



The impact of access to antenatal care on maternal health outcomes among young adolescents on the North coast of KwaZulu-Natal, South Africa

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DECLARATION

The author hereby declares the content of this research project is the author's own unaided original work, except where specific indication is given to the contrary (by reference). This work has not been previously submitted to the Durban University of Technology (DUT) or any other University.

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PRESENTATIONS

Poster presentation at the Public Health Association of South Africa (PHASA) Conference, Southern Sun Elangeni, Durban, South Africa, 9th October 2015: The Impact of Access to Antenatal Care on Maternal Health Outcomes Among Young Adolescents on The North Coast of Kwazulu-Natal, South Africa: Govender T, Reddy P, Ghuman, S.

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ABSTRACT

South Africa, like many other developed countries, is challenged by the under attendance and delay in initiation of antenatal care (ANC) services among pregnant adolescents. Adolescents are more vulnerable to pregnancy related complications, which may contribute to maternal and child mortality and morbidity. This study aimed at evaluating the under attendance and/or delay in initiation of ANC services among young pregnant adolescents (13-16 years old) as a risk for adverse maternal and birth outcomes. The research was based at a district hospital on the North Coast of Kwazulu-Natal. A retrospective review of all young adolescent (13-16 years old) maternity case records for the period from 2011-2013 was conducted. Data collected included ANC trends in attendance, obstetric and perinatal outcomes.

A total of 314 pregnancies were recorded among young adolescents at this single hospital over a period of 3 years. Adolescent pregnancy was associated with a risk of late ANC booking and reduced ANC visits. The prevalence of anaemia (32%) was relatively high among the girls. Fifty percent of all adolescents received episiotomies while, 45(14%) experienced perineal tears. Logistic regression models found that the condition of perineum was significantly associated with HIV status (OR= 0.36; 95% CI=0.16; 0.84; $p<0.05$). HIV positive mothers were more likely to have an intact perineum post-delivery. However, HIV positive adolescents were twice as likely to be diagnosed with anaemia compared HIV negative mothers (results not significant). Underutilisation of ANC (i.e less than 4 visits) was significantly associated with lower gestational age (< 37 weeks) (OR=2.64; 95% CI=1.04; 6.74; $p<0.05$). Fifteen percent of young mothers delivered early (< 37 weeks), 10% delivered babies with a low birth weight (< 2500 g) and 15% of the neonates suffered fetal distress. Low birth weight, low Apgar scores as well as the incidence of maternal anaemia and Pregnancy Induced Hypertension (PIH) were found to be related to late ANC booking. Qualitative findings highlighted the perceived barriers of ANC by pregnant adolescents. Interviews identified the following as factors that hindered access of care; financial barriers, attitudes of Health Care Workers (HCW), system barriers and fear of HIV testing.

Urgent population based strategies are required to encourage timeous initiation of ANC among adolescents. Strengthening of health education programs on the benefits of ANC attendance among adolescents can be utilized as part of an approach to address the current public health concern.

DEDICATION

I dedicate this thesis to:

My late grandparents (Mr and Mrs Sambiah)

My parents (Rava and Logie Govender)

and siblings; (Sashlin and Karina Govender)

From you I derive my inspiration and my success is attributed to your unconditional love,
patience, and encouragement.

“Faith is confidence in what we hope for and assurance about what we do not see.”

(Hebrews 11:1)

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
BANC	Basic Antenatal Care
FDC	Fixed Dose Combination
LBW	Low Birth Weight
MDG	Millennium Development Goals
NDOH	National Department of Health
NND	Neonatal Death
NVD	Normal Vaginal Delivery
PHC	Primary Health Care
PIH	Pregnancy Induced Hypertension
PMTCT	Prevention of Mother to Child Transmission
SA	South Africa
SDG	Sustainable Development Goals
SGA	Small for Gestational Age
STI	Sexually Transmitted Infection
UTI	Urinary Tract Infection
VCT	Voluntary Counselling and Testing
WHO	World Health Organisation

LIST OF DEFINITIONS

Antenatal Care (ANC)

Refers to the health care rendered to pregnant women in the period of time before giving birth

Anaemia

A level of haemoglobin below 11g/dl.

Basic Antenatal Care (BANC)

Refers to the minimum level of ANC that every pregnant woman should receive.

Gravidity

The number of times a woman has been pregnant inclusive of the current pregnancy.

Gestational Age (GA)

Can be defined as how old the pregnancy is, and is described in weeks.

Late Booking

Defined as attending the initial ANC visit at the gestational age of 20 weeks and above.

Low Birth Weight (LBW)

A baby weighing < 2500 grams at birth.

Maternal death

The death of a pregnant woman during pregnancy until six weeks post-delivery.

Neonatal Death

A baby born alive that dies within the first month (28 days) of life.

Parity

The number of previous viable pregnancies (infants stillborn or alive).

Preterm

Pregnancy is less than 37 completed weeks.

Post Term

A pregnancy that exceeds 41 weeks of gestation.

Primigravidae

A woman who is pregnant for the first time.

Stillbirth

A baby born dead. It usually refers to babies weighing more than 500g.

Source of Definitions: (Pattinson 2005: 2-30)

CHAPTER 1

INTRODUCTION

1.1 Introduction to the study

Worldwide adolescent pregnancies pose a major public health concern, especially in sub-Saharan Africa. Statistics show that maternal mortality is 5% higher for young adolescents below sixteen years than in adults (Chaibva, Roos and Ehlers 2009: 14). Early childbearing, especially amongst teenagers, has consequences: demographic, socio-economic and socio-cultural. Adolescent mothers are at a higher risk of complications, which may result in higher mortality/morbidity for them and their babies during delivery (Philemon 2007:1). It is imperative for high-risk mothers to have appropriate antenatal care (ANC) (Young, Trotman and Thame 2007: 414-420). In a study conducted in Central Africa, young maternal age at delivery was proposed to be a risk factor for adverse pregnancy outcomes (Kurth *et al.* 2010: 1).

Globally, important gaps and variations are evident in child health, such as the irregular burden of infant and under five childhood mortality linked to deaths within the neonatal period (Bhutta *et al.* 2005: 520). Millennium Development Goal (MDG) 4 targets a reduction in the under-5 child mortality rate by two-thirds between 1990 and 2015 (United Nations 2013: 24-33). In South Africa (SA), maternal death has become a notifiable condition since 1997. Deaths of all pregnant women, or deaths occurring within the postpartum period of six weeks after delivery, were required to be reported to provincial departments of maternal and child health. Each maternal death is assessed by the National Committee for the Confidential Enquiries into Maternal Death. This assessment focuses on the cause, potentially avoidable factors, missed opportunities, and incidences of negligent care are recorded. Results of these maternal death enquiries are included in the Saving Mothers: Confidential Enquiries into Maternal Deaths in South Africa report (Pattinson 2005: 6). Millennium Development Goal 5 was concerned with the reduction of maternal mortality by 2015 (Mlilo-Chaibva 2007:2) and ANC plays a key role in the package of services aimed at improving maternal and child health (Pell *et al.* 2013: 1).

Young women within the age group 15-19 years contribute to more than fifteen million out of 35 million live births globally (United Nations 2013: 24-33). In SA pregnant adolescents access the same ANC services as adult clients due to challenges with health resources. The

existing health service needs to be able to provide services that are customised to suit the vulnerable group of adolescent clients (Duggan and Adejumo 2012: e63). Research in developed countries such as Canada, America and the United Kingdom indicated the following reasons for limited ANC utilization: acceptance and awareness of pregnancy, influence of chaotic lifestyles and perception that there are no benefits of ANC (Downe *et al.* 2009: 520-521). In SA common reasons for delay and the failure to initiate ANC were low socio-economic status, a lack of money for transport to an ANC clinic, having a partner with a low education level, a lack of knowledge on early initiation and not being aware of pregnancy (Mametja 2009: 72; Solarin and Black 2013: 363). Antenatal care services in SA are free of charge (Solarin and Black 2013: 360); however, costs are incurred in transportation to and from the clinic. Many young women are still at school and come from a poverty stricken background; this may contribute to non-attendance or late booking of ANC.

The promotion of access to ANC services will ensure the well-being of mothers and newborns which is pivotal in the prevention of maternal and child mortality (United Nations 2013: 24-33).

1.2 Background to the problem

The study was based at a District hospital on the North Coast of KwaZulu-Natal (KZN), located approximately 10km inland from a town called Verulam. The research site provided health care services to communities from the North Coast consisting of the following areas: Osindisweni, Ndwedwe, Hazelmere, Waterloo, Amaoti, Verulam and Tongaat. The hospital rendered ANC services which were free of charge to women of all ages. Adolescents and adults accessed maternity care services at the same queue. Pregnant adults and adolescents who booked for ANC at Primary health Care (PHC) clinics within the catchment area and were classified as high risk according to the Basic Antenatal Care (BANC) Guidelines, were referred to the ANC clinic based at the research site for further specialised care. These adolescents were referred to the hospital for further management of possible complications. Anecdotal evidence indicates poor attendance at ANC services and late booking by adolescent mothers. The researcher was motivated to pursue this study by the high rate of adolescent pregnancy and late ANC booking at the research site. Few community-based studies are available on barriers to accessing ANC in the South African context.



Figure1. Map of eThekweni including Verulam which was the nearest town to the research site (source: eThekweni – Durban Accommodation 2002).

