

Missed Opportunities of Preventing Mother to Child Transmission Programme at
Germiston District Hospital in 2004

Research Report

Submitted to the School of Health Systems and Public Health
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Submitted by

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Dedication

To the memory of my late niece Nozibusiso Mfishane “Momo” Ngcongwane and her mother, my dear selfless sister, Sibongile Rebecca Ngcongwane Ndlovu, who both succumbed to AIDS; Umhlaba awunoni!

Declaration

I hereby declare that the content of the following research report is my original work and has not been published elsewhere for Diploma or Degree purposes.

Signature-----Date-----
Phindile Ngcongwane

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I would also like to extend my heartfelt gratitude to the Ford Foundation's International Fellowship Programme for the financial support for the completion of my MPH studies and the resources to conduct the research.

I am eternally grateful to the Father for restoring and opening up the doors of learning for me, and to my girls boMafulela, Khanya-Qhawe Hope Cindi and Mbikwa Thandulwazi Bongiwe Cindi, for the sacrifice they made during my studies, which was certainly not in vain.

List of acronyms and abbreviations

AIDS	.....	Acquired Immunodeficiency Syndrome
ANC	.....	Antenatal Care
ART	.....	Antiretroviral Treatment
ARVs	.....	Antiretroviral drugs
BAs	.....	Birth Attendants
HIV	.....	Human Immunodeficiency Virus
HAART	.....	Highly Active Antiretroviral Therapy
MTCT	.....	Mother to Child Transmission
NVP	.....	Nevirapine
PMTCT	.....	Preventing Mother to Child Transmission
PNC	.....	Postnatal Care
STIs	.....	Sexually Transmissible Infections
VCT	.....	Voluntary Counselling and Testing

Abstract

Background: The vertical transmission of HIV from mother to child ranges from 15 to 40%. The preventing mothers to child transmission programme (PMTCT) services have been introduced during the past five years in South Africa; however vertical transmission of HIV remains high.

Objectives: The objectives of the study were:

1. To describe the clinical and demographic characteristics of women attending the ANC clinic and delivering at the Germiston Hospital;
2. To determine the proportion of women who were offered voluntary counselling and testing (VCT) in 2004;
3. To determine the proportion of women who subsequently received PMTCT.

Methods: This is a cross-sectional study in which a sample of 776 patient files were retrospectively, systematically and randomly sampled from 1,500 antenatal files for the period 2004 (Jan-Dec), in an urban district hospital in the Gauteng Province. A checklist was used to extract specific information. Data was entered into EpiData and analysed using STATA version 8. Pearson's chi-square test was used to obtain measures of association for all categorical variables. The multiple logistic regression method was used to investigate predictors for missed PMTCT opportunities.

Results: The prevalence proportion of syphilis was 14.19% {95%CI (11.81-16.85)}; prevalence proportion of HIV was 33.76% {95% CI (27.53-37.13)}. The mean age of the sample population was 26.37 years (min=22, max=30). Forty eight per cent of the sample

had registered late in the third trimester of pregnancy. Pregnant women presenting with syphilis were more likely to have a missed PMTCT opportunity {OR=2.2, 95%CI (1.16-4.20), p=0.02}. Women having made fewer than two ANC visits were more likely to have a missed PMTCT/VCT opportunity than women having made more than two visits {OR=0.51, 95%CI (0.30-0.86), p=0.01}.

Conclusions: The prevalence proportion of HIV is high in this setting (33%) and the prevalence of syphilis is seven times greater than the national prevalence. Every antenatal care visit is an opportunity for the healthcare worker to offer voluntary counselling and testing. All women identified as having syphilis infection are at high risk of acquiring HIV. Therefore every woman identified and treated for syphilis should be counselled and tested for HIV. Women must be offered HIV and AIDS education at every ANC visit. Routine opt-out counselling should be offered at every ANC visit for those who have not been previously tested.

Recommendation: In order to increase the uptake of the PMTCT programme healthcare workers should have training and re-orientation on:

1. The need to use every opportunity in antenatal care and maternity wards to offer HIV counselling and testing to mothers;
2. HIV and AIDS in pregnancy, PMTCT, as well as the treatment and care of pregnant women.

Key Words: *Antenatal Care, Counselling, HIV and AIDS, Missed Opportunity, Patient Records, PMTCT, Nevirapine.*

Chapter 1

INTRODUCTION

The global prevalence rate for Human Immunodeficiency Virus (HIV) infection in 2005 was at 40.3 million. Adults made up 38.0 million and children 2.3 million¹. South Africa is one of the southern African countries hardest hit by the HIV and the Acquired Immune Deficiency Disease Syndrome (AIDS) epidemic in the sub-Saharan region. In South Africa 10.8% people are living with HIV, which translates as over one in ten South Africans who are living with HIV. The antenatal health survey of 2004 put the prevalence of HIV among the 15-49 year age group at 29.5% (see figure 1), which makes South Africa the country with the largest number of HIV- infected people in the southern hemisphere. Young African women in informal settlements are at highest risk of HIV infection, according to recently released findings of the Human Sciences Research Council study².

Infected pregnant women are high risk as the source and transmitter of HIV infection to their unborn children. A pre-existing Sexually Transmitted Infection (STI) in these women increases the risk of HIV infection. It is imperative that pregnant women with a positive test for syphilis and other STIs like Chlamydia are managed appropriately during the Antenatal Care (ANC) period because of the is an association between STIs and HIV infection.

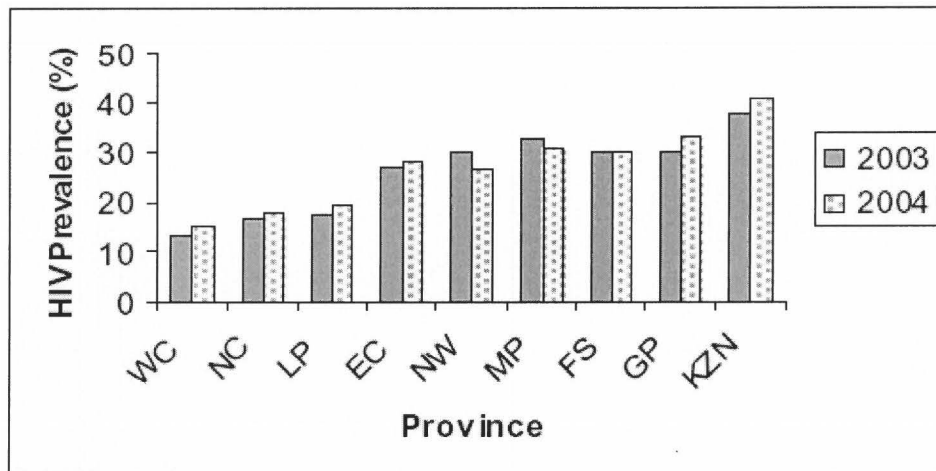


Figure 1: Prevalence of HIV in South Africa

(Source: National HIV & Syphilis Antenatal Sero-prevalence Survey, South Africa 2004)

WC=Western Cape; NC=Northern Cape; LP=Limpopo Province; EC=Eastern Cape; NW=North West; MP=Mpumalanga; FS= Free State; GP=Gauteng; KZN=KwaZulu Natal

There has been an increase in STIs, including HIV, as seen in the United Nations Aids (UNAIDS) Update Report released in 2005. In the year 1988 the prevalence proportion in a Johannesburg STI Clinic was at one per cent, and as the next prevalence proportion was measured in 1994 it had risen sharply to 25%.¹

The South African National Department of Health’s National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD) compiled a series of “Saving Mothers” Reports which outline the major causes of maternal mortality in South Africa, and the guidelines for interventions for the reduction of these causes. The report is compiled from data collected triennially. In the second “Saving Mothers” report, for the period 1999 to

2001, the NCCEMD suggested that the current estimated maternal mortality ratio (MMR) of 150/100 000 live births obtained by the Demographic and Health Survey in 1998 was probably low and that a more realistic estimate might be about 175/100 000 live births. This implied that the MMR had increased in that triennium. The increase was attributable to maternal deaths due to non-pregnancy-related infections, mainly AIDS. The five main causes of death were non-pregnancy-related infections (mainly AIDS); complications of hypertension in pregnancy, obstetric haemorrhage; pregnancy-related sepsis; and pre-existing medical conditions.³

In order to manage the HIV epidemic in South Africa, the government approved the Comprehensive Plan for HIV/ AIDS Management in November 2003 and the implementation of the operational plan began in 2004. The plan has a strong emphasis on strengthening the health system and the provision of antiretroviral drugs (ARVs) to the public health facilities.⁴ It is planned that there will be at least one service point per health district, and the campaign aims to provide ARVs to at least 1.4 million people by 2008. Currently 51 of the health districts have service points and 28 786 people are on ARVs.⁵ The challenges that were evident from the start concern finance and infrastructure; adequacy of human resources; and equitable distribution of the resources.

Access to Antiretroviral Treatment (ART) has been made available throughout South Africa since 2003, but problems still exist at operational level. The study retrospectively evaluates some of these problems. ANC and Maternity ward reports of past patients are reviewed as part of this evaluation.

