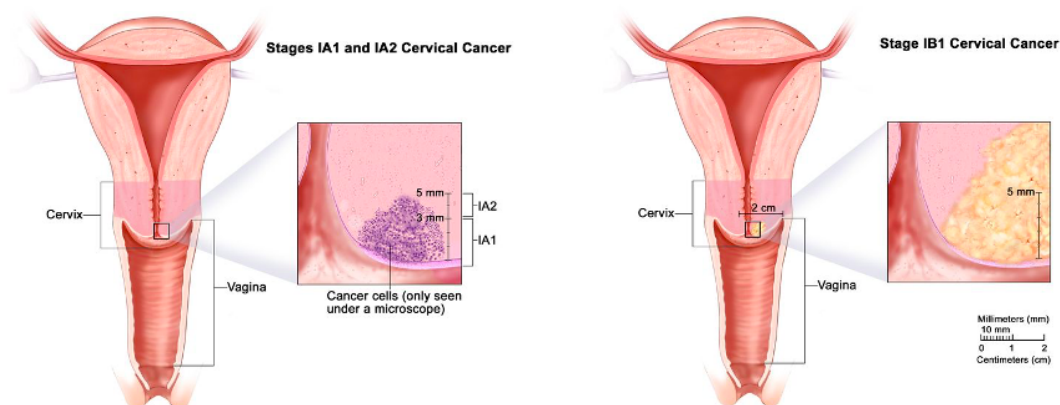
2.4 The Effects of Noncompliance

Cervical cancer preventative practise within this report it outlined through two material forms of preventative practises, a) HPV immunisation as a primary preventative measure, and b) cervical cancer screening or papanicolaou smears as a secondary preventative measure (NDoH, 2017). HPV immunisations functions as immunostimulant for the various mutations of the HPV virus, immunisation for females over the ages of 12 is administered on one occasion, while cervical cancer screening is a speculum removal of cells. Females are required to frequently screen for cervical cancer over the span of their lifetime, as cervical cancer is predominant among females of reproductive age; it does not eliminate females beyond the reproductive period. It is advisable for females living with HIV to frequent screening approximately every 3-5 years, while females without HIV may screen at least every 5-10 years (Sawaya, Smith-McCune & Kuppermann, 2019). Females aged 21-24, however, are encouraged to screen every three years, as this cohort is considered at higher risk due to the relatability of HPV infections to cervical cancer. As previously mentioned, HPV functions as a precursor to cervical cancer. The load of noncompliance veers differently across HIC's and LMIC's, noncompliance in HIC's is often related to misconceived urgencies regarding screenings while noncompliance in LMIC is firmly related to social barriers, compounded by structural incompetence's and resources restrictions within the public health system (Bruni et al., 2022). Non-compliance is characterised by an array of descriptions, this section intends to discuss noncompliance, more specifically the medical, social and economic effects thereof. Although cervical cancer can be considered a female isolated event, it bears multitude of layers that are directed towards the individual, but equally peripheral communities and larger assemblies, such as public health.

Medical

Within this particular subject matter, non-compliance refers to failing to schedule and or attend screening appointments, failing to adhere to endorsed screening procedures and recommendations, and failing to follow-up (Basu et al., 2009). The prominent medical effects of medical noncompliance can be oversimplified to mortality and morbidity. Saharan Africa experienced drastic mortality outcomes, with 27.6 deaths per 100,000 females, compared to the less than 2 deaths per 100,000 females experienced by developed countries (Yimer et al., 2021; WHO, 2012). Untreated cervical cancer sluggishly erodes at the body, as evident in its description cervical cancer begins in the cervix, however it progresses over five stages. The onset stages of cervical cancer do not present indicators of the disease, therefore it is uncommon for early diagnoses to occur as a result of physical indicators of illness (Cohen et al., 2019). Symptoms of cervical cancer vary, and are often wide-ranging, however abnormalities such as atypical vaginal bleeding, fetid vaginal discharge, sciatic neuritis among others are key indicators of the disease (Cohen et al., 2019).

Figure 2.2/3: Phases of stage 1 cervical cancer

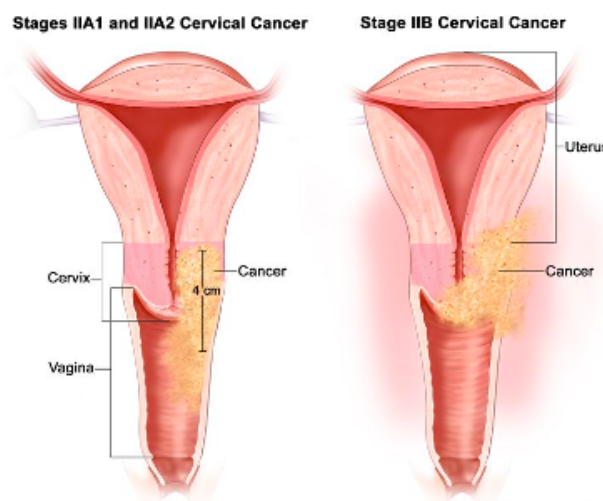


Source: National Cancer Institute (2022)

Screening as frequently as advised strengthens the efficacy of treatment, the first stage of cervical cancer is directed by Stages IA1 and IA2 which are characterised by size and depth of the malign cells which vary between 3-5 millimetres deep (NCI, 2022). At this stage the malign cells are not visible to the naked eye, progression from this stage introduces Stages IB1, at this point the malign cells have increased to at least 2 centimetres in size, with a depth of 5 millimetres (NCI, 2022). Stage two of onset cervical cancer, the malign cells have extended from the cervix to the vagina, however not yet into the epithelial tissue surrounding the uterus (NCI, 2022). In the case of compliance, it is at this point that a patient may receive both internal and external radiation –via chemotherapy-, and often surgery -radical hysterectomy- (Cohen et al., 2019). Chemotherapy is managed through two forms of radiation, external beam radiation therapy, and internal

radiotherapy (brachytherapy) (Cohen et al., 2019; NCI, 2022). Stage two of cervical cancer may present lower limb oedema and the aforementioned sciatic neuritis. Lower limb oedema refers to the build-up of water and fluids in the thighs or legs due to a poorly functioning lymph system. The lymphatic system of the body functions to fight infections by filtering bodily fluids (Wang et al., 2023). Each stage of cervical cancer has an additional division of extent, the later phases of stage 2, untreated cervical malign cells, facilitate pelvic sidewall invasion which results in sciatic neuritis (Cohen et al., 2019). Sciatic neuritis is the presence of hip-leg pain along the sciatic nerve (Holmes & Sworn, 1945).

Figure 2.4: Phases of stage 2 cervical cancer



Source: National Cancer Institute (2022)

Although often isolated, cervical cancer facilitates cancer spread throughout the rest of the body and physical deterioration. The early phases of stage three cervical cancer begin to cause low levels of inflammation within the cervix and the vagina, the spread is often accompanied by totable levels of discomfort, which is often mistaken by lower abdominal pain. It is often at this stage, at which cervical cancer is diagnosed, stage three is recognised as advanced stages of cervical cancer (Snyman & Herbst, 2013). At this stage, undiagnosed cervical cancer begins to progresses into the pelvic wall resulting in onset vesicovaginal fistula, vesicovaginal fistula is an atypical breach between the bladder and the vaginal wall (Medlen & Barbier, 2020; Cohen et al., 2019). This atypical breach results in incontinence, and often haematuria which is the passing of blood into the urinary tract and the bladder. Later stages of stage 3 cervical cancer begins to affect the kidneys, hydronephrosis. Hydronephrosis occurs when either one or both kidneys become inflamed, resulting in excessive swelling in the organs as they become filled with urine or

lymphatic fluids (Cohen et al., 2019; Yang et al., 2021). Invasion of the pelvic floor bares a multitude of threats to neighbouring organs.

Stages 4 and 5 are condensed into just stage 5, at this stage the cervical cancer has incapacitated the pelvic floor and further spread beyond the bladder to infect the rectum, which results in a rectovaginal fistula (Cohen et al., 2019). Rectovaginal fistula is the build-up of foreign material between the rectum and lower part of the large intestine, rectovaginal fistula causes bowel material to pass through the fistula/foreign material into the vagina (Sugiyama et al., 2022; Cohen et al., 2019). This results in additional hygiene challenges which often lead to persistent vaginal or urinary tract infections. Later phases of stage five can lead to metastatic cancer, at this phase the cancer has spread beyond the pelvic floor, bladder and rectum, to infect additional vital organs, such including the lungs and liver (Zhou & Peng, 2020). The phase of metastases is eerily unforgiving on the body, often females are shelled by chronic fatigue, persisting abdominal pains, obstipation and consistent hyperemesis. The duality of obstipation and consistent hyperemesis has subsequent effects of infrequent bowel movement and emesis will result in dehydration and imbalance of electrolytes, leading to a weakened physiological state. The disadvantage of cervical cancer, regardless of its state at the point of detection, is the risk of recurrent cervical cancer as metastatic cancer.

Physiological ailments as a result of untreated cervical cancer are not isolated from psychological distress. Undiagnosed cervical cancer, or noncompliance to recommended guidelines bares negative effects on mental and psychological domains. There is a surplus of evidential material that correlates psychological illness and discomfort to mental distress. Recent studies reported an increase in mental distress -leading to longitudinal depression- and suicide rates among individuals who experienced optical discomfort post Lasik eye surgery (Yu, 2020; Conroy, Duran & Avery, 2016). Consistent physical ailments as a result of noncompliance, such as pain, emesis, constipation or fatigue facilitate mental distress, and dealing with ongoing physical symptoms can be draining and disturb ones overall well-being. These physical ailments often disrupt daily functioning and routines, as women are generally primary caregivers, these ailments restrict activities and the extent to which one can offer effective care to others. In addition, the progression of the disease threatens independence, subsequently inducing various forms of social isolation and financial burden. Many studies have reported that the state of illness and sickness is often isolating for the individual, these experiences become exacerbated in cases individuals are unaware of their health state or are unable to adhere to the recommended treatment guidelines.

Social

The social ramifications of noncompliance are closely related to psychological and mental distress, particularly in relation to social communities and systems. As previously mentioned, the physical distress associated with cervical cancer feeds into facets of independence. Individuals living with ailments often find themselves withdrawing from social communities, networks, and activities due to the physical discomfort and the subsequent embarrassment associated with physiological changes as a result of migration and development of the disease. Mental distress, as a result of physiological changes are prominent across both females who have adhered to medical guidelines, and those who have not. According to a study by Sekse et al. (2019), women who had gynaecological surgery for cancer suffered from post-operative body dysphoria, which negatively impacted their self-image, self-esteem, and general quality of life. Internal disdain from the physiological changes as a result of the cancer expedite feelings of loneliness and alienation, this can lead to strained proximal and distal relationships. Resistance towards medical compliance may equally strain relationships with family members, friends and larger social groups; in this sense apprehension to medical help in the case it is availed, can equally burden close related family and friends. More often than not individuals do not exist in isolation, therefore various forms of dependence may arise however the challenge here is that close family and friends may not be physically and mentally equipped to offer effective care, resulting in additional mental distress or ill-feelings towards the person (Guilabert et al., 2018).

With the progression of the disease, independence becomes strained, in turn females who have maintained employment become at risk of becoming unemployed. Unequivocally, the development of cervical cancer will disturb one's ability to perform effectively at work or school. The effects of cervical cancer are not isolated to the individuals' proximal environments, nonattendance at work or school negatively affects the outcomes of academic or financial progression. Poor or strained interpersonal relations are expected to have direct impact on mental health, and subsequently the progression of the disease.

Economic

There has been a notable rise in female breadwinners across the globe (Carelock et al., 2022). According to the General Household report by Statistics South Africa (2022) found that 42.1% of females were accounted as primary financial providers A considerable, and foreshadowing,

economic consequence of noncompliance is the risk of loss of income, untreated cervical cancer results in additional physiological burdens that inhibit the individual from performing day-to-day tasks, which include their ability to effectively perform their work; and subsequently, maintain their status of employment. The loss of income increases the risk of financial burden particularly when considering the requirements of medical intervention, be it basic self-medication or extensive medical intercession (Dau et al., 2022). Cervical cancer is a progressive disease that unequivocally requires medical interference with its progression, negating necessary medical intervention extends clinical and emergency room visitations which have a financial implication on the individual or their financier. The financial burden of noncompliance effectively undermines security.

2.5 Affective determinants of health behaviours and subjective norms on cervical cancer screening uptake.

Affective determinants of health refer to the psychological and emotional features in the decision to perform a particular action (Williams, Rhodes, & Conner, 2019). The characteristics of affective determinants to health behaviours, such as confidence to perform the health behaviour, personal orientation towards the health behaviour and external support, underline the intersections of essential behavioural properties regarding the performance of a -health- behaviour by an individual. Within the conceptualisation of affective determinants of health behaviours, this research specifically bears focus on the compounding effects of perceived barriers and benefits which are determined through interpersonal experiences and encounters, and how these factors inform the intention to perform a health behaviour. In the consideration of proximal determinants of health, health behaviours are typically embraced when personal dispositions towards those behaviours shift in favour of those behaviours. These determinants should be and are regarded as crucial elements to improving the uptake of health behaviours. The influence that affective determinants have on the decision-making process is attested to by theories like the Social Cognitive Theory (SCT), Theory of Planned Behaviour, and Health Belief Model (HBM). A study by Rosser, Njoroge, & Huchko (2015), regarding cervical cancer screening among women in rural Kenya, revealed that negative social orientation regarding cervical cancer screening resulted in an aversion of cervical cancer screening uptake among females who presented initial interest in the subject.

Thus, orientations towards health behaviours function relationally to larger and external social orientations. Lee (2010) asserts that present behaviours and social settings significantly determine

the reception and prioritisation of new information, in turn efforts to access cervical cancer screening will be largely determined by personal and communal orientations towards the necessity thereof, such as a positive attitude towards HIV testing. In 2006 the Zambian Cervical Cancer Prevention Program (CCPP) initiated a 'see and treat' approach, as a means to prevent the compounding cervical cancer incidence rates (White et al., 2012). While monitoring the key motivators for screenings, White et al. (2012) noted that many women held a positive attitude towards screening if other women, that they knew, had a positive experience. Ergo positive narratives and experiences of cervical cancer screening established positive communal perceptions regarding cervical cancer screening. Equally negative orientations, such as proximal and distal stigmatisation congruently affected one's decision to not undergo cervical cancer screening, such as the perception of free services as "satanic" related (White et al., 2012). This study primarily depicted how barriers to positive health behaviours are established within individual perception, and experiences. In addition individual perception and experiences are seen to affirm or contest social and subjective hesitations towards the adoption of a health behaviour.