1.3 Rationale of the study

The study is based at a public sector hospital on the North Coast of KZN; anecdotal evidence suggests that there is a high incidence of adolescent pregnancy in this area. Statistical records at the study site indicated that a total of 1407 girls below eighteen years gave birth at the institution between the years 2009-2013. The study population of adolescent girls between 13-16 years was chosen as young adolescents are a vulnerable group in society (Chigona and Chetty 2008: 262- 281). Identification and exploration of factors that influence access to ANC among young adolescent pregnancies are pivotal to improve attendance amongst this vulnerable group. An evaluation of ANC attendance trends, as well as the analysis of maternal health and birth outcomes during this study, will highlight the importance of early

initiation and continuity of ANC in mitigating adverse birth outcomes and poor maternal and child health.

1.4 Significance of the study

Early booking together with effective utilisation of ANC services form key strategies in reducing maternal and child mortality. Health promotion as part of the ANC package of services empowers women and promotes health during pregnancy, leading to good pregnancy and birth outcomes. This is in keeping with MDG 4 and 5.

Findings from the study can be used by the National Department of Health (NDOH) to implement strategies that will aid in developing youth friendly maternity services. By focusing on a specific population such as pregnant adolescents, reasons for late and under-utilisation of services can be determined. Recommendations to overcome service barriers and improve accessibility to ANC services can be derived from the study in order to enhance maternal health service delivery on the North Coast of KZN. In turn, this will improve maternal and neonatal health outcomes as well as reducing mortality.

1.5 Research problem

The under-attendance and delay in the initiation of antenatal care services amongst young pregnant adolescents may lead to adverse maternal health outcomes.

The following research questions were asked in order to address the problem statement:

- What factors can influence under-utilisation/non-utilisation of ANC services?
- How do pregnant teenagers perceive the quality of ANC that is provided?
- What can be done to encourage ANC attendance among young adolescents?
- What do pregnant adolescents perceive to be the benefits of ANC?
- What can be done to make ANC services more user friendly for adolescents?

1.6 Purpose of the study

The purpose of the study is to investigate the reasons for under-attendance and the delay in initiation of ANC as well as associated trends of attendance amongst adolescents. The association between attendance of ANC and adverse maternal and neonate health outcomes will be also be investigated.

1.7 Objectives

The study's objectives will attempt to:

- Assess the trends of ANC service utilisation by pregnant adolescents (13-16 years) over a three year period (2011-2013).
- Evaluate the maternal health outcomes related to young adolescent pregnancies.
- Identify factors that influence access to ANC among young pregnant adolescents.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the literature on the inherent problem of under-attendance and delay in the initiation of ANC services among young pregnant adolescents and the contributory factors as well as the obstetric outcomes.

2.1 Introduction

Teenage pregnancy and childbearing is a significant medical and social problem (Kara, Uygur and Yesildaglar 2003: 1). In 2010, there were 49 births per 1000 girls aged 15-19 reported worldwide. Fifteen to nineteen year-old girls were responsible for 11% of all births globally, the majority being in low and middle income countries (World Health Organization 2014). In the United States of America (USA), a 2012 report indicated that the live birth rate was 29.4 per 1000 women for the 15-19 age group; this was a record low for the USA (Teen pregnancy: The Importance of Prevention 2014). In comparison, a survey by Statistics South Africa: General Household Survey (2013: 30) revealed that 5.4% of females in the 14-19 years age group were pregnant during the twelve month period prior to the survey. In 2014 the Department of Education (DOE) recorded 20 000 learner pregnancies in the country, of which 223 were among primary school learners. Gauteng Province accounted for the highest number of learner pregnancies in the same year, which was 5000 (20 000 learners fell pregnant in 2014 2015). In the year 2015 the KZN department of Arts and Culture co-ordinated a girls summit in Ballito, Durban. The summit focused on the empowerment of girls in dealing with social problems such as teenage pregnancy and substance abuse (KwaZulu-Natal Government to Empower Young Girls 2015).

Numerous initiatives are aimed at preventing adolescent pregnancy in SA. Lovelife, a South African organisation founded in 1999, aims to reduce HIV/AIDS, Sexually Transmitted Infections (STI's) and teenage pregnancies. The South African Government has made contraceptives freely available to all persons over the age of twelve at hospitals and clinics (Mkalipi 2013). A key strategy by the South African Government in response to the HIV epidemic was the implementation of mandatory life skills-HIV/AIDS education in schools. In January 1998 'Curriculum 2005' was developed and was anticipated as being fully implemented by 2005. The principal goal of a life skills and HIV/AIDS education programme for grades 8-12 was to increase knowledge and develop skills, as well as promoting

responsible attitudes. In KZN, by the end of 2001, nearly all secondary schools had implemented a life skills education programme modelled according to the national initiative (Magnani *et al.* 2005: 290). Despite programmes implemented by both Governmental and Non-Governmental Organisations (NGO's), adolescent pregnancy is still a problem in SA (Teenage Pregnancy: Prevent and Support 2011).

Adolescent pregnancies are considered high risk (Chaibva, Roos and Ehlers 2009: 14). Due to adolescent mothers being at higher risk of pregnancy-related and birth complications, increased mortality and morbidity for both the mother and the child during delivery are of a greater consequence (Philemon 2007: 1; Patton *et al.* 2009: 884; Mayor 2004: 1152). Pregnant adolescents are known to delay entry into ANC too late in pregnancy, or do not access care at all (World Health Organization 2007: 33). A study conducted among adolescent mothers in Bulawayo found the following factors to influence the non-utilisation of ANC services: socio-economic issues, the individual's perceptions about ANC, limited knowledge about ANC, policies and structural barriers. Adolescents in the study sample were knowledgeable that delivering with skilled attendance could improve the outcomes of both the mother and the baby (Chaibva, Roos and Ehlers 2009: 14).

2.2 Antenatal Care (ANC)

Antenatal care can be defined as the care rendered during pregnancy, which includes the identification of risk factors, early diagnosis of complications during pregnancy, together with remedial and preventative actions such as appropriate management and health education (Department of Health 2007: 8). Screening for and the detection of numerous health complications occurring before childbirth form an important part of ANC. Antenatal care can aid in detecting and treating anaemia and other chronic diseases such as HIV and tuberculosis. Enrolment into maternity care services can substantially improve the outcome for the unborn baby, allowing for detection and treatment of maternal infections which are potentially dangerous to the baby (Pattinson 2005: 5).

The WHO advises that all pregnant women with an uncomplicated pregnancy should access a minimum of four ANC visits during pregnancy (World Health Organization 2006: 1). Ideally, the first ANC visit should be initiated as early as possible, preferably in the first trimester (World Health Organization 2006: 4). During the first visit a general assessment of the woman's health should be conducted. Suitable corrective action of treatment for underlying conditions should be implemented, if required, thus ensuring that the woman maintains good

health during pregnancy and for birth. An antenatal assessment close to the expected date of delivery is also recommended; this is done to ensure that appropriate corrective actions are taken to prevent problems during birth (World Health Organization 2006: 4).

2.3 Antenatal care in South Africa

Antenatal care services in SA are available free of charge. Current guidelines state that all PHC facilities should screen pregnant women on the first visit to the clinic, preferably before 20 weeks of gestation (Solarin and Black 2013: 360). On suspecting pregnancy, women are expected to seek care at the nearest appointed antenatal clinic as soon as possible to access service on the same day (Solarin and Black 2013: 360). The SA Department of Health Maternal Health guidelines (2007: 20) state that ANC should commence at a woman's first visit to the clinic, even if the first visit was merely to confirm a pregnancy. Furthermore, it is a policy of the DOH that no-one should be refused public health care regardless of whether or not a person has a South African identity document (Solarin and Black 2013: 363).

South Africa has been utilising the approach recommended by the South African Nursing Council (SANC) Act No. 50 of 1978, which is included in the scope of practice for midwives. This entails that a midwife should ensure that a pregnant woman presents herself to clinic for ANC once every month until 28 weeks of gestation, and thereafter every two weeks until 36 weeks of gestation; after 36 weeks she should be seen weekly up until delivery (South African Nursing Council 1990). According to this approach, a woman should have up to twelve ANC clinic visits during the course of one pregnancy (Ngxongo and Sibiya 2014: 907), however, this approach has been disregarded by the WHO (Villar *et al.* 2001: 7). In 2007 SA responded to the recommendations by the WHO, and a different ANC approach called Basic Antenatal Care (BANC) was adopted and substituted for the previous programme (Ngxongo and Sibiya 2014: 907).

Basic antenatal care refers to the most basic level of ANC that every pregnant woman should obtain. The care has been simplified to enable every clinic sister to be able to perform the necessary tests and measures. The BANC programme is supported by a comprehensive system of flow charts based on the principles of the Integrated Management of Childhood Illnesses (IMCI) programme (Pattinson 2005: 7-8; Ngxongo and Sibiya 2014: 908).

The process of implementing the BANC programme was first initiated as a pilot project in the eThekweni district at a few facilities at the North Sub-district in 2007. The pilot group

comprised of both eThekweni municipality and KwaZulu-Natal Provincial Administration (KZNPA) facilities. The rest of the facilities were anticipated to initiate the BANC programme in 2008 (Ngxongo and Sibiya 2014: 908). Research by Ngxongo and Sibiya (2014: 910-911), which investigated the challenges associated with the roll out of BANC in PHC facilities in eThekweni, found the following to impede the implementation process:

- Lack of training of midwives on BANC.
- Shortage of staff.
- Lack of co-operation from referral hospitals.
- Lack of material resources.
- Poor support of facility management.
- Challenges with transportation of specimens.
- Unavailability of BANC guidelines.

Due to the above barriers it was found that only a few facilities have been successful in executing the BANC programme, while others have either not begun or were unsuccessful in sustaining the programme and returned to the pre-existing ANC programme (Ngxongo and Sibiya 2014: 906).