1.1 Background to South African Policy on HIV and AIDS

In South Africa the coordinated public policy response to HIV and AIDS dates back to 1992, with the formation of the National Aids Coordinating Committee of South Africa (NACOSA). The NACOSA plan was reviewed in 1997 and its major strengths and areas needing improvement were identified. The government launched the five-year Strategic Plan for HIV and AIDS in year 2000, which provided the framework for executing the Comprehensive Plan for HIV & AIDS Care. The plan has four key areas of intervention: 1. prevention; 2. treatment, care and support; 3. research, monitoring and surveillance; and 4. legal and human rights. In 2002 the Cabinet reviewed its approach to HIV and AIDS, reiterated its commitment to the Strategic Plan, and decided on a number of measures to strengthen and support its efforts, including continued use of Nevirapine in PMTCT and the development of the roll-out plan.

In 2003 Cabinet instructed the Department of Health to develop a detailed Operational Plan by September of the same year. The plan was indeed developed and stood on three pillars:

- Ensuring that the greater majority of South Africans who are uninfected remain uninfected; enhancing efforts in prophylaxis;
- Providing the treatment of opportunistic infections, improved nutrition and lifestyle; and lastly
- Effectively managing the infected individuals who have developed AIDS-defining illnesses.⁶

Figure 2 is the patient flow diagram of the Germiston Hospital Antenatal care and Maternity wards. The flow diagram depicts the route a pregnant woman would take from first registration for antenatal care through to delivery of her newborn, postnatal care and finally to being discharged. Throughout the flow the healthcare offered to the woman is manually-recorded on the antenatal card and in her hospital file when she gets admitted for care and delivery of the newborn. The ANC card is retained by the woman until she submits it on admission for delivery. The records are kept and archived at the hospital archives on the hospital premises. The hospital also uses an electronic data system.

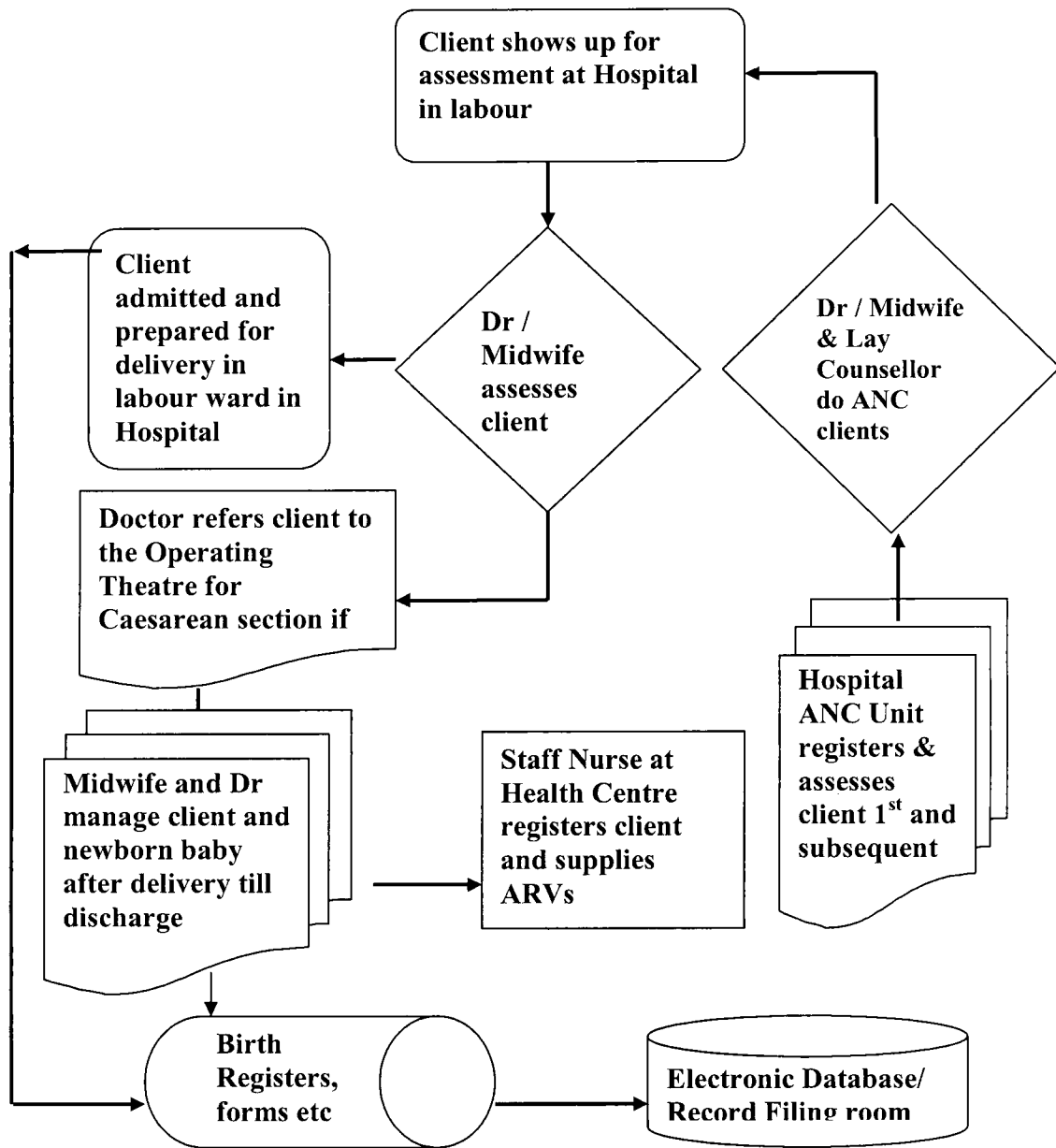


Figure 1: Client flow diagram of antenatal care and maternity wards

1.2 Community Profile

The community that makes use of the Germiston Hospital is mainly drawn from Ekurhuleni Metropolitan Municipality areas.

1.2.1 Midyear population estimates

The mid-2006 population is estimated at approximately 47,4 million. (The census figure for October 2001 was 44, 8 million.) African people are in the majority (nearly 37,7 million) and constitute 80 per cent of the total South African population.

Fifty-one per cent (approximately 24 million) of the population is female.

The provincial estimates show that KwaZulu-Natal has the largest share of the population (approximately 21%), followed by Gauteng (20%).^a

^a Statistics South Africa; 2006.

Table 1: Ekurhuleni Municipality Census 2001 by age group, population group and gender

Age group	African Black Female	Coloured Female	Indian / Asian Female	White Female
15 - 19	81 035	3 429	1 740	20 121
20 - 24	10 4743	3 548	1 947	17 386
25 - 29	11 3578	3 533	2 161	19 194
30 - 34	89 072	3 123	2 034	21 616
35 - 39	79 571	2 962	1 855	21 029
40 - 44	63 165	2 520	1 580	20 522
45 - 49	47 205	1 955	1 214	17 328

Chapter 2. LITERATURE REVIEW.

The extent to which missed opportunities for HIV testing occur in medical evaluations prior to one's HIV diagnosis is not known⁷. However, in this study, a model by Piot used to assess the sequence of steps that patients have to take when they are ill of malaria, would be adapted and used to assess missed opportunities for PMTCT. The model was proved to be useful for analyzing disease-control programmes like tuberculosis (TB) and sexually transmitted infections (STIs) in (Piot 1967; Dujardin et al. 1997; Buve et al. 2001). For TB it has been suggested to use the model as a tool for dialogue between TB control coordinators and public health professionals and to identify priorities for operational research. The model describes the different steps a person has to go through after becoming ill until finally being cured. In case management of malaria, it is only when patients go through all the steps in the model successfully that they would be cured.⁸

2.1 Missed Opportunity Studies

A 10-year retrospective chart-review of patients seen at an HIV intake clinic between January 1994 and June 2001 was conducted in Boston Massachusetts. Patients who tested positive for HIV during the 12 months prior to their presentation at the intake clinic, and those who had at least one encounter recorded in the medical record prior to their HIV – positive status were selected. Data collection included demographics, clinical presentation, and whether HIV testing was recommended to the patient or addressed in any way on the clinical record. The findings pointed out that among 221 cases meeting eligibility criteria, i.e. all that had triggers for HIV testing in the record. Triggers were

found in 50% of their medical visits. HIV was addressed in 27% of visits in which triggers were found. More recent clinical visits (between 1997 and 2001) were more likely to have HIV addressed than earlier visits ($p=.0001$). Furthermore, women were offered testing less than men ($p=.07$).⁷

In 2003 a study was conducted in Bulgaria looking at congenital syphilis in terms of missed opportunities for prevention. Four infants were examined and found to have among others; disseminated maculous, erythemosquamous, hemorrhagic, bullous and papulosquamous lesions. Skeletal effects included osteochondritis of the long bones on x-ray. Infants also had severe anaemia, leucocytosis and thrombocytopenia.