The association of affective determinants and orientations towards the adoption of a health behaviour partially depends on socio-cultural constructions of the illness and help-seeking behaviours. In traditional states, like South Africa, cultural appropriateness within programmatic interventions equates to the success of health programmes (Kreuter et al., 2003). Of which are contingent on the population, demographic or communal acknowledgment of perceived risks associated with the noncompliance of advised health practises -as notable by the study conducted in Ghana, which found that significant barriers to cervical screening related to misinformation, cultural anathemas regarding cervical cancer screening and the social ostracization of women with cervical cancer (William et al., 2013). Equally in Zambia, a study by Chirwa et al. (2010) found that women attached meanings of negative spiritual repercussion to cervical cancer, such including bewitchment or punishment for using oral contraceptives, similar to the 'satanic' meanings attached to free screening mentioned. White et al. (2012) reported similar superstitions regarding screening, in turn cultural competence remains a key factor in ensuring sufficient comprehension of medical practises, and increased use of medical services.

Subjective and socio-cultural norms form affective determinants of health, individual beliefs and attitudes towards a particular idea and behaviour are influenced by the notions established within that community or larger society. Subjective norms are determined by perceived social pressures and or expectations that often vary between communities and culture, however they establish what

is considered to be the acceptable social behaviours and standards (Markus & Hamedani, 2007; Reid, Cialdini, & Aiken, 2010). Consequently, Subjective norms often enforce conformity and compliance in order to establish uniformity towards a particular belief, idea or subject. This becomes more challenging in the case of implementing positive health behaviours as perceived risks are minimal as well as subjective norms supersede risks informed by health practitioners. Social cultural norms establish a cultural conditioning among individuals, as a means of socialising individuals into adopting and partaking in particular practices or ideas that have been passed down (Reid, Cialdini, & Aiken, 2010). Social cultural norms then uphold traditional practices or ideas and are carried throughout generations. The negative misconceptions regarding cervical cancer screening, on a subjective level, women are fearful of testing due to negative reactions, responses, and perceptions that they may be subjected to. Similarly in some communities as mentioned cervical cancer screening is associated with negative western conceptions of medicine, rather, alternative forms of medicine are encouraged as they are perceived to be more effective and better aligned with their traditional practices of care (White et al., 2012). As a result, there is the challenge of mending the gap of misinformation and consideration of cultural competency in contexts that rely on alternative health systems.

Psychological distress, identified by irregular mood patterns, distorted perceptions, affect and spits of psychosis are prevalent conditions associated with chronic conditions and illnesses (KlÜgel et al., 2017). Both physiological and social stressors affect the extent to which one's mental, cognatic and psychological state are able to function effectively, congruently it's imperative to consider the impact of the interactive nature of social and cultural features on one's mental state. Cervical cancer diagnoses or precancerous lesions are recognised as potential threats to mental and psychological well-being. According to KlÜgel et al. (2017), cervical cancer presents fundamental risks to mental health, a considerable one being, initial trepidation upon receiving the diagnoses. More often than not recipients experience episodes of catastrophising, which refers to the propensity to reckon and dwell on worst-case scenarios, leading to feelings of distress and despair. The blend of misinformation and lack of information regarding treatment and diagnoses outcomes becomes an overshadowing mantle, a study by White et al. (2012) illustrated that a significant portion of women within sub-Saharan Africa has little to no information regarding the survival outcomes of cervical cancer. Often fear, accompanied by cultural conceptions, dominated what females understood cervical cancer to be, which subsequently affected their decision to seek advanced medical services.

A meta-analysis conducted by Mejareh et al. (2021) conveyed prevalence of high mental distress and or depression, ranging from 9-58%, among cancer patients, while the study by Ding et al. (2023) determined that the prevalence of depression among cervical cancer patients ranged from 31.5% to 70.5%. Based on the regional report by WHO, Mejareh et al. (2021) found the highest prevalence of depression to be among African states, with 36% of females experiencing depression after receiving cancer diagnosis. Cervical cancer presents a multi factored risk to patients, Villoria & Lara (2018), and Milligan et al. (2018) determined higher mortality outcomes among cancer patients living with depression those who were not depressed. While studies by Sudarisan, Abraham, & George (2019) and Mejareh et al. (2021) both account for the progression of cancer among patients living with depression. Females with recurring diagnoses are often an overlooked cohort, generally due to that misconception that they are effectively equipped to recounter cervical cancer, more often these women experience a resurgence of ill-experiences that heighten mental distress or exacerbate persisting depression. A study by Sekse et al. (2019) found that females experienced a sense of subsequent body dysphoria after undergoing gynaecological surgery for carcinoma, this had negative effects of their self-image, self-esteem and overall quality of life. Conversely, Liu et al. (2022) and Chang et al. (2019) elucidates to the long term decline of social support for females who had received breast cancer diagnoses; the sequential report of these difficulties serves the purpose of highlighting the lived experience of contending with a host of hardships parallel to enduring a cervical cancer diagnosis.

2.6 Demographic and socioeconomic effects on cervical screening.

Demographic factors tend to perform an understated, yet prevailing, function in human behaviour, in turn providing constructive insight to cohort behavioural trends and patterns. Factors such as age, level of education, migrant status, marital status influence the determination of health behaviours, a study conducted on rural Tanzanian women found that marital status and level of education -among other factors- determined their likelihood of seeking cervical cancer screening (Lyimo & Beran, 2012; Yimer et al., 2021). Acquiesce from the husband, for cervical cancer screening, determined the health behaviour of wives. Although more traditional contexts have displayed male Aquidneck towards the adoption of certain health behaviours, such as contraceptive use, male acquiesce continues to function as a veil of hindrance to reproductive agency for women. A study conducted in India found that husbands often had negative beliefs or attitudes towards cervical cancer screening, even after being appropriately informed about the actuality of cervical cancer screening (Singh, Bloom, & Tsui, 1998). Therefore women are more likely to undergo cervical cancer screening in the case that they have received positive responses

from their husbands. A study conducted by Liao et al. (2006), in Taiwan, determined higher rates of cervical cancer screening compliance among single women than married women equally within the study it was found that a greater proportion of younger women failed to comply with screening.

Age persists as a significant factor to screening outcomes, this is primarily due to the underlying socio-economics factors which intersect with age. For instance it is commonly noted that younger women are less likely to undergo cervical cancer screening, factors such as access to information function as a barrier for younger women (Lyimo, & Beran, 2012). While equally being the largest cohort to engage in sexual behaviour (Yimer et al., 2021). There is a notable relationship between education levels, age and screening outcomes, Lyimo & Beran (2012), as well as Yimer et al. (2021) found that cervical cancer knowledge was higher among older women with higher education levels. Corresponding studies carried out in Ghana and Ethiopia indicated that poor, or absence, of formal education had a direct impact on cervical cancer screening uptake (Yimer et al, 2021). In turn, greater awareness and knowledge about cervical cancer, reflected positive attitudes towards preventive practise. Limitations in access to information affects perceived risks and benefits, in addition communal perceptions often associate positive reproductive practice with sexual promiscuity (Lyimo & Beran, 2012; Abdullahi et al., 2009). According to Akokuwebe, et al. (2021), black women are less likely to undergo cervical cancer screening or know of cervical cancer. However, they are the leading mortality cohort in South Africa. The existing health disparities among population groups permit accessibility to resources that afford improved health care. Buskwofie, David-West, & Clare (2020) found that historically marginalised racial groups, as well as ethnic groups in South Africa, still have poor access to health facilities which afforded effective health care. Information/knowledge gaps are largely related to access of resources, and proximity to facilities which offer effective health care services and information.

The Socio-economic determinants of health concept substantiates the realisation of access to healthcare -including but not limited to, *maintaining* the state of well-being (WHO, 2008)- as that which is established and afforded to individual based on the assemblage of their social and economic descriptions (Braveman & Gottlieb, 2014). Socio-economic features such as residence location, occupational status, income, medical insurance, encompass and facilitate access to health resources and available health resources; of which subsequently inform health behaviours. One of the more crucial factors which determine the extent to which an individual can exercise positive reproductive care, is their financial status or wealth quantile. Females who fall within the lower

economic quantile face the challenge of accessibility to effective health care as well as the ability to maintain positive states of health. The Cervical Cancer Prevention and Control Policy implemented by the NDoH's Sexual and Reproductive Health (SRH) program, offers HIV negative women three free cervical cancer screenings, within ten-year intervals. However health care facilities in rural areas, and in low income communities often do not have the necessary apparatus to conduct screening (Akokuwebe, et al., 2021). According to the SADHS survey, the province of Limpopo had very few cervical cancer screening, in addition a study by (Ramathuba et al., 2016) conducted in Limpopo found that females from the Vhembe region had little to no knowledge of cervical cancer and cervical cancer screening services, however the women stated that if given the resources, they would undergo screening. Additional factors such as employment status improve the ability to exercise reproductive agency beyond the availability of the public sector. Kangmennaang et al. (2015) found that 34% of the study cohort -females averaged 33 years- had no prior cervical cancer screening knowledge, while women who had medical insurance had prior knowledge of cervical cancer screening through health personnel, thus resulting in their informed decision to undergo cervical cancer screening.

2.7 HIV-Testing and Cervical Cancer Screening HIV testing behaviours

In 2013 the Joint United Nations Program on HIV/AIDS (UNAIDS) established the 90-90-90 objectives, these objectives were designed to strengthen efforts to improve HIV/AIDS outcomes beyond 2015. The objectives intend to ensure that by 2020, 90% individuals living with HIV are aware of their HIV status, 90% individuals living with HIV have access to antiretroviral therapy (ART) and are consistently able to receive their treatment, and lastly that 90% of individuals living with HIV and using ART's have viral an adequately low viral load, and overall suppression (UNAIDS, 2014). The restructured 95-95-95 objectives function as a tool of measuring the extent to which states and larger health institutions and organisations have adequately countered the HIV epidemic. In 1981 HIV/AIDS was officially declared as an epidemic, with a confirmed mortality estimation of 86 million (CDC, 2006; De Cock, Jaffe & Curran, 2012)

Globally

According to UNAIDS, as of 2022, globally, 39 million individuals who were living with HIV, while 1.3 million individuals were newly diagnosed with HIV. This statistical data indicates that although HIV has become moderately manageable, infection rates continue to escalate globally. Albeit so, 28.8 million individuals were able to access ART which is a treatment plan used to manage HIV infection (UNAIDS, 2023). ART is carried out using an arrangement of antiretroviral

drugs which function to reduce the reproduction and development of HIV, in turn suppressing the HIV virus (Garcia & Guzman 2023; Lu et al, 2018). It is essential to bear in mind that ART does not cure HIV, but rather functions as a means of managing the virus. It is currently estimated that in 2022, 76% of all individuals living with HIV had access to ART, of which 82% of females have access to ART (UNAIDS, 2023). In 2022 46% of all documented HIV diagnoses were females.

In 2022 females of reproductive age, in sub-Saharan Africa, ages 15-24, reported over 77% of new HIV infections. Unlike males of the same cohort, females reproductive age had a threefold likelihood of acquiring HIV. According to UNAIDS (2023) it was approximated that 4000 females of reproductive age, become infected with HIV, globally. Alarming 3100 of these cases were diagnosed in sub-Saharan Africa, ergo making up 77,5% of accumulated global cases. High cases of HIV may be attributed to a number of details, however UNAIDS (2023) determined that only 42% regional epicentres in sub-Saharan Africa had instituted HIV prevention programs for females of reproductive age. Females aged 15-24, in sub-Saharan Africa positioned as vulnerable groups due to the insecurity of various interconnected factors such as increased socioeconomic challenges, limited access to education, poor access to healthcare and economic prospects. Studies, such as Muyunda et al. (2018) Worku, Tesema, & Teshale (2021), have determined education, more particularly access to education and level of education function as positive factors of influence regarding sexual and reproductive knowledge, and subsequent practice. Unfortunately only five Africa states reached their targeted 95-95-95 objective, United Republic of Tanzania, Eswatini, Zimbabwe, Botswana and Rwanda (UNAIDS, 2023).

South Africa

Comparatively South Africa maintained the highest rates for HIV/AIDS (Zuma et al 2022). In 1992 the National AIDS Convention of South Africa (NACOSA) was assembled by various political institutions, including the African National Congress (ANC) with the aim of establishing programmatic efforts in response to the rise of HIV infections (Butler, 2005). HIV was first detected in South Africa, in 1982, between the years 2000 and 2003 South Africa recorded 330 00 HIV/AIDS related deaths, and 35 000 infants infected with HIV due to mother to child transmissions (Chigwedere et al., 2008). This was followed by the enactment of ART availability in public health facilities in 2004 (Burger, Burger & Van Doorslaer, 2022). Currently in South Africa there is no national testing policies, however in 2016 the government announced the provision of free ART's of all individuals living with HIV (Burger, Burger & Van Doorslaer, 2022) Prior to 2016 the individuals with particularly low Cluster of Differentiation 4 counts (CD4

T-cells) were offered free ART's, simply put, CD4 T-cells function to manages the body's immune system response infections and foreign material (Garcia & Guzman, 2023). However in 2017 the South African government launched The South African National Strategic Plan on HIV, TB and STIs 2017 - 2022 (NSP), which is a widespread policy document that outlines intervalled targets to mitigate the HIV, Tuberculosis (TB), and Sexually Transmitted Infections (STI's) epidemics (NSP, 2017). In reference to HIV/AIDS the NSP, in congruence with the UNAIDS 90-90-90 objectives, intends to improve preventative means in order to decrease new HIV infections, provide effective treatment and care in order to reduce mortality and morbidity, implement context specific interventions targeted at vulnerable populations, and address social and structural factors which contribute increase in infections, among many others (NSP 2017).

