PREVALENCE OF ABNORMAL PAP-SMEAR AMONG SEX WORKERS IN HILLBROW, JOHANNESBURG, SOUTH AFRICA

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A RESEARCH REPORT SUBMITTED TO THE FACULTY OF HEALTH SCIENCES, UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF
MASTER OF PUBLIC HEALTH (MPH)

JOHANNESBURG, SOUTH AFRICA, 2010.

DECLARATION

I, Tiisetso Petunia Motloung declare that this research report is my own work. It is being submitted for the degree of Masters of Public Health of the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

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……..day of ……, 2010

DEDICATION

I dedicate this degree to my daughter Gugulethu and my late beloved mother Sarah Mapula Motloung (1936-2006) who never had a chance to see this project completed.

This degree should serve as an inspiration and motivation to all my siblings, to never give up in their studies.

ABSTRACT

Introduction

Sex workers are considered to be a high risk group in the acquisition and transmission of sexually transmitted infections which include Human Immunodeficiency Virus (HIV) and Human Papillomavirus (HPV). Infection with HPV has been clearly established as a causative agent that infects the cells of the cervix and slowly causes cellular changes (dysplasia) or abnormal cells that can later develop into cancer. Women who are HIV positive are thought to be at higher risk of having HPV infection, and subsequently also at higher risk of having abnormal cervical lesions.

Objectives

The main focus of this study is to describe the prevalence of abnormal Pap-smears among sex workers and to further identify the difference between Pap-smear results of sex workers who are HIV-positive and HIV negative.

Methods

This is a retrospective descriptive study, where data was obtained from sex workers records from January 2004 to December 2006. The study population included all sex workers who attended the Esselen Street Clinic and sex worker outreach clinic in Hillbrow, in the inner-city of Johannesburg. Three hundred and nine records were randomly selected, of which 200 met the inclusion criteria. Data was collected on socio-demographic information including the age and place of residence, laboratory results (Pap-smear and HIV) and history of sexually transmitted infection at the last physical examination. Extracted data was captured in excel spreadsheet and transferred to Stata Computer Package software version 9.0 for data

management and analysis. Descriptive analysis included frequency distributions of categorical variables (e.g. residence, Pap-smear results, HIV status and age group) and summary statistics of continuous variables (e.g. age). Pearson chi-square test or Fisher Exact test when necessary, where conducted to obtain proportions of the sex workers with abnormal Pap-smear results corresponding to each category of the explanatory variables for example age, HIV status and place of residence or business or business transactions. For continuous explanatory variables, such as age, two sample t-tests were used to determine differences between sex workers in terms of abnormal and normal Pap-smears. In all statistical considerations, a probability level of ≤ 0.05 was used.

Results

There were 200 records which were analysed to achieve the study objectives. These included 146 records of HIV positive (73%) and 54 of HIV negative sex workers (27%). Their ages ranged from 18 to 45 years with a mean of 26.85 years and median of 26.0 years. More than 70% (n=141) of the sex workers were below the age of 30 years. More than two thirds of sex workers lived in hotels and almost 90% was considered to be symptomatic for STIs. Eighty-eight (44%) of the sex workers were found to have had an abnormal smear result, of whom 58 (65.9%) were below the age of 30 years. Age, as a continuous variable, and place of residence (living on the street) was found to be statistically significantly associated with having an abnormal smear result. However, age (being older than 30), having symptoms of an STI and being HIV positive was not found to be statistically significantly associated with having an abnormal Pap-smear result.

Conclusion

This study has shown that the prevalence of abnormal Pap-smears among Hillbrow sex workers was high, especially in young sex workers. Sex workers who operated from the street were found to have a higher percentage of abnormal smear results as compared to those operating from the brothels and flats, signifying a need for a controlled environment and to improve sex workers access to health care services. No significant association was found between HIV status and abnormal Pap-smears. Further studies are required in this area. The study indicates that they may be a need to review the National Cervical Cancer Screening Policy to take into consideration the needs of high risk population, such as sex workers.

ACKNOWLEDGEMENTS

I would like to thank my supervisor Ruxana Jina, my family and friend Godspower Akpomiemie, who were a source of inspiration to carry on with this project despite all the challenges. Furthermore, thank RHRU and CoJ for their financial support during initial phase of MPH studies and lastly the Gauteng legislature.

Thank you

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CHAPTER 1. INTRODUCTION

1.1. BACKGROUND

According to UNAIDS (2002), sex work is regarded as a public health concern worldwide. The nature of the industry of "selling sex" to multiple sexual partners has a ripple effect on the health of people involved in the sex work cycle. For instance, if one sex worker becomes infected with a sexually transmitted infection (STI), the whole pool of clients and their sexual partners are susceptible to being infected. Sex workers are a diverse group of women, who are from different social backgrounds. Belza et al. (2001) and Stulhofer et al. (2009) have shown that sex workers were likely to be less educated, however, it is difficult to generalise this to all sex workers as Munasinghe et al. (2007) found no significant difference on the level of education between non-sex workers and sex workers in Melbourne. According to UNFPA/UNAIDS/Government of Brazil (2006), sex workers start, on average, at 18 years of age and the majority are in their early twenties. The average age of first sexual intercourse globally was 16 years, especially in Asia, and some parents, because of poverty sent their underage daughters into sex work. These findings are more or less consistent with other studies conducted on sex workers.

In many instances sex workers are considered to be a highly mobile population, who sell sex for money, and live or operate from a variety of locations. Street sex workers are associated with homeless people and night clubs while indoor sex workers operate from hotels, flats and massage parlours. Sex workers who normally operate from the streets are the most powerless and unable to negotiate or insist on a condom usage by their clients and are more at risk of sexually transmitted infections compared to those who operate from hotels and brothel, which

could be considered to be protected areas (Cwikel, 2003). In many instances, sex work is heavily stigmatised or its existence even denied, thus affecting sex workers access to support services, especially health care (Fick, 2005; UNFPA/UNAIDS/Government of Brazil, 2006).

Sex workers are considered to be a high risk group in the acquisition and transmission of STIs which include Human Immunodeficiency Virus (HIV) and Human Papillomavirus (HPV). Clifford et al. (2003) found out that HPV is more common in sexually active women and there is evidence that HIV infection increases the prevalence of HPV as the CD4 count drops (van der Burg & Palefsky, 2009). This is of concern in sex workers, as infection with HPV has been clearly established as a causative agent that infects the cells of the cervix and slowly causes cellular changes (dysplasia) or abnormal cells that can later develop into cancer. However, the progression of the disease is slow and may take up to 10 to 20 years before the disease becomes invasive (World Health Organization, 1986).

According to Williamson and colleagues (2002), the prevalence of HPV infection and cervical cancer is high in South Africa. Their study was conducted to assess the HPV types causing cervical infections in a large population (>1 000) of women in South Africa. The findings showed that the prevalence of HPV infection increased from 20.4% (173/848) in women with normal cytology to 41.7% (48/115) in women with Atypical Squamous Cells of Undetermined Significance (ASCUS), 70.2% (40/57) in women with Low-grade Squamous Intraepithelial Lesions (LGSIL), and 83% (44/53) in women with High-grade Squamous Intraepithelial Lesions (HGSILs). Cervical HPV infection was found in 41.8% of women below 30 years and decreased to a low of 18.6% among women aged 45 to 49 years.

There are more than 40 known HPV types that infect the female genital tract. Various types of HPV infections such as type 16, 18, 31, 33, 35, 39, 45 and 52 are most frequently associated with cancer of the cervix. (De Villiers et al., 2004). Other HPV types, such as 6 and 11, are considered to be transient infections and less likely to progress to cancer especially in younger women. Persistent infection is associated with a high risk type of HPV and a higher risk of cancer cell transformation, which is more associated with the older age group of women (Goldie et al., 2001).

Cervical cancer is preventable by detecting and ultimately treating precursor lesions through Pap-smear screening (World Health Organization, 1986). Pap-smear screening, is a highly effective screening procedure that collects cells from the cervix (i.e. the lower narrow end of the uterus) to detect abnormalities in the cervical smear. However, it is noted that a Pap-smear test is not diagnostic, and does not detect HPV, but can detect pre-cancerous conditions before they can progress into cancer. Good quality of smear screening is determined by the adequacy of the smear and using the correct technique. Studies on the accuracy of conventional cytology report a sensitivity of 72% and a specificity of 94% (Coste et al., 2003; Sankaranarayanan et al., 2005; Geldenhys et al., 2007).

South Africa has adopted the 2001 Bethesda Reporting System, where the Pap-smear screening results should include the following criteria:

- the Pap-smear sample as adequate for analysis,
- incidental findings such as evidence of infection, and
- the evidence of lesions: Low-grade Squamous Intraepithelial Lesion (LGSIL), High-grade Squamous Intraepithelial Lesion (HGSIL), including carcinoma in situ. (Solomon et al., 2002).