The mothers of the children had positive syphilis serology, and they had not been tested for syphilis. These cases could have been prevented with early and adequate pre-natal care. The policy requires that pregnant women have to be examined twice in pregnancy, during the first and third trimester, as well as immediately after delivery on the umbilical cord. Unfortunately the procedures are not always adhered to.⁹

A retrospective cohort study of consecutive newly diagnosed HIV infected patients in a large urban setting was conducted. The goals of this study were to quantify delays in diagnosing HIV infection in patients presenting for medical care prior to the identification of their HIV infection, and to determine characteristics of visits preceding the identification of HIV infection. Patients were predominantly minorities and identified from all inpatient and outpatient departments with HIV tests performed between December 29, 1998 and December 27, 1999. Data were collected from all emergency department and clinic visits for each patient included in this study for a 3-year period

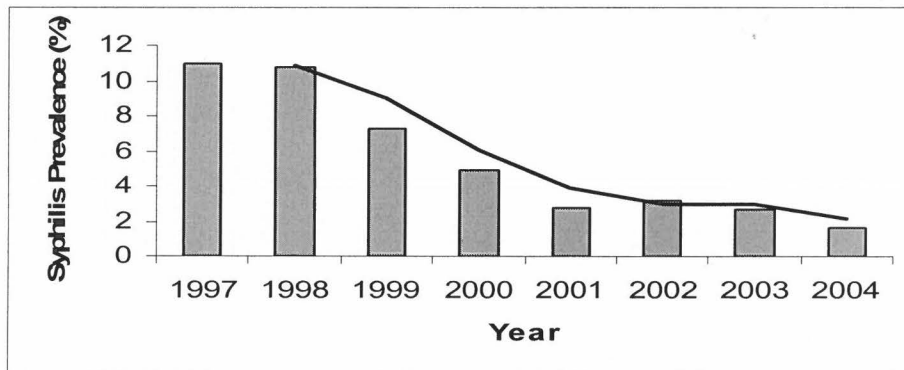
preceding the first diagnosis of HIV infection. Two hundred and seventy-eight patients tested positive for HIV during the study period. Of these, 76 (27%) met the inclusion criteria. Twenty-three patients made a total of 53 health care visits preceding the diagnosis of their HIV infection. The median delay in diagnosis of HIV infection was 2 days (inter-quartile range [IQR], 1–22 days; range, 0–1093 days) for all subjects, although 19 (25%); 95% confidence interval [CI]: (16%–36%) of patients had a delay in diagnosis of 30 days or more. Among those patients who had made prior health care visits, the median delay in diagnosis was 112 days (IQR, 33–690 days; range, 2–1093 days). No specific risk factor, historical clue, physical examination finding, or laboratory finding reliably identified patients with HIV infection. Documentation in the medical record of specific risk factors and clinical characteristics suggestive of HIV infection was poor. This study documented missed opportunities and delays in diagnosis of patients with unrecognized HIV infection. As a recommendation, the authors urged the clinicians to maintain a high index of suspicion for HIV infection in all patients.¹⁰

2.2 STIs and HIV and AIDS.

Clinical services offering STIs care are an important access point for people at high risk for both STIs and HIV. Identifying pregnant women with STIs allows for not only the benefit of treating the STI, but for prevention education, counselling and HIV testing, identifying HIV-infected persons in need of care, and partner notification for STI or HIV notification.² Furthermore, a proportion of blood sample taken from pregnant women aged 15-49 that test positive for syphilis during routine screening provide an opportunity

for motivating to enrol for VCT which would determine eligibility for PMTCT programme.

Figure 2: Syphilis prevalence among ANC attendees 1997-2004



(Source: National HIV and Syphilis Antenatal Sero-prevalence Survey, South Africa 2004).

Syphilis prevalence among women in ANC is going significantly downwards from 1999 to 2004, as seen in figure two above. The trend is attributable to the intervention of syndromic management. If all syphilis infected were to be offered and receive HIV counselling and testing, then mother to child transmission (MTCT) would also be reduced.

Table 2: Annual Antenatal survey prevalence of HIV among pregnant women aged 15-24 years 2002 to 2004.

Age in Years	% HIV+ 2002	% HIV+ 2003	% HIV+ 2004
15	7.2	8.5	10.0
16	8.3	9.4	9.1
17	11.7	12.5	12.3
18	16.1	19.1	19.0
19	18.7	19.4	19.9
20	23.4	23.0	25.1
21	25.7	27.5	28.5
22	31.1	28.1	31.1
23	33.5	36.3	34.7
24	32.3	37.1	35.5
15-19	14.7	15.8	16.2
20-24	29.1	30.3	30.8
15-24	23.5	24.8	25.2

2.3 PMTCT

Huge progress has been made since the publication of 1994 of the landmark ACTG 076 trial results, showing a two-thirds reduction in HIV transmission using extensive AZT regimen in pregnant women and their infants especially in developed countries.

According to the UNAIDS estimates, 1800 HIV infected children continue to be born daily in the developing world which is approximately 650 000 per annum.¹

Surveys in ANC find HIV prevalence range at 5% or less in West and Central Africa, 29% in South Africa, 38% in Botswana and Swaziland. Approximately 640 000 children infected by mother to child transmission (MTCT) in 2002 Sub-Sahara, and only 1% of women had access to PMTCT. With PMTCT programme, pregnant women are among the first in the public sector to be tested, establish their status and to be offered treatment.⁷

Approximately 98% of HIV- infected children have acquired HIV from their mothers in utero during pregnancy, at delivery and through breastfeeding, making PMTCT a major health priority.

Risk factors that are instrumental for mother to child transmission are:

- Maternal viral load
- Maternal clinical and immunological status,
- Mode of delivery,
- Pre-maturity and breast-feeding.
- Vitamin A deficiency is also associated with increased transmission.^{3,7}

2.4 Components of PMTCT

- Counselling and testing
- Antenatal Care

- History-taking, physical examination, Iron and Vitamin Supplements
- Treatment of STIs, TB, Malaria and other infections
- Counselling on Nutrition, infant feeding and Family Planning
- Modified birthing practices; promote normal birth avoid vaginal examination, artificial rupture of membranes, episiotomy
- Use of universal precautions
- Anti-Retroviral Nevirapine or short course Zidovudine
- Modified infant feeding; exclusive breast-feeding or exclusive formula feeding if that is Acceptable, Feasible, Affordable, Sustainable and Safe (AFASS).
- Prevent breast-problems like engorgement and mastitis.⁷

2.5 Barriers to PMTCT

- Inadequate health care infrastructure
- Inadequate staff motivation
- Lack of well-trained health care professionals
- Lack of trained HIV Counsellor with expertise in PMTCT
- Insufficient time for quality counselling
- Lack of guidelines for counselling
- Low acceptability for HIV testing
- Low acceptability for infant formula or breast-milk substitutes
- Ongoing counselling and support is difficult owing to few providers per patient ratio, and lack of HIV support services after delivery.³

Furthermore in a study in year 1994, the results of AIDS Clinical Trials Group 076 demonstrated that antiretroviral therapy could prevent HIV transmission, and other studies showed that combination antiretroviral therapies and delivery by caesarean section in select circumstances could reduce Perinatal HIV transmission further. These findings facilitated establishment of state- and nationally funded Perinatal HIV-prevention programmes. Data from CDC's HIV/AIDS Surveillance System and local and state health departments have monitored the success of the programmes.^{7,9} After the trial results, the US

Public Health Service first issued guidelines for universal counselling and offering voluntary HIV testing of pregnant women in 1995, and in 2001 revised the guidelines to further reduce barriers to universal HIV testing of pregnant women. In 2003, the CDC reiterated its goal of universal HIV testing of all pregnant women and recommended the "opt-out approach" to prenatal HIV screening as a useful strategy to achieve high levels of prenatal HIV testing to achieve additional reductions in Perinatal HIV transmission. With the opt-out approach, pregnant women are notified about Perinatal HIV and its prevention and advised that an HIV test will be included in the standard battery of prenatal tests unless a woman refuses. The CDC also recommends routine rapid testing at labour for those women whose HIV status is still unknown. In New York, there is mandatory expedited HIV testing of mothers or newborns at the time of delivery when the results of prenatal HIV testing are not known. The results of the expedited testing are made available within 12 hours of birth. Furthermore, all newborns are tested for Perinatal HIV exposure through the Comprehensive Newborn Screening programme.