Clinic checklist: Follow-up visits
(Back page of first visit checklist)

[illegible]

Figure 2: The BANC clinic checklist follow-up visit (source: Pattison 2005: 14).

Part 2 - Checklists

Clinic Checklist – Classifying (first) visit

Name of patient _____	Clinic record number	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Address _____	Telephone _____						
_____	Cell _____						

INSTRUCTIONS: Answer all the following questions by placing a cross mark in the corresponding box

	No	Yes
Obstetric History		
1. Previous stillbirth or neonatal loss?	<input type="checkbox"/>	<input type="checkbox"/>
2. History of 3 or more consecutive spontaneous abortions	<input type="checkbox"/>	<input type="checkbox"/>
3. Birth weight of last baby < 2500g?	<input type="checkbox"/>	<input type="checkbox"/>
4. Birth weight of last baby >4500g?	<input type="checkbox"/>	<input type="checkbox"/>
5. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?	<input type="checkbox"/>	<input type="checkbox"/>
6. Previous surgery on reproductive tract (Caesarean section, myomectomy, cone biopsy, cervical cerclage,)	<input type="checkbox"/>	<input type="checkbox"/>
Current pregnancy		
7. Diagnosed or suspected multiple pregnancy	<input type="checkbox"/>	<input type="checkbox"/>
8. Age < 16 years	<input type="checkbox"/>	<input type="checkbox"/>
9. Age > 40 years	<input type="checkbox"/>	<input type="checkbox"/>
10. Isoimmunisation Rh (-) in current or previous pregnancy	<input type="checkbox"/>	<input type="checkbox"/>
11. Vaginal bleeding	<input type="checkbox"/>	<input type="checkbox"/>
12. Pelvic mass	<input type="checkbox"/>	<input type="checkbox"/>
13. Diastolic blood pressure 90 mmHg or more at booking	<input type="checkbox"/>	<input type="checkbox"/>
General medical		
14. Diabetes mellitus on insulin or oral hypoglycaemic treatment	<input type="checkbox"/>	<input type="checkbox"/>
15. Cardiac disease	<input type="checkbox"/>	<input type="checkbox"/>
16. Renal disease	<input type="checkbox"/>	<input type="checkbox"/>
17. Epilepsy	<input type="checkbox"/>	<input type="checkbox"/>
18. Asthmatic on medication	<input type="checkbox"/>	<input type="checkbox"/>
19. Tuberculosis	<input type="checkbox"/>	<input type="checkbox"/>
20. Known 'substance' abuse (including heavy alcohol drinking)	<input type="checkbox"/>	<input type="checkbox"/>
21. Any other severe medical disease or condition	<input type="checkbox"/>	<input type="checkbox"/>

Please specify _____

A yes to any ONE of the above questions (i.e. ONE shaded box marked with a cross means that the woman is not eligible for the basic component of antenatal care)

Is the woman eligible (circle) No Yes

If NO, she is referred to _____

Date _____ Name _____ Signature _____

(Staff responsible for antenatal care)

Figure 3: Clinic checklist-classifying first visit (source: Pattinson 2005: 14).

The aim of BANC was to ensure that all pregnant women attend ANC clinics at least four times during their pregnancy; ideally the first visit should be initiated before twelve weeks of pregnancy, with the first follow-up visit at 20 weeks (Figure 1). This programme enables women to be screened in order to allow the accurate categorisation of patients as high- or

low-risk during pregnancy (Figure 1) (Pattinson 2005: 10-17; James, Rall and Strumpher 2012: 2).

A BANC handbook compiled in 2005 has been made available to health care workers (HCW) as a guideline document in providing basic ANC services. This handbook consists of checklists and information which guide the HCW in providing BANC, including the categorisation of high-risk pregnancies and referral to the next level of care (Pattinson 2005: 13-14). According to the BANC clinic checklist, classifying (first) visit (Figure 3), adolescents < 16 years of age are considered as high-risk and are not eligible for basic care at a PHC level (Pattison 2005: 14).

Patients diagnosed as high-risk or with pregnancy-related complications are referred to a tertiary healthcare facility for further care and management (Figure 3) (Pattinson 2005: 10; James, Rall and Strumpher 2012: 2). Younger women, as opposed to those in the 20-34 years age category, are less likely to be informed of the signs of pregnancy or of the special screening tests that are required during pregnancy (Macleod and Tracey 2010: 7). Late presentation for pregnancy care is a persistent problem in South Africa (Macleod and Tracey 2010: 7). Despite efforts taken at National and local levels, SA itself and the KZN Province continue to have high rates of maternal and peri-natal mortality (Hoque, Hoque and Kader 2008: 66). In KZN, the top three causes of maternal deaths between 2008 and 2010 were non-pregnancy-related infections (48%), hypertensive disorders (10%) and obstetric haemorrhage (9%) (Moran and Moodley 2011). Primary causes of maternal death in SA include non-pregnancy-related infections (HIV infections complicated by TB, pneumocystis (PCP) and pneumonia), obstetric haemorrhage, and complications of hypertension in pregnancy and pregnancy-related sepsis (Department of Health 2013a: 19). It has been found that maternal health programme efforts in developing countries are grossly deficient, more especially in rural areas (Hoque, Hoque and Kader 2008: 66).

In the past, access to maternal health services posed major challenges for rural and black communities in SA; however, the political transitions in 1994 brought many positive changes (Hoque, Hoque and Kader 2008: 66). The most promising change included the introduction of free maternal and child (age < 6 years) health care. Antenatal care is provided in accordance with National protocols and guidelines at all public health care facilities in SA (Hoque, Hoque and Kader 2008: 66). The South African Government, in an attempt to limit maternal and neonatal deaths in the country, have developed and introduced guidelines to be

utilised during the care of a maternity patient (Department of Health 2006: 2), as well as guidelines for the management of neonatal emergencies (Department of Health 2008: 4). In 1999 the Minister of Health established the National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD) through the National Policy Health Act, No 116 of 1990, to support the goal of developing guidelines to assist with the care of maternity patients (Department of Health 2006: 9). Reports from NCCEMD (Department of Health 2006: 7) revealed that there was poor to non-attendance of ANC clinics by pregnant adolescents, in spite of free ANC services offered at public institutions (James, Rall and Strumpher 2012: 2).

Antenatal care plays a pivotal role in obstetric and perinatal care, as it forms part of preventative medicine and is essential to obtain optimal pregnancy outcomes (World Health Organization 2004: 43). Maternal conditions such as anaemia, hypertension, pre-eclampsia, medical diseases (diabetes mellitus, epilepsy, HIV complications), STD's and malnutrition can all be successfully treated in pregnancy (Pattinson 2005: 6). Antenatal care is considered as much more than a health screening procedure, as pregnant women require social contact with a HCW and reassurance as well as answers to many questions and concerns (World Health Organization 2004: 43).

2.4 Pregnant Adolescents and the Role of ANC

An adolescent pregnancy is considered as high-risk due to the mother's physical and psychological immaturity (Mlilo-Chaibva 2007: 18). Antenatal care enables pregnant teenagers to recognise and respond to the signs and symptoms of obstetric complications. Various studies have revealed that most pregnant adolescents attend their first ANC visit only during the second and third trimester of pregnancy (Mlilo-Chaibva 2007: 19; Myer and Harrison 2003: 268; Gross *et al.* 2012: 6). Skilled ANC services can prevent pregnancy and childbirth-related causes of morbidity and mortality amongst pregnant teenagers; however, some teenagers deliver without attending ANC at all (Mlilo-Chaibva 2007: 19). Early booking of ANC is pivotal to ensure the timeous detection and treatment of adverse pregnancy-related outcomes. Pregnant women in developing countries are advised to access ANC services within the first four months of pregnancy (World Health Organization 2006: 1). Antenatal care is recommended within the first twelve weeks of gestation in developed countries such as the UK (Trinh and Rubin 2006: 1). Antenatal care plays a pivotal role in obstetric and perinatal care. In the past, much emphasis was placed on the number of ANC visits whereas more recently the focus has shifted to the content of ANC services and the

importance of early booking (World Health Organization 2007: 31). The United States Public Health Service Expert Panel on Prenatal care advises pregnant women to make the first visit for ANC within the first eight weeks of gestation, and ideally recommend preconception care early enough in order to recognise and treat health conditions that could affect the foetus (Trinh and Rubin 2006: 1). Late ANC is classified at a cut-off point of 20 weeks in developed countries such as Australia, as well as developing countries including SA (Trinh and Rubin 2006: 1).

In a South African study based in ANC clinics in the Eastern Cape Province, adolescents indicated that they felt afraid and embarrassed when attending the clinic as they were young. Clients also expressed that system barriers posed challenges, and that coming to clinic early was a waste of time due to long waiting times (James, Rall and Strumpher 2012: 6). In this study the barriers that affect access to ANC clinics in the context of KZN will be addressed. Financial costs may pose barriers to adolescents accessing care; this may lead to a delay in the decision to seek care (World Health Organization 2007: 42). Teenagers may be overwhelmed with feelings of intense fear, guilt, depression, denial, inadequacy and feelings of being trapped. Preoccupation with these feelings may lead to a delay in the initiation of ANC. Once an adolescent chooses to seek care or is advised by someone to seek care, she may not know where to access care and this could also result in a late ANC booking (Montgomery 2003: 250).