Although incidence rates have improved, by maintaining an annual decline of 1.07% since 2012 to 0.48% in 2017 (Zuma et al., 2022). Even with improvement within HIV incidence rates, South Africa continues to maintain comparatively high and irregular rates. Young females between the ages of 15 and 25 continue to be the cohort with highest annual new infections (Grebe et al., 2018). According to Zuma et al. (2022), in 2017 South Africa 66 200 females within the 15-24 cohort, tested positive for HIV. However HIV related deaths, between the years of 2007 and 2017, decreased by 10.5% annually. Ergo South Africa's burden regarding HIV/AIDS has shifted from one which is epitomized by mortality, in the late 1990's-early 2000's, to one which is characterised a steady increase in infections, thus the prevalence of HIV within South Africa continues to persist at equal margins to those of 2008 (Zuma et al., 2022). According to Kassanjee et al. (2022) of the 7.3 million individuals living with HIV, 64% are females, additionally 25% of females of reproductive age, 15-49 years, are living with HIV in South Africa. Females who constitute the black African population, between the ages of 20-34, bear the highest risk of infection (Kassanjee et al., 2022). As of 2022 (UNAIDS), the prevalence of HIV among females aged 15-49 was 23.5, while 100 000 new infections were recorded for females above 15 years. In addition 20 000 AIDS related deaths were recorded for females over the age of 15, and the coverage of females above the age of 15 receiving ART is current 3.9 million (UNAIDS, 2022).

According to Dhokotera et al. (2022) it is projected that 48% of females of reproductive age in South Africa are not aware of their HIV status. Poor responsiveness -both by the public and larger health structures- is particularly alarming considering the HIV statistics in sub-Saharan Africa, more so South Africa. Meagreness across the board interrupts access to essential HIV treatment and care services, in turn facilitating the rapid development of the unconstrained virus and

increasing the risk of infection to fetuses and sexual partners. Moreover, unidentified HIV infections facilitate the preservation of the rife epidemic by enduring constant transmission systems. This accentuates the significance of enhancing HIV testing and diagnosis efforts, particularly among females of reproductive age, in order to guarantee effective detection of HIV infections and rapid introduction of life supporting treatments and services.

2.8 Effects of Cervical Cancer on Females Living With HIV

Females Living with HIV are postured with a significant health burden with respect to the risk of cervical cancer. The immunocompromised state linked with HIV infection hastens the development of human papillomavirus infection, the primary cause of cervical cancer, in turn leading to substantially increased risk of developing cervical cancer malignancies. According to Danso, Lyons & Bradbeer (2006) and D'andrea et al. (2019), females living with HIV become subsequently predisposed to Cervical Intraepithelial Neoplasia (CIN), due to the impairment of the immune system as a result of HIV-immunosuppression -CIN is the emergence of atypical cells within the uterus (Cohen et al., 2019). Females living with HIV are at a higher risk of contracting corresponding intrusive carcinoma's, more specially Human papillomavirus, the amplified risk of HPV has resulted in the establishment of Highly Active Antiretroviral Therapy (HAART) (D'andrea, 2019). Unlike the traditional Antiretroviral Therapy (ART), HAART offers a more rigorous and successful formula of ART, consisting of a triadic treatment that borrows from ART (Lu et al., 2018). The aspect of increased risk is a dual-edged dilemma, in that the anatomical disruption of the HIV virus adversely impacts one's immune system, and equally the exceptionally high risk of HPV -and its positive influence on the development of cancerous lesions in the CD4 counts (D'andrea, 2019). - further elucidates the precarity of females living with HIV. The anatomical state of immunosuppression introduces an additional health concern, relating to STD/I infections for females living with HIV,

According to Dhokotera et al. (2022) and Stelzle et al. (2021), in 2018 females living with HIV constituted 63% of global cervical cancer diagnoses, while in South Africa females living with HIV contributed to 53% of all diagnosed cervical cancer cases. While equally 48% of females of reproductive age were uninformed of their HIV status, this data provides empirical support for asserting that a significant portion of females living in South Africa are unaware of their HIV status (Stelzle et al., 2021). As previously mentioned, immunosuppression as a result of HIV significantly amplifies the prospect of cervical cancer through an enabling pathways, more specifically by enabling the accumulation of genetic irregularities and the transmission from

dysplasia to cancer (Stelzle et al., 2021; D'andrea, 2019; Goncalves, 2016). In females living with HIV, cervical cancer -as well as HPV- unveil a belligerent disease development as a result of the immunosuppression and defective immune function. Infections such as HPV in females living with HIV may persist longer, develop more rapidly, and lead to an increased risk of developing cervical intraepithelial neoplasia – or cervical dysplasia-, and successfully, cervical cancer (Stelzle et al., 2021). While early diagnosis cervical cancer has a survival rate of 91%, within the first five years of detection, however it decreases to 61% when detected in the later stages (NIH, 2023). However this outcome staggeringly changes for persons living with HIV, a study conducted by Turdo et al. (2022) found that females living with HIV had a 40% five year survival. In turn, females living with HIV, who are diagnosed with cervical cancer, face an exceptionally challenging battle against cervical cancer as a result of the increased immunosuppression associated with HIV. An additional matter of concern is the exposure to the higher risk HPV strains, and persistent exposure due to the various strains. Similarly cervical cancer advances in development due to the challenges in accessing timely and comprehensive sexual and reproductive healthcare.

The aggressive disease development for females living with HIV often face barriers to accessing timely and adequate screening and treatment services, this in turn exacerbates the likelihood of advancement within the disease representation and poor clinical outcomes. In addition to heightened probability of cervical cancer, HIV negatively affects the recurrence rate by elevating the post treatment for precancerous conditions and weakens life expectancy (Stelzle et al., 2021). A study conducted in Botswana determined a fervent psychological and social impact on females living with HIV, who were later diagnosed with cervical cancer. The double weight of managing two compromising disorders concurrently can lead to increased levels of anxiety, depression and overall distress (Molefe & Duma, 2009). The insecurity surrounding treatment outcomes and prognoses function to aggravate these psychological challenges, which further incite feelings of hopelessness and fear. Furthermore the stigma related to both cervical cancer and HIV can heighten seclusion, prejudice and a sense of separation from one's proximal and distal communities and social systems. In turn, females are likely to encounter a considerable deterioration in their quality of life, such as challenges in upholding connections with family or friends, maintaining employment and overall well-being. These three factors have secondary effects on the physiological and psycho-social well -being of the individual, which is already strained by the dual of indisposition.

This compounded risk underscores the critical need for tailored preventative strategies, including regular cervical cancer screening and HPV vaccination, within comprehensive HIV care programs to mitigate the disproportionate burden of cervical cancer amongst this vulnerable population. While females living with HIV frequently make use of health facilities, interactions with medical personnel may expose them to informative sexual and reproductive material, in turn offering females living with HIV greater cervical cancer screening frequencies (Mwanahamuntu et al., 2013; Bogale et al., 2021). Consequently, appropriate, and improved reproductive practice is facilitated by interactions with medical professions, improves individual orientations regarding cervical cancer, and enlightens patients on the necessity of cervical cancer screening (Ezechi et al., 2013). HIV-testing inadvertently affects and determines cervical cancer screening -as a health behaviour. The evasion of HIV testing of STD/STI testing reduces the likelihood of interactions with medical professions and access to information. In turn the value of HIV-testing is not limited to individuals living with HIV but proceeds to include all females partaking in testing, as a measure of preventative reproductive practice. Likewise the merit of cervical cancer screening is not restrained to the finding of cervical cancer but also the detection of alternative cervical disorders.

The influence of individual orientations regarding the initiative and act of 'testing' overall but be accounted for. The normalisation of testing as part of a health practice defines perceptions regarding cervical cancer screening and initiatives to screen. However the greater challenge that pervades testing facilities is two-fold, first being the institutional challenge bifurcated health services, in that sexual and reproductive services are offered in isolation. As of current South Africa has not mandated sexual and reproductive policies which encourage and outline associative health services. A consolidation of associative medical services, particularly those related to sexual and reproductive care ensures comprehensive detection for females by maximizing resources. Associative, or related, medical services are conducted in conjunction with healthcare personnel are given the opportunity to synchronise efforts more efficiently in congruence with the national health projections, but more importantly offer knowledge about positive reproductive practise, such as frequent cervical cancer screening and HPV vaccinations. A strength of centralised sexual and reproductive health services offers a more rounded patient care, which accounts for the interrelated health issues experienced by females, and allows for the implementation of comprehensive treatment plans – which include social and communal support. Access to comprehensive psychosocial support, counselling and social networks becomes central in

addressing the unique needs of females navigating the multifaceted intersection of cervical cancer and HIV.

2.9 Implications of HPV Immunisation

According to Mark et al. (2007) the upturn cervical cancer is immediately related to Human Papillomavirus (HPV). HPV functions as a singular term for a collection of 15 sexually transmitted Human Papillomaviruses infections (Yimer et al, 2021). Okunade (2020) makes it clear that 99.7% are a result of the HPV infections, with particular ode to HPV 16 and HPV 18 as they increase their bare cancer inducing genotypes, otherwise referred to as oncogenes. HPV viruses target the mucocutaneous epithelium which are tissues surrounding the virginal tract, these tissues function as a protective barrier against pathogens and physical damage (Danso, Lyons & Bradbeer, 2006; Cohen et al., 2019). In contrast to the conduct of familiar sexually transmitted diseases or infections HPV does not present onset symptoms or indicators, in turn making it particularly threatening. According to Mark et al. (2007), and Yimer et al. (2021), individuals - both men and women- infected with HPV can live with the virus for an estimated 10 years prior to detection. Equally females are at a higher risk of contracting HPV within the first five to ten years of their sexual life (Yimer et al., 2021), in turn cervical cancer screening as a key mediation, in conjunction with HPV immunisations as primary mediations considerably reduce the risk of cervical cancer diagnoses. With a global infection rate of 42.2%, a regional rate of 22.6% in lower to middle income countries (Kombe et al., 2021) , 70% of sexually active men and females will contract HPV Okunade (2020). While South Africa maintains an age-standardised rate (ASR) of 26.6/100 000 among females (Ritcher et al., 2013). HPV immunisation in lower to middle income countries remains significantly low slung. In 2020 only 55% of states associated with WHO put into operation HPV immunisation as part of their national immunisation agendas, of which was largely constituted by higher incomes states (Ledibane, Ledibane & Matlala, 2023). Regionally, 31% of African states affected HPV immunisation into national immunisation agendas, in comparison while 77% of European states and 85% of American states (Ledibane, Ledibane & Matlala, 2023).

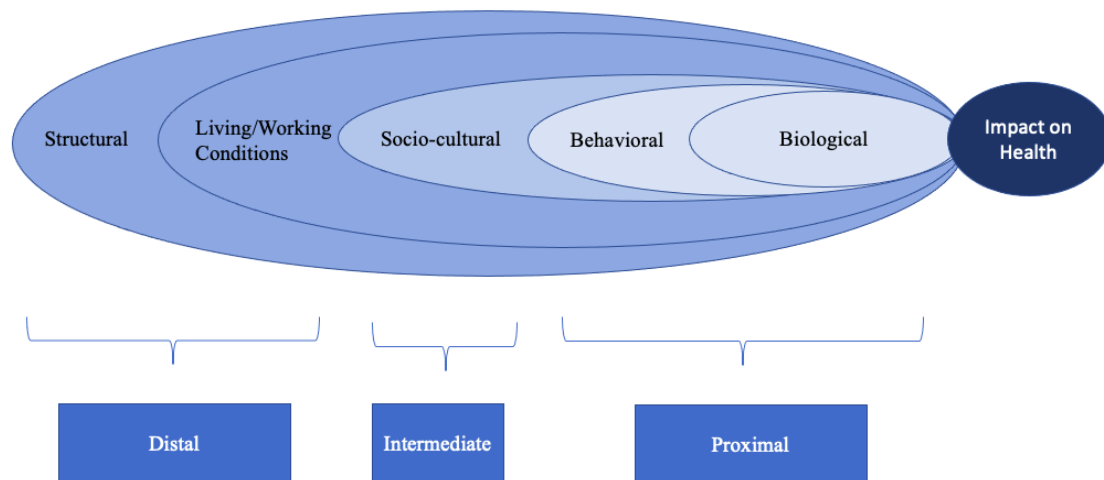
At present South Africa does not offer free HPV immunisations, in 2020 the National Advisory Group on Immunisation (NAGI) indorsed a change in immunisation to target girls in grade, running a operation from February 2024 - March 2024, followed by a secondary campaign in October 2024 - November 2024. Dissimilar from the South African extended immunisation program, the 2014 School-based HPV vaccination program was directed towards female learners

aged 9-12 years old in public schools as a primary prevention measure (NDoH, 2017), while the South African extended immunisation program offered under 6 immunisation at healthcare facilities. In 2014 the Department of Basic Education (DBE) estimated the immunisation of 500 000 grade 4 learners, and a total of 17 000 schools (Delany-Moretlwe et al., 2018). According to the study by Ledibane, Ledibane & Matlala (2023) of the 360 Tshwane District schools included in the school based HPV immunisation programme of 2019 the immunisation was below 80% at 72.0%, in turn indicating a high upturn of immunisation. The continuation of school based immunisation offers positive preventive measures that may offer positive cervical cancer screening outcomes for females in the future. With that it is imperative to make mention of the fissure of females who were not able to be immunised as a result of a) schooling prior to the 2014 immunisation program, b) above the recommended age of the program, c) lack of availed resources to various school districts. Apart from the 2014 school based immunisation program and the 2017 Cervical Cancer Prevention and Control Policy, females aged 10-29, more specifically females of reproductive ages, do not have alternative preventative measures. In turn increasing the risk of HPV and subsequent cervical cancer risks.

2.10 Theoretical framework

This research intends to adopt the Social Determinants of Health Theory (SDH) as the primary supporting theory. The SDH functions to expound systematic and structural determinations of health outcomes which are predominantly defined by proximal, intermediary, and distal influences which affect the ones authority to exercise positive health practices (Scotii et al., 2017). These include, structural, biological, behavioural, socio-cultural, living and working factors. The SDH theory proposes that the performance of a health behaviour and health outcomes are fundamentally conditioned by the intersection of multiple determinants at various levels of intersection, positive determinants output positive outcomes, while impairing determinants will result in negative outcomes (Scotii et al., 2017). The SDH paradigm prioritises health outcomes to systemic and structural conditions instead of solely focusing on individual conduct as a determinant of health outcomes. In doing so, the SDH paradigm re-evaluates the extent to which agency, towards enacting positive health behaviours, can solely be credited to the individual.