Despite the successes and the dramatic decline in Perinatal HIV transmission rates in the United States, missed opportunities and failures of Perinatal HIV prevention continue to occur. Hard-to reach pregnant women include illicit drug users, adolescents, non-English-speaking women, and unregistered immigrants. In the Pediatric Spectrum of HIV Disease study, illicit-drug-using women were significantly more likely to lack prenatal care than non-drug-using women. Immigrants may be reluctant to agree to HIV-testing or choose to breastfeed for cultural reasons. CDC-funded Perinatal HIV prevention programmes target these hard-to reach populations in the United States to offer needed services and support. In parallel, CDC's Global AIDS Programme and other organizations are helping to develop and implement programmes to reduce perinatal transmission in resource-limited international settings with high HIV seroprevalence. Although fewer women in resource-poor countries compared to the United States have access to prenatal care and hospital-based deliveries, it has been suggested that traditional birth attendants (BA's) may be able to play a role in preventing perinatal transmission of HIV. Pilot studies in several African countries are investigating the use of trained traditional BA's to provide HIV counselling and testing and assistance with administering antiretroviral prophylaxis at delivery in rural settings without hospitals.¹⁹

Furthermore, the Cameroon Baptist Convention Health Board implemented a programme to prevent mother-to-child transmission of HIV-1 (PMTCT) as part of its routine antenatal care, with single-dose maternal and infant peripartum Nevirapine (NVP) prophylaxis of

HIV infected mothers and their babies. Nurses, midwives, nurse aides, and trained BA's counselled pregnant women, obtained risk factor data, and offered free HIV testing with same-day results. From February 2000 through December 2004, the programme expanded rapidly to 115 facilities in 6 of Cameroon's 10 provinces, and not only to large hospitals but to remote health centres staffed by trained BA's. In total 690 health workers were trained in PMTCT and 68,635 women were counselled, 91.9% of whom accepted HIV testing. Of 63,094 women tested, 8.7% were HIV-1-positive. Independent risk factors for HIV-1 infection included young age at first sexual intercourse, multiple sex partners, and positive syphilis serology (p-value 0.001 for each). A total of 98.7% were counselled of all the positive and negative mothers on a post-test basis. Of 5,550 HIV-infected mothers, 5433 were counselled (97.9%) on single-dose NVP prophylaxis. Consistent training and programmatic support contributed to rapid up-scaling and high uptake of counselling rates.²⁰

Chapter 3

RELEVANCE OF STUDY

The aim of the study is to look for possible gaps in patients' records that indicate that there may have been missed opportunities for providing to VCT and/or PMTCT in women who received ANC and who delivered their babies at the Germiston Hospital. The outcome of the study is a description of the ANC process in relation to the hospital's PMTCT programme. In the event of findings of missed opportunities for VCT and PMTCT at this facility, there would be a need for an intervention like staff training and for management support to increase the level of uptake of the programme. Improving PMTCT can elevate the level of ANC, which would benefit both HIV- infected and not infected women and their infants. The study operates on the assumption that saving even a few infants from being born with HIV infection and dying at an early age is worth the fight. HIV-infected women in the PMTCT programme may leave behind orphans, and it is much better to leave behind a healthy orphan for others to care for than to leave a sick HIV infected orphan.³

STUDY PURPOSE

3.1 Research Question

The study addressed the following question: "Are all women registered for antenatal care, delivery and postnatal care offered the necessary counselling, testing and PMTCT programme?"

3.2 Aim of the Study

The aim of the study is to review the patient records of women who received pregnancy and maternity care at the Germiston Hospital in year 2004, with the aim of assessing the missed opportunities for enrolling them in the PMTCT programme.

3.3 Objectives of the Study

The objectives of the study are:

1. To describe the clinical and demographic characteristics of women attending ANC clinic and deliver at the Germiston Hospital;
2. To determine the proportion of women who were offered VCT in 2004; and
3. To determine the proportion of women who subsequently received PMTCT.

Chapter 4

METHODOLOGY

4.1 Study Design

The study design is cross-sectional.

4.2 Target Population and Inclusion Criteria

The population of the study was all women who received prenatal care, delivered their infants and received postnatal care at Germiston Hospital in 2004.

Subject eligibility criteria for inclusion are that the women who received ANC services delivered their infants, and had postnatal care at the hospital in 2004.

4.3 Sample Size of the Study

The sample size of study was determined using the Stat Calc module of Epi-Info version 3.3. The following assumptions were made to determine the sample size of study:

- Average number of women who deliver at Germiston Hospital is 1,500 per annum.
- The level of significance of the test = 0.05;
- The power of the test was fixed at the 80% level;
- The proportion of mothers who did not get adequate PMTCT-related assistance varies from 10% to 11% based on past experience at Germiston Hospital during the period of study.

Using the above assumptions, the sample size of study became 776 patient records.

The 776 records were selected using a systematic random sampling. The sampling

interval was given by: $k = \frac{1500}{776} \approx 2$. A list of all eligible records was drawn. The first

eligible record was selected at random. From then on, every 2nd record that met the criteria of inclusion into the study was selected. The procedure was continued until all 776 records were selected.

4.4 Variables of the Study

A checklist with the variables listed below was used to assess each record.

4.4.1 Sample of checklist used to extract data

- Age
- Parity
- Trimester at Registration
- Syphilis sero status
- Other STIs on record
- Number of ANC visits before delivery
- Counselling noted
- Pre-test
- HIV test done
- Post-test
- HIV sero status

- Nevirapine given to the mother at 28/40
- Nevirapine given to mother at >28/40
- NVP taken at home/transit/in hospital
- Unbooked case counselling
- Unbooked case NVP taken
- Mode of delivery modified
- Counselling post delivery
- HIV-test post delivery
- Nevirapine administration to infant

4.5 Abbreviations and Definitions

Listed below are abbreviations and definitions of terms used in the study.

Antenatal: This is the period before birth. It is a time in pregnancy starting after conception and ending with labour at delivery time.

Labour: This is parturition or child-birth, which takes place in three stages: (1) dilatation of the cervix uteri; (2) Passage of child through the birth canal; (3) Expulsion of placenta.

Missed Opportunity: In this case this is when a woman who has had a contact with the health service does not get the counselling for HIV that may lead to testing for HIV and getting the relevant subsequent care as per policy on comprehensive management of HIV and AIDS.

MTCT: This is mother to child transmission of HIV infection, it is the vertical transmission of HIV from a mother who is HIV infected to her infant. It is the main transmission route for HIV infection in infants and children

PMTCT: This programme is aimed at preventing mother-to-child transmission of HIV infection. It comprises interventions carried out at in the antenatal period, during delivery and post partum.

Postpartum: Following labour, this is a time immediately after delivery and lasts up to six weeks.

Unbooked: This refers to a pregnant woman who registers at a health facility already in labour, without having made antenatal visits to the hospital or the clinic.

4.6 Data Collection

Patient records were reviewed to determine missed opportunities for the PMTCT programme at the Germiston Hospital in 2004. The drug register in the maternity ward was used to validate the issuing of Nevirapine syrup to the infant within 72 hours after birth.

4.7 Data Management

Data was primarily collected by the researcher, and a midwife was trained and engaged to help with data collection; she was supervised on a regular basis. Strict adherence to the research protocol and ethical guidelines was practised. The researcher was responsible for checking data collection quality and for ensuring that data was stored in a safe and confidential place. Single data entry was done and at least 10% of the study questionnaires were validated on data entry using EpiData. Data cleaning involved the identification of missing data, range and distribution checks, and checking coherence of data within each case.

4.8 Methods of Statistical Data Analysis

The following methods of statistical data analysis were used:

- Frequency tables were obtained for all discrete variables of study.
- Summary statistics were also obtained for all continuous variables of study.
- Pearson's chi-square tests of association were used to identify factors that are significantly associated with each other.

- Binary logistic regression analysis was used to identify influential variables that affect the ability of women to receive PMTCT services. Unadjusted and adjusted odds ratios were estimated for a list of highly influential predictor variables.

4.9 Statistical Package

The EpiData statistical software package was used to enter data from paper questionnaires and the statistical package STATA version 8 was used for data analysis.

4.10 Ethical Considerations

Permission to conduct the study was sought from the Faculty of Health Sciences Research Ethics Committee of the University of Pretoria; a permission was granted and the Ethics approval number: **S193/2005** received.

Gauteng Provincial Authority's Germiston Hospital Chief Executive Officer, and the Ekurhuleni Research Committee, also granted their permission for the study to take place. The researcher undertook to maintain anonymity of patients' identities from the records. Confidentiality was maintained throughout the study. The researcher agreed that the findings would be shared with the Germiston Hospital management and staff, and with the research community.

4.11 Limitation of Study

The study is based on record reviews only, and the findings have not been verified by interviews with staff or patients. The study findings can only be inferred to Germiston Hospital for 2004, they cannot be generalised to all district hospitals in the region, province or country.

Chapter 5

RESULTS

The results are based on the 776 selected records of ANC unit and maternity clients in 2004 from January to December.