The South African Cervical Cancer Screening Programme guidelines (Department of Health, 2000) defines a normal smear or negative intraepithelial lesion as a client clear of pre-cancerous lesions and recommends that the health care professional set up the next screening date with the client according to the screening protocol.

Atypical Squamous Cells of Undetermined Significance (ASCUS) could indicate the presence of inflammation of the cervix that requires monitoring and repeat smears in 6 months to a year (Department of Health, 2000).

Low-grade Squamous Intraepithelial Lesion indicates early changes in the size, shape and number of cells. Some low-grade lesions regress on their own, especially in younger women. However other lesions may persist with time, becoming more advanced forming a high-grade lesion. It is usually necessary to investigate further when a Low-grade Squamous Intraepithelial Lesion is present on a Pap-smear. The smear should be repeated within six month to a year later to assess any progression to a higher level (Department of Health, 2000).

Furthermore, High-grade Squamous Intraepithelial Lesion and Atypical Glandular Cells of Undetermined Significance (AGCUS) indicate that there are a large number of pre-cancerous cells. Solomon, et al. (2002) cite that in the past, these lesions were referred to as moderate or severe dysplasia, or carcinoma in situ. In this case, further diagnostic investigations are carried out, for example, biopsy and histological assessment of cervical specimens.

The screening process and management is thus dependent on the outcome of the Pap-smear screening results as indicated in the South African National Cervical Cancer Programme.

1.2. RESEARCH PROBLEM

The main issue of concern is the susceptibility of sex workers in having abnormal cervical lesions. Several studies have shown that sex workers are prone to various sexually transmitted infections, including HIV and HPV (Rees et al. 2000; Stulhofer et al. 2009). There are limited studies that determined the effects of their exposure to these infections in the development of abnormal cervical lesions. Therefore the main focus of this study is to describe the prevalence of abnormal Pap-smears among sex workers and to further identify the difference between Pap-smear results of sex workers who are HIV-positive and those who are negative.

1.3. LITERATURE REVIEW

1.3.1. The prevalence of cervical cancer

The significance of cervical cancer cannot be underestimated. Ferlay et al. (2004) reported that in 2000 there was 470 606 new cases of cancer of the cervix and 233 372 deaths as a result of cervical cancer worldwide. According to the National Cervical Cancer Coalition, approximately 11% of women did not have regular cervical cancer screenings in the United States in 1995,and among those who were screened about 10 000 were diagnosed with cervical cancer. Furthermore, it was reported more than 3 700 women die each year from this disease (National Cervical Cancer Coalition, n.d).

In South Africa, cervical cancer is the second most common form of cancer affecting women, where one in every 41 women will within their lifetime develop cancer of the cervix (Department of Heath, 2000). According to Mqoqi et al. (2004), there were 60 172 new cancer cases reported to the cancer registry in 1998 and 60 343 new cases in 1999. In both the years, female cancer cases comprised half of all reported cases. Cancer of the cervix was the second most common amongst females, comprising 18.6% of all female cancer cases and the most common cancer in young women aged 15-29 years old, comprising 12.5% of all cancers. There were racial variations, as the age standardised rate in 1999 showed that white women had 12.4% reported cases of cervical cancer as compared to Asians with 11.0%, and coloureds with 26.4%. The black population group was the most affected, with 34.9% having cervical cancer (Mqoqi et al., 2004).

1.3.2. Factors influencing Cervical Cancer Screening Programmes in South Africa and worldwide

A difference in the incidence is noted between women in developed and developing countries, where more women in the developing world are affected by cervical cancer than any other cancer whereas this is not true in developed world (IARC (Globocan), 2008). The discrepancy is attributed to the difference in health costs, lack of awareness; certain geographical areas being deprived of health care services including information about reproductive health and absence of adequate health infrastructure. Amarin, Badria and Obeidat (2008) stated that women's knowledge of cervical cancer is also very limited in developing countries.

In support of the above findings, Abrahams, Jewkes and Wood (1996) undertook research in Montagu District in the Western Cape with the aim of investigating the organisation and effectiveness of current screening activities as well as exploring women's knowledge and experiences of cervical screening and barriers to the uptake of the service. Results showed that the women neither recognised the word 'cervix' nor distinguished separate parts of the womb. In terms of the knowledge about cervical smears, some women had a variety of explanations for why one should have a cervical smear. These differed in their degree of understanding, and some women had very limited knowledge. However, there was a considerable amount of coverage of cervical smear activity in Montagu District, though; the difference was marked between the coverage in the rural areas and in town, where the coverage was 6 times higher.

According to this study (Abrahams, Jewkes and Wood, 1996), the inequitable geographic and socioeconomic distribution of health resources in South Africa are the key factors that affect access to health care services and thus delay in the identification of women with cervical lesions. The difference in the access to the health care system contributes to a certain extent to the different rates of cervical cancer in women of different population groups.

Women who are most at risk of developing cervical cancer are those aged between 30 and 60 years (World Health Organization, 1986); with Coloured women being more at risk than White women. This age group represented only 52% of the women screened in Montagu district in 1993, meaning that 48% of the women screened in the study would not be eligible in the new national program (Abrahams, Jewkes, Wood, 1996).

Franco, Duarte-Franco, and Ferenczy (2001) reported that organized cytology screening programs have been successful in developed countries, but in developing countries these programs lack coverage, accessibility, effectiveness and acceptability.

Lancaster and colleagues conducted a study in 1999 to establish the incidence of cervical intraepithelial neoplasia (CIN) and cervical cancer in previously unscreened rural populations (Lancaster et al., 1999). Ten thousand consecutive Pap-smears from Ka-Ngwane (Mpumalanga) area, 20 000 from Pretoria and 18 000 from a previously unscreened rural population of Transkei were analysed and compared for the prevalence of cervical abnormalities. Results showed that positive cases consisted of 3% in Ka-Ngwane, 5% in the Greater Pretoria area and of more than 6% in Transkei. Cancer of the cervix constituted 12.4% of all positive cases for Ka-Ngwane, 4.8% for the urban population of Pretoria and 26.0% of the positive cases in Transkei. The screening programme confirmed the high prevalence of CIN and the incidence of cancer of the cervix in the previously unscreened population.

It therefore became apparent that, although the details of the new screening protocol was not yet finalised at that time, the policy would likely target women between the ages of 30-55 years (Fonn et al., 1994). These studies, thus partly informed the formulation of the National Cervical Screening Policy and programs in South Africa which has been in effect since 2001. The Policy attempts to reduce the incidence of cervical cancer, targeting the age group most at risk of developing high-grade, precursor lesions of the cervix.

The National Department of Health's cervical screening policy recommends three free Pap-smears (in the public sector) at ten-year intervals for all women over 30 years of age and

referral of women with high-grade squamous intra-epithelial lesions (HGSIL) or malignant lesions to appropriate facilities for diagnosis and treatment (Department of Health, 2000). The policy conformed to the World Health Organization's (WHO) recommendations for screening in resource-limited countries, and aims to achieve 70% coverage of the target age group (women 30 years and older) within ten years (Department of Health, 2000; Kawonga and Fonn, 2008). It is therefore clear that in order to attain a high cervical cancer screening coverage and treatment of all women with precancerous lesions, it is necessary to have a well functioning health care system, with all the cervical cancer screening requirements. However, the high laboratory costs, lack of information dissemination and absence of adequate health infrastructure and resources pose an immense challenge in implementing the planned population-wide Pap-smear screening programme.

According to Kawonga and Fonn (2008), "*several elements are required for a successful Cervical Cancer Screening Programme: a reliable screening method, mechanisms to educate, inform and invite women for screening; health facilities; cytology laboratories; personnel to perform screening tests, read smears, and interpret and inform women of results; communication between service sites and laboratories; systems to follow-up and refer women with precursor lesions or invasive disease; facilities for diagnosis and treatment of pre-cancer and invasive cancer; mechanisms to recall women according to national screening schedules; and monitoring and evaluation systems.* In summary, a well functioning health system is required." Furthermore Kawonga and Fonn (2008) state that "*Health systems should therefore establish all these elements as it is unethical to offer screening without ensuring that follow-up and treatment services are available for women with abnormal smear results*". In this case, much as South Africa has budgets constraints in terms of sufficiently strengthening the health care system, however, there is a need to consider

building the management capacity to co-ordinate and monitor the screening programme. Since there are challenges in the implementation of the National Cervical Cancer Screening Policy, another potential limitation is the poor coverage of high risk women especially those in the sex industry and HIV positive women (Kietpeerakool et al, 2009; Wake, Rebe, and Burch, 2009).