2.5 Benefits of Early ANC Attendance

During the first ANC visit, women are issued with an antenatal card and will be rendered the 'first visit' ANC services. The first visit is of great importance as gestational age and risk factors can be determined; there is no need to wait for the second visit for these assessments to be finalised. After initiating the first ANC visit, a woman is regarded as 'booked' for ANC clinic (Department of Health 2007: 20). Antenatal care, when booked early in pregnancy and continued until after delivery, is more beneficial in preventing adverse pregnancy outcomes (Belayneh, Adefris and Andargie 2014: 1). Early initiation of ANC allows for prompt identification of high risk pregnancies and other potential health problems and allows for the implementation of early interventions (Solarin and Black 2013: 360). Research in Zambia among pregnant women of various ages (n=613) found no association between maternal age and late ANC booking. Women who conceived unintentionally had a higher odds ratio of starting ANC late in both rural [4.2 times (AOR= 4.258; 95% CI= 1.631, 11.119)], and urban

[3.1 times (AOR=3.103; 95% CI=1.261, 7.641)] settings (Banda, Michelo and Hazemba 2012: 34). A study conducted in Ethiopia among women 20-30 years of age found that women aged ≤ 25 were nearly two times more likely to commence ANC early by comparison with women > 25 years of age (OR=1.85; 95% CI= 1.10, 3.09) (Gudayu, Woldeyohannes and Abdo 2014: 3). Adolescents who visited ANC clinics regularly were better prepared for childbirth than those who did not. Early diagnosis and treatment of complications help to improve the likelihood of good pregnancy outcomes for both mother and baby (James, Rall and Strumpher 2012: 8).

Numerous studies from developed and developing countries have revealed a positive relationship between good ANC and positive obstetric outcomes for both mother and child (Treffers *et al.* 2001: 116; Ashraf-Ganjoei, Mirzaei and Anari-Dokht 2011: 112; Raatikainen *et al.* 2005: 157). A study by Belayneh, Adefris and Andargie (2014: 4) revealed that women who booked ANC earlier in their former pregnancy were more likely to initiate ANC earlier for their current pregnancy. This is indicative that patients were counselled on the importance of timely ANC initiation in previous ANC visits, which influenced early booking in successive pregnancies. It is argued that if good ANC is provided pregnant adolescents may not be considered as a high risk group (Chen *et al.* 2008: 693).

An important function of ANC is to provide health education and services that can notably boost the health of pregnant women and infants (Simkhada *et al.* 2007: 245). The benefits of giving birth under medically controlled conditions can also be emphasised during antenatal education (Adjiwanou and LeGrand 2013: 26).

During the antenatal period pregnant women are provided with a variety of important pregnancy-related health information in the form of verbal education and written information such as posters and pamphlets. Pregnant women are educated on the following:

- The five danger signs and symptoms during pregnancy: severe headache, abdominal pain, drainage of liquor from the vagina, vaginal bleeding and reduced foetal movements. A pregnant woman who encounters any of the above symptoms is advised to report to the clinic/hospital promptly, as well as to take her ANC card with her.
- Self-care during pregnancy, which is inclusive of dietary requirements; exercise; personal hygiene; breast care; use of medications and substance abuse.

- A delivery plan: at the end of the first ANC visit all pregnant women should receive a temporary birth plan which should contain the following information: estimated date, place and mode of delivery; personnel conducting the delivery (either doctor or midwife); pain relief options; as well as a transport plan in the event of an emergency.
- Newborn and infant care: feeding options and follow-up care such as immunisations.
- Family planning: method of contraception post-delivery (Department of Health 2007: 28).

Antenatal care during pregnancy has been noted to have a favourable impact on the usage of postnatal health care services. Empirical evidence displays that four visits are adequate for uncomplicated pregnancies and more visits are required only in cases of complications (Simkhada *et al.* 2007: 245); thus the WHO recommends at least four visits during pregnancy (World Health Organization 2006: 1). Pregnant teenagers require intensive integrated ANC. The absence of such care can be harmful to both mother and foetus. Adolescents who do not access ANC miss out on the opportunity to have sufficient nutritional and social support services provided; nor do they benefit from early diagnosis and management of pregnancy associated complications which may affect pregnancy and birth outcomes (Chandra *et al.* 2002: 121-122).

2.6 Late ANC Booking among Adolescents

Many younger women attend antenatal testing only in their second or third trimester (Macleod and Tracey 2010: 18). The lack of knowledge regarding the importance of antenatal consultations may be reasons attributed to the late attendance (Macleod and Tracey 2010: 7). The late initiation of ANC may be attributed to numerous reasons. The adolescent may be unaware of the pregnancy due to lack of knowledge on the signs of pregnancy, which may sometimes only be identified upon having missed a number of menstrual periods (Montgomery 2003: 249). Research in Uganda found a lower number of ANC visits amongst adolescents, compared with adult women in first time pregnancies (Gross *et al.* 2012: 8). Non-attendance and late attendance for ANC have been listed among the top five preventable causes of perinatal deaths in South Africa's Saving Babies report. Further, the report identifies non-attendance and infrequent attendance for ANC as two of the common causes of patient-related maternal mortality (Solarin and Black 2013: 359). Findings from research in three Johannesburg public health facilities amongst women of different ages reported that

almost a third of women attended ANC in order to get an antenatal card, and, therefore, quicken their access to care when they went into labour. Furthermore, a fifth reported that they would have attended earlier only if they had felt sick (Solarin and Black 2013: 365).

The majority of adolescent mothers sampled in a Turkish study were found to have lacked ANC (1386/1800; 77 %) (Yildirim, Inal and Tinar 2005: 250). The findings of a study conducted in Central Africa concurred with this, indicating that adolescents attended significantly fewer ANC visits than adults (3.3 ± 1.9 versus 4.4 ± 1.9 mean visits, $p < 0.01$, $n = 356$) (Kurth *et al.* 2010: 1). A comparative analysis of the use of maternal health services in Sub-Saharan Africa indicated that teenage mothers started ANC even later and had poorer maternal health care in comparison with adult mothers (Gross *et al.* 2012: 2). Research based in the rural setting of the Hlabisa district in the KZN Province indicated that the majority of women in this setting do not perceive major health threats during pregnancy, and in turn feel that more than one ANC visit is unnecessary (Tshabalala 2012: 26). They do, however, recognise labour and delivery as a time of significant health risks that need medical attention; the majority of these women prefer to give birth in a health facility (Tshabalala 2012: 26). A study in Nigeria among women of various ages indicated similar findings, where most women initiated ANC late due to the perception that there were no advantages in booking for ANC in the first trimester (Ndidi and Oseremen 2010: 51). There is some contradiction in the belief that health care is important for childbirth but not during pregnancy; this has led to majority of the women's main reason for seeking ANC in this setting, that is to receive an antenatal attendance card which is required to deliver at a health facility only (Tshabalala 2012: 27).

In a study undertaken in Zambia, the long waiting time at ANC clinics was revealed to impede access to services in the recommended period (Banda, Michelo and Hazemba 2012: 34). Late visits may be attributed to a poor understanding of the significance of early booking. Other factors responsible for late bookings could be cultural practices and socio-economic factors related to transport costs (Hoque, Hoque and Kader 2008: 66). Perceptions of pregnant teenagers on the ANC clinic environment revealed that pregnant adolescents felt the clinic environment was non-accommodating of their needs as adolescents. They reported the environment as unwelcoming and that they were treated disrespectfully, thus they stayed away from the clinic (James, Rall and Strumpher 2012: 8).

2.7 Number of ANC visits during pregnancy

According to the WHO (2006: 1), all pregnant women with an uncomplicated pregnancy should access at least four ANC visits during the course of one pregnancy. Research in Uganda in 2015 among women of various ages found that most women did not complete the recommended four ANC visits, and almost half of the respondents were not aware of the recommended number of visits (n=400). Insufficient ANC utilisation in Uganda is a contributory factor to the high rates of maternal and neonatal mortality (Kawungezi *et al.* 2015: 1-2). Results indicated that the number of ANC visits was associated with occupation (Pearson chi p=0.001). The majority of civil servants completed four ANC visits while close to half of those who were self-employed did not complete the recommended number of visits. Antenatal care visitation was also influenced by parity; almost half of the primigravidae did not complete the four visits (p=0.04) (Kawungezi *et al.* 2015: 7).

In Kenya, research among pregnant women of different ages indicated that the majority of participants (196; 51.9%) attended the recommended number of four or more ANC visits, while 182 (45.2%) had fewer than four visits and 25(6.2%) did not attend ANC at all (n=403) (Asweto *et al.* 2014: 156). Currently, ANC services are available free of charge in Sweden with a utilisation rate of up to 99%. Antenatal care services are mainly provided by midwives, and during an uncomplicated pregnancy a woman can access up to 10-12 visits in the public health sector during the course of a single pregnancy in Sweden (Byrskog *et al.* 2015: 2). Research undertaken in Sweden among pregnant women of various ages (n=3061) indicated that the majority of respondents found it preferable to follow the standard schedule of ANC visits (2142; 70%), while 23 % of respondents preferred more frequent visits (Hildingsson, Waldenstrom and Radestad 2002: 122). The following factors were found to be associated with the preference for fewer ANC visits: parity and number of children, age, civil status, education, obstetric history, previous birth experience and timing of pregnancy. Younger women aged < 25 years favoured more ANC visits (n=626; 21%); (RR 1.2; 1.1, 1.4; p<0.03), while older women preferred fewer visits (n=316; 10%); (RR 1.9; 1.3, 2.6; p<0.001) (Hildingsson, Waldenstrom and Radestad 2002: 122).

A study in Ethiopia revealed that those women who attended four and more visits during pregnancy were 2.39 more likely to book earlier by comparison with those who booked late (n= 369); (p < 0.05); (AOR = 2.39; 95% CI= 2.23, 9.86) (Belaynah, Adefris and Andargie

2014: 3). Pregnant teenagers suffer the most in not obtaining early and adequate ANC (Tilghman and Lovette 2008: 51).