5.1 Description of Women in the Study

Age distribution of women in the study

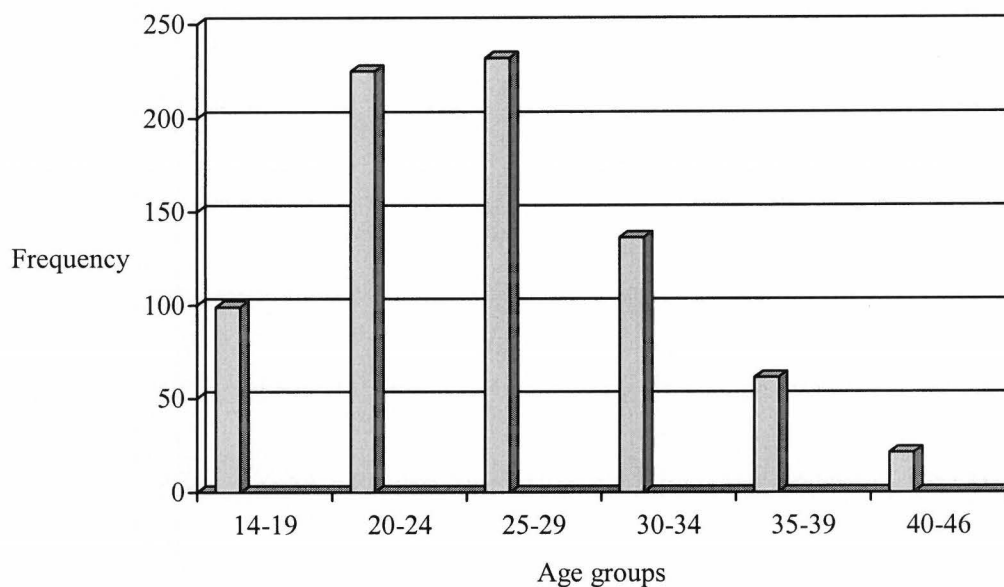


Figure 4: Age distribution of women in the study

Figure 4 above depicts the age distribution of women in the study. The ages ranged from the youngest at 14 years old to the oldest at 46 years old. The **mean age was 26**.

5.2 Antenatal Care Visits, Trimester at Registration and Parity of Women in the Study

Table 3: Antenatal care visits and trimester at registration for ANC

Variable		Frequency	Per cent
ANC Visits	Women with 2 visits or fewer	243	33.35
	Women with 3 or more visits	532	68.65
Total		775	100
Trimester at registration	Proportion of women who were not booked	29	3.73
	Women registered for ANC in their 1 ^s trimester	22	2.85
	Women registered at 2 nd trimester	346	44.76
	Proportion of women who registered at the 3 rd trimester of pregnancy	376	48.64
Total		773	100

The women who had made two or fewer visits to the ANC facility provides illustrates the period the woman has had contact with healthcare providers. Every contact provides an opportunity for the promotion of VCT. These women have had a low contact with healthcare providers. Table 3 above indicates that 31.35% (n=243) of all pregnant women made two visits or fewer.

However, 69% (n=532) had three or more visits to the ANC service, which increased their opportunities for being counselled and tested for HIV, and entered into the PMTCT programme where necessary. It is also important to register earlier on in pregnancy than to register late or not at all.

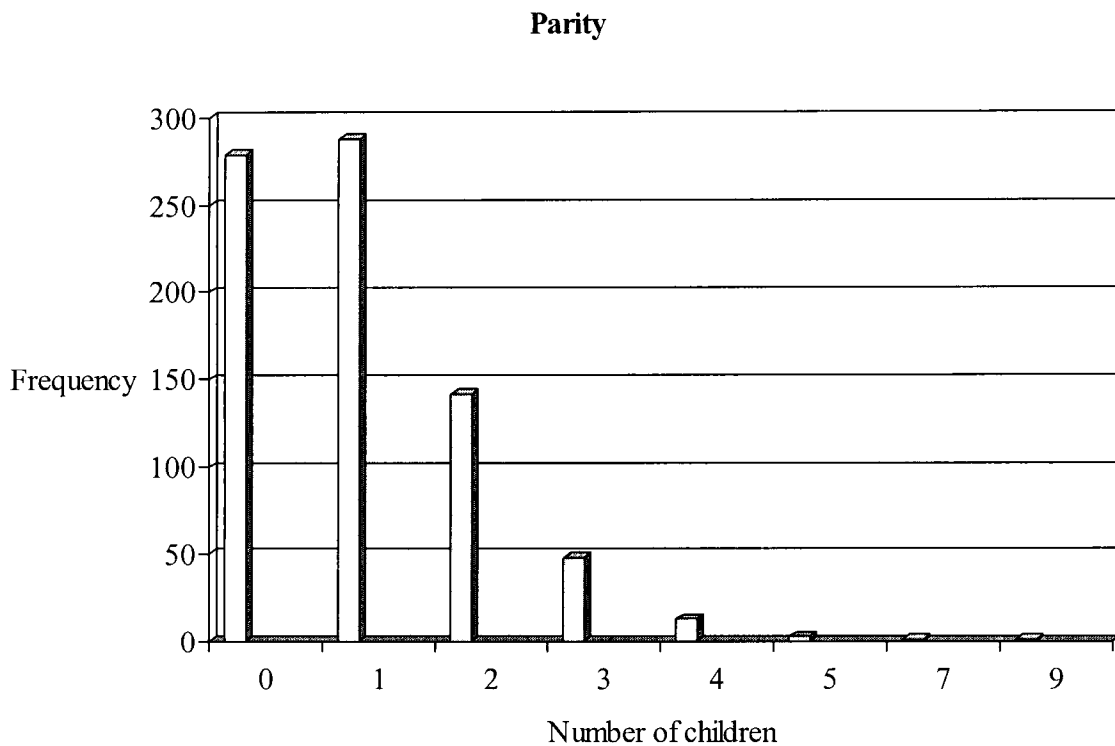


Figure 4: Number of children women have at time of registration for ANC

Figure 5 above shows us that the women had a range of parity from zero to nine children; the largest cohort was that of 37.16% (n=288), which consists of women who had only one child at the time of registering for care, followed by those who did not have children at 36% (n=279).

Table 4: Syphilis and other STIs on the records of women

Variable		Frequency	Per cent
Syphilis	Women without syphilis infection	665	85.81
	Women with syphilis	110	14.19
Total		775	100
Other STIs	Women with no other STI on their record	635	82.15
	Women with other STI infection/s on their record	138	17.85
Total		775	100

The information on other STIs over and above syphilis is useful in determining the risk a pregnant woman has of acquiring and transmitting the STI to her unborn infant. These women with other STIs on their record, were 18% in total of the sample (n=138) and were having an indication for targeting counselling during their ANC visits, delivery and or at their postnatal care stage.

5.3 Women Offered and Receiving VCT Services

Table 5 below presents variables determining the proportion of pregnant women who were offered counselling, and testing for HIV and their sero-status.

Table 5: Counselling, Testing and Results

Variable		Frequency	Per cent
Group Counselling	Women who were offered group counselling	577	74.64
	Women who were not offered group	196	25.36

Total Variable		773 Frequency	100 Per cent
	counselling		
Pre-test Counselling	Women who were offered individual pre-test counselling	480	62.10
	Women who were not offered individual pre-test counselling	293	37.90
Total		773	100
HIV test	Women who had HIV testing done	391	50.58
	Women who were not tested for HIV	382	49.42
Total		773	100
HIV Status	Women with HIV status on record as positive	261	33.76
	Women with HIV status on record as negative	128	16.56
	Women without HIV status on their record/status unknown	384	49.68
Total		773	100

5.4 Women who were Offered and Receiving PMTCT following VCT

Table 6 below presents variables denoting administration of NVP to mother and infant, this indicates women who were subsequently offered and who received PMTCT.

Table 6: Nevirapine administration to mother and infant

Variable		Frequency	Per cent
Nevirapine issued to Mother	NVP issued to mother	120	15.42
	NVP not issued to	653	84.68

mother			
Total		773	100
Variable		Frequency	Per cent
Nevirapine for infant	NVP issued to infant	97	12.52
	NVP not issued to infant	678	87.48
Total		775	100

Table 7: Measures of association between ANC visits, and counselling and testing for HIV

Variable	Pearson Chi-square	Odds Ratio	Level of Significance	95% Confidence Interval
Trimester	31.9289	2.662	0.000	1.88; 3.76
Syphilis	40.0090	2.774	0.000	1.76; 4.36
Counselling	36.2570	1.685	0.000	97; 2.90

5.5 Logistic Regression Analysis of Factors associated with Missed Opportunities for PMTCT

Binary logistic regression was used to explore the relationship between PMTCT use (yes, no) and eight important variables that affect participation in PMTCT services. The dependent variable of study is dichotomous, as it has only two possible outcomes. The predictor variables related to the dependent variable of study are all discrete variables.

The measure of effect in binary logistic regression analysis is the odds ratio. Influential predictor variables are characterised by estimated odds ratios that are significantly different from 1; confidence intervals of odds ratios that exclude 1; and small P-values.

5.5.1 List of variables used for binary logistic regression analysis

The study is based on nine variables of study (one outcome variable of study + eight independent variables of study that are related to the outcome variable of study). The outcome variable of study is the attendance of PMTCT services by the mothers in the study.

5.5.2 Outcome variable of the study

The outcome variable of study is receiving PMTCT services.

Visits2: Attendance of PMTCT services (1 if PMTCT visits not received, 0 otherwise)

5.5.3 List of 8 independent variables of study and their levels

Trimester2 (1 if 3rd or unbooked, 0 otherwise)

Syphilis2 (1 if positive, 0 otherwise)

Counsel2 (1 if no counselling given, 0 otherwise)

Pretest2 (1 if no pre-test done, 0 otherwise)

HIVdone2 (1 if no HIV test done, 0 otherwise)

Posttest2 (1 if no post test done, 0 otherwise)

HIVstatus2 (1 if positive, 0 if negative)

NVP2 (1 if NVP2 not given, 0 if given)

(Remark: Category 1 of each of the eight independent variables of study contributes to failure to benefit from PMTCT services.)