Amarin et al., (2008) mentions that improving coverage of population wide screening has cost implications in low resourced countries. It is however envisaged that "an effective population based screening programme with a good follow-up system and adequate quality control measures can help to ensure maximum benefit and impact on incidence and mortality of cervical cancer" (Amarin et al., 2008). Developed countries with more advanced screening programs and resources have reduced cervical cancer considerably as compared to developing low resourced countries For example, the Australian National Cervical cancer screening policy, recommends routine screening with Pap-smears every 2 years for women who have no symptoms or history suggestive of cervical cancer. Therefore, the Australian Health Department provide Pap smear screening to all women who have ever been sexually active between the ages of 18 years and 20 years or 1 or 2 years after the first sexual intercourse, whichever is later; and Pap-smear screening may cease at the age of 70 years for women who have had 2 normal Pap-smear within the last 5 years. Furthermore, women over 70 years who have never had a Pap-smear, or who request a Pap-smear should be screened (Australian Government: Department of Health and Ageing, 2009).

1.3.3. Factors contributing to cervical cancer

Worldwide, the prevalence of HPV in cervical carcinomas is reported to be 99.7% (Mqoqi et al., 2004). Some endogenous or exogenous factors are believed to act in conjunction with HPV infection to cause invasive cancer. Consequently, an estimate of half a million new cases of HPV occur each year, and 20% to 40% of sexually active women have some form of HPV, though not considered to be harmful (Boyle & Levin, 2008; Dunne et al, 2007). Certain subtypes of HPV are strongly associated with cancer of the cervix, and persistency to HPV infection tends to increase the risk to high grade dysplasia (Fonn et al., 2000). Severe immune suppression with low CD 4 count related to HIV is also established as a factor to dysplasia (Fonn et al., 2000).

Other risk factors known to be strongly associated with invasive cervical cancer include low social class, as well as sexual behaviour such as the lifetime number of sexual partners, and early age at first intercourse (Mqoqi et al., 2004). Various authors have indicated that, women who first become sexually active at an early age (before age 16) are at higher than average risk of developing cervical cancer. In addition, various authors cite that women who have had multiple sexual partners are also at higher risk exposure to HPV. (Cwikel, et al., 2003; Didelot-Rousseau et al., 2006; UNAIDS 2006).

1.3.4. HIV and cervical cancer

Worldwide, South Africa has the highest number of people living with HIV/AIDS, which accounts for 17% of the global burden of HIV infection in 2007 (Abdool Karim et al., 2009). According to UNAIDS (2006) the HIV epidemic in South Africa disproportionately affects

women. The global estimates for 2008 (World Health Organisation (WHO/UNAIDS, 2008), indicates that women comprise 50% of people living with HIV but this goes up to 60% in Sub-Saharan Africa. It is estimated that young women (15–24 years) are four times more likely to be HIV-infected than are young men. For example, in 2005, the prevalence among young women was 17% compared with 4.4% among young men (Shisana et al., 2005). Those infection levels were similar to those found in the 2003 national survey of 15–24 year olds when 15.5% of young women and 4.8% of young men were found to be HIV-infected (Pettifor et al., 2004).

The relationship between HIV and cervical cancer have been considered globally (Gaym et al., 2007; Strickler H D, 2009). Bower; Mazhar and Stebbing (2006) indicated that in 1987 the Centers for Disease Control and Prevention created a list of clinical diagnoses that defined the types of AIDS defining illnesses, and in 1993 invasive cervical cancer was included in the list. A contentious issue at the time was that only an increased incidence of cervical intraepithelial lesion had been established in HIV positive women and not invasive cervical cancer (Bower, Mazhar, Stebbing, 2006). There had been a number of conflicting outcomes on the association between HIV and cervical cancer, as there was evidence of an association between HIV and the development of abnormal or pre-cancerous cervical lesions, but there were inconclusive findings that HIV-positive women were at an increased risk compared to HIV-negative women in the development of invasive cervical cancer (Strickler HD, 2009).

Subsequently, more studies investigated the association between HPV, HIV and the increased risk of cervical cancer. Firstly, Sitas et al. (1997), made an attempt to quantify the association between HIV infection and certain cancers. The results showed that there was a lack of

association between cancer of the cervix and HIV infection. These findings were found to be consistent with data from Tanzania where the HIV epidemic has been present for longer than in South Africa, and there was no increase in the incidence of cervical cancer (Mayaud et al. 2001). It appeared, that unlike other viruses that have a direct oncogenic effect (e.g. HPV and Epstein–Barr virus), HIV's oncogenic role is rather limited (Serraino, 1999). This was argued on the basis that HIV facilitates, through the suppression of the immune system, the occurrence of several cancer types caused by other infectious agents, although not to affect *per se* the probability of cancer occurrence among infected individuals. Cancers for which, in western countries, increases were thought to be related to HIV infection, although not conclusively demonstrated, include invasive cervical cancer (ICC), liver cancer, lung cancer, anal cancer, testicular cancer, or pharyngeal cancer, myeloma, and non-melanoma skin cancer (Serraino, 1999).

Taking that into consideration, Womack et al. (2000) compared the results of HIV positive and negative women for HPV prevalence, prevalence of low-grade and high grade squamous intraepithelial lesion and for the test characteristics of an HPV DNA test in screening for squamous intraepithelial lesions (SIL). The study focused on women between the ages of 25 to 55 years attending primary health care in Chitungwiza, Zimbabwe. HPV tests were obtained in 2 140 participants and 486 participants consented to HIV tests. Those with normal cytology were 350, LGSIL 60, HGSIL 56 and there were no cases of invasive cervical cancer. HPV was detected more than twice in HIV positive women as compared to HIV negative women (64.3% vs. 27.6%) and HGSIL prevalence was nearly 3 times higher in HIV positive women as compared with HIV negative women. In summary, the study found that HIV infection was associated with a 7 fold increase in the HPV burden in women who

had a normal colposcopy, and this implied that HIV infection may indirectly increase the rate of cervical disease by increasing the pool of HPV infected women.

Strickler et al. (2005) conducted a prospective cohort study, investigating the natural history and possible reactivation (persistence) of HPV in HIV positive women in New York, Chicago and Washington DC. A total number of 1 848 HIV positive and 514 HIV negative women with HPV test results were included in the study. The results showed that HIV-positive women had a higher prevalence and incidence of HPV, and that HPV persistence increased with decreased CD4 cell count. In support of Strickler et al. (2005), Didelot-Rousseau et al (2006) reported that studies conducted in industrialized countries have shown that HIV-1 alters the natural history of HPV infection by up-regulating HPV persistence and recurrences, thus resulting in progression to HGSIL and cancer.

The results from this study (Strickler et al., 2005) further indicated that a substantial fraction of incident HPV detection in immune-compromised HIV positive women were not related to recent sexual activity and these finding gives a clear understanding of the natural history of HPV in HIV positive women. HPV persistence was moderately increased by HIV co-infection, and this could account for the higher rates of HPV detection in HIV positive women, and raises the possibility that periodic cervical cancer screening by Pap-smear and testing for HPV is necessary in HIV positive women.

In contrast, Palefsky et al. (1999) reported that women who are HIV-positive generally have a lower incidence of invasive cervical cancer despite a high prevalence of risk factors, when they investigated the natural history of HPV in HIV sero-positive and HIV-negative women. A sample size of HIV-positive (n = 1778) and HIV-negative (n = 500) women in a number of

sites across the USA (Bronx, Brooklyn, Washington, DC, San Francisco, Chicago and Los Angeles) were tested at enrollment for the presence of HPV DNA in a cervicovaginal lavage specimen. Pap-smears were performed every six months and results were graded using the Bethesda system. Median age at baseline for HIV positive women was 36, and 34 years for those who were HIV negative. The results showed that 62.7% of the HIV-positive women and 31.7% of the HIV-negative women had evidence of HPV infection; while 13.6% and 3.6% respectively had oncogenic HPV strains associated with cervical cancer. At baseline 37.7% of the HIV-positive women and 17.3% of the HIV-negative women had abnormal cervical cytology of any grade, with the following breakdown: ASCUS (19.5% and 10.8%), AGCUS (1.9% and 2.7%) and Low-grade Squamous Intraepithelial Lesion (14.1% and 2.55%) respectively. High-grade Squamous Intraepithelial Lesion was seen in 32.1% of the HIV-positive and 61.4% of the HIV-negative women, while only one HIV-positive woman and none of the HIV-negative women had cervical carcinoma (Palefsky et al., 1999).