2.8 Maternal Nutrition and Lifestyle

Adolescents are known to indulge in energy-dense and micro-nutrient deficient diets. During pregnancy dietary intake of folate, iron and vitamin D are of great concern. Micronutrient deficiency during pregnancy has been associated with adverse pregnancy outcomes (Whitworth and Cockerill 2010:324). Women who are malnourished are at an increased risk of complications during pregnancy (including death) than women who are not malnourished. Anaemia is one of the early indicators of malnutrition (Pattinson 2005: 28). Malnutrition is commonly a sign of poor economic status. Screening for malnutrition occurs during the first ANC visit, where the woman's weight and height are measured and Body Mass Index (BMI) calculated. A pregnant woman with a BMI of $< 18.5\text{kg/m}^2$ is indicative of malnutrition, while a BMI of $> 32.3\text{kg/m}^2$ indicates obesity. When malnutrition is identified during the antenatal period the woman is referred to the social worker for further assistance; she may also be given food parcels or food supplements if necessary (Pattinson 2005: 28).

The health status of the adolescent mother and infant are greatly influenced by nutritional status before and during pregnancy (Stang, Story and Feldman 2005: 4). Nutritional assessment and counselling plays a pivotal role in pre-conception, antenatal and postpartum health services (Stang, Story and Feldman 2005: 4). The adolescent's nutritional burden is increased by nourishing a growing foetus, especially if her own growth is still incomplete (Rolfes, Pinna and Whitney 2008: 483). Adolescents are exposed to poor nutrition, recreational drugs, tobacco, alcohol, emotional stress and inadequate ANC. These problems may be associated with low birth weight babies (Chandra *et al.* 2002: 117). Pregnant adolescents may stand a greater possibility of nutritional-related problems such as iron deficiency anaemia and poor weight gain (Stang, Story and Feldman 2005: 10). In Malaysia research among women of childbearing age ($< 20 - < 40$ years of age) indicated a prevalence of anaemia amongst 46% of young mothers < 20 years (Haniff *et al.* 2007: 534). Research by Raatikainen *et al.* (2005: 160) indicated that smoking and anaemia were revealed to be risk factors in teenage pregnancies.

In the South African public health sector, ANC clinics provide the following supplements to all pregnant women at no cost:

- Ferrous sulphate tablets 200 mg (daily) which assists in the prevention of anaemia.
- Calcium tablets 1000mg (daily) which prevents complications from pre-eclampsia.
- Folic acid tablets 5mg (daily); which prevents neural tube as well as other birth defects in the foetus (Department of Health 2007: 26).

Folic acid supplements are of great importance in the first twelve weeks of pregnancy, as rapid brain and nervous system development are occurring in the foetus at this stage (Folic Acid in Pregnancy 2013). Antenatal care aims at improving the nutritional status of pregnant women as well as optimising health during pregnancy (Pattinson 2005: 5). Good nutrition together with abstinence from smoking, alcohol and other drugs can improve the outcomes of teenage pregnancies (Rolfes, Pinna and Whitney 2008: 500).

2.9 Antenatal Management of HIV/AIDS and Prevention of Mother to Child Transmission (PMTCT) during pregnancy

In a country where a third of pregnant women are infected with HIV/AIDS, early initiation of ANC is crucial in order to optimise Antiretroviral Therapy (ART) initiation, thus aiding in the reduction of maternal mortality and paediatric HIV infection (Solarin and Black 2013: 366). South African youth aged 15-24 years old are at a higher risk of HIV infections than any other age groups (Hoque and Ghuman 2011: 3711). In recent years, STI's have occurred predominantly among young people, with the 15-24 years age group accounting for the highest rates of STI's (Hoque and Ghuman 2011: 3711).

Reproductive health outcomes of teenagers may be further complicated by HIV infection (Obare, Van der Kwaak and Birungi 2012: 2). Furthermore, experiencing repeated unplanned pregnancies indicates greater exposure to unprotected sexual intercourse, which has health consequences for those who are HIV-positive in terms of the high risk of re-infection with another strain of the virus (Obare, Van der Kwaak and Birungi 2012: 2). There is little understanding of the experiences of unplanned pregnancies and poor pregnancy outcomes amongst HIV-positive teenagers as opposed to that of the general population (Obare, Van der Kwaak and Birungi 2012: 2). A major concern regarding childbirth is the vertical transmission of HIV from mother to child during pregnancy, labour and post-birth via breastfeeding. The presence of other STD's (syphilis, gonorrhea and Chlamydia) with local

inflammation can increase the possibility of viral shedding, hence increasing the risk of transmission during labour (World Health Organization 2004: 24). The provision of maternal antiretroviral therapy during gestation can lower transmission, predominantly through the reduction of viral load (World Health Organization 2004: 24).

Early Voluntary Counselling and Testing (VCT) should be offered to all pregnant women for improved maternal and child health care. This enables women who test positive to start preventative interventions early, thereby reducing the risk of Mother to Child Transmission (MTCT) (Tshabalala 2012: 24-25). In SA VCT is conducted during the first ANC visit and thereafter repeated at 32 weeks of gestation (Department of Health 2007: 28). Effective ANC services are able to identify risk factors and implement treatment and further management, and will be of great benefit to pregnant adolescents (Mlilo-Chaibva 2007). An important intervention in the PMTCT is the early ART for HIV positive mothers (Solarin and Black 2013: 360). In SA this is of particular importance as antenatal sero-prevalence is 30.2% (Solarin and Black 2013: 360). Antiretroviral Therapy has been noted to decrease MTCT in most developed countries to 1%, however, studies conducted in SA have revealed HIV-transmission rates, while greatly decreased, are still sub-optimal at approximately 5-7% (Solarin and Black 2013: 360). HIV-positive pregnant women require special care and support during pregnancy to ensure optimum health (Tshabalala 2012: 24-25).

2.10 Obstetric and Reproductive Outcomes in Adolescent Pregnancies

Adolescent pregnancy is a global public health problem and has been linked to complications such as premature birth, low birth weight; perinatal mortality; and increased infant mortality. In developing countries it has been noted that adolescent mothers were at a greater risk of maternal anaemia, pre-term birth and caesarean (C-section) delivery (Yadav *et al.* 2008: 141).

Pregnancy is a physiological state of stress on the body and predisposes women to many other illnesses. Mortality due to pregnancy and childbirth-related complications is twice as likely to occur in the adolescent group as compared with non-adolescents (Saxena *et al.* 2010: 16). Adolescent pregnancy poses many concerns for the adolescent, her unborn foetus and her immediate family. Concerns arise mainly from the fact that should further complications occur, two lives are at risk (James, Rall and Strumpher 2012: 1). Pregnant adolescents below the age of seventeen years have a higher occurrence of medical complications involving mother and child by comparison with adult women (Klein 2005: 283). It is often debated whether unfavourable reproductive outcomes in adolescent pregnancy are due to social,

economic and behavioural factors rather than the biological effect of young age (Yadav *et al.* 2008: 141). Research has indicated that the initiation of early and frequent ANC decreases foetal death and other maternal complications (Tilghman and Lovette 2008: 51). Some researchers regarded pregnant adolescents not to be a high risk group if good ANC was provided (Chen *et al.* 2007: 372). Factors that contributed to favourable outcomes in teenagers were superior myometrical function, greater connective tissue elasticity, and lower cervical compliance. There was no difference in mode of delivery noted between the younger and older teenagers (Gupta, Kiran and Bhal 2008: 170).

It is crucial for adolescents, being a high risk group, to have access to appropriate and adequate ANC, thereby allowing for the early identification and management of risk factors associated with adverse outcomes (Young, Trotman and Thame 2007: 415). Advocating early and extensive ANC use is a crucial strategy in the improvement of outcomes in adolescent pregnancies (Omar *et al.* 2010: 222).

2.11 Risk Factors Associated with Adolescent Pregnancies

2.11.1 Birth Weight & Preterm babies

A study by Mukhopadhyay, Chaudhuri and Paul (2010: 494) found that adolescent mothers were at higher risk of complications such as preterm births, stillbirths, neonatal deaths, and delivered low birth weight babies by contrast with adult primigravidae mothers. Adolescent pregnancy has been associated with a notably increased risk of preterm births and low birth weight (LBW) babies (Yadav *et al.* 2008: 141). It is more likely for adolescent mothers (fourteen years and below) than other age groups to give birth to underweight babies, and this is more prominent in black adolescents (Klein 2005: 283). The prevalence of having low infant birth weight among teenagers was more than double the rate for adults (Klein 2005: 283). Findings by Gupta, Kiran and Bhal (2008: 165-168) indicated that a higher risk of preterm labour (< 37 weeks) was noted amongst the young adolescent group (seventeen years and below) when compared with the older adolescent group. A study based in Central Africa on risk factors associated with adolescent pregnancy indicated that adolescents (≤ 16 years of age) were at an increased likelihood of delivering a baby with low birth weight in univariate analysis than adult women ($n=591$; women of various ages); (OR= 2.9; 95% CI= 1.5, 5.6; $p < 0.005$) (Kurth *et al.* 2010: 1-2).

Similar results were reported by Yuldrim *et al.* (2005: 249) in Turkey; low birth weight was the most common obstetric complication amongst adolescents. Research on adolescent reproductive outcomes in Nepal (n=790 15-19 year olds); (n=3311 20-29 year olds) found that adolescents were at a significantly higher risk of Low Birth Weight (LBW) babies (OR=1.54; 95% CI= 1.18, 2.02; P<0.05) (Yadav *et al.* 2008: 142). As the growth in adolescents continues throughout puberty, the adolescent mother competes with the developing foetus for nutrition to the disadvantage of the foetus, which may contribute to low birth weight babies (Young *et al.* 2007: 419).