Table 8 below shows unadjusted and adjusted odds ratios obtained from binary logistic regression analysis for the top three most influential predictor variables.

Table 8: Crude and adjusted odds ratios from logistic regression analysis

Description	Unadjusted odds ratio	Adjusted odds ratio	P-value	95% Confidence Interval
Trimester at registration for antenatal care	2.54	2.66	0.000	(1.88, 3.76)
Women with positive syphilis serology	2.49	2.77	0.000	(1.76, 4.36)
Women who were offered post-HIV test counselling	1.55	1.68	0.091	(0.61, 32.38)

(Remark: Adjustment was made for the variables “counsel2”, “pretest2”, “hivdone2”, “hivstatus2” and “nvp2”)

Table 8 above shows that unadjusted and adjusted odds ratios are fairly similar. This shows that none of the variables of adjustment is a potential confounding variable.

5.5.4 Interpretation of significant odds ratios

At the 5% level of significance, two of the nine variables used for logistic regression analysis were significant. The third variable was significant at the 10% level of significance.

The most influential factor is “trimester2”. The odds ratio for “trimester2” is 2.66. A woman with trimester2 = 1 (which means a woman who came late in her pregnancy for registration for ANC) is 2.66 times more likely to miss counselling and testing and PMTCT services in comparison with a woman who registered early in her pregnancy.

The second most influential factor is “syphilis2”. The odds ratio for “syphilis2” is 2.77. A woman with syphilis2 = 1 (which means a woman with syphilis during pregnancy) is 2.77 times more likely to miss counselling and testing, including PMTCT, in comparison with a woman who does not have syphilis during pregnancy.

The third most influential factor is “counsel2”. The odds ratio for “counsel2” is 1.68. A woman with no counselling during pregnancy is 1.68 times more likely to miss PMTCT services in comparison with a woman who is given counselling services during pregnancy.

5.5.5 Assessment of goodness-of-fit of fitted model

In this study the adequacy of the fitted logistic regression model was assessed using standard diagnostic procedures such as the Model Chi-square test, the classification table, the Hosmer-Lemeshow goodness-of-fit test, the likelihood ratio test, and the area under the Receiver Operating Characteristic (ROC) plot.

5.5.5.1 The Model Chi-square test

The magnitude of the Model Chi-square statistic was -434.15761, with a P-value of 0.000. This showed that the overall model was statistically significant.

5.5.5.2 The classification table

The percentage of overall correct classification was 71.49%. This shows that the fitted model is fairly adequate. The percentages of sensitivity and specificity were 36.21% and 87.59% respectively. This shows that the fitted model is poorly sensitive (the model poorly predicts women who do not participate in PMTCT activities) and highly specific (the model predicts women who participate in PMTCT activities fairly well).

5.5.5.3 The area under the ROC curve

The area under the ROC curve is a measure of explained variation, and has a magnitude of 71.44%, which shows that the fitted model is fairly adequate.

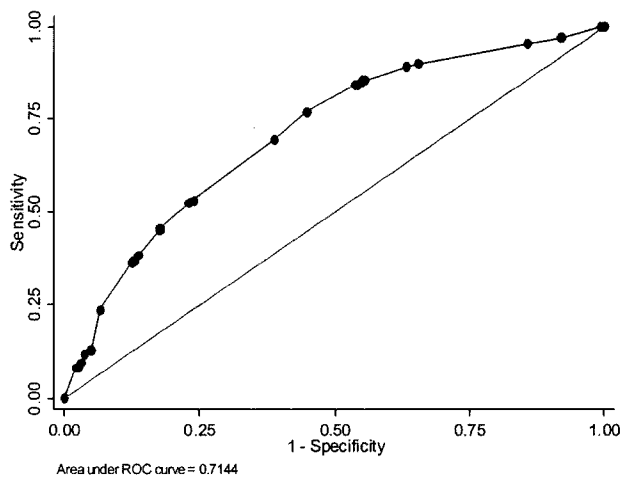


Figure 6: Area under the ROC curve

5.5.5.4 The Hosmer-Lemeshow goodness-of-fit test

The Hosmer-Lemeshow goodness-of-fit test is used to test the following null hypothesis:

H0: There is no reason to doubt the adequacy of the fitted model

H1: There is reason enough to doubt the adequacy of the fitted model

The P-value from the test was $0.2443 > 0.05$. Hence, the null hypothesis is accepted at the 5% level of significance, and it can be concluded that the fitted model is adequate.

Chapter 6

DISCUSSION

Figure 2 above (see chapter 1) illustrates the ANC client flow at the Germiston Hospital. Clients are pregnant women requiring care at various levels during their pregnancy. Lay counsellors are limited to the ANC unit and they are available during the first and subsequent visits to provide group and individual pre-test counselling, HIV rapid testing and post-test counselling. This service is critical for the intervention of preventing mother-to-child transmission of HIV, in that if a woman is found to be infected she is then issued with the single dose Nevirapine tablet at 28 weeks gestation, for administration at the onset of labour. The infant of the same woman will receive the single dosage within 72 hours of delivery.

6.1 Demographic: Age

The 25th percentile of women in the assessment was 22 years old in 2004, and the national ANC Survey for 2002 to 2004 (see table 2 above) puts the same age group as among the hardest hit by HIV and AIDS at 30.8% prevalence.

6.2 Gestation Period at Registration

Given that pregnant women registering for ANC during the first and second trimester stands a good chance or opportunity of being counselled and monitored adequately by health-care workers with appropriate interventions that increase the chance of good maternal and neonatal outcomes, such as proper nutritional advice as well as the detection of abnormalities, it follows then that the 3rd trimester registrations and those who are not booked at all have a minimal opportunity for adequate interventions. In this case almost

half of the women registered early and received ongoing support at 51% (n=397) compared to the 48% (n=378) of the women who chose to register late for ANC.

6.3 Antenatal Care Visits

The assessment has revealed that 31% (n=243) of women had two ANC visits or fewer before delivery, and that 69% (n=532) had three or more visits. This is in contrast to the findings of the study which used data from recent Demographic and Health Surveys (DHS) from 11 of the 12 sub-Saharan African countries that are included in the US Presidential Initiative on Mother to Child HIV Transmission.²⁰ These surveys are Cote d'Ivoire DHS 1998/1999; Ethiopia DHS 2000; Kenya DHS 1998; Mozambique DHS 1997; Namibia DHS 1992; Nigeria DHS 1999; Rwanda DHS 2000; South Africa DHS 1998; Tanzania DHS 1999; Uganda DHS 2000/2001; and Zambia DHS 2001/2002. The last DHS in Botswana was done in 1988, and the data is not included. Data from DHS shows that between 26% and 95% of women in the 11 countries had at least one prenatal visit with a health professional during their most recent pregnancy. In the three countries that had percentages of below 80% (Ethiopia 26%, Nigeria 64%, and Mozambique 71%), there will be a significant number of missed opportunities for prenatal intervention.²²

If prenatal intervention is missed in the US, the next opportunity to intervene for HIV-positive pregnant women is when they deliver in a hospital. In the US, practically all (99%) deliveries take place in a hospital. The situation is quite different in sub-Saharan Africa in that, for ten of the 11 countries noted above, only between 5% and 68% of

women deliver in a health-care facility. South Africa is a notable exception, with 84% of women surveyed having delivered their last born in a health care facility.²¹