Similarly, Moodley et al. (2006) found that HIV positive women in the Western Cape of South Africa were at an increased risk of cervical pre-cancer, but were not at a greater risk of invasive cervical cancer. The authors felt that guidelines on how to best screen HIV positive women are urgently needed in the country. Additionaly, in South Africa, Denny et al. (2008) investigated the natural history of high-risk HPV infection and cervical cancer in HIV-1 infected women in Cape Town. It was found that the progression from LSIL to HSIL only occurred in 4% of cases, whereas progression from normal/ASCUS cytology to any grade of SIL occurred in 17% of cases. Low grade squamous intraepithelial lesions regressed to normal or ASCUS in 11% of cases. Although the ages of cases that regressed are not stated, most studies has established that regression occur in women below the age of 30 (Fonn et al, 2002; WHO, 2007). Notwithstanding the fact that, no cases of cancers developed during the

three year period of the study. Based on these findings, the authors recommended that there was no need for yearly cervical cancer screening of HIV positive women, and that HIV positive women could safely be screened at 2-3 year intervals after the initial colposcopy following an abnormal Pap test result to rule out invasive cancer. This is however, contrary to Mak et al. (2004) who recommends yearly Pap smear screening especially for sex workers who are most susceptible to HIV and cervical cancer. It should also be considered that the above-mentioned studies were conducted before the widespread rollout of antiretroviral therapy, which may have further policy implications.

When considering the interplay between HIV and HPV infections, it should be remembered that the risk factors are similar, and therefore the causal interpretation of HIV's association with the risk of invasive cervical cancer can be confounded by sexual promiscuity (Serraino, 1999). There is thus a further complexity when one then considers the relationship between HIV, HPV and cervical cancer in sex workers. Previous studies had shown the prevalence rate of HIV and sexually transmitted infection is high, and that impacts on the women's reproductive health and especially on sex workers health**.** According to Dunkle et al. (2005), the high prevalence of sexually transmitted infections (STI) contributes disproportionately to the high HIV incidence among sex workers. On the other hand, it is noted that HIV may have contributed to some extent to STI increases, especially of viral agents such as herpes simplex virus or HPV.

Kjaer et al. (2000) assessed the prevalence and risk factors of HPV in Danish female sex workers aged between 20 and 29 years of age, and compared this to women of the same age but with different sexual habits from two other populations in the same region. The sex

workers had a higher HPV prevalence at 47%, as compared to 43% of women who attended an STI clinic and 15% of women from the general population sample.

In addition, Mak et al. (2004) assessed the prevalence of abnormal smears and HPV in Belgium sex workers. Sex workers from Gents region were screened for STIs, cervical smear and vaccination against hepatitis B. An equal number of controls were also recruited from the same region as sex workers; selection of controls was based on a routine screening data of 2001 Ghent University Hospital. The results showed that the prevalence of LGSIL (15.6% vs. 2.9%) and HGSIL (2.9% vs. 0.6%) in sex workers were high as compared to the control group of women of the same age and region. The prevalence of HPV was also high at 77.4% as compared to 27.6% from the control group. The study found that a quarter (63/258) of sex workers younger than 25 years required repeat smears or a colposcopy examination. The researchers therefore, proposed that sex workers be offered Pap-smear screening when they start working in the sex industry.

1.3.5 Sex workers and access to health services

A study conducted by Munasinghe et al. (2007) and a report from UNAIDS (2009) on sex workers worldwide, noted that sex workers do not normally present for health care services due to a number of structural barriers including policies, legislations and customary practices that prevent access and utilisation of appropriate services, especially for reproductive health care services. They therefore fall into a pool of unscreened and unreachable population. Cwikel et al. (2003) found that in Israel, sex workers who are not permanent residents depend on the brothel owner for access to health care, indicating that gynaecological visits are demanded by the brothel owners, but not in response to current pains, discomforts or

symptoms of sex workers. An observation noted by the Sex Work Education and Advocacy Task Force, who are based in Cape Town, (Fick, 2005) was the negative perception about the nature of sex work by the overall public. These perceptions channel sex workers to work in secluded areas, like in the streets and brothels away from public scrutiny.

Sex work in South Africa is still criminalised, and this has an effect on sex workers' behaviour, mobility and work. Once a sex worker is confronted with a disease or health problem, it becomes difficult for them to contact the relevant public health institution. Mphatsoe and Pather (2008) identified some of the reasons as to why sex workers do not access public health institutions. These include the feeling of being discriminated, stigmatized, verbally abused and morally judged by health care providers.

Another reason that could affect sex workers' ability to access health care facilities entails the structure of the health care system, which collides with their lifestyles (Rees et al., 2000). The health care system in South Africa is such that Primary Health Care (PHC) facilities provides for, among other, reproductive health services like the treatment of sexually transmitted infections, family planning and Pap-smear screening. The operating hours at these facilities are from 07h30 until 16h30 and are therefore not user friendly for sex workers; as sex workers work mostly during the night and sleep throughout the day. In addition, Mphatsoe and Pather (2008) noted that Pap-smear screening in most primary health care services is client initiated rather than service provider initiated, resulting in missed opportunities and delays in the screening of clients especially those who are not familiar with clinic services like sex workers. Sex workers might still not freely access public health institutions because of the judgemental attitudes of health providers and fear of victimization by their clients and

police on their way to the health care facility, despite the availability of health care services nationwide (UNFPA/UNAIDS/Government of Brazil, 2006).

For the reasons cited above, as an alternative for health care treatment, some sex workers often seek assistance from private doctors, pharmacist, home remedies and traditional healers in order to avoid the overcrowding, aggression and prejudice at public health care facilities (Tempongko et.al. 1996). Most of these above mentioned practitioners do not provide a comprehensive package of reproductive health assessment and care. In support of the above statement, Schneider et al. (2005), estimated that half or more sexually transmitted infection (STI) episodes in South Africa are treated by private general practitioners (GPs) and that there was poor quality of care in these settings. Based on this report, it can therefore be assumed that sex workers are more likely to be inadequately examined and treated for sexually transmitted infections and those eligible for Pap-smear screening may be missed resulting in a delay in the detection of abnormal cervical lesions.

1.4. JUSTIFICATION FOR THE STUDY

Most of the studies conducted on sex workers in South Africa in the inner-city of Johannesburg, focused on the prevalence of sexually transmitted infections, HIV and the living conditions of sex workers. Hillbrow is the inner city of Johannesburg, Gauteng Province in South Africa. It is known for its population density, with people coming from different rural and urban areas with diverse ethnic background including migrants from Africa predominately from Nigeria. The area is characterized with high levels unemployment, poverty and dilapidated buildings. There is lack of building maintenance and investment which led the area into a state of decay. Old buildings and flats are used as

brothels where crime, drug peddling and sex work are very rife. Sex workers outreach clinic was established to provide sexually transmitted infection treatment services and health promotion information, following a report that Sex workers were found not to access mainstream STI services despite being at high risk (Rees et al., 2000).

There have been other published studies that looked into the prevalence of abnormal Pap-smears among sex workers, for example in Belgium (Mak, Van Renterghem, 2004) and Thailand (Roongpisuthipong et al. 2009), but none in South Africa. Sex workers tend to share the same characteristics and are therefore exposed to more or less the same health challenges and conditions. Sex workers are more likely to miss the opportunity of being screened for cervical cancer due to lifestyle factors. For example, sex workers usually would work during the night, and might rest during the day when health facilities are open. UNFPA/UNAIDS/Government of Brazil (2006) stated that the lack of access to physical examination especially reproductive health care can deter early detection of pre-cancerous lesions of women in the sex industry. In order to improve the provision of these services and manage the sexual health of Hillbrow sex workers, it was imperative to assess the prevalence of abnormal Pap-smears at a smaller scale that could act as a baseline for further investigations and better management.

1.5. OBJECTIVES OF THE STUDY

1.5.1 Aim

The aim of the study was to determine the prevalence of abnormal cervical lesions among Hillbrow sex workers, and to further assess the difference in the prevalence of the abnormal smears between sex workers who are HIV-positive and those who are negative.

1.5.2. Specific objectives

The objectives of the study were:

- To describe the prevalence of abnormal Pap-smears among sex workers who attended the Esselen Street Clinic and sex worker outreach clinic in Hillbrow from January 2004 to December 2006.
- To describe the difference in prevalence of abnormal Pap-smears between HIV-positive and HIV-negative sex workers who attended the Esselen Street Clinic and sex worker outreach clinic in Hillbrow from January 2004 to December 2006.
- To identify risk factors (age, place of residence and business transactions, symptomatic STI infection and HIV status) associated with abnormal Pap-smears in sex workers who attended the Esselen Street Clinic and sex worker outreach clinic in Hillbrow from January 2004 to December 2006.

CHAPTER 2. METHODOLOGY

2.1. STUDY DESIGN

This is a retrospective descriptive study, where data was obtained from sex workers clinical records from January 2004 to December 2006. The study population included all sex workers who attended the Esselen Street Clinic and sex worker outreach clinic in Hillbrow, in the inner-city of Johannesburg.