Figure 2.1: Social Determinants of Health Theoretical Framework



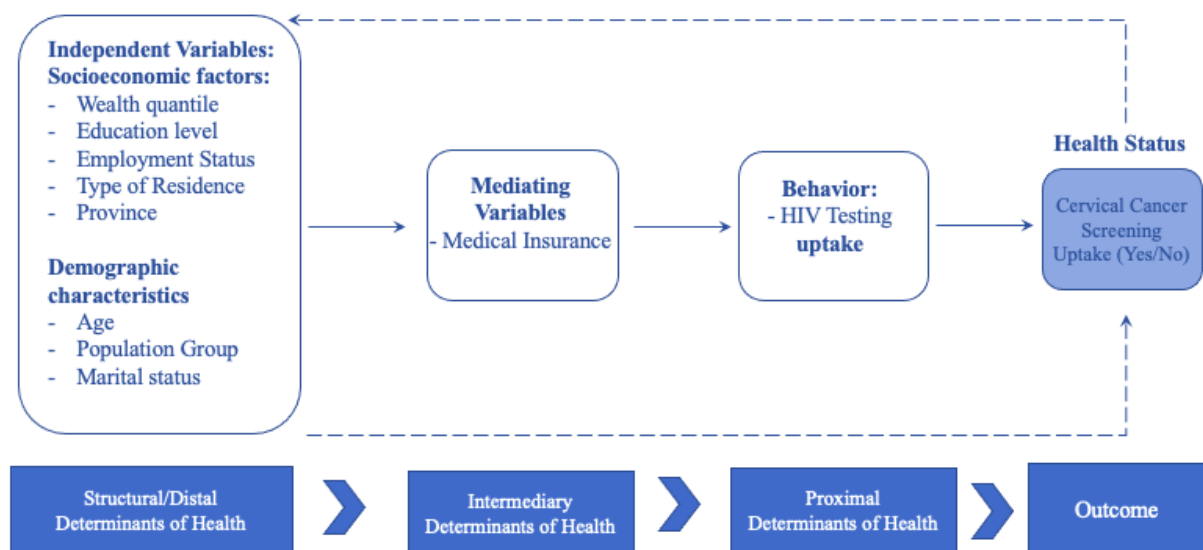
Source: Scott et al. (2017)

Cervical cancer screening uptake is determined by the intersection of social, economic and cultural factors which afford individuals the material means to exercise positive sexual and reproductive practise. Demographic and or socioeconomic features determine accessibility and availability of resources, of which includes access to information that affords informed health practice. Individual's beliefs, attitudes and or orientations towards a particular health concern informs health behaviours and social perceptions or misconstructions regarding -the necessity of- preventative practise. While preventative practice is informed by access to applicable health interventions. This conceptual framework encapsulates the socioeconomic factors such as employment status and places of residence, equally it accounts for the demographic characteristics which functions as sub contributors to overall social determinants of health, ergo including factors such as age, race and level of education -as represented by the distal determinants of health in figure 2.1. From figure 2.2, displayed in the SDH framework these characteristics form the biological, sociocultural, working and living dynamics which constitute the structural determinants of health.

Williams-Brennan et al. (2012), observed direct and positive correlations between cervical cancer and cervical cancer screening uptake in lower to middle income countries, while Akokuwebe et al. (2021) corresponded the effects of socio and demographic determinants in relation to levels of cervical cancer screening outcomes within the context of South Africa. In both studies socio-demographic factors are incorporated as key variables to determine the relationship between economic features and the outcome of screening; the same is applied to the socio-demographic

features of respondents. The inclusion of these variables or features, in turn elucidated the extent of influence on one's ability to perform a particular health behaviour in relation to their overall positioning within the larger structural and distal assemblies. While this conceptual framework does not incorporate a variable that accounts for an individual's beliefs, attitudes and or orientations, such dispositions can be found within the intermediate factors, more particularly socio-cultural factors within the traditional SDH framework. This study made use of the 2016 South African Demographic and Health Survey (SADHS), which offers secondary data. SADHS 2016 features socioeconomic and demographic representation of females between 15-49 years, in turn affording this study countrywide representation, and applicability. Ergo the data utilised in this study corresponds effectively with the SDH framework as this research topic reflects demographic and socioeconomic characteristics of females between the ages of 15-49.

Figure 2.2: Conceptual Framework Adapted from Social Determinants of Health Theory



Chapter 3

Methodology

3.1 Introduction

This chapter presents the methodology used to meet the objectives of this study. It includes a description of the study design, data source, study population, sample size and a delineate of the study predictor and outcome variables. This chapter includes details of the data management and analyses of the data.

3.2 Study Area

The study was conducted in South Africa, which is situated at the Southern end of Africa. South Africa comprises nine primary provinces, while internally neighboured by Lesotho and Swaziland, and externally by Botswana, Zimbabwe, Namibia, and Mozambique (Statistics SA, 2011). As of 2022, South Africa's current population was estimated to be 61.60 million people, of which 16.50 million are females of reproductive age, between 15-49 years (Statistics SA, 2022).

3.3 Study design and data source

The secondary data source that was utilised in this study is the 2016 South African Demographic and Health Survey (SADHS). The SADHS is the third DHS, and follows the surveys carried out in 1998 and 2003. It is a nationally representative survey that was conducted and collected as a collaboration between Statistics South Africa (Statistics SA), the South African Medical Research Council (SAMRC) and the National Department of Health (NDoH), with technical support from ICF through the DHS Program of the United States Agency for International Development (USAID) (SADHS, 2016).

The South African Demographic and Health Survey (SADHS 2016) features representation of females between 15-49 years and uses the Statistics SA Master Sample Frame (MSF), assembled from the 2011 Census frame, which functions as a bi-level sample design consisting of 71,241 primary sampling units (PSU) secondary sampling units (SSU) which account for 15 000 dwelling units (DU) (SADHS 2016). The use of MSF as the sampling frame includes 103,576 enumeration areas (EAs) which accounts for all nine provinces, state-wide (SADHS, 2016).

The study design is cross-sectional and the SADHS 2016 functions as the most suitable data source as this research topic considers demographic and socioeconomic characteristics of women between the ages of 15-49. The variables of interest in this study were extracted from the Individual Recode (IR) and Adult Health Recode (AHR). The two datasets were merged using the case id assigned to each individual in order to match variables between the two datasets. Merging was achieved using a many-to-one merge.

3.4 Study population and sample size

The study population are all females of reproductive age 15-49 years old, who responded to questions pertaining to cervical cancer screening. This study included women who have undergone at least one cervical cancer screening in their lifetime and women who have undergone HIV testing. For the purpose of this study, Papanicolaou smear was referred to as cervical cancer screening as a smear is a medical procedure which forms part of the overall methodological process of extracting cells from the cervix (Tambouret, 2013). The unweighted distribution in this study was (N) 8,515 females. In order to establish an accurate sample size females, over the age of 49 were excluded as they do not form part of the reproductive cohort. The sample size of this study was a weighted (n) distribution of 4,199 females of reproductive age.

3.5 Variables

3.5.1 Outcome variable

The outcome variable of interest in this study is the uptake of cervical cancer screening. This variable was derived from women aged 15 and older who were asked if they had ever undergone cervical cancer screening through the uptake of a Papanicolaou smear exam. Respondents were asked, "Have you ever had a Pap smear?". This was a dichotomous outcome defined by "Yes" (1) for those who were screened for cervical cancer or "No" (0) for those who were not screened. This variable was adopted as such for this study.

3.5.2 Independent Variables

Main predictor variable

HIV Testing is determined through the woman's questionnaire, which focused on independent testing (V781), and the laboratory instituted HIV testing through dried blood spot (DBS).

Respondents were asked “Have you ever been tested for HIV?” This was a dichotomous outcome defined by “Yes”(1) for those who had reported to have undergone HIV testing, and “No” (2) for those who had not. This variable was adopted as such for this study.

Table 3.1:Other independent variables to be used in this study.

Study Variable name	Survey Variable name	Survey Categorization	Study Categorization
Demographic Variables			
Ever Married	v501	Never in union Married Living with partner Widowed Divorced No longer living together/Separated	Married (0) Unmarried (1)
Education Level	v106	No education Primary Secondary Higher	None (0) Primary (1) Secondary (2) Tertiary (3)
Age of Respondent	v013	15-19 20-24 25-29 30-34 35-39 40-44 45-49	15-19 (0) 20-24 (1) 25-29 (2) 30-34 (3) 35-39 (4) 40-44 (5) 45-49 (6)
Type of place of residence	v102	Urban Rural	Urban (0) Rural (1)
Province	v101	Western Cape Eastern Cape Northern Cape Free State Kwazulu-Natal North West Gauteng Mpumalanga Limpopo	Western Cape (0) Eastern Cape (1) Northern Cape (2) Free State (3) Kwazulu-Natal (4) North West (5) Gauteng (6) Mpumalanga (7) Limpopo (8)
Population group	v131	Black/African Whites Coloured Indian/Asian Other	Black/African (0) Other (1)
Socio-economic Variables			
Wealth quintile	v190	Poorest	Poor (0)

		Poor Middle Rich Richest	Middle (1) Rich (2)
Employment Status	v714	Currently Working	Yes (0) No (1)
Medical Insurance	v481	Covered by health insurance	Yes (0) No (1)

3.6 Data Analysis Plan

The data by SADHS (2016) was analysed through the three phases: univariate, bivariate and multivariate. The data analyses were carried out through STATA version 17.

Objective 1: To examine the levels of cervical cancer screening among females 15-49 years, in South Africa. Frequencies and percentage distributions were generated using a weighted sample of the women. At the bivariate level, contingency tables were employed, using the Pearson chi-square test of association which examined the strength of crude relationships between cervical cancer screening and the study of independent variables (Tallarida, & Murray, 1987). Associations with p -value <0.05 were considered statistically significant. The formula below is applied for objective 1, the Pearson chi-square test of association indicated by Tallarida, & Murray (1987):

$$\chi^2 = \sum [(f_o - f_e)^2 / f_e]$$

where:

χ^2 = Chi-square Statistic
 f_o = Observed Frequency
 f_e = Expected Frequency

Objective 2 and 3: To examine the association between HIV testing and cervical cancer screening; while controlling for confounding demographic and socioeconomic variable .

The study conducted a multivariate analysis through the employment of a binary logistic regression as the outcome of the study is categorised with ‘yes’ and ‘no’ binary responses. The binary logistic regression results were presented in tabular format consisting of both an unadjusted and adjusted model. The formula below is applied for objective 2, the Binary Logistic Regression indicated by Tranmer & Elliot (2008).

$$\text{logit}(p) = \log[p/(1-p)] = \ln [p/(1-p)]$$

where:

$\text{logit}(p)$ = the log odds of the probability of the binary outcome

p = the probability of occurrence

3.7 Hypotheses

Ho : There is no relationship between HIV testing and cervical cancer screening uptake among females of reproductive age, in South Africa

Ha : There is a relationship between HIV testing and cervical cancer screening uptake among females of reproductive age, in South Africa

3.8 Ethical Consideration/Clearance

The data used in this research study is secondary data from SADHS 2016, therefore participant anonymity is preserved, and individual, confidential, and revealing material or features of participants have been thoroughly removed to preserve the integrity of this survey and minimise risks. Additional approval was provided by the University of Witwatersrand's Human Research Ethics Committee, WDEMG2023/07/01

CHAPTER FOUR

RESULTS

4.1 Introduction

The objective of this study is to analyse the association between HIV testing and cervical cancer screening uptake among females of reproductive age (15-49 years) in South Africa. This section displays the levels of cervical cancers screening, as well as the association demographic and socioeconomic factors which determine cervical cancer screening uptake, which satisfies the outline of objective 1 and objective 2

4.2 Levels of cervical cancer screening among females 15-49 years, in South Africa.

The cervical cancer screening uptake among females is notably low, with only 33% of female respondents having ever undergone the screening, while 67% have not undergone cervical cancer screening.