6.4 Unbooked Cases

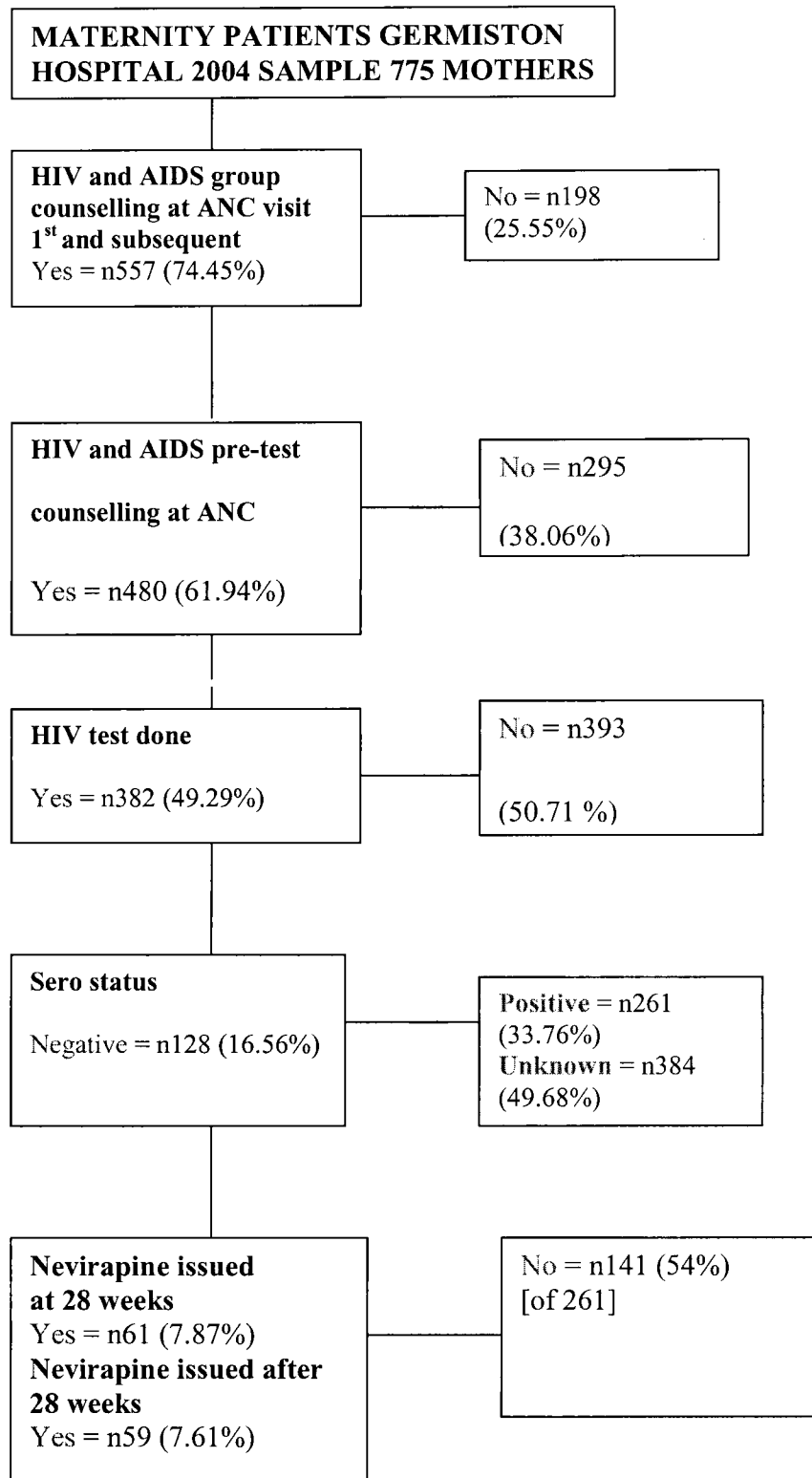
In this study it was found that there was a total of 4% (n=29) of all 775 mothers who were unbooked cases, which also had no record of counselling during and after delivery. All of them had missed an opportunity to attend a PMTCT programme.

6.5 Syphilis

The screening of syphilis is routinely provided to all ANC clients. The prevalence of syphilis among the clients at this hospital is at 14% (n= 110) which is much higher than the national prevalence. An opportunity is missed whenever a provider does a syphilis test in the absence of an HIV test; the client-provider interaction could be optimised.

6.6 Piot's Model of Analysis of the Problem

Adaptation of Piot's flow diagram as seen in figure 7 below (a model adapted from the one described by Piot²²) is utilised to illustrate the areas in which missed opportunities were identified in the study. The adapted Piot's flow diagram provides a framework to determine the proportion of women who were not offered counselling and testing, and the proportions who were not subsequently offered PMTCT.



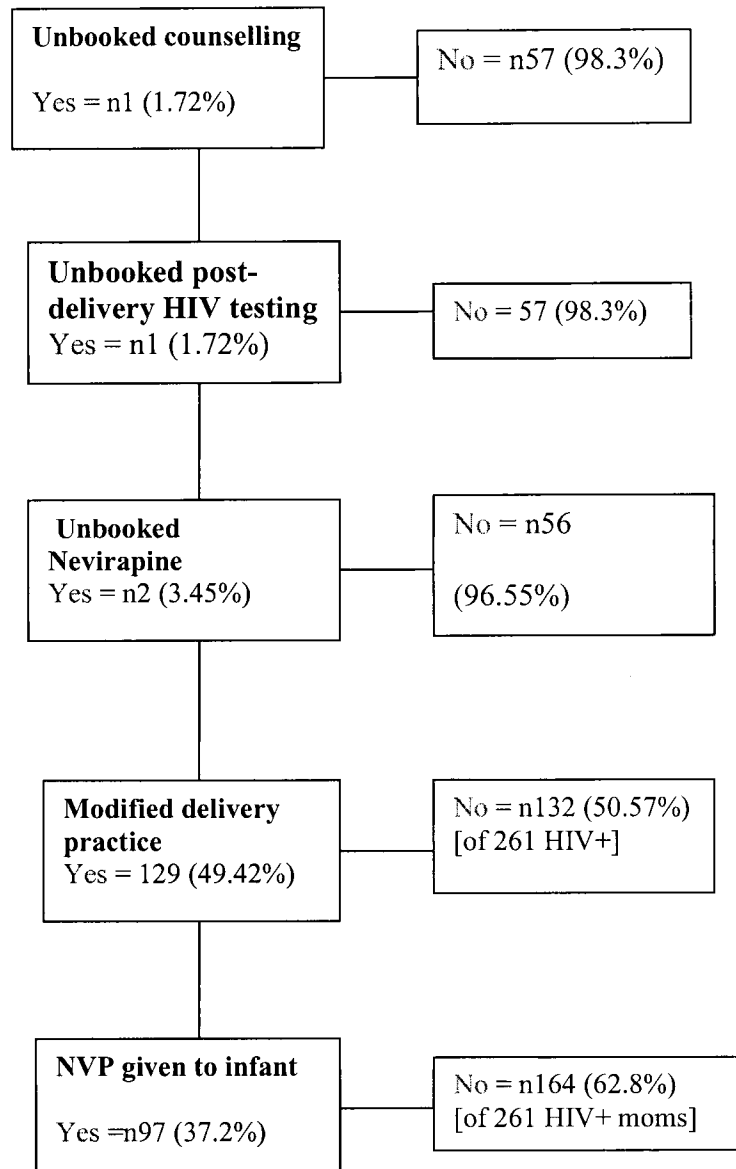


Figure 7: Diagram of Adapted Piot's flow model^b

^b Buch E, Mathambo V, Ferrinho P. et al: Leakages in PMTCT Care in a District Hospital In KwaZulu Natal, South Africa. 2003. University of Pretoria SHSPH.

To sum up all missed opportunities identified in the study, all the omitted items' percentages are used as seen in table 9 below. Only three variables are below or at 50%, in terms of omissions, out of ten variables. This shows the gravity of the situation in that seven variables are strongly omitted. It also shows that there is much room for improvement at this hospital.

Table 9: Sum of missed opportunities

Description	Score in Per cent %
Group counselling not offered	25.44
Pre-test counselling not offered	36.06
HIV test not done	50.71
Sero status unknown	49.68
NVP not issued to HIV infected mothers	54
Unbooked mothers who were not offered counselling	98.3
Unbooked mothers who were not offered counselling post delivery	98.3
Unbooked mother not issued NVP	96.55
Modified delivery not practised to HIV-infected mothers	50.57
NVP not administered to infants born to HIV-infected mothers	62.8

- **Group counselling** is one of the seemingly simple interventions that can be achieved, as it is offered during waiting periods in the ANC unit, and 25.4% of the records reviewed had not noted this procedure. Group counselling is also useful as motivation for individualised pre-test counselling and in providing suitable counselling for HIV-negative women.
- **Pre-test counselling** was offered to and accepted by only 62% of study participants. This process, by and large, leads to testing for HIV, and in this case the test used is a rapid test, requiring no long waiting periods before the results are available.
- **HIV tests** were not done for half of the participants in the study, or 50.71%. This is the group that will not be in line for receiving are NVP if this is indicated. This is substantial, as it means only half of the intended users of a service are actually receiving it. The key PMTCT strategy of the Germiston Hospital is to make HIV testing and counselling widely available.
- **Sero-status unknown** women were 49.64% or n384 of all women in the study. This is a significantly high figure for people who would otherwise not receive the following: antiretroviral prophylaxis and treatment; safer modified delivery practices; and education and support in safer infant-feeding practices. Most importantly the risk of mothers transmitting the virus to their unborn babies is also possible where the mothers' sero-status is unknown.

- **Nevirapine** was not issued to 54% of the 261 women who tested HIV positive according to the record extraction. In above half of all high risk cases the key prevention intervention was not given, which seriously undermines the efforts of the whole PMTCT programme. This intervention is short-term use of antiretroviral drug to reduce HIV transmission from mother to infant.
- **Modified delivery** is not recorded in 50.57% of n=261 HIV infected cases, which entails that half of all at-risk women did not have the promotion of safer delivery practices during delivery. These practices are designed to reduce the transmission of HIV from mother to infant during delivery. They include minimum per-vagina examination and non-rupturing of membranes during labour by midwives and obstetricians.
- **Nevirapine syrup** was not issued to 62.8% or n=132 of at-risk infants born to the 261 HIV- infected women. The protocol dictates that the syrup be issued up to within 72 hours of delivery as an ARV prophylaxis. One hundred and thirty two is significantly high figure. This indicates a serious flaw in the PMTCT programme at this particular hospital at the time.