2.2. SELECTION OF SAMPLE

Files from sex workers who accessed health services at the Esselen Street Clinic and sex worker outreach clinic in Hillbrow during the study period were selected. These files are all stored at the Esselen Street 1st Floor sex worker Clinic. From a total of 1 250 sex workers who attended the Esselen First Floor and Hillbrow Outreach Clinic between January 2004 to December 2006, 309 records were randomly selected for the purpose of the study. Of these 309 records further selection was done to meet the inclusion criteria for the purpose of this study.

2.2.1. Inclusion criteria

- Availability of recent Pap-smear results in the file
- Sex workers who were 18 years and above
- Sex workers who had a recent HIV test result

2.2.2. Exclusion criteria

- Pap-smear not done
- Sex workers below 18 years
- HIV test not done

2.3. DATA COLLECTION

A data collection tool (Appendix A) was used to collect information from the files of sex workers. Information was obtained from the last visit that the sex workers attended.

2.3.1. Routine procedures at Esselen Sex Worker Clinic (facility-based and outreach programmes

All sex workers attending both the outreach and facility based sex worker clinics are subjected to the same questionnaire and clinical management during the first and subsequent clinic visits. The team working with Hillbrow sex workers comprise of two registered nurses and three trained lay counsellors. The patient's personal details and a risk assessment questionnaire are completed by trained health care workers/counsellors. The information is verified by the registered nurse during consultation, by also capturing previous medical, surgical and gynaecological history prior to the physical examination. The counsellors provide general health education to sex workers and their client's. Health education topics include STI, HIV, cervical cancer and the use of barrier methods. All sex workers are then motivated to test for their HIV status. Pre and post HIV counselling is provided to all sex workers willing and consenting to test for HIV. Those who are not ready for tests are given time to consider testing for HIV. During the pelvic examination, Pap-smear screening is

offered to all sex workers who are above 30 years and those below 30 years are screened when their cervix is suspicious of any abnormality, mostly genital warts, after verbal informed consent. Smear results and the follow-up procedure are explained and carried out.

2.4. MEASUREMENTS

The following information was collected from the files:

- Socio-Demographic information including the age and place of residence and business transactions
- Laboratory results (Pap-smear and HIV)
- History of sexually transmitted infection at the last physical examination

For the purpose of this study, laboratory results, that are HIV and Pap-smears, were only considered if the test was conducted within three months of the last clinic visit.

In addition, information on the history of having a sexually transmitted infection was obtained from the records of sex workers during the physical examination at the last clinic visit, and was recorded as either symptomatic or asymptomatic. This included sex workers who may or may not have received treatment for the infection.

2.5. DATA MANAGEMENT

Extracted data was captured in excel spreadsheet and transferred to the Stata Computer Package software version 9.0 for data management and analysis. Variables were coded and labelled. A codebook of the dataset was produced to explain the meaning of each variable and

their codes for the researcher's records. Smear results were classified into the following categories: negative for intraepithelial lesions, atypical squamous cells of undetermined significance (ASCUS), low grade squamous intraepithelial lesions and high grade intraepithelial lesions.

2.6. DATA ANALYSIS

Analysis started with the determination of frequency distribution of categorical variables (e.g. residence, Pap-smear results, HIV status and age group) and summary statistics of continuous variables (age). The outcome (dependent) variable, Pap-smear result was dichotomized into a binary response: positive = 1 and negative = 0 for ease of analysis. The second stage of the analysis involved cross tabulations to obtain proportions of the sex workers with abnormal Pap-smear results corresponding to each category of the explanatory variable (age, place of residence and business transactions, symptomatic STI infection and HIV status). Differences between groups (of abnormal and normal smears) were assessed from the distribution of Pearson chi-square ($\chi 2$) test and the corresponding two tail probabilities (p-value). Where cell(s) in cross-tabulated tables had small counts (due to small sample size), the Fisher Exact test was used to measure of any significant differences between groups. Fisher Exact test has the advantage of not depending on approximations (as do the Pearson and likelihood ratio chi-square tests) especially for small sample size (School of Statistics and Actuarial Science, 2003). For continuous explanatory variables, such as age, two sample t-tests were used to determine differences between sex workers in terms of abnormal and normal Pap-smears. In all statistical considerations, 95% confidence interval (CI) and probability levels of ≤ 0.05 were used.

2.7. ETHICAL CONSIDERATION

Ethical clearance was received from the Human Research Ethics Committee (MEDICAL) of the University of Witwatersrand (Appendix B), and the study was approved by the Postgraduate Committee of the University of the Witwatersrand, School of Public Health.

Names or any other parameters that could have revealed the identity of individual sex workers were not included in the dataset. To further ensure confidentiality and safety of the records, the dataset was exclusively managed, analysed and stored in a password-protected personal computer of the researcher.

CHAPTER 3. RESULTS

This study included sex workers who attended both the outreach and facility based services at the Esselen Street Clinic in Hillbrow. There were 1250 sex workers records from January 2004 to December 2005 for review. Of the 309 records that were sampled, 200 records were eligible according to the inclusion criteria and were included in the final analysis in order to achieve the study objectives. These included 146 records of HIV positive (73%) and 54 of HIV negative sex workers (27%). Their ages ranged from 18 to 45 years with a mean of 26.85 years and median of 26.0 years. More than 70% (n=141) of the sex workers were below the age of 30 years (Table 1). More than two thirds of sex workers lived and worked in hotels and almost 90% was considered to be symptomatic for STIs. Table 2 shows the frequency of Pap-smear results with a detailed breakdown of the abnormal Pap-smear findings. Eighty-eight (44%) of the sex workers were found to have had an abnormal smear result.

Table 1 Socio demographic characteristics, sexually transmitted infections and HIV status (N=200)

	n (%)
Age	
Below 30 years of age	141 (70.5%)
30 years and older	59 (29.5%)
Place of residence and business transactions	
Hotel	154 (77.4%)
Flat	23 (11.6%)
Street	22 (11.1%)
Symptomatic for STI	
Yes	175 (87.5%)
No	25 (12.5%)
HIV status	
Positive	146 (73.0%)
Negative	54 (27.0%)

Table 2 Pap-smear results (N=200)

	n (%)
Normal	112 (56.0%)
Abnormal	88 (44.0%)
ASCUS	5 (2.5%)
Low grade lesions	55 (27.5%)
High grade lesions	28 (14.0%)

Table 3 shows the breakdown of Pap-smear results by age, where 38 (27%) sex workers below the age of 30 years as compared to 17 (28%) of those above the age of 30 years had low grade squamous intraepithelial lesions; and high grade intraepithelial lesions were noted on 17 (12.1%) and 11 (18.6%) of sex workers respectively. ASCUS was noted in 3 (2.1%) and 2 (3.4%) of the sex workers from the different age groups respectively. In total, 41.2% (n=58) of sex workers below the age of 30 years had abnormal Pap-smear results compared to 50.8% (n=30) of sex workers equal to or older than 30 years.

Table 3 Breakdown of Pap-smear results by age group (N=200)

	Sex workers < 30 years of age (N=141)	**Sex workers ≥ 30 years of age (N=59)**	**p value**
Normal	83 (58.9%)	29 (49.2%)	0.511
ASCUS	3 (2.1%)	2 (3.4%)	
Low grade lesions	38 (27.0%)	17 (28.8%)	
High grade lesions	17 (12.1%)	11 (18.6%)	

Factors associated with abnormal Pap-smears are presented in Table 4. Age, as a continuous variable, and place of residence and business transactions (living and working on the street) was found to be statistically significantly associated with having an abnormal smear result. However, age (being older than 30), having symptoms of an STI and being HIV positive was not found to be statistically significantly associated with having an abnormal Pap-smear result.

Table 4 Factors associated with abnormal smears (N=200)

	Abnormal smear	**Normal smear**	**P value**
Age (mean)	27.98	25.96	0.016*
Age			
Below 30 years of age	58 (65.9%)	83 (74.1%)	0.216
30 years and older	30 (34.1%)	29 (25.9%)	
Place of residence and business transactions			
Hotel	65 (73.6%)	90 (80.4%)	0.043*
Flat	8 (9.2%)	15 (13.4%)	
Street	15 (17.2%)	7 (6.3%)	
Symptomatic STI			
Yes	78 (88.6%)	97 (86.6%)	0.667
No	10 (11.4%)	15 (13.4%)	
HIV status			
Positive	63 (71.6%)	83 (74.1%)	0.691
Negative	25 (28.4%)	29 (25.9%)	

* Significant at the level of 0.05

In comparing abnormal Pap-smear results between HIV positive and negative sex workers, there was a significant difference, (p=0.002) as shown in Table 5. The proportion of HGSIL for HIV positive sex workers (n=20, 13.7%) was similar to that of HIV negative sex workers (n=8, 14.8%). Of further note, were the number of HIV negative sex workers who had ASCUS 5 (9.3%) as compared to none in HIV positive sex workers, and a significant

proportion of HIV positive sex workers had an increased number of LGSIL as compared to those who were HIV negative.