2.11.2 Biological and Physiological Immaturity

Adolescent pregnancies have been associated with foetal growth restriction, low birth weight, preterm birth and neonatal mortality (Raatikainen *et al.* 2005: 157). This could be attributed to biological immaturity, lifestyle factors or inadequate attendance to maternity care (Raatikainen *et al.* 2005: 157). The general features of biological immaturity, such as a girl becoming pregnant before her growth ceases and early conception within two years of menarche, has been thought to have an adverse impact on pregnancy outcomes (Young *et al.* 2007: 419). Biological factors that have been continually linked with unfavourable pregnancy outcomes are poor nutritional status, low pre-pregnancy weight and height, parity and poor pregnancy weight gain (Klein 2005: 283). The body of a woman has to naturally grow to such an extent that it can accommodate a developing baby easily. An underdeveloped body would pose problems for both the mother and baby she carries. Adolescents would be considered not fully physically developed to comfortably accommodate a baby (Sodi 2009: 19). There is evidence in developing countries, predominantly the poorer regions, that in very young girls (< 16 years) the pelvic bones and the birth canal are still immature and underdeveloped for delivery; this may lead to obstructed labour and other obstetric complications (World Health Organization 2004: 30).

Findings by Young *et al.* (2007: 419) indicate that the diagnosis of a urinary tract infection (UTI) was made more frequently in teenagers compared with older women. There is a possibility that the genitourinary system of younger women is immature and unable to cope with the stress of pregnancy, and this puts her at risk to increased infection (Young *et al.* 2007: 419).

2.11.3 Mode of Delivery

The physical effect of pregnancy on a teenager is unlike that of the average population of expectant mothers (Tilghman and Lovette 2008: 52). Young adolescents who have not finished their own growth are at an increased risk for C-section birth and metabolic changes, including toxemia (Tilghman and Lovette 2008: 52). A study based in Jerusalem found an increased rate of instrumental deliveries among adolescent mothers (Geist *et al.* 2006: 189). In contrast, Yadav *et al.* (2008: 141) found adolescents to have a lower likelihood of delivery by episiotomy, forceps or vacuum and (C-sections).

Caesarean section is often considered as an action taken due to complications in young women such as Cephalopelvic disproportion (CPD) and contracted pelvis (World Health Organization 2004: 27). Results from a Turkish study including adolescent and adult mothers indicated that the rates of C-sections in adults were notably higher than in teenagers (Kara, Uygur and Yesildaglar 2003: 1). The crucial reasons for C-section delivery were foetal distress, CPD and breech presentation (Kara, Uygur and Yesildaglar 2003: 1). The study was supported by the results of research in Latin America, where the C-section delivery rate was much lower in adolescent's ≤ 19 years old ($n=344,626$) than in adult women aged 20-24 years old ($n=509,751$) (Conde-Agudelo, Belizan and Lammers 2005: 345). According to Chandra *et al.* (2002: 120-121) low C-section rates among adolescents can be explained by the predominantly small size of their fetuses. Results from another Turkish study on C-section delivery rates concurred with this, where C-section delivery rates were lower in adolescents compared with adults ($n=40,391$); (17.12% vs 28.84%) (Zeteroglu, Sahin and Gol 2005: 119).

2.11.4 Apgar scores

Low Apgar scores may be linked to adolescent pregnancy (Chen *et al.* 2007: 369). Malaysian research comparing outcomes of adults and adolescents found significant associations between adolescent mothers and low Apgar scores (Omar *et al.* 2010: 221). In contrast a study by Kara, Uygur and Yesildaglar (2003: 2) found no significant differences between the two groups in relation to the mean gestational age, mean birth weight and mean Apgar scores of the first and fifteen minutes of the newborn babies. Research by Wilson *et al.* (2012: e51) which investigated adverse outcomes of adolescent and adult mothers disagreed with this. The results in fact indicated that babies born to adolescent mothers had a higher percentage of Apgar score < 7 at five minutes (2.77% vs. 2.28% vs. 1.59%, $p < 0.0001$) (Wilson *et al.*

2012: e51). Research by Kara, Uygur and Yesildaglar (2003: 231) found no statistical significance between Apgar scores of the babies of adults and adolescents in the study sample ($p > 0.05$).

2.11.5 Gestational Hypertension / Pregnancy Induced Hypertension (PIH)

Pregnancy Induced Hypertension (PIH) can be defined as elevated blood pressure, which develops after 20 weeks of gestation with the presence of proteinuria in a previously normotensive woman. It has been found to complicate approximately 6% of all pregnancies. Women who develop PIH are at an increased risk for developing preeclampsia (Mustafa *et al.* 2012: 10).

Malaysian research by Omar *et al.* (2010: 221) found no significant association between adolescent pregnancy and PIH. A study based in the United Kingdom among pregnant adolescents < 20 years ($n=4126$) and adults 20-35 years old ($n=17615$), indicated that there was a lower incidence of PIH amongst adolescent primigravidae than in adults ($OR=0.8$; 95% $CI=0.6, 0.8$; $p=0.001$) (Gupta, Kiran and Bhal 2008: 165-167).

2.11.6 Anaemia

Anaemia is a significant public health concern as it influences populations of both rich and poor countries. The main cause of anaemia is iron deficiency; however, it is rarely present in isolation. Commonly it accompanies numerous other causes, such as malaria, parasitic infection, nutritional deficiencies and haemoglobinopathies (World Health Organisation 2008: 7). Anaemia is especially prevalent amongst adolescent girls, women, nursing mothers and expectant mothers. Worldwide approximately 56% of adolescent girls are anaemic (Kannammal 2012: 37). Anaemia may commonly occur during pregnancy due to the increased demands on the mother's body to supply the expanding blood volume and rapidly growing foetus and placenta (Hoque, Hoque and Kader 2009: 70).

In pregnant women anaemia can be defined as haemoglobin levels $< 11\text{g/dl}$ and in non-pregnant women $< 12\text{g/dl}$ (World Health Organization 2008: 4). In SA the same haemoglobin range has been adopted by the BANC guidelines for women during pregnancy; however, treatment usually begins when haemoglobin levels are $< 10\text{g/dl}$. Severe anaemia is characterised as a haemoglobin level of $< 8\text{g/dl}$ and should be referred to the hospital for further management (Pattinson 2005: 28-29). Anaemia is also an important indicator of other chronic diseases such as HIV, TB or Malaria. The cause of malnutrition must be determined

to ensure the correct management of anaemia (Pattinson 2005: 28-29). Screening for anaemia takes place in the form of haemoglobin testing, which is conducted at the initial ANC visit as well as at 32 weeks gestation (Pattinson 2005: 29). An early ANC booking together with nutritional screening and the initiation of prenatal supplements, such as ferrousulphate and folic acid, can prevent anaemia (Pattinson 2005: 29).

During pregnancy, anaemia is an issue for significant concern as it is a contributory factor to increased risk of maternal death during the antenatal period (Mbule *et al.* 2013: 1). Together with obstetric hemorrhage, anaemia contributes to up to 40 % of maternal mortality and morbidity in sub-Saharan Africa (Van DerBroek 2001: 4). Research in rural Uganda among pregnant women aged 15-49 years (n=304) found that the prevalence of anaemia was 61.3%, which was high enough to be referred to as a severe public health problem. The findings concluded that anaemia was attributed to poverty as well as limited access to nutritional and health education (Mbule *et al.* 2013: 1). A local study based in Empangeni on the North coast of the KZN Province among pregnant women of various ages found that intestinal parasites were associated with severe anaemia (n=100 anaemic); (n=200 controls) (OR=9.06-176.59); (p-value=0.000) (Hoque, Hoque and Kader 2009: 70).

A study in Brazil amongst pregnant adolescents and adult women found there to be significant variances between anaemia in both groups; however, adolescents were found to have lower body iron stores and ferritin (< 12 µg/l) than adults during pregnancy (Soares *et al.* 2010: 343). Research on adverse outcomes in women from the USA indicated that anaemia was found to be more frequent amongst younger and older adolescents by comparison with adults (9.39% vs.10.15% vs. 8.2%, $p < 0.0001$) (Wilson *et al.* 2012: e51). A comparative study of anaemia between pregnant and non-pregnant adolescents in the Gaza strip showed that female students were anaemic before conceiving, and during gestation anaemia increased (Hamad, Jalambo and Abed 2012: 533). Similarly, a case control study based in Malaysia among pregnant girls aged 10-19 years and adults aged 20-35 years old found anaemia to be significantly associated with pregnant adolescents ($p < 0.001$) (Omar *et al.* 2010: 222).

2.12 Maternal and Infant Mortality

2.12.1 Maternal Mortality

Stillbirth, neonatal deaths and maternal morbidity are great public health concerns (Filippi *et al.* 2006: 1537). Maternal deaths can be defined as “the death of a woman while pregnant or

within 42 days after delivery from any cause related to or aggravated by the pregnancy or its management, but not from accidental/ incidental causes” (Conde-Agudelo, Belizan and Lammers 2005: 343).

Adolescents who are pregnant for the first time are at risk of severe complications due to their physiological and social immaturity (Mlilo-Chaibva 2007: 1-6). Approximately 70 000 teenage mothers die each year globally because their bodies are not yet fully physically developed for motherhood and due to social disadvantages; the number one killer among 15-19 year old girls is pregnancy and childbirth (Gross *et al.* 2012: 1). The maternal mortality rate for very young adolescents between the ages of 10-14 years is five times higher than that of women aged 20-24 years (Saxena *et al.* 2010: 16). Maternal death has decreased significantly internationally except in Sub-Saharan Africa (Gross *et al.* 2012: 1). It is estimated that in Tanzania in the year 2010, pregnancy and childbirth complications led to 445 maternal deaths per 100 000 live births (Gross *et al.* 2012: 1). Many of these complications occur during labour, delivery and the immediate postpartum period (Gross *et al.* 2012: 1).