Chapter 7

CONCLUSION

The prevalence of HIV is high in this setting (33%) and the prevalence of syphilis is seven times higher than the national prevalence. Every antenatal visit is an opportunity for offering voluntary counselling and testing. All women identified as having syphilis infection are at high risk of HIV and AIDS, with consequences of vertical transmission to their unborn infants. Therefore every woman identified and treated for syphilis should be counselled and tested for HIV and AIDS. Furthermore, the screening for syphilis is completely integrated into the routine practice of midwives and medical officers on duty; albeit day or night, weekend or night duty, the screening is done for all maternity clients booked and unbooked. This exceptionally good service provision can be learnt by the providers of counselling and screening for HIV in all maternity cases.

Women must be offered HIV and AIDS education at every ANC visit. Routine opt-out counselling should be offered at every antenatal care visit for those who have not been previously tested.

The accumulated missed opportunities for PMTCT are huge, and these undermine the response made to deal comprehensively with the epidemic of HIV and AIDS. Antenatal care of women who are HIV-infected and women of unknown HIV status includes the following factors, which can be offered routinely:

- Health information and education;

- Education about safer sex practices and HIV;
- Safe motherhood, including TB and malaria treatment;
- HIV testing and counselling;
- Partner HIV testing and counselling;
- Interventions to reduce the risk of MTCT;
- Infant-feeding counselling and support; and
- Diagnosis and treatment of STIs.

As a significant proportion of women (49.68%) had their HIV status as unknown in this setting, the women should have been considered as being at risk for MTCT, and should have been counselled accordingly during their interaction with healthcare professionals at this hospital. Furthermore, there are steps the healthcare professionals could have taken to prevent MTCT, and these include:

- Offering rapid testing with right to refuse during labour;
- Provide post-test counselling;
- Provide ARV prophylaxis to mother and infant as appropriate; and
- Providing a single dose of NVP for prophylaxis.

It was also apparent in the study that even though women had their status known and recorded as HIV infected, not all of them received modified delivery practices. Adherence to standard practices for delivery and to procedures that reduce foetal contact with maternal blood and secretions would have increased the chances for PMTCT during delivery. The following are interventions that reduce MTCT risk in labour and delivery:

- Antiretroviral treatment and prophylaxis following national protocols;

- Universal precautions;
- Minimal use of cervical examination;
- Avoidance of prolonged labour; routine rupture of membranes; unnecessary trauma such as episiotomies; and foetal-scalp monitoring;
- Minimizing risk of postnatal haemorrhage; and
- Safe transfusion practices

The study also assessed the interaction between mothers who had come to the hospital unbooked and healthcare professionals in the hospital after delivery, from which it was apparent that only one mother was counselled out of 58 such cases. After delivery, knowledge of HIV status can help the mother who is HIV infected to choose safer feeding options; initiation of ARV prophylaxis for the infant and access to HIV treatment can be provided, and the mother can be educated on how to care for herself.²³

Chapter 8

RECOMMENDATIONS

The following list comprises of recommendations that are being made following the study findings, to improve the service provided to women at Germiston Hospital.

- 8.1 Healthcare workers should have training and re-orientation on the need to use every opportunity in antenatal care and maternity wards to offer counselling and testing for HIV.
- 8.2 All health care workers especially midwives and medical officers should have training and re-orientation on HIV and AIDS in pregnancy, prevention of MTCT, and treatment and care of pregnant women, in order to increase the uptake of PMTCT.
- 8.3 All pregnant women who present at the facility for the first time in labour, as well as those who have delivered before arrival can still be offered counselling and testing. Furthermore, the infants born before arrival can still be given SD Nevirapine within 72 hours of birth, as the national treatment protocol covers these infants too.
- 8.4 At policy level the “Opt-out approach” should be adopted. With the opt-out approach, pregnant women are notified about Perinatal HIV and its prevention and are advised that an HIV test will be included in the standard battery of prenatal tests unless they refuse.

8.5 Highly active antiretroviral therapy (HAART) should be offered to pregnant women, and midwives should be trained and skilled in diagnosis and in applying World Health Organisation (WHO) staging for pregnant women infected with HIV.

8.6 Counselling services should be increased by having all health care workers, in particular midwives and medical officers in ANC, maternity wards and postnatal Care facilities integrating counselling into their routine service. This would enable the uptake of counselling to include even night times and weekends, since lay counsellors are not available after hours.

Figure 9 below illustrates further the recommendations made.

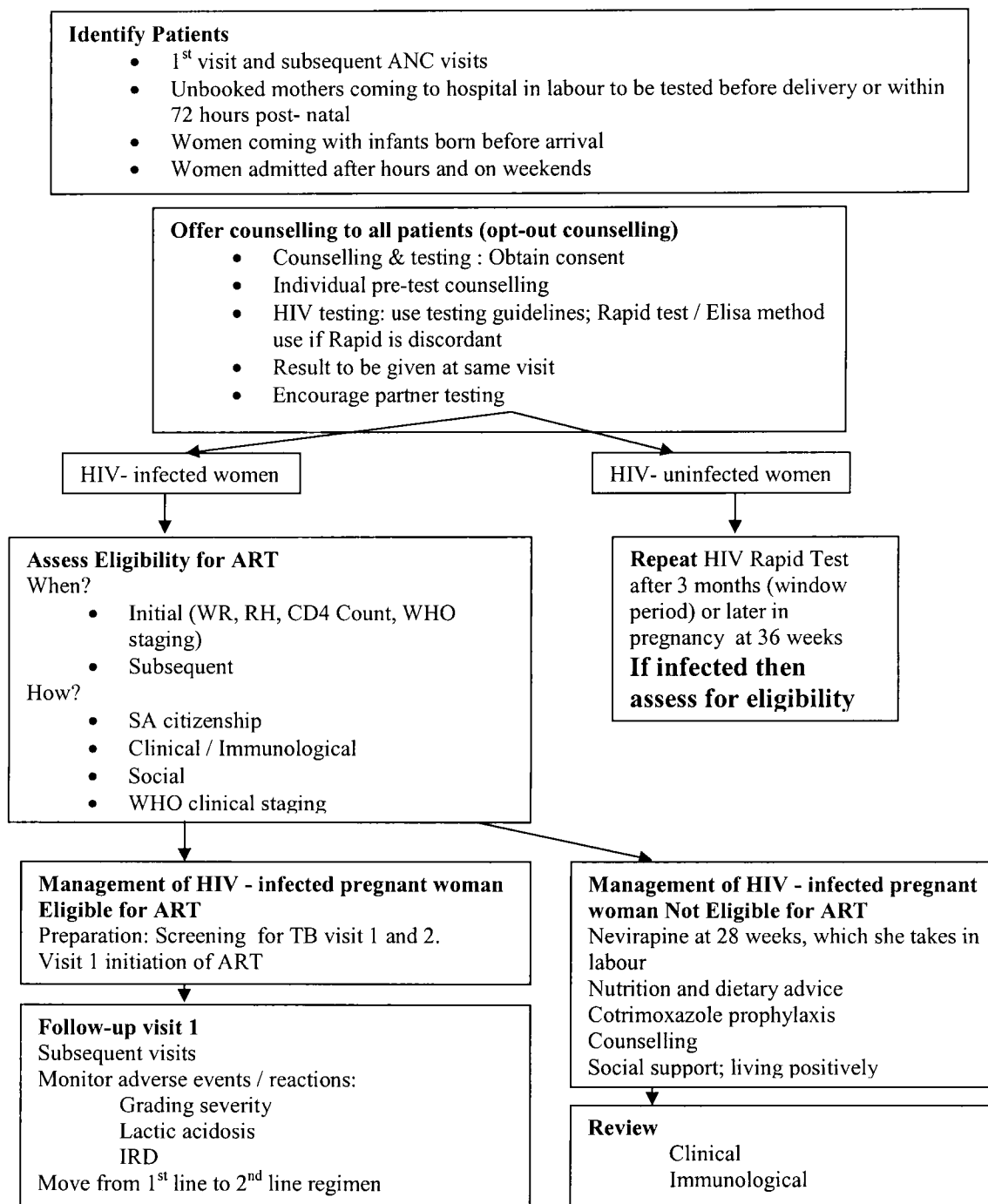


Figure 9: Diagram depicting recommended comprehensive ANC, including PMTCT programme.

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Appendices

(1). Questionnaire/ Checklist

Questionnaire number:

Rapid Epidemiological Assessment Of Missed Opportunity For The Prevention Of Mother To Child Transmission (PMTCT) Programme At The Germiston Hospital In 2004.

Hosp Id Number:

Age:

Parity:

Trimester at Registration:

Syphilis sero status:

W.R Results date:

Other STIs on record:

Y/N

Number of ANC visits before delivery:

Counselling Noted:

Y/N

Pre-test:

Y/N

HIV Test done:

Y/N

Post-test:

Y/N

HIV sero status:

Neg/Pos

Nevirapine given to Mother at 28/40:

Y/N

Nevirapine given to Mother at >28/40:

Y/N

NVP taken at home/transit/in hospital

Y/N

Unbooked case Counselling:

Y/N

Unbooked case NVP taken:

Y/N

Mode of delivery Modified:

Y/N

Counselling post-delivery:

Y/N

HIV-test post-delivery:

Y/N

Nevirapine administration to infant:

Y/N

Appendix (2)
Ethics Approval Certificate.