Table 5 Breakdown of Pap-smear results by HIV status

	HIV positive sex worker (N=54)	**HIV negative sex worker (N=146)**	**p value**
Normal	83 (56.8%)	29 (53.7%)	0.002
ASCUS	0 (0%)	5 (9.3%)	
Low grade lesions	43 (29.5%)	12 (22.2%)	
High grade lesions	20 (13.7%)	8 (14.8%)	

CHAPTER 4. DISCUSSION

This study aimed to determine the prevalence of abnormal cervical lesions among Hillbrow sex workers who attended the outreach and facility based services at the Esselen Street Clinic, and to further assess the difference in the prevalence of the abnormal smears between sex workers who are HIV-positive and those who are negative. Factors associated with abnormal Pap-smear were also assessed, with a special focus on HIV.

4.1. THE PREVALENCE OF ABNORMAL SMEARS AMONG HILLBROW SEX WORKERS

All sexually active women have a risk of acquiring HPV in their lifetime, which could be explained by taking lifetime number of sexual partners, regular or multiple and years since first sexual intercourse (National Cancer Institute, 2009). The nature of work conducted by sex workers predisposes them to an increased risk of HPV infections and thus potentially abnormal Pap-smears. This study has shown that the prevalence of abnormal Pap-smear results among Hillbrow sex workers was relatively high at 44% (88/200), where almost half of sex workers screened had abnormal smears. This can be compared to rates of 4.8% in females of the general population in Pretoria, 12.4% in Ka-Ngwane (Mpumalanga) and 26.0% in rural Transkei (Lancaster et al., 1999).

The results show that almost three quarter (n=141, 70.5%) of the Pap-smear screenings were done on women below the age of 30 years. Sex workers below the age of 30 years were screened for Pap-smear as they showed signs of a suspicious cervix during vaginal examination, and were part of the a select group. Although the South African Cervical Cancer

Screening Guidelines recommends screening for women 30 years and above, almost half of the sex workers who were below 30 years had abnormal smears (41.2%), of which 12.1% had HGSIL, as compared to those who were eligible for Pap-smear screening. However, no significant difference was found in the breakdown of Pap-smear results for women younger than 30 and for those of age 30 and above. This was similar to the findings reported by Gaym et al. (2007). These findings indicate that some women below the eligible age for cervical screening could be at high risk for abnormal cervical lesions. If these abnormal cases cannot be identified on time they might be missed and only be discovered when the woman is at the recommended age for screening or when the lesion is at an advanced stage.

This study was only limited to sex workers, and there was no comparison with women of the same age who were not in the sex industry. However, Mak, Van Renterghem and Cuvelier (2004) assessed the prevalence of abnormal smears and HPV in sex workers in Belgium to determine if the screening policy for early detection of cervical cancer and its precursors was adequate for this specific group of women. It was found that Pap-smear results for the sex worker population was significantly different from women in the general population. The prevalence of LGSIL (15.6%) and HGSIL (2.9%) at routine screening of sex workers was very high as compared to the control group of women of the same age and region but not in the sex industry at LGSIL (2.9%) and HGSIL (0.6%.) The authors therefore recommended that cervical cancer screening should start at the onset of sex work irrespective of age.

The high number of abnormal Pap-smear results among young sex workers especially those below the age of 30 years (41.2%) as compared to sex workers above 30 years (50.8%) in this present study is not surprising, this can be associated with acquisition of high rates of HPV following an early entry into the sexually active life. Secondly, this could be attributed to

young sex workers attracting more sexual clients than older sex workers resulting in an increased frequency of exposure to sexually transmitted infections. This may also be related to power dynamics as older sex workers are better able to negotiate condom use than younger sex workers.

In this study, over a quarter of sex workers had low grade squamous intraepithelial lesions (27.5%), less than a fifth (14.0%) had high grade squamous intra epithelial lesions and a smaller fraction (2.5%) had ASCUS. Fayed 2008), cites "For some women, an Atypical Squamous Cells of Undetermined Significance result is due to changes in the cervical cells caused by HPV infection. For adolescents and young women, an ASCUS Pap-smear result is more often caused by HPV infection than a vaginal infection or cervical inflammation. In older women, it is more often due to a vaginal infection or cervical inflammation, not an infection of HPV". In most cases, some of these cervical changes do not progress to cervical cancer but require further monitoring and possible treatment to prevent cervical cancer. However, this finding is important because Denny et al. (2008) found that where an initial normal or ASCUS cytology results was followed 6 month later by a second Pap-smear, 17% of cases progressed to LSIL or HSIL. There is therefore a need to consider more frequent screening of women in this high risk group.

4.2. THE ASSOCIATION BETWEEN PLACE OF RESIDENCE AND ABNORMAL SMEARS

Worth noting and of significance from this study is the association of abnormal smears with place of residence and business transactions. Sex workers who resided in the streets were at an increased risk of having abnormal smears as compared to sex workers who resided at

hotels and flats. There could be various reasons for these findings. It could be argued that sex workers operating from the streets do not have an opportunity to negotiate for condoms use as compared to those operating from a hotel. Therefore, street sex workers may be more vulnerable and more likely to be exposed to sexually transmitted infections than those working from the hotels.

4.3. THE ASSOCIATION BETWEEN HIV AND ABNORMAL SMEARS

According to the UNAIDS (2004), the burden of HIV infection in sub-Saharan Africa among young women under the age of 30 years is starting to plateau and decline, but it is still quite high. The burden is however, greater in sex workers. As Rees et al. (2000) report that 45% (137/295) of sex workers in Hillbrow were HIV infected between 1996 and 1998. In terms of its association with cervical cancer, Nel et al (2006) indicate that women less than 35 years with invasive cancer were 2.6 times more likely to be HIV-positive. Womack, Chirenje and Gaffikin (2000) also report that HIV infected women have higher rates of HPV infections, squamous intraepithelial lesions and cervical carcinoma. It is thus assumed that populations that have high prevalence of HIV infections would also have a high incidence of cervical cancer. This study did not show an association between HIV status and abnormal Pap-smears, but a significant difference was found in the breakdown of smear results. HIV positive sex workers were found to have statistically less ASCUS and more LSIL than HIV negative sex workers.

The prevalence of HSIL was similar in HIV negative and positive sex workers. These findings appear contrary to Gaym et al. (2007) where women who were HIV positive were found to have a higher percentage of HSIL compared to those who were HIV negative.

According to Strickler et al. (2005) and Didelot-Rousseau et al. (2006), HIV positive women with HSIL are more prone to recurrences and persistence and need more monitoring and management. Therefore, it is imperative that these women be encouraged to be part of the cervical cancer screening.

The findings of this study differ from some published studies that indicated that there were significant differences between Pap-smear results of HIV-positive and negative women. Glancing at different categories of abnormal smears and HIV, Gaym et al. (2007), notes that almost all cases of HGSILs occurred among HIV-infected women, suggesting a strong association between HIV infection and cytological changes. Moodley et al. (2006) reported a greater odds of ASCUS (odds ratio: 4.4), LSIL (odds ratio: 5.8) and HSIL (odds ratio: 5.8) with HIV infected women as compared to HIV negative women. Again, this was not found to be the case in this study.

More investigations on abnormal smears between HIV positive and negative sex workers below the age of 30 years are still needed to consider the different perspectives regarding screening policy on HIV women and sex workers. The indicator for Pap smear screening for sex workers below the age of 30 years should be based on the sexual history and the onset of vaginal intercourse that often exposes sex workers to HIV and HPV (Saslow et al. 2002). Denny et al. (2008) have made some recommendations after studying the natural history of HPV and cervical cancer in HIV positive women. They felt thatt since HIV positive women will most likely behave the same as HIV negative women regarding cervical cancer, similar screening guideline could be applied to both groups. Furthermore, they recommend colposcopy screening at baseline, following an abnormal pap smear. However in South Africa, the protocol has not changed despite the high HIV prevalence among women. The

screening interval has remained at 10 years irrespective of the HIV status of the women. It is imperative, that a review of the cervical screening programs be considered, that would improve cervical cancer screening coverage, to both sex workers and women infected with HIV.

4.4. THE ASSOCIATION BETWEEN SEXUALLY TRANSMITTED INFECTIONS AND ABNORMAL SMEARS

Sex workers are at an increased risk of having abnormal Pap-smears based on their behavioural life style, which could lead to continuous exposure to sexually transmitted infections including HPV and HIV. The constant exposure has been verified by Pettifor et al. (2004) during the focus group discussions with self declared sex workers , and they stated that their main problems was the unwillingness of their clients' to use condoms, police abuse, and the lack of sex worker friendly health care services. However, the results in table 4 of this study have not convincingly demonstrated an association of sexually transmitted infections and abnormal Pap-smear results among these sex workers.