Research in Latin America revealed that the likelihood of maternal mortality from pregnancy associated causes is four times higher for adolescents < 16 years than for women in their early twenties (Conde-Agudelo, Belizan and Lammers 2005: 347). The primary medical causes of maternal deaths are alike for all women globally. These causes are inclusive of haemorrhages, infections, toxemia, obstructed labour and complications from unsafe abortion (Phafoli, Van Aswegen and Alberts 2007: 17a). A study on adolescent maternal mortality conducted in Mozambique indicated that the most prevalent causes of adolescent maternal mortality were Malaria (27%) and PIH/eclampsia (21%). These causes of death were substantially more prevalent in adolescents than adults ($p < 0.01$) (Granja *et al.* 2001: 304).

Late entry to ANC leads to women missing the chance to obtain lifesaving care because they are unable to identify the signs of life-threatening complications during pregnancy and childbirth (Phafoli, Van Aswegen and Alberts 2007: 17a). Antenatal care is a key approach to decreasing maternal mortality; however, in developing countries millions of women do not receive it. Whilst certain obstetric emergencies cannot be anticipated, thorough ANC screening women can inform women of how to identify and act on symptoms that may result in serious complications (Simkhada *et al.* 2007: 244-245).

In Lesotho, despite the provision of ANC at different levels, there is still a high rate of maternal mortality (approximately 762 per 100 000 live births) and an infant mortality rate of 72 per 1000 live births (Phafoli, Van Aswegan and Alberts 2007: 17). Maternal health service utilisation is definitely an essential strategy in reducing the risks associated with pregnancy and childbirth amongst pregnant teenagers (Dairo and Owoyokun 2010: 4).

In 2009, the African Union commission initiated the Campaign for Accelerated Reduction in Maternal Mortality in Africa (CARMMA) (2012) to curb pregnancy related mortality with the aim of progressing towards MDG 5. This campaign was implemented as a strategy to prompt intensive and increased action towards enhancing maternal and newborn health and survival across the continent (Why Campaign for Accelerated Reduction in Maternal Mortality in Africa? 2012). The key focus of the CARMMA was to expand the availability and utilisation of universally accessible quality health services related to sexual and reproductive health, which are pivotal for the reduction of maternal mortality (Why Campaign for Accelerated Reduction in Maternal Mortality in Africa? 2012). In May 2012 the CARMMA was launched by the DOH in South Africa. This initiative was implemented under the theme 'South Africa Cares: no women should die while giving life' (Launch of campaign accelerated reduction of maternal mortality in Africa (CARMMA) in South Africa, KwaZulu-Natal 2012).

2.12.2 Infant Mortality

Child mortality is the consequence of a complicated web of determinants at different levels (Jones *et al.* 2003: 65). Neonatal deaths are more common than maternal deaths and can be minimised through a variety of approaches: institutional or community-based; antepartum; peripartum; and post-partum (Filippi *et al.* 2006: 1537). Skilled birth attendance poses great benefits for both maternal and neonatal survival (Filippi *et al.* 2006: 1537). Research conducted in Germany (n=293091 deliveries between 1996-2000) investigated infant mortality during pregnancy (n=1006 cases of infant mortality) and found that infant death was closely linked to foetal surveillance, the number of ANC visits, ultrasound measurements and foetal heart rate monitoring (Kunzel and Misselwitz 2003: S86-S87). As ANC is focused on identifying risk factors at an early stage in pregnancy, regular ANC enables proper foetal surveillance (Kunzel and Misselwitz 2003: S86-S91).

The three greatest causes of neonatal death are preterm delivery, complications of presumptive birth asphyxia, and infection (Filippi *et al.* 2006:1537). Research in the USA

among pregnant adolescents (< 19 years old) and adults (20-24 years old) indicated that adolescent pregnancy was associated with increased neonatal mortality (OR=1.20; 95 % CI = 1.16, 1.24) and post neonatal mortality (OR=1.47; 95% CI=1.14, 1.54) (Chen *et al.* 2008: 688). Two-thirds of child deaths are preventable by interventions that are available and practical for implementation in lower income countries (Jones *et al.* 2003: 69). In the USA mortality rates for infants born to adolescent mothers have remained high, with an increased risk of post neonatal mortality and its relationship to low birth weight (Chen *et al.* 2008: 689). The results from a large hospital-based retrospective study in Latin America indicated that there was an increased risk of early neonatal death in adolescent mothers < 16 years of age by comparison with those who were 20-24 years of age (Chen *et al.* 2007: 372). Research on the outcomes of adolescent pregnancy found adolescent pregnancy to be associated with a higher foetal (1.9 % vs 0.3%, $p < 0.05$) and neonatal mortality (3.8 % vs 0.5 %, $p < 0.05$) (Kumar *et al.* 2007: 927).

In the developed world, maternal death has become a rare event (Kramer 2003: 1592); however, it is still of concern in developing countries. The death of the mother or offspring has been considered the most serious adverse outcome of pregnancy (Kramer 2003: 1592).

2.13 Millennium Development Goals and Sustainable Development Goals

South Africa has signed agreements with several international commitments such as the MDG's, in seeking to address the needs of child and maternal health; the health of children and mothers in SA, however, remains poor (Healthcare in South Africa 2015). In developing countries more than 200 million children below five years of age are not fulfilling their developmental potential (Walker *et al.* 2007: 145). In spite of substantial improvements in child health globally, it is still increasingly apparent that important gaps and variations exist. Specifically, it is apparent that an irregular burden of infant and under five childhood mortality is linked to the deaths within the neonatal period, which often occur within the first few days after birth (Bhutta *et al.* 2005: 520). The aim of the MDG 4 was to reduce the under-5 child mortality rate by two-thirds between 1990 and 2015 (United Nations 2013: 24-33).

It is estimated by the WHO that approximately 536,000 women die each year from pregnancy-related complications. The target of MDG 5 was to reduce maternal mortality by 2015, and achieve universal access to reproductive health (Mlilo-Chaibva 2007: 2). The MDG report proposes that if women have access to ANC and other maternal health services,

then maternal deaths may be reduced (Mlilo-Chaibva 2007: 2). Coverage of maternal health care in developing countries is much lower than global targets (United Nations 2013: 24-33). Despite the approaching end date of the MDG's, evidence depicts that target levels of under-5 infant mortality (MDG 4) and maternal mortality (MDG 5) were not fulfilled at a global level (Malqvist *et al.* 2013:1). Some countries are progressing well despite this, particularly on MDG 4 where reduction targets have already been met, especially in Latin America and South East Asia (Malqvist *et al.* 2013: 1). In developing regions only half of pregnant women access the recommended minimum of four ANC visits (United Nations 2013: 24-33). Women between the ages of 15-19 are responsible for more than 15 million out of 35 million live births worldwide (United Nations 2013: 24-33). Approximately 80% of maternal deaths can be attributed to direct obstetric deaths (Assfaw 2010: 5).

There have been challenges in evaluating the extent of progress towards the MDG 5 target of improving maternal health, due to the lack of valid data in developing countries (Dairo and Owoyokun 2010: 4). In order to achieve the MDG's on improved maternal health, reducing child mortality and eliminating extreme poverty, reproductive health needs to be improved (Williamson *et al.* 2009: 2). Pregnancy in adolescents seems to be an issue that might contribute to a struggle to accomplish the objectives of the MDG's that are directly linked to reproductive health and neonatal care. Midwives and nurses find it hard to fully manage all these pregnancies due to adolescents defaulting from clinic attendance, thus worsening the challenge (James, Rall and Strumpher 2012: 1).

Due to the unfinished work of the MDG's millions of people, more especially women and children have been left behind (United Nations 2014: 21). Time has elapsed for the MDG's with the deadline fast approaching. The United Nations has attempted to build on the progresses of the MDG's by developing an updated and inclusive post-2015 agenda which includes sustainable development goals (SDG's).

Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts*
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

Figure 4 Sustainable Development Goals (SDG's) (United Nations 2014: 18).

The SDG's will guide the next fifteen years of international development with a focused plan of action working towards sustainable development (Boucher 2015). Sustainable development goal 3 to "Ensure healthy lives and promote wellbeing for all at all ages" (Figure 4) focuses on reducing global maternal mortality to less than 70 per 100,000 live births and ending preventable deaths of newborns and children under five by the year 2030 (Open Working Group Proposal for Sustainable Development Goals 2014). According to the United Nations report on the MDG post-2015 agenda (United Nations 2014: 13), SDG's will strengthen the commitment made by the unfinished MDG's as well as breaking new ground regarding goals in inequalities, economic growth, decent jobs, cities and human settlements, industrialisation, energy, climate change, sustainable consumption and production, as well as peace, justice and institutions (Figure 3).



Figure 5: Six essential elements for delivering the SDG's (United Nations 2014: 20).

One of the six key elements of the SDG's (Figure 5) is "People: to ensure healthy lives, knowledge and the inclusion of women and children" (United Nations 2014: 20). This element will entail that all women, youth and children have access to a full range of services. The SDG agenda will encompass "universal health care coverage, access and affordability as well as to put an end to preventable maternal new-born and child death" (United Nations 2014: 21).

It has become evident that general economic development is not adequate for improving health for all, but that the health of disadvantaged groups needs to be taken into account by policy makers and health care planners to ensure sustainable development (Malqvist *et al.* 2013: 1).