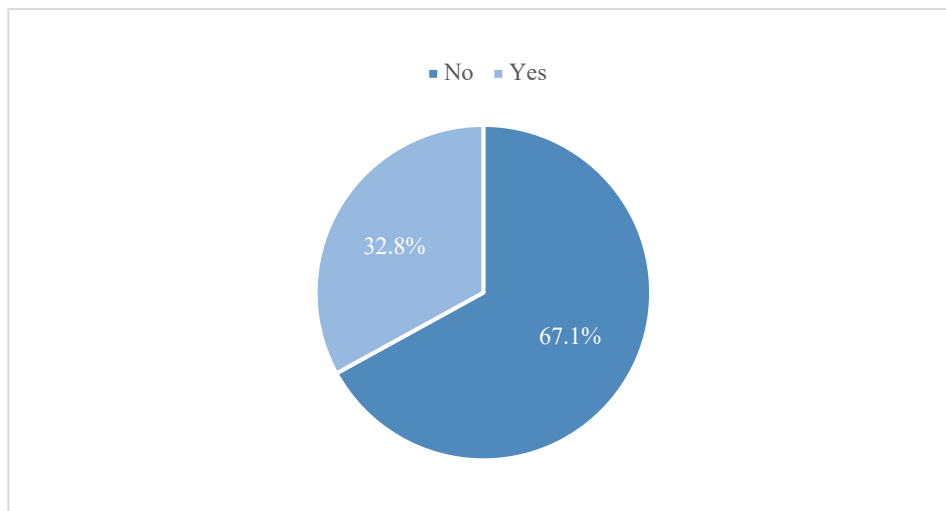


Figure 4.1: Percentage distribution of Cervical Cancer Screening among females of reproductive age in South Africa (N=4,199)

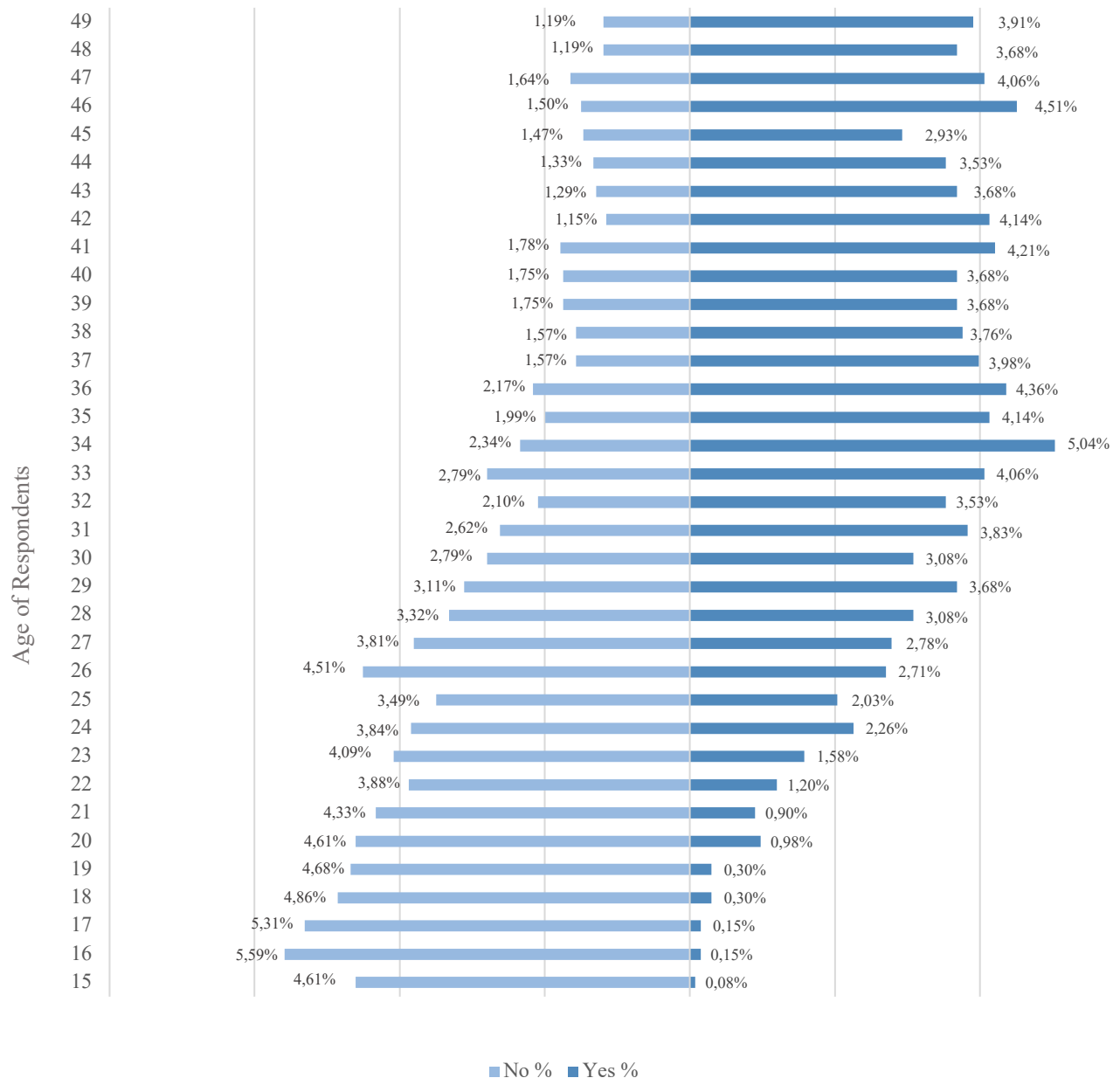


Figure 4.2: Percentage distribution of levels of Cervical Cancer Screening among females of reproductive age in South Africa

Evidential data in Figure 4.2 consistently underscores a notable correlation between higher age and an increased likelihood of engaging in cervical cancer screening. As individuals advance in age, they often become more conscientious about their health and prioritize preventive healthcare measures, including regular screenings. As shown in 4.1, of the 67.1% of respondents who had undergone cervical cancer screening, females between the ages of 35-39 (19.9%) were the largest cohort to have previously had their cervical cancer screened, followed

by those between 30-34 (18.7%). Females in the age cohort of 45–49 have the highest screening rates (56.07%) within each age group, followed by those in the age groups of 40–44 (55.17%) and 35–39 (50.67%). The figure1 shows that as age increases, the uptake of cervical cancer screening displays a positive incline, older females are indicated to screen more than younger females.

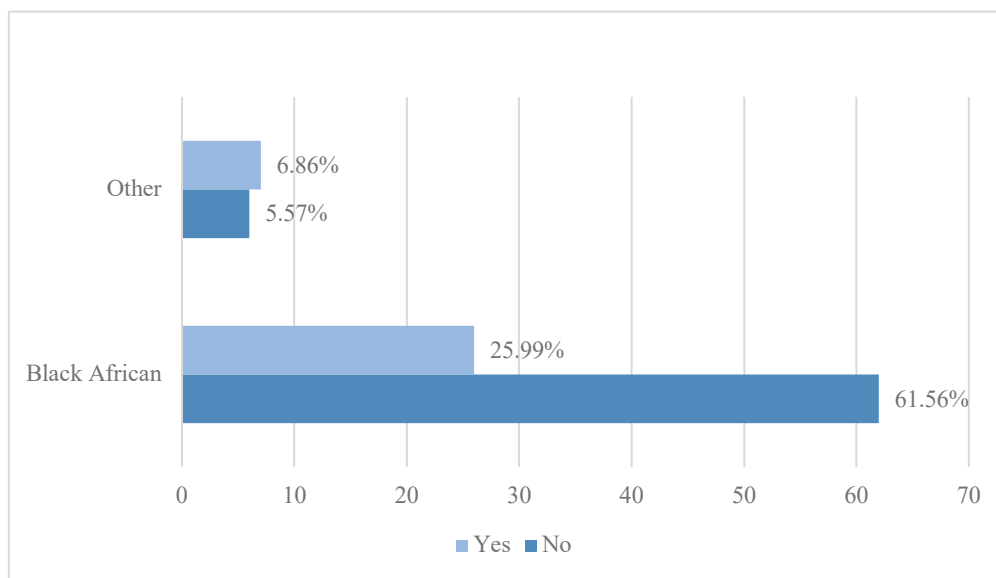


Figure 4. 3: Percentage Distribution of Cervical Cancer Screening and Population Group (%)

Within this sample of respondents black African makes up 88% of the cohort, of which 62% had never undergone cervical cancer screening. However, a comparative analysis of the categories in Figure 3.2 indicates a higher difference in terms of cervical cancer screening among black Africans and other population groups. A significant portion of the respondents (30.24%) identified as belonging to the poor socioeconomic category, had never undergone cervical cancer screening. While respondents within the rich quintile displayed a fairly equal proportion between those who had undergone cervical cancer screening (21.91.%) and those who did not (17.01%). Within the demographic constituted by the middle class, those who have undergone cervical cancer screening were considerably fewer, accounting for 6.40% of screened respondents. In terms of employment status, the percentage of unemployed respondents stood considerably higher at 66.2% compared to the employed cohort, 33.7%. Of those respondents who are unemployed only 17.59% had ever undergone cervical cancer screening, however of those respondents who indicated that they were employed an equal proportion of screened (16.11%) and non-screened are displayed (16.74%).

Of particular concern is the finding that 67.1% of respondents had not undergone cervical cancer screening, with a strikingly high correlation of 66.2% among the unemployed demographic and 85.43% lacking medical insurance coverage. This statistic indicates a potentially substantial disparity in medical insurance coverage when juxtaposed with the sample's employment ratios and wealth quintile distributions. There's a considerable disparity in screening uptake outcomes among respondents with medical insurance compared to those without medical insurance. But equally respondents covered by medical insurance displayed comparative proportions in terms of screening, unlike respondents without medical insurance. Furthermore, 66.61% of the respondents reside in urban areas, while 33.38% inhabit rural regions. Urban and peri-urban areas tend to be associated with comparatively better living standards, increased employment opportunities, and greater accessibility to superior healthcare services. Of the females residing in urban areas 74.5% answered yes to having undergone cervical cancer screening, while only 25.4% of rural residing respondents had ever undergone screening. The distribution of cervical cancer screenings among provinces revealed that Gauteng constituted the largest percentage (24.1%) of respondents who had undergone the screening, followed by the Western Cape (18.3%) and Kwazulu-Natal (17.6%)

Table 4.1: Frequencies And Percentage Distributions of Cervical cancer screening by demographic and socioeconomic characteristics of females of reproductive age in South Africa

Study Variables	No N (%)	Yes N (%)	Total N (%)	P-Value
HIV Tested				
No	634 89.81	72 10.19	706 100	0.00
Yes	2186 62.56	1308 37.43	3493 100	
Ever Married				
Married	448 47.87	488 52.13	936 100	0.00
Unmarried	2371 72.669	892 27.331	3263 100	
Education Level				
None	60 72.38	23 27.62	83 100	

Primary	279 71.52	111 28.48	390 100	0.00
Secondary	2248 69.20	1001 30.80	3249 100	
Tertiary	232 48.63	246 51.37	478 100	
Population Group				
Black//African	2585 70.31	1092 29.69	3677 100	0.00
Other	234 44.81	288 55.19	522 100	

Wealth Quintile				
Poor	1270 76.21	396 23.79	1667 100	0.00
Middle	629 70.05	269 29.95	898 100	
Rich	920 56.30	714 43.70	1637 100	
Employment Status				
No	2080 74.74	703 25.26	2783 100	0.00
Yes	739 52.20	677 47.80	1416 100	
Medical Insurance				
No	2546 70.97	1041 29.03	3587 100	0.00
Yes	274 44.69	338 55.31	612 100	
Type of Place of Residence				
Urban	1769 63.25	1028 36.75	2797 100	0.00
Rural	1050 74.90	352 25.09	1402 100	
Province				
Western Cape	197 43.84	253 56.16	450 100	0.00
Eastern Cape	321 69.94	138 30.06	459 100	
Northern Cape	59 67.702	28 32.298	87 100	
Free State	147 67.72	70 32.28	217 100	
Kwazulu-Natal	574	243	817	

	70.25	29.75	100
North West	174 62.53	104 37.47	278 100
Gauteng	798 70.52	334 29.48	1132 100
Mpumalanga	228 67.91	108 32.082	335 100
Limpopo	321 75.81	102 24.19	423 100

Table 4.1 displays the preliminary analysis that was performed in order to assess the initial associations between cervical cancer screening and the independent variables under study. Associations with p-values less than 0.05 were regarded as statistically significant. To comprehensively evaluate the relationships between the independent variables and the outcome variable, the Pearson Chi-square Test of Association was utilized. To facilitate the presentation of results, the age variable was categorized into intervals of five years each. This categorization allows for a clearer and more structured representation of the data, enabling a more accessible and interpretable analysis of the results. According to the findings in the table, of the 32.86% (N= 1 380) of respondents who had screened the highest screening outcomes were respondents aged 35-39, 51.80% (N= 276) this was followed by females aged 45-49, 57.30% (N=258) and females aged 40-44, 55.14% (257). While only 2.74% (N= 19) of females aged 15-19 had ever screened for cervical cancers, this was followed by females aged 20-24 13.90%(N= 96), and females aged 25-29 29.30% (N= 215). Within the cohort of married respondents 52.13 % (N=488) accounted for those who had screened, while 47,87% (N= 448) had never screened. Level of education presented a statistically associative relationship with cervical cancer screening uptake, more specifically the disparity between ever screened and never screening decreased as level of education increased. For instance, respondents who had tertiary education 51.37% (N=246) had screening while 48.63% (N=232) had never screened, while respondents with primary education 71.52% (N=279) had never screened, and 28.48% (N=111) had undergone cervical cancer screening. Black African females screened significantly less, in comparison to other population groups, only 29.69% (N=1092) of black African respondents had screened, while 55.19% (N=288) of other population groups had ever undergone cervical cancer screening.

As projected in the descriptive results, respondents within higher wealth quintiles are more likely to have undergone cervical cancer screening as they may have better access to financial resources, and, subsequently, health care facilities. Within the lowest wealth quintile, 78.52% (N=658) respondents had never undergone cervical cancer screening while only 48.83% (N=380) respondents within the highest wealth quintile, had never undergone cervical cancer screening. The wealth quintile is expected to be associated with the availability of health insurance, given the even relationship between socioeconomic status and access to healthcare resources. Individuals within higher wealth quintiles are more likely to have the financial means to afford medical insurance, which in turn facilitates their access to comprehensive healthcare services. Comparably, within Table 4.1 of the respondents who had medical insurance 55% (N=338) had undergone cervical cancer screening, while of those respondents without medical insurance, only 29% (N=1041) had undergone cervical cancer screening. As the primary premise of this study suggests a corresponding relationship between testing behaviors, particularly HIV testing and cervical cancer, table 4.1 shows that respondents who test for HIV 37.43% (N=1308) screened for cervical cancer, as opposed to those who didn't test, of which only 10.19 % (N=72) screened for cervical cancer.