4.5. LIMITATIONS TO THE STUDY

Information for this study was obtained from sex workers attending health services at the Esselen Street Clinic. No recruitment outside of the facility was done and it is possible that there may be sex workers who do not access health services at all and who were not included in the study sample.

This was a cross-sectional study and therefore no comment can be made on the temporality of between HIV and abnormal cervical lesions. Also, there is an issue of the window period of HIV, but an attempt was made to address this by only using case files with a recent HIV and Pap smear result. A cohort study investigating Pap-smear outcomes that included HIV positive and negative sex workers with normal Pap-smears at baseline could address the issue of temporality.

The information that was collected and analysed on sexually transmitted infections was from the day of the physical examination. As some of those presumed to be asymptomatic may have been exposed and treated for sexually transmitted infections at some point in time, the findings on the association of sexually transmitted infections and abnormal smears could have been different.

Another limitation to the study was that, only sex workers who were below the age of 30 years, who had suspicious cervix were screened. The findings may have been different is all sex workers were screened irrespective of the state of their cervix and age.

As this study was descriptive and not a cohort study, follow up of young sex workers with abnormal smears to check if the abnormality persists was a challenge due to the high mobility character of sex workers, as shown by Women at Risk Study (2000). This study also did not examine the types of HPV infection in the HIV infected and uninfected women.

CHAPTER 5. CONCLUSION AND RECOMMENDATIONS

5.1. CONCLUSION

The data from this study have implications on the cervical cancer screening policy and on the clinical interventions for female sex workers. This information has shown that the prevalence of abnormal Pap-smears among Hillbrow sex workers was high and there was a high prevalence of abnormal Pap-smear results among young sex workers below the age of 30 years who had suspicious cervix. These results could be associated with the high exposure to sexually transmitted infections, including HPV among this group. Much as there was no significant difference between HIV positive and negative sex workers in this study, more investigation is needed to further compare the prevalence of abnormal smears between HIV positive and negative sex workers and to clearly understand the effects of other risk factors on abnormal cervical lesions.

The high prevalence of abnormal Pap-smears amongst sex workers also indicates that more efforts are needed to improve sex workers access to health care services, especially cervical cancer screening and reproductive health services. Sex workers are more likely to be identified at the late stages of the disease if not specifically screened for abnormal smear as indicated in Australia where sex workers are screened when they enter the sex industry (Mak et al. 2004;Australian Government: Department of Health and Ageing, 2009).

5.2. RECOMMENDATIONS

- This study was done on a small scale. It is therefore important that further studies be conducted with larger sample of sex workers and in other areas of South Africa. Further thought needs to be given regarding the age at first cervical cancer screening, especially for high risk women such as female sex workers, and HIV positive women. Such studies could influence a review of the cervical cancer screening guidelines;
- Early detection through routine Pap-smear screening and treatment of abnormal Pap-smears, amongst sex workers as well as all women who are HIV positive needs to be incorporated into the universal HIV and cervical cancer screening and management protocol, to reduce morbidity and mortality.
- Innovative measures, such as decriminalising the sex worker industry to reduce stigma and regulate the industry with regular mandatory health check-ups could be considered in the future.

REFERENCES

Abdool Karim SS, Churchyard GJ, Abdool Karim Q, et al. 2009. HIV infection and tuberculosis in South Africa: an urgent need to escalate the public health response. *Lancet*, 374, 921-933.

Abrahams N, Jewkes R, Wood K. 1996. Cervical screening in Hlabisa District: Women's experiences, coverage and barriers to uptake. Tygerberg: CERSA-Women's Health (Medical Research Council).

Allan B, Marais DJ, Hoffman M, et al. 2008. Cervical Human Papillomavirus (HPV) infection in South African Women: Implication for HPV Screening and Vaccine Strategies. *Journal of Clinical Microbiology*, 46, 740-742.

Amarin ZO, Badria LF, Obeidat BR. 2008. Attitudes and beliefs about cervical smear testing in ever- married Jordanian women. *Eastern Mediterranean Health Journal,* 14, 389-397.

Australian Government: Department of Health and Ageing. 2009. National Cervical Screening Program. <http://www.health.gov.au/screening/publishing/cervical> (Accessed 5 July 2009).

Belza MJ, Llácer A, Mora R, et al. 2001. Sociodemographic characteristics and HIV risk behaviour patterns of male sex workers in Madrid, Spain. *AIDS Care*, 13, 677-682.

Bower M, Mazhar D, Stebbing J. 2006. Should cervical cancer be an Acquired Immunodeficiency Syndrome - defining cancer? *Journal of Clinical Oncology,* 24, 2417-2419.

Boyle P & Levin B (Eds). 2008. World Cancer Report 2008. Lyon: International Agency for Research on Cancer (World Health Organization).

Clifford GM, Smith JS, Plummer M, et al. 2003. Human papillomavirus types in invasive cancer worldwide: a meta-analysis. *British Journal of Cancer,* 88, 63-73.

Coste J, Cochand-Priollet B, de Cremoux P, et al. 2003. Cross sectional study of conventional cervical smear, monolayer cytology, and human papillomavirus DNA testing for cervical cancer screening. British Medical Journal, 326, 733.

Cwikel J, Ilan K, Chudakov B. 2003. Women brothel and occupational risks. *Journal of Epidemiology and Community Health*, 57, 809-815.

Denny L, Boa R, Williamson AL. et al. 2008. Human Papillomavirus Infection and Cervical Disease in Human Immunodeficiency Virus-1 Infected Women. *Obstetrics and Gynecology*, 111, 1380-1387.

Department of Health. 2000. National Guideline for Cervical Cancer Screening Programme. Pretoria: National Department of Health.

De Villiers EM, Fauquet C, Broker TR, et al. 2004. Classification of Papillomavirus. *Virology*, 324, 17-27.

Didelot-Rousseau MN, Nagot N, Costes- Martineau V, et al. 2006. Human Papillomavirus genotype distribution and cervical squamous intraepithelial lesions among high-risk women with and without HIV-1 infection in Burkina Faso. *British Journal of Cancer*, 95, 355-362.

Dunkle KL, Beksinska ME, Rees VH, et al. 2005. Risk factors for HIV infection among sex workers in Johannesburg, South Africa. *International Journal of STD and AIDS*, 16, 256-261.

Dunne EF, Unger ER, Sternberg M, et al. 2007. Prevalence of HPV infection among females in the United States. *JAMA: the Journal of the American Medical Association*, 297,813-819.

Ferlay J, Bray F, Pisani P, et al. 2004. GLOBOCAN 2002: Cancer Incidence, Mortality and Prevalence Worldwide. IARC CancerBase Nº5, version 2.0 Lyon: IARC Press. <http://www-dep.iarc.fr/> (Accessed 27 June 2008).

Fick N. 2005. Coping with stigma discrimination and violence: Sex workers talk about their experiences. Cape Town: Sex Worker Education and Advocacy Taskforce.

Fonn S, Bloch B, Mabina M, et al. 2002. Prevalence of pre-cancerous lesions and cervical cancer in South Africa - a multicenter study. *South African Medical Journal*, 92, 148-156.

Franco EL, Duarte-Franco E, Ferenczy A. 2001. Cervical cancer, epidemiology, prevention and the role of human Papillomavirus infection. *Canadian Medical Association Journal*, 164, 1017-1025

Gaym A, Mashego M, Kharsany ABM, et al. 2007. High prevalence of abnormal Pap smear among young women co-infected with HIV in rural South Africa- Implications for cervical cancer screening policies in high HIV prevalence populations. *South African Medical Journal,* 97, 120-123.

Geldenhys L, Michelle L, Murray MD. 2007. The sensitivity and specificity of the Pap smear for glandular lesions of the cervix and endometrium. *The Journal of Clinical Cytology and Cytopathology*, 51, 47-50.

Goldie SJ, Kuhn L, Denny L, et al. 2001. Policy analysis of cervical cancer screening strategies in low-resource settings: clinical benefits and cost-effectiveness. *JAMA: the Journal of the American Medical Association*, 285, 3107-3115.

IARC (Globocan), 2008. WHO/ICO Information Centre on Human Papilloma Virus (HPV) and Cervical Cancer. <http://www.who.int/hpvcentre/statistics/en> (Accessed 24 October 2010).

Kietpeerakool C, Phianmongkhol Y, Jitvatcharanun K, et al, 2009. Knowledge, awareness, and attitudes of female sex workers toward HPV infection, cervical cancer,

and cervical smears in Thailand. International Journal of Gynecology & Obstetrics, 107, 216-219.

Kjaer SK, Svare EI, Worm AM, et al. 2000. Human papillomavirus infection in Danish female sex workers. Decreasing prevalence with age despite continuously high sexual activity. *Sexually Transmitted Diseases,* 27, 8, 438-445.

Kawonga M, Fonn S. 2008. Achieving Cervical Cancer Screening Coverage in South Africa through human resources and health system development. *Reproductive Health Matters journal, 16,32-40.*

Lancaster EJ, Banach L, Lekalakala T, et al. 1999. Carcinoma of the uterine cervix: results of Ka-Ngwane screening programme and comparison between the results obtained from urban and other unscreened rural communities. *East African Medical Journal,* 76, 101-104.

Mak R, Van Renterghem L, Cuvelier C. 2004. Cervical Cancer and human papillomavirus typing in sex workers. *Sexually Transmitted Infections,* 80, 118-120.

Mayaud P, Gill D. K, Weiss H. A, Uledi E et al. 2001. The interrelation of HIV, cervical human Papillomavirus, and neoplasia among antenatal clinic attenders in Tanzania. *Sex transmitted infection,* 77, 248-254.

Mphatsoe DS, Pather MK. 2008. Missed opportunities for cervical Cancer for cervical screening at Worcester Hospital and Worcester Community Health Centre, Worcester, South Africa. *South African Family Practice*, 50, 68-68d.

Mqogi N, Kellet P, Sitas F, et al. 2004. Incidence of histologically diagnosed cancer in South Africa, 1998 - 1999. Johannesburg: National Cancer Registry of South Africa.

Moodley JR, Hoffman M, Carrara H. et al. 2006. HIV and pre-neoplastic and neoplastic lesion of the cervix in South Africa: a case- control study. *BioMed Central Cancer* 6, 135-135.

Munasinge T, Hayes RD, Hocking, J., et al. 2007. Prevalence of sexual difficulties among female sex workers and clients attending a sexual health service. *International Journal of STD & AIDS* 18, 613-616.

National Guidelines on Cervical cancer Screening Program, National Department of Heath, (n.d).

National Cancer Institute. 2009. Cancer Risk: Understanding the puzzle. <http://understandingrisk.cancer.gov/a_Cervical/01.cfm> (Accessed 5 July 2009).

National Cervical Cancer Coalition. Undated. What is the National Cervical Cancer Coalition (NCC)? <http://www.nccc-online.org/> (Accessed 5 December 2008).

Nel CPG, Schoeman LC, Van Wyngaardt M, et al. 2006. The prevalence of HIV amongst women with cervix cancer. *South African Family Practice,* 48, 17.

Palefsky JM, Minkoff H, Kalish A, et al. 1999. Cervicovaginal human papillomavirus infection in human immune deficiency virus-1 (HIV)-positive and high-risk HIV-negative women. *Journal of the National Cancer institute,* 91, 226-236.

Pettifor AE, Rees HV, Kleinschmidt I, et al. 2004. Young people's sexual health in South Africa: HIV prevalence and sexual behaviours from a nationally representative household survey. *AIDS,* 19, 1525-1534.

Rees H, Beksinska M, Dickson-Tetteh K, et al. 2000. Commercial sex workers in Johannesburg: Risk behaviour and HIV. South African Journal of Science, 96, 283-284.

Roongpisuthipong A, Chalermchockcharoenkit A, Sirimai K, et al. 2009. Operational Research for STD Service: Improvement of treatment and care at Siriraj Hospital. *Siriraj Medical Journal,* 61, 27-30.

Sankaranarayanan R, Gaffikin L, Jacobs M, et al. 2005. A critical assessment of screening methods for cervical neoplasia. *International Journal of Gynecology and Obstetrics,* 89, 4-12.

Saslow D, Runowicz CD, Solomon D, et al. 2002. American cancer society guideline for the early detection of cervical neoplasia and care. *CA A Cancer journal for clinicians,* 52,342-362.

Serraino D. 1999. The spectrum of Aids-associated cancers in Africa. *AIDS*, 13, 2589–2590

Schneider H, Chabikuli N, Blaau D, et al. 2005. Sexually transmitted infections – factors associated with quality of care among private general practitioners. *South African Medical Journal.* 95, 782-785.

Shisana O, Rehle T, Simbayi L, et al. 2005. South African National HIV Prevalence, HIV Incidence, Behaviour and Communication Survey 2005. Cape Town: HSRC Press

Sitas F, Bezwoda WR, Levin V, et al. 1997. Association between human immunodeficiency virus type 1 infection and cancer in the black population of Johannesburg and Soweto, South Africa. *British Journal of Cancer.* 75, 1704–1707.

Solomon D, Davey D, Kurman R, et al. 2002. The 2001 Bethesda System: Terminology for Reporting Results of Cervical Cytology. JAMA: Journal of the American Medical Association, 287, 2114-2119.

Strickler HD, Burk RD, Fazzari M, et al. 2005. Natural history and possible reactivation of Human Papillomavirus in Human Immunodeficiency Virus-positive women. *Journal of the National Cancer Institute,* 97, 577-586.

Strickler HD. 2009. Does HIV/AIDS Have a Biological Impact on the Risk of Human Papillomavirus-Related Cancers? *Journal of the National Cancer Institute*, 101, 16, Oxford University Press.

Stulhofer A, Bacak V, Drglin T, Puljiz M, Miklin M. 2009. Female sex work and HIV in Croatia. *Aids Care*, 21, 1439-1446.

Tempongko SB, Tiglao TV, Ghee A, WI TE. 1996. Health -seeking behaviour related to STD in commercial sex setting. International Conference on AIDS. July 7-12, 11: 189

UNAIDS. 2002. Sex work and HIV/AIDS: Technical Update Sex work and HIV/AIDS. Geneva: UNAIDS.

UNAIDS. 2004. Report on the global AIDS Epidemic. Geneva: UNAIDS.

UNFPA, UNAIDS, Government of Brazil (2006) Report on the Global Technical Consultation on HIV and Sex Work, Rio de Janeiro: UNFPA/UNAIDS.

UNAIDS. 2009. UNAIDS Guidance Note on HIV and Sex Work. Geneva: UNAIDS.

School of Statistics and Actuarial Science, 2003. Statistical Research Design and Analysis. Johannesburg: University of the Witwatersrand.

van der Burg SH & Palefsky JM. 2009. Human immunodeficiency virus and human papilloma virus – why HPV-induced lesions do not spontaneously resolve and why therapeutic vaccination can be successful. Journal of Translational Medicine,7, 108.

Wake RM, Rebe K, Burch VC. 2009. Patient perception of cervical screening among women living with human immuno-deficiency virus infection attending an antiretroviral therapy clinic in urban South Africa. *Journal of Obstetrics & Gynaecology*, 29, 44-48.

Williamson AL, Marais D, Passmore JA, Rybicki E. 2002. Human papillomavirus (HPV) infection in Southern Africa: prevalence, immunity, and vaccine prospects. *IUBMB Life*, 53, 253-8.

Wormack SD, Chirenje ZM, Gaffikin L, et al. 2000. HPV- based cervical cancer screening in a population at high risk for HIV infection. *International Journal of Cancer,* 85, 206-210.

World Health Organization. 1986. Control of cancer of the cervix uteri. A WHO meeting. *Bulletin of the World Health Organization*, 64, 607-618.

World Health Organisation. 2002. Cervical Cancer Screening in Developing Countries. Geneva: WHO.

World Health organisation. 2007. Human Papillomavirus and HPV vaccines, technical information for policy – makers and health professionals. Geneva: WHO

Appendix A. Data collection tool

Record ID: # # #
Date of record review: __ __ /__ __ __ /__ __ (dd-mmm-yy)

The following information will be extracted from patients' clinic files:

1. **Age from the last birthday …… (years).** ***Must be ≥ 18 years old***
2. **Place of residence**

   ☐ Hotel …..[1]
   ☐ Flat…….[2]
   ☐ Street…..[3]
3. **HIV status**

   ☐ Negative …..[0]
   ☐ Positive…….[1]
4. **Date of previous HIV test __ __ /__ __ __ /__ __ (dd-mmm-yy)**
5. **Date of most recent HIV test __ __ /__ __ __ /__ __ (dd-mmm-yy)**
6. **STI**

   ☐ Asymptomatic…..[0]
   ☐ Symptomatic…….[1]
7. **Date of most recent physical examination __ __ /__ __ __ /__ __ (dd-mmm-yy)**
8. **Treatment provided for the most recent HIV test?**

   ☐ Yes… [0]
   ☐ No…. [1]
9. **Pap smear result**

   ☐ Negative…..[1]
   ☐ LGSIL…….[2]
   ☐ HGSIL…….[3]
   ☐ ASCUS……[4]
10. **Date of first Pap smear test__ __ /__ __ __ /__ __ (dd-mmm-yy)**
11. **Date of last Pap smear test__ __ /__ __ __ /__ __ (dd-mmm-yy)**

Appendix B. Human Research Ethics Committee (Medical) of the University of Witwatersrand clearance