4.3 Factors associated with cervical cancer screening uptake

Table 4.2: Unadjusted Odds Ratios for the Binary Logistic Regression of the association between the background characteristics with Cervical Cancer screening

Outcome Variable	Cervical Cancer Screening		
	OR	P-Value	95% CI
Age of Respondents			
15-19	0.26**	0.000	0.121-0.0569
20-24	0.15**	0.000	0.104-0.216
25-29	0.38**	0.000	0.283-0.527
30-34	0.66	0.005	0.498-0.883
35-39 (RC)	1.00		
40-44	1.14	0.434	0.816-1.603
45-49	1.24	0.179	0.903-1.727
Marital Status			
Married (RC)	1.00		
Unmarried	0.34**	0.000	0.284-0.419
Education Level			
None	0.36**	0.001	0.203-0.641

Primary	0.37**	0.000	0.253-0.560
Secondary	0.42**	0.000	0.321-0.052
Tertiary (RC)	1.00		
Population Group			
Other (RC)	1.00		
Black African	0.34**	0.000	0.267-0.439
Wealth Quintile			
Rich (RC)	1.00		
Middle	0.55**	0.000	0.326-0.495
Poor	0.40**	0.000	0.434-0.698
Employment Status			
No (RC)	1.00		
Yes	2.70**	0.000	2.240-3.274
Medical Insurance			
No (RC)	1.00		
Yes	3.02**	0.000	2.374-3.853
Type of Place of Residence			
Rural (RC)	1.00		
Urban	1.73**	0.000	1.435-2.095
Province			
Western Cape (RC)	1.00		
Eastern Cape	0.33**	0.000	0.232-0.483
Northern Cape	0.37**	0.000	0.255-0.543
Free State	0.37**	0.000	0.258-0.536
Kwazulu-Natal	0.33**	0.000	0.233-0.468
North West	0.04**	0.000	0.335-0.652
Gauteng	0.32**	0.000	0.224-0.474
Mpumalanga	0.36**	0.000	0.263-0.518
Limpopo	0.24**	0.000	0.176-0.352
HIV Tested			
No (RC)	1.00		
Yes	5.27**	0.00	3.806-7.312

RC = Reference Category, **p < 0.05 represents significant results at 95% level of Confidence; OR = Odds Ratio

The above table, Table 4.2, displays the results of the odds ratios of cervical cancer screening among females of reproductive age in South Africa. This analysis found that all the independent variables, or the controlling variables included in the model demonstrated overall statistical

significance in reference to the dependent variable, cervical cancer screening. However this excludes the category 40-44 and 45-49 which did not display statistical significance. With regards to the variable 'age of respondents', the cohort 35-39 was used as the reference category as this is the cohort with the highest screening outcomes. Females between the ages of 40-44 were significantly (OR=1.14 $p < 0.05$ CI: 0.81-1.60) more likely to undertake cervical cancer screening than females aged 35-39, this was followed by females between the ages of 45-49 (OR = 1.24 $p < 0.05$ CI: 0.90-1.72) -although both cohorts do not reach statistical significance. According to the table, it can be inferred that an increase in age increases the likelihood of cervical cancer screening uptake. Females between the ages of 20-24 (OR= 0.15 $p < 0.05$ CI: 0.10-0.21) , despite belonging to a demographic that is disproportionately at risk for cervical cancer, were considerably more likely to screen than females aged 35-39. It is key to note that 2017 the Cervical Cancer Prevention and Control Policy excludes females of reproductive age below the age of 30, which is estimated to make up 15% of population.

Marital status displays a statistical association to cervical cancer screening, respondents who are not married were 0.34 (OR = 0.34 $p < 0.05$ CI: 0.91-1.29) less likely to undergo cervical cancer screening, compared to respondents who are married. While within the category of level of education, in reference to respondents with a tertiary education, there is a decline in likelihood of uptake by level of education even with a positive statistical association between the various levels. It was found that respondents with no education were 0.36 times (OR = 0.36 $p < 0.05$ CI: 0.20-0.64) less likely to undertake cervical cancer screening, there's not much difference in percentage between those who had no education and respondents with primary education, with a 0.37 less likelihood of uptake (OR = 0.37 $p < 0.05$ CI: 0.25-0.56). unlike respondents with secondary education, with 0.42 lower probability (OR = 0.42 $p < 0.05$ CI: 0.32-0.05), compared to respondents with a tertiary education. Equally respondents who are employed are more likely to undergo cervical cancer screening (OR = 2.70 $p < 0.05$ CI: 2.24-3.37), and females who have health insurance are 3.02 times more likely to get screened for cervical cancer (OR = 3.02 $p < 0.05$ CI: 2.37 -3.85).

Type of place of residence, specifically urban regions, indicates a statistically significant relationship to cervical cancer screening uptake with a 1.73 likelihood of uptake compared to rural areas (OR = $p < 0.05$ CI: 1.43-2.09), this significance is further reiterated when comparing developed provinces such as the Western Cape to poorer provinces like the North West. Comparatively, respondents in the North West are 0.32 (OR = 0.32 $p < 0.05$ CI: 0.03-0.65) less

likely to undergo cervical cancer screening than those in the Western Cape; while respondents in Gauteng Province are 0.32 times less likely (OR = 0.32 $p < 0.05$ CI:0.22-0.47). The Western Cape is used as a reference category (RC) as it is the province with the most effective and efficient healthcare facilities and services, for women of reproductive age, in South Africa. In addition, the Western Cape has a provincial screening uptake outcome of 56%, which was the highest among all provinces, in South Africa. Female respondents who had a propensity to test for HIV were 5.27 times more likely to undergo cervical cancer screening, in comparison to respondents who don't test for HIV.

4.4 The association between HIV Testing and Cervical Cancer screening among females of reproductive age in South Africa.

The second objective was to determine the association between HIV testing and cervical cancer screening among females of reproductive age (15-49 years) in South Africa. The binary logistic regression was conducted for the adjusted analysis and the results are presented below.

Table 4.3 Adjusted Odds Ratios for the Binary Logistic Regression of the association between HIV testing (including the background characteristics) with Cervical Cancer Screening.

Outcome Variable	Cervical Cancer Screening		
	OR	P-Value	95% CI
HIV Tested			
No (RC)	1.00		
Yes	3.24	0.000	0.01-0.08
Age of Respondents			
15-19	0.03**	0.000	0.162-0.089
20-24	0.15**	0.000	0.108-0.023
25-29	0.38**	0.000	0.282-0.057
30-34	0.66**	0.015	0.514-0.930
30-35 (RC)	1.00		
40-44	1.22	0.256	0.862-1.738
45-49	1.41	0.036	1.022-1.955
Marital Status			
Married (RC)	1.00		
Unmarried	0.84**	0.133	0.681-1.052
Education Level			
None	0.29	0.000	0.163-0.546
Primary	0.54	0.010	0.342-0.866
Secondary	0.68	0.019	0.505-0.940
Tertiary (RC)	1.00		
Population Group			
Other (RC)	1.00		

Black African	0.75	0.063	0.55712-1.01567
Wealth Quintile			
Rich (<i>RC</i>)	1.00		
Middle	0.72	0.044	0.534-0.992
Poor	0.70	0.036	0.510-0.977
Employment Status			
No (<i>RC</i>)	1.00		
Yes	1.01	0.860	0.822-1.263
Medical Insurance			
No (<i>RC</i>)	1.00		
Yes	1.68**	0.000	1.277-2.234
Type of Place of Residence			
Rural (<i>RC</i>)	1.00		
Urban	1.33**	0.021	1.045-1.698
Province			
Western Cape (<i>RC</i>)	1.00		
Eastern Cape	0.44**	0.000	0.302-0.662
Northern Cape	0.40**	0.000	0.270-0.662
Free State	0.42**	0.000	0.266-0.661
Kwazulu-Natal	0.50**	0.000	0.342-0.730
North West	0.66	0.057	0.436-1.011
Gauteng	0.35**	0.000	0.234- 0.532
Mpumalanga	0.05**	0.005	0.036-0.840
Limpopo	0.42**	0.000	0.279-0.642

RC = Reference Category, **p < 0.05 represents significant results at 95% level of Confidence; AOR =Adjusted Odds Ratio

The first, and key, variable within this model results is HIV testing. HIV Testing is the main predictor variable within this study, as this study proposes that there is a positive association between HIV testing and cervical cancer screening uptake. Specifically, that females who test for HIV are more likely to undergo cervical cancer screening, as health testing behaviors are related. According to Table 4.3, respondents who have tested for HIV were considerably more likely to undergo a cervical cancer screening than those who have not (AOR= 3.24, p<0.05; CI: 2.26-4.64).

Apart from, Age of Respondents -cohorts 40-44 and 45-49-, Education Level, and Wealth Quintile, the odds ratio of many of the variables remained unchanged when holding HIV testing at a constant. With regards to table 4.3, the cohort 35-39 was chosen as the reference group for the variable "Age of Respondents" as it had the best screening performance. While neither cohort reached statistical significance, females between the ages of 40 and 44 were (AOR=1.22 p>0.05 CI: 0.86-1.73) more likely to undergo cervical cancer screening than females aged 35-

39; while holding HIV testing at a constant. This was followed by females between the ages of 45-49 (AOR = 1.41 $p < 0.05$ CI: 1.02-1.95). The odds of cervical cancer screening, while controlling for HIV testing relative to HIV testing among younger females, aged 25-29 were (AOR = 0.38 $p < 0.05$ CI: 0.28-0.05) less likely, and continues to decline with descending age groups.

In comparison to the unadjusted model there was a decline in likelihood of uptake by level of education even with a positive statistical association between the various levels. It was found that respondents with no education (OR = 0.36 $p < 0.05$ CI: 0.20-0.64) had the highest unlikelihood, while the adjusted model depicts a fairly constant (OR = 0.29 $p < 0.05$ CI: 0.20-0.64) unlikelihood of screening, while controlling for HIV testing. Respondents with secondary education had a lower inclination to take up cervical cancer screening (OR = 0.68 $p < 0.05$ CI: 0.50-0.94), compared to respondents with a tertiary education, equally while controlling for HIV testing. The p-values in these results reveal statistical association, thus it is unlikely that the variances in screening likelihood are the consequence of arbitrary. As a result, it is key to note that the inclusion of 'HIV Testing' within the adjusted model did not offer considerable change to the odds ratios or the interpretation thereof. This proposes that the relationship between cervical cancer screening and level of education remains statistically significant, even after controlling for HIV testing.

Particularly unanticipated in the adjusted model was the ratio variance in cervical cancer screening uptake among middle and poor wealth quantile. Females within the middle wealth quintile were (OR = 0.72 $p < 0.05$ CI: 0.51-0.99) times less likely to undertake cervical cancer screening compared to respondents within the rich quantile. Similarly poor respondents maintained (OR = 0.70 $p < 0.05$ CI: 0.51-0.97) a lower probability to screen. The results within the unadjusted model displayed a 5% difference between the two wealth quintiles, however while controlling for HIV testing the gap of difference between the two has reduced significantly. These differences bear a statistical association, inclusion of 'HIV Testing' within the adjusted model offers considerable change to the odds ratios. Within the unadjusted model, cervical cancer screening among the middle quintile was at odds of 55%, and poor quantile at 60% lower likelihood of screening, in comparison to the rich quantile. The analysis suggests that inclusion of HIV testing is associated with an increased probability of cervical cancer screening uptake among females within the middle and poor wealth quantile, compared to

females within the rich wealth quintile in South Africa. Even after accounting for HIV testing, there is still a statistically significant correlation between wealth and cervical cancer screening.

The odds of cervical cancer screening among respondents who are employed, while adjusting for HIV testing remains at an equal ratio of occurrence (OR = 1.01 $p > 0.005$ CI: 0.82-1.26). Therefore employment does not appear to be a major predictor of cervical cancer screening, even after accounting for HIV testing. The odds ratio of 1.01, which is not statistically significant, shows that the probability of cervical cancer screening uptake among working individuals is fairly comparable to those who are unemployed. However in the unadjusted model employment status functions as a predictor to cervical cancer screening, respondents who are employed are more likely to undergo cervical cancer screening (OR = 2.70 $p < 0.05$ CI: 2.24-3.37). Equally population group, within the adjusted model does not bare a statistical association to cervical cancer screening (OR = 0.75 $p > 0.05$ CI: 0.063), or marital status (OR = 0.84 $p > 0.133$ CI: 0.68:1.05).

Chapter Five

Discussion and Conclusion

5.1 Introduction

Globally, poor screening rates are linked to perceived risk of cervical cancer, and socio-economic and demographic factors negatively impact the ability to engage in positive reproductive agency (Endeshaw et al., 2018). In Southern Africa, particularly in South Africa, inadequate screening is influenced by factors such as poor perceived behavioural control, insufficient access to resources (including knowledge and information), and the availability of health resources for screening (Akokuwebe et al., 2021; Lyimo & Beran, 2012; Hoque et al., 2014). A key assertion within this research is the thought that individuals who undergo any form of STD testing, such as HIV Testing, are considerably more inclined to partake in subsequent and additional examinations, such as cervical cancer screening. This research accounts for the convergence of knowledge seeking behaviours, with increased practice and consequential increases in positive sexual and reproductive practice. Ergo the historic pattern and inclination to testing, bears direct and positive correlations to the outcome of positive sexual and reproductive practise. The principal aim of this research is to explore the relationship between HIV testing and cervical cancer screening uptake, among females of reproductive age, particularly in South Africa.

By honing in on the influences of health behaviours, in particular those relating to the performance and uptake of positive sexual and reproductive practices insight can be offered to relieving related barriers. This research maintains the assertion that health testing behaviours are related. Equally, Mwanahamuntu et al. (2013) and Bogale et al. (2021) reflect HIV testing as a censoring indicator for testing behaviours, indicating positive health outcomes among females who frequently utilise testing facilities. HIV testing reflects initiatives aimed at exercising sexual and reproductive agency with the primary goal of maintaining sexual and reproductive health, thereby contributing to the uptake of cervical cancer screening. In South Africa, as of 2017, 82% of females aged 15-49 had undergone HIV testing, while only 37% had ever undergone cervical cancer screening (SADHS, 2016). Barriers to routine testing are often associated with subjective norms related to testing and resource constraints concerning healthcare access and availability of resources in low- and middle-income countries (LMIC). This research provides evidence to barriers that inhibit females in South Africa from accessing

testing facilities, or related resources, as well as the factors which afford frequent testing. This is especially vital in LMIC countries as, in LMIC such as South Africa where only 9% of the eligible screening cohort had ever undergone cervical cancer screening (Arbyn et al., 2020). Ergo the significance and value of analysing the relatability of health behaviours, as per this research, is revealed through the provision of valuable insights that reflect the patterns and determinants of testing behaviours.

This bears significant relevance to the field of public health, particularly focusing on sexual and reproductive health of females. It does so by highlighting essential aspects of testing behaviours, especially bearing relevance to the monitoring of health trends in testing behaviours of an extended period of time. The findings reflected in this report can be used as contributory apparatus to long term initiatives that intend to monitor testing rates, and coverage, determine developing issues and assess the efficacy of related public health campaigns, programs or interventions. Within the context of South Africa, identifying social and economic disparities is essential to determining the extent to which health campaigns, programs or interventions can be effective. The inclusion of economic indicators, contributes to the absolute comprehension of health inequity. The findings in this report function as essential features to acknowledging, and further addressing health inequities, ensuring that testing services are accessible and used across various socio-economic and demographic groups.

According to Sung et al. (2021), global cervical cancer cases reached 604,000 in 2020, with a mortality rate of 56.6%. In 2018, Southern Africa recorded 14,409 cases and a mortality rate of 45% (Arbyn et al., 2020). Southern Africa maintains one of the highest age-standardised incidence rates (ASIR) for cervical cancer globally, with 43.1 cases per 100,000 female population (Jedy-Agaba et al., 2020; Arbyn et al., 2020; Abotchie & Shokar, 2009). In 2020, South Africa reported 6,426 new cases, compared to 6,181 in 2018 (NICD 2020; NICD 2018). The increase in cases is attributed to barriers such as individual attitudes, misconceptions about cervical cancer screening, and challenges related to access to health facilities and available resources (Guillaume, Chandler & Igbinoba, 2020). The outcome of this study aligned with the initial predictions and the primary premise of this research. This suggests and indicates that health behaviours are interconnected, particularly highlighting that females who undergo various forms of STD testing, such including HIV testing, are more inclined to undergo cervical cancer screening. The unadjusted model determined that female respondents who had a propensity to test for HIV were 5.27 times more likely to undergo cervical cancer screening, in

comparison to respondents who don't test for HIV, and a probability of 3.34 within the unadjusted model. Health behaviours, particularly the correlation between HIV testing and cervical cancer screening, highlight the interconnected nature of preventative healthcare practices. The findings of various studies emphasises a notable relationship, indicating that individuals who engage in sexually transmitted infection and disease testing are more likely to pursue similar forms of sexual and reproductive health care services, as well as exercise preventative practice, or positive health practices (Thompson et al., 2021). An equivalent correlation can be drawn between HIV testing and its relatability to cervical cancer screening. A study conducted by Thompson et al. (2021) revealed that young men and women opted for STD testing in opposition to condom use, which subsequently resulted in the implementation of additional sexual and reproductive preventative behaviours. This correlation can be attributed to a variation of shared factors, such as health consciousness, proactive healthcare seeking behaviours, and a general inclination towards preventative measures. This correlation becomes especially important in the context of cervical cancer screening, where females who prioritise one aspect of their health, such as undergoing HIV testing and are more inclined to extend their commitment to cervical cancer screening.

Recognizing these related health behaviours informs comprehensive healthcare strategies, promoting a holistic approach to preventative care that addresses multiple facets of females' sexual and reproductive well-being. A study conducted by Mabotja, Levin, & Kawanga (2021) further showed that despite the fact that the Johannesburg health district offers free continuous cervical cancer screening for females living with HIV, above the age of 30, South Africa continues to fail to meet its cervical cancer prevention targets. Between 2016 and 2017 only 47.4% of females living in the Johannesburg district had undergone cervical cancer screening, this was considerably lower than the projected 55% district target, and the 55% provincial targets and the 62% national targets. Cervical cancer screening rates remain low, not only among females living without HIV, but also among those living with HIV.

Thus the impending health crisis of cervical cancer requires aggressive prevention measures that are not only limited to increasing screening outcomes but additional health measures targeted towards cervical care. Females within this data set had high HIV testing outcomes, in turn the propensity to test for HIV is significantly greater than cervical cancer screening uptake. Cervical cancer screening barriers in LMIC, within the proximal level continue to pervade intentions to screen, a considerable facilitator of this that was previously observed as well

within the barriers to HIV testing were individual conceptions regarding testing. In a study by Enyan et al. (2022) on Ghanaian Muslim women, honing in on the favourable reception and participation in cervical cancer screening services, retained the significance of social perceptions on individual perceptions, and subsequent intentions to partake in screening. While a study conducted in Ethiopia by Zhang et al. (2019), showcasing the effects of cervical cancer knowledge on the outcome of cervical cancer screening uptake, elucidated lack of resources, such including knowledge, to be key contributors to poor outcomes. While studies indicate improved HIV testing rates among women to be related to aggressive dissention tools, accompanied by holistic initiatives to preventative care (Beck et al., 2016)

Age undeniably influences the capacity of individuals to engage in health behaviours. It is intuitive to recognize that as individuals assume improved self-governance with advancing age, there is a corresponding uptake of personal responsibility concerning health matters. Robbins et al. (2020) unpack the state of vulnerability of adults aged 18 to 24 years regarding the extent to which they are able to effectively address their healthcare requirements. Most notably, the paper highlights the difficulties regarding the transition of agency, and subsequent health responsibility, for adults aged 18 to 24 years who were previously under the guidance of older parties. The paper further elucidates the existing gap in ensuing dissemination tools and healthcare facilities, bearing particular focus on this demographic due to ensure systematic transition of adolescents from paediatric healthcare to adult healthcare. The findings in this study highlight a clear association between older age and an increased probability of participating in cervical cancer screening uptake. Within advancing age, females tend to be more attentive of their health needs, while equally prioritising preventative healthcare such as screenings. A comprehensive country based study of Asian women, compiled by Salehiniya et al. (2021) displays a relationship between advancing age and cervical cancer screening uptake, most epically among females aged 40 years and above.

Within the context of South Africa, females aged 30 years and above are beneficiaries of the 2017 Cervical Cancer Prevention and Control Policy which offers females three free cervical cancer screenings, within ten-year intervals (NDoH, 2017). This research particularly focused on females aged 15-49 as females of reproductive age serve as critical study groups due to their immediate relation and impact on reproductive and maternal health, prospective generations, as well as the broader influence of societal well-being and public health.

A study conducted by Mabotja, Levin, & Kawanga (2021) further validated the positive associations between positive perceptions regarding cervical cancer screening uptake, among females of reproductive age in South Africa. Their research indicated that females with favourable perceptions were more inclined to participate in screening efforts, indicating significant influence of attitudes on positive health behaviours. A proportion of these respondents were females above the age of 40 years, equally the binary logistic regression results of this study similarly indicate that females aged between 40-49 years were significantly more likely to undergo cervical cancer screenings. These findings, in conjunction to those of Mabotja, Levin, & Kawanga (2021) emphasise the importance of promoting age specific educational programmes and strategies towards the dissemination of information regarding cervical cancer and positive related behaviours, in order to improve participation in cervical cancer screening efforts. Such initiatives would be favourable to the National Department of Health cervical cancer prevention targets which intend to ensure a screening coverage of 70% of females of reproductive age. The achievement of this target is at a risk as only 13.6% of the intended target demographic have undergone cervical cancer screening (Gwavu, Muray, & Okafor, 2023; Vhuromu et al., 2018)

No doubt, one's level of education should be considered as a precursor to additional factors intertwined with economic status, such as employment status, type of occupation, and subsequently accessed to medical insurance. Education functions as a foundational determinant that influences an individual's social economic standing, affecting their opportunities for employment and their nature of their occupation. This in turn plays a critical role in determining the individual's access to essential resources such as medical insurance, which afford individuals improved positive sexual and reproductive practices. Recognizing education as a precursor allows for a comprehensive understanding of the interconnected nature of socioeconomic factors that collectively influence an individual's access to healthcare and, consequently, their overall health outcomes. Stormacq, Van den Broucke & Wosinski (2019) provides an interrelated account for the interconnected nature of health literacy and level of education, with particular concentration on the existing gap between the effects of low education levels in facilitating disadvantage and poor health behaviours, and subsequent outcomes. While investigating the factors associated with cervical cancer screening among Asian women, Salehiniya et al. (2021) found education and various levels of education as a determining factor to poor knowledge regarding cervical cancer screening. In addition this study encapsulates the domino relationship between education, levels of education and the

ultimate factors which encourage cervical cancer screening uptake. Factors such as information regarding what cervical cancer screening is, and the overall importance of sexual and reproductive healthcare play a significant role.

In lower to middle income disparities in gender related education outcomes remain high, irrespective of the extensive counteractive efforts (Baten et al., 2021), this is further accompanied by distal barriers to higher education pursuits. Getachew et al. (2021) conducted a study based in Addis Ababa, Ethiopia where females with higher education levels were 64% more acquainted with cervical cancer related knowledge, in comparison to those with secondary schooling (34%). The finding of this study revealed that a correlation has been observed between increased educational attainment and the adoption of cervical cancer screening. Higher educated respondents might be more conscious of the value of routine screenings for early detection and preventative healthcare practices. Higher levels of education attainment further translates to employment status, a significantly large proportion of females within this study were considered unemployed. Currently South Africa maintains an unemployment rate of 32.6% for men and rises to 35.7% for females, according to Statistics South Africa (2021). With that there needs to be a consideration of subsequent economically related impairments, for instance employment status is a critical determinant of access to medical insurance as previously mentioned, as it shapes the extent of healthcare accessibility for individuals. This research included employment status and access to medical insurance as influential factors to the outcome of cervical cancer screening; stable forms of employment provide material benefits such including medical insurance and comprehensive health coverage. This intersection between level of education, employment status, and medical insurance facilitates health inequalities, further encapsulating the need for comprehensive strategies to ensure equitable healthcare access for all.

Within the last ten years there has been a consistent representation of marital status as a key factor to women's health. Studies conducted in India and Tanzania have consistently highlighted an enduring association between cervical cancer and the social cultural perceptions, particularly concerning marital status. A research study involving rural Tanzanian women revealed that marital status influenced their inclination to seek cervical cancer screening (Lyimo & Beran, 2012). The study identified that spousal approval, particularly in the context of the husband, played a crucial role in shaping wives' health behaviours. Despite certain traditional settings exhibiting male reluctance toward adopting specific health behaviours, like

contraceptive use, male approval remains a hindrance to women's reproductive agency. Also, another study conducted in India, revealed that husbands often harboured negative beliefs or attitudes toward cervical cancer screening, even with adequate information (Singh, Bloom, & Tsui, 1998). Consequently, women are more likely to undergo cervical cancer screening when they receive positive responses from their husbands. The findings established by Mabotja, Levin, & Kawanga (2021) align with the outcomes of this study, indicating a congruence in the understanding that marital status alone does not provide evidence in favour of cervical cancer screening. In Taiwan, a study by Liao et al. (2006) observed higher screening compliance rates among single women compared to married women. Additionally, the research indicated that a larger proportion of younger women failed to comply with screening within the studied population. A more recent study conducted on Korean women by Shin et al., (2022) found that certainly in congruence with previous studies and data females who are married were significantly more likely to undergo cervical cancer screening than females who are unmarried. 57% of married females had undergone cervical cancer screening while only 26.6% of unmarried females had undergone screening (Shin et al., 2022). However it would be key to include the fact that women who had screened far more were females who had children, in this case motivation for screening may be attributed to varying factors related to antenatal and postnatal care.

The true influence of marital status on the uptake of particular practices or health behaviours significantly relies on the context of the research, for instance research that is aligned with cultural and religious beliefs is more inclined to produce outcomes that are significantly associated with marital status. Equally research associated with sexual and reproductive features is more likely to provide adjacency to marital status. In the unadjusted model of this study, marital status exhibited a statistical significance in relation to cervical cancer screening, implying a notable association between marital status and the likelihood of undergoing cervical cancer screening. However, when considering the adjusted model with the analysis control for HIV testing, the statistical significance of marriage status negatively changed. This suggests that the initial observed association between marital status and cervical cancer screening may be influenced by HIV tests. The shallowly opposing outcomes between the qualitative studies, as well as the quantitative finding of this study further highlight the necessity of mixed method research studying regarding the trials to screening outcomes for females of various demographic categories and geographical contexts. While marital status may not bear

substantial significance to the performance of health behaviours and practices in South Africa, this does not negate the alternative social barriers to positive health behaviours and practices.

The results of this study pertaining to population groups produced intriguing outcomes. Despite observing a lower cervical cancer screening rate among black African females, the disparities between the black African population group and other groups were not as largely different as expected. Initially, this paper anticipated a considerable disparity in screening outcomes between the black African population and the population of other groups. However, the observed differences, although significant, were not as extensive as expected. According to the National Cancer Registry, in 2011 82.7% of diagnosed cervical cancer cases were black females (NDoH, 2017), similarly Statistics South Africa 2019 determined that black female account for 44,2% of all cancer diagnosed cases in South Africa; with cervical cancer being the most diagnosed form of cancer in the year 2019 (Statistics South Africa, 2019). Furthermore between 2008 and 2019 South Africa observed increased incidence rates among black females ranging between 25,000 and 30,000 cases per 100,000, with the exclusion of 2016 where the incident rate arrived at 32.71 (Statistics South Africa, 2019). As of 2018, The ASIR in South Africa is 15,0 however black (17,92) and coloured (9,75) females maintain the highest mortality rates, while white (4,11) and Asian women (4,42) maintain lower mortality rates (Statistics South Africa, 2019). An analysis of individuals who did not undergo testing displayed a substantial outcome, particularly notable when considering both sides of the population groups studied.

The selection of the black population group for a specific focus in this study was particularly motivated by the distinctively high incident rate of cervical cancers associated with black females living in South Africa. A similar study conducted by Gwavu, Muray, & Okafor (2023) primarily focused on black South African females within the study, centering on the perceptions and barriers to cervical cancer screening uptake, as it equally highlights black African females as the population presenting the highest incidence of cervical cancer within South Africa. The study found that many individuals were acquainted with the term ‘cervical cancer’, however were never provided comprehensive details as to its relation to females’ sexual and reproductive health. Ergo throughout this research lack of knowledge remains a recurring feature surrounding the diverse variables considered, as potential barriers to cervical cancer screening uptake. A study conducted in the Eastern Cape, South Africa by Mbulawa et al., (2023) highlights inadequate knowledge and accessibility to knowledge as a sizable barrier,

and again such a study establishes the significance and true efficacy of access to knowledge and its role within the dissemination of information throughout communities.

The analysis results revealed a key disparity, indicating that a higher percentage of individuals within the black population have not undergone cervical cancer screening when compared to other population groups. Specifically, black female respondents constituted a substantial majority within this sample, suggesting a larger percentage of individuals who had not undergone screening. With that said, it is imperative to take into account the proportional representation of black African populations in contrast to other population groups. Upon observation of the binary logistic regression results, the adjusted model pertaining to the population group did not exhibit statistical significance or association with cervical cancer screening. Nevertheless, it is of significance and key importance to knowledge that race, as a demographic factor, significantly influences the capacity of individuals to engage in certain behaviours. Studies conducted in the United States a racial disparity that subsequently impacts health outcomes, specifically in terms of the extent to which black women receive equitable healthcare in comparison to other racial groups (Buskwofie, David-West, & Clare, 2020). In addition, it becomes essential to consider both these social and economic contexts, as they contribute to providing individuals with the necessary resources to engage in, and access, healthcare services. While race, especially in the context of black African women, is undeniably a significant factor to health outcomes, it is crucial to extend our consideration to account for other racial groups and people of colour, such as coloured, Indian, and Asian females. The historical legacies of inequality equally impact these groups and play a considerable role in determining the extent to which they can engage in positive reproductive health practices.

5.2 Applicability to Theoretical Framework

The primary aim of this study was to explore the association between HIV testing and cervical cancer screening uptake among females aged 15-49 in South Africa, employing the Social Determinants of Health (SDH) framework. Within this theoretical framework, the research examined the crucial determinants to the uptake of positive health behaviours, such as socioeconomic status, social support networks, and cultural beliefs and attitudes, recognizing their pivotal roles in shaping health-seeking behaviours among females of reproductive age. As mediating variables, the study emphasised the impact of HIV testing uptake and access to medical insurance, both recognized as essential factors influencing individuals' engagement

with healthcare services. By integrating these mediating variables with broader social determinants, the research aimed to provide comprehensive insights into the intricate dynamics which influence HIV testing and cervical cancer screening behaviours in reference to female reproductive health in South Africa. Cervical cancer screening uptake was depicted as a complex outcome influenced by the intersection of social, economic, and cultural factors that provide individuals with the means to adopt positive sexual and reproductive practices.

Demographic and socioeconomic features, such as age and employment status, were acknowledged as determinants affecting the accessibility and availability of resources, including access to information crucial for informed health practices. Individual beliefs, attitudes, and orientations toward a specific health concern were recognized as informing health behaviours, while social perceptions or misconceptions about the necessity of preventive practices played a significant role. Moreover, the study acknowledged that preventive practices were shaped by access to relevant health interventions. The SDH framework was employed to elucidate the systematic and structural determinants of health outcomes, encompassing proximal, intermediary, and distal influences related to structural, biological, behavioural, socio-cultural, and environmental factors. The theory proposes that the performance of health behaviours and health outcomes is fundamentally conditioned by the intersection of multiple determinants at various levels, where positive determinants yield positive outcomes and impairing determinants result in negative outcomes. In the context of this research, the SDH framework considered cervical cancer screening uptake as a health outcome dependent on systemic and structural conditions, emphasising the importance of moving beyond a sole focus on individual conduct as a determinant of health outcomes.

5.3 Applicability to Conceptual framework

The study intended to analyse the relationship between HIV-testing and cervical cancer screening uptake among females aged 15-49 in South Africa, it did so by employing the Social Determinants of Health (SDH) framework. Within this framework, the research considers several key determinants, such including socioeconomic status, social support networks, and cultural beliefs and attitudes, all of which play crucial roles in shaping health-seeking behaviours among the target population. As mediating variables, the investigation highlights the influence of HIV-testing uptake and access to medical insurance, both of which are critical factors affecting individuals' engagement with healthcare services. By incorporating these mediating variables alongside the broader social determinants, the study projected to offer

comprehensive insights into the complex dynamics governing HIV-testing and cervical cancer screening behaviours within the context of female reproductive health in South Africa.

The efficacy of this conceptual framework lies within the unpacking of specific and individual demographic and socioeconomic characteristics as the determining factors to the uptake of cervical cancer screening. In particular the structure of the conceptual framework, stimulated by the SDH framework, accentuates the interconnectedness of health behaviours, such as the translation of HIV testing practices to additional positive sexual and reproductive practices – cervical cancer screening. The results of this research, in conjunction with supportive literature indicate a positive association between sexual and reproductive practices, more specifically how females who tested for HIV were significantly more inclined to undergo cervical cancer screening services. In addition the accomplished action was further subjective to one's demographic and socioeconomic characteristics.

This paper affirms the efficacy of the 2017 Cervical Cancer Prevention and Control Policy, instituted by the NDoH, for females above the age of 30. Figure 4.2 consistently underscores a notable correlation between higher age and an increased likelihood of engaging in cervical cancer screening. As individuals advance in age, they often become more conscientious about their health and prioritize preventive healthcare measures, including regular screenings. The analysis of this paper ascertained that females below the age of 30 severely don't screened for cervical cancer, although they make up 15% of the population. Equally, through the adaptation of social economic and demographic factors, such as age revealed a significant contributing factor to behaviours. By including economic and demographic factors in the analysis, the findings provided a more nuanced understanding to the association of cervical cancer screening, as well as the association between cervical cancer screening and HIV testing. Through this report specific subgroups were identified as higher risk, and in need of tailored interventions. This paper contributes to the satisfaction of the gap regarding research on the relatability health behaviors come up particularly considering HIV testing behaviors as a contributing factor to cervical cancer screening uptake. In turn this study can be used as a guide to design targeted interventions to improve screening rates among higher risk groups, as well as improve early detection and ultimately reduce cervical cancer related mortalities in South Africa. Through the various statistical methods applied in this study, the findings can provide reliable evidence that can be generalized to similar context, and further improve health development and research.

5.4 Limitations

While this study has successfully established an association between HIV testing and cervical cancer screening uptake, it is essential to acknowledge several inherent limitations. The study may be affected by underreporting of both HIV testing and cervical cancer screening due to limited awareness or social stigma, this is further affected by limited access to health resources. This underreporting may introduce bias into the data, potentially compromising the overall validity of the study's findings. Furthermore, it is crucial to recognize that the scope of this study is confined to the context of South Africa. The study specifically addresses the intersection between high HIV prevalence and increased cervical cancer incidence rates in this region. Consequently, the generalizability of the findings is limited, given the unique health outcomes of South Africa, related to the unique HIV prevalence. This is in addition to the substantial inequality disparities that impact access to resources and influence health outcomes. An additional limitation pertains to the exclusion of certain confounding factors from the analysis. Notably, factors such as cervical cancer knowledge and access to healthcare services were not accounted for. This factor limits the depth of the study, as these factors could potentially provide valuable insights into the barriers to cervical cancer screening uptake. Moreover, cultural factors, which play a significant role in shaping health behaviours, were not fully captured in the data used in this study. This may undermine a comprehensive understanding of the contextual factors influencing the observed associations. Finally, the study did not extensively consider knowledge, perceptions, and beliefs of respondents regarding cervical cancer screening uptake, which are recognized as influential factors in the perceived risk of cervical cancers and related cervical disorders. This may limit a holistic interpretation of the study's results, as highlighted by previous research studies which emphasise the role of perceptions regarding health behaviours (Mabotja, Levin, & Kawanga, 2021; Gwavu, Murray & Okafor, 2023).

5.5 Conclusion

This study investigated the association between HIV testing and cervical cancer screening uptake among females of reproductive age, aged 15-49 years old, in South Africa. The results of this research revealed a considerable association between HIV testing and cervical cancer screening uptake. A greater proportion of females who undergo HIV testing are especially more inclined to take up cervical cancer screening efforts. In addition, the observed marginal disparities in screening outcomes among females who had tested for HIV highlight a positive association, thus suggesting a congruent relationship between HIV testing behaviour and

cervical cancer screening uptake; as positive sexual and reproductive practises. Similar conclusions can be drawn from the findings related to studies conducted in East Africa - Mekelle Zone, Northern Ethiopia- which, account for the relationship between std testing and cervical cancer screening uptake. The correlation evident here in this context suggested that females who participated in sexually transmitted testing, akin to HIV testing, were more predisposed to avail themselves to cervical cancer screening services.

Furthermore, females who participated in sexually transmitted testing were more likely to access complementary information and knowledge pertaining to cervical cancer and cervical cancer screening. This was equally accompanied by the provision of information regarding the various cervical disorders. This study contributes to understanding the factors determining cervical cancer screening behaviours and underscores the potential benefits of integrated healthcare approaches for females, not limited to those of reproductive age in South Africa. A positive result in HIV testing was found to be associated with an increased likelihood of undergoing cervical cancer screening, as observed through the analytical statistical analysis.

A considerable aspect of this research findings is the positive correlation between age and the likelihood of undergoing cervical cancer screening. The research findings indicate that as age increases so do the probabilities of ensuring positive outcomes in cervical cancer screening. This underscores a significant factor to screening, age as an instrumental factor to favourable cervical cancer screening results. Similarly, the research outcomes established constant HIV testing outcomes across various age groups, consequentially distinct age groups exhibited consistent and positive results with regards to HIV testing, in contrast to the variability observed in cervical cancer screening uptake based on age. It also spotlights age-related trends: older women prioritise cervical cancer screening, while younger women lean towards HIV testing. These findings underscore the need for targeted interventions and healthcare policies to enhance cervical cancer screening access, especially among disadvantaged groups. There is a need for enhanced awareness on the importance of HIV testing as one way to increase the uptake of cervical cancer screening among women in South Africa.

The concept of socio-economic determinants of health accounts for the realisation of healthcare accessibility, accounting for overall well-being. Equally, with similar studies conducted in Ghana and Ethiopia, which highlighted a significant correlation between a lack of formal education and poor use of cervical cancer screening services, this research identifies a positive

association between higher educational levels and the adoption of cervical cancer screening. Respondents with higher education levels have access to awareness of preventive healthcare measures and the importance of regular screenings for early detection. Furthermore, this study observed that respondents covered by medical insurance demonstrated fair rates of screening, unlike those without medical insurance. Socio-economic factors such as residential location, occupational status, income, and medical insurance both encompass and facilitate access to healthcare resources, subsequently influencing health behaviours. Among these factors, an individual's financial status or wealth quantile functions as a significant determinant of one's ability to practise positive reproductive care. Females in lower economic quantiles encounter challenges in accessing effective healthcare and maintaining favourable health states.

5.6 Recommendations

To effectively address the progression of cervical cancer outcomes and associated cervical disorders, it is imperative to establish consistent and systematic data collection initiatives, coupled with comprehensive research endeavours focusing on cervical cancer rates. Particularly, individual states should institute regular research systems that accommodate the dynamic nature of cervical cancer outcomes. Adopting a mixed-method research approach, wherein qualitative research is complemented by quantitative data, holds benefits in offering an alternative understanding of the factors contributing to insufficient screening efforts. Quantitative research methodologies play a pivotal role in uncovering subjective challenges, such as limited access to knowledge regarding reproductive health and prevailing societal perceptions. In this context, quantitative research facilitates the identification and analysis of barriers linked to economic factors, including challenges related to medical insurance, employment, and educational attainment. The integration of these two forms of data collection will provide a comprehensive perspective, contributing to a well-rounded understanding of the layered determinants influencing cervical cancer screening behaviours.

Cervical cancer related outcomes are not solely limited to cervical cancer screening, they are indicative of a collection of health practices related to sexual and reproductive health, such including but not limited to Human Papillomavirus immunisation and HIV testing. At present, South Africa has established a school based HPV immunisation programme, that centres the immunisation of female persons aged 9 years old as a means to counteract cervical disorders, particularly cervical cancer. In addition to understanding the intricate association between cervical cancer screening and Human Papillomavirus , it is imperative to employ studies that

evaluate the impact of HPV vaccination programs. Specifically, these investigations should aim to determine the efficacy and long-term results of such vaccination initiatives on the incidence and prevalence of cervical cancer, with a particular focus on the Sub-Saharan region of Africa. A comprehensive assessment of HPV vaccination programmes should entail a meticulous analysis of their effectiveness in mitigating the burden of cervical cancer within the aforementioned context. This involves assessing the extent to which vaccination campaigns succeed in preventing HPV infections, subsequently positively contributing to the significant reduction in cervical cancer incidence rates. These initiatives are essential for establishing vaccination strategies that are context specific and appropriate, thereby optimising preventive measures against cervical cancer.

Additionally, the inquiry should extend to the socio-economic, cultural, and healthcare infrastructural determinants influencing the implementation and efficacy of cervical cancer screening uptake programs in the sub-Saharan region. Evidence and information collected from such studies are essential in determining targeted public health interventions and policy frameworks, addressing contextual challenges and enhancing the overall impact of screening uptake initiatives- such as resource scarcity. In essence, carrying out precise and context-specific research endeavours to unpack the multifaceted dimensions of cervical cancer screening uptake programs is imperative for advancing our comprehension of their efficacy and enduring impact on cervical cancer incidence and prevalence, particularly within the distinctive socio-epidemiological landscape of South Africa, and Sub-Saharan Africa at large.

Alongside the existing 2017 Cervical Cancer Prevention Policy, and in reference to the findings of this research, it is recommended that the state institute policy that endorses comprehensive healthcare services, particularly policies initiatives geared towards the integration of sexual and reproductive healthcare provisions. This integration should notably encompass the incorporation of cervical cancer screening services into existing HIV testing programs, with a specific focus on females within the age demographic of 15 to 49 years. Policy-determined initiatives should be constructed to collaborate HIV testing and cervical cancer screening services, as both services share related risk factors, and equally the potential for shared resources. By integrating these services, a more comprehensive approach to women's health can be determined, consequentially accounting both infectious diseases and gynaecological disorders within a unified healthcare framework. The current policy needs to include for females aged 15-29, for free screenings. Pursuing females aged 15 to 49 years is essential, as

this demographic accounts for a critical life stage where reproductive health concerns, including cervical cancer risk, are prominent. Integrating cervical cancer screening with HIV testing during this period can yield substantial benefits, facilitating early detection of cervical abnormalities and timely interventions. UNAIDS equally endorses the maxim, “two diseases, one response” motto regarding HIV testing and cervical cancer screening.

Additionally, this approach aligns with a preventive healthcare strategy, aiming not only to identify existing health conditions but also to pre-emptively address potential risks. To ensure the success of such integrated programmes, collaboration between healthcare sectors, government bodies and relevant stakeholders is paramount. The implementation of dissemination tools, such as extensive educational campaigns, is essential to effectively distribute information, raise awareness and understanding among females, regarding the benefits of frequent cervical cancer screening.

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