2.14 Barriers to Accessing ANC

Promoting the early recognition of pregnancy is of great importance as it may encourage women to seek care earlier and may also provide motivation to undertake positive lifestyle changes, which may lead to the decline in risk of adverse pregnancy outcomes (Solarin and Black 2013: 365). The contributory factors to late entry of ANC include ethnicity, age, education, employment status and the intention to get pregnant (Trinh and Rubin 2006: 2). Pregnant adolescent's health-seeking behaviour may be influenced by social factors such as

culture, a low literacy level, inadequate reproductive health knowledge, and inadequate attendances. The above factors contribute to pregnancy complications and poor birth outcomes (Mlilo-Chaibva 2007: 18). Access to early ANC is regarded as pivotal in improving maternal and peri-natal outcomes (Tshabalala 2012: 2).

Women who were 25 years and older were twice as likely to make use of ANC services by comparison with those aged 25 years and below (Dairo and Owoyokun 2010: 3-4). Women living in urban areas were found to be more inclined to attend ANC clinics than those in rural areas (Dairo and Owoyokun 2010: 3-4). This could be attributed to the fact that women in urban areas are more acquainted with services; rural women have confined access to ANC services as they are dependent on PHC centre's for maternal health services. Hence, women based in urban areas have more options to choose from (Dairo and Owoyokun 2010: 7).

At times, the motivation of women to present for ANC is thought to be unsuccessful due to misguided perceptions and attitudes of pregnant women and adolescents (James, Rall and Strumpher 2012: 2). Barriers to accessing care are inclusive of financial constraints, a lack of health insurance, and language and cultural barriers. Those concentrating on the care of pregnant teenagers must study the cultural differences and become culturally capable to secure positive outcomes for this specific population (Tilghman and Lovette 2008: 51). Variables such as poor quality of care, a lack of understanding of the health benefits of ANC, late identification of pregnancy, and social and economic factors may affect timing of ANC (Gross *et al.* 2012: 1-2).

In some cultures women may avoid health facility deliveries due to specific requirements around delivery position, warmth and handling of the placenta. Amongst some cultural groups in Africa there is a belief that obstructed labour is due to extramarital relations, thus hindering care seeking. In some contexts birth may be seen as a test of endurance and care seeking a sign of weakness, which may be a reason for delivering alone (Gabrysch and Campbell 2009: 6).

2.14.1 Educational attainment

Educated women conceive fewer children and achieve better child survival as compared with illiterate women, as they avoid early marriage, adolescent pregnancy, and high parity and because they attend antenatal and postnatal services more regularly (Phafoli, Van Aswegen and Alberts 2007: 17b). These are key factors in the prevention of maternal death. Schooling

on sex, pregnancy and contraceptives should start at primary level when learners are at the age of ten years, and not later than twelve years. This early education will empower teenagers to obtain the necessary knowledge to make educated decisions about issues concerning sex, pregnancy and contraception (Phafoli, Van Aswegen and Alberts 2007: 17b).

2.14.2 Age and marital status

The utilisation of ANC services may be restricted by the woman's perspective towards pregnancy and other psychological factors (Phafoli, Van Aswegen and Alberts 2007: 17b). Research undertaken in rural India among married adolescents indicated that women with middle and higher education were more likely to make use of ANC than uneducated women (Singh *et al.* 2012: 4). Single women with unintended pregnancies, like most pregnant adolescents, may have a pessimistic attitude towards their pregnancy and, due to this, may be less conscious of the signs of pregnancy and seek care much later by comparison with older women (Phafoli, Van Aswegen and Alberts 2007: 17b). A qualitative study by Smith and Roberts (2009) revealed that young mothers reported feeling uncomfortable attending antenatal clinic in which other parents were older. Young mothers felt that they were "looked down upon" by older mothers (Smith and Roberts 2009: 625). In a South African study on the perceptions of adolescents regarding the ANC clinic environment, participants conveyed that they were conscious of being the youngest among other women attending ANC. In addition, they were uncomfortable sitting in a queue with older women (James, Rall and Strumpher 2012: 5). Research by Reynolds, Wong and Tucker (2006: 6) entailing the examination of demographic and health survey (DHS) data for adolescents < 18 years of age in fifteen developing countries, found that in five out of fifteen countries adolescents were less likely than women aged 19-23 to use ANC or delivery care (OR 0.5-0.9). The greatest impact of maternal age on usage of maternal and child health care was found in Bangladesh, India and Indonesia. In Indonesia and India ≤ 16 year olds were less likely to use health care than older women (Reynolds *et al.* 2006: 12). While in Ethiopia, Guinea, Malawi and Mali, no differences were noted in health care utilisation and maternal age, with the exception of Uganda (Reynolds, Wong and Tucker 2006: 6).

2.14.3 Adolescents attitude towards pregnancy

A Canadian study on barriers and motivators to ANC among women of various ages indicated that a pessimistic attitude towards pregnancy, essentially due to having an unplanned or unwanted pregnancy, was related to increased odds of insufficient ANC

attendance. Late recognition of, and doubts about the pregnancy, together with cultural beliefs and practices around pregnancy, have been documented to influence women's timing of ANC attendance (Gross *et al.* 2012: 1-2).

2.14.4 Health Care Providers

In a study based in Uganda, adolescents conveyed that there was a high degree of disinterest amongst HCWs regarding patient care. The findings suggested that health care facilities lacked compassion towards pregnant adolescents, thus clients utilised herbal remedies. This prevented adolescents from attending maternity care (Atuyambe *et al.* 2009: 789-790). The lack of enthusiastic facilitation and a non-conducive clinic environment may lead to boredom amongst women attending ANC (James, Rall and Strumpher 2012: 2). In a local study by Duggan and Adejumo (2012: e64) which was conducted in KZN, adolescents felt that they were not respected by HCWs. South African research in Mpumalanga indicated that youth-friendly services programmes are limited in the sub-district (Geary *et al.* 2014: 1).

2.14.5 Financial Barriers

In SA, ANC services are free of charge to all pregnant women (Solarin and Black 2013: 360). Women from an Indonesian study on the under-utilisation of ANC reported the distance to a clinic as a challenge in accessing care. A study based amongst adolescents in India found a determinant of ANC access to be wealth. Mothers from richer quintiles were almost four times more likely to have full ANC coverage than mothers belonging to the poorest wealth quintile (Singh, Kumar and Pranjali 2014: 13). Antenatal care services, as well as contraceptive services, are amongst the cheapest services offered in Lesotho; 10.00 Maloti or R10.00 (rand) in South African currency is needed for the initial ANC visit; thereafter, visits are free of charge. Thus it is anticipated that pregnant adolescents would make use of these services more often (Phafoli, Van Aswegan and Alberts 2007: 17a-17b). A qualitative study by Atuyambe *et al.* (2009: 788-792) found that adolescents' enrolment in ANC was strongly determined by the financial support provided by parents and boyfriends. Research in Kenya indicated that pregnant women who travel less than seven hours were more likely to have early ANC initiation [(n=403); (OR=6.91; 95% CI= 1.72, 12.1)], as well as being five times more likely to attend at least four ANC visits than mothers who travel more than one hour (OR=4.98; 95% CI= 3.26, 7.96) (Asweto *et al.* 2014:156). Socio-economic factors were found to have an influence over attendance at health facilities (James, Rall and Strumpher

2012: 2). It is more likely for pregnant teenagers and their families to have fewer resources and support than the average pregnant woman (Tilghman and Lovette 2008: 51).

2.14.6 Lack of support for pregnant teenagers

Social support during the antenatal period can be influential on adolescents' attitude towards pregnancy (Macleod and Weaver 2003: 50-51). A study conducted by Macleod and Weaver (2003: 55), revealed that the majority of teenage respondents were given social support by boyfriends. Midwives were not found to be providers of social support among the study population (Macleod and Weaver 2003: 57). The findings from a study conducted in Uganda revealed that pregnant adolescents experienced rejection and violence from partners and parents. The common reason for rejection from partners was the lack of responsibility for parenthood (Atuyambe *et al.* 2008: 8-9). Results from Gross *et al.* (2012: 1) identified the following factors to be associated with later ANC initiation: perceived poor quality of care, late discovery of pregnancy, and lack of support by husband or partner ($p < 0.05$). Earlier antenatal attendance was associated with primigravida and previous experience of miscarriage or still birth ($p < 0.05$) (Gross *et al.* 2012: 1).

Conclusion

Despite the availability of free ANC services in SA, late booking continues to pose challenges. Interventions targeted at adolescents should be used to promote early and frequent ANC, as it is imperative for high-risk mothers to have appropriate ANC. Knowledge on the status of adolescent pregnancy in SA is pivotal to promote adolescent health. The provision of health services that enable women to make decisions regarding their reproductive health is crucial for women's health. Youth-friendly ANC services should be provided to pregnant adolescents.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter will outline the research methodology in two separate phases. The first phase highlights the research methods used during the retrospective review of adolescent mothers' - maternity case records. The second phase discusses the process of qualitative data collection from adolescent mothers with the use of semi-structured in-depth interviews.

3.2 Study site

The study was conducted at a District hospital based on the North coast of Durban in KwaZulu-Natal, South Africa, located in the eThekweni Municipal area. The municipality comprises an area of approximately 2297 km², consisting of a population of 3.5 million inhabitants (Statistics South Africa 2011). Within the eThekweni district, maternal health services such as ANC are accessible at PHC clinics, government hospitals, private hospitals and private practices. Antenatal care services are freely available to all maternity patients attending public health care facilities. The research site provided ANC services and was a referral hospital for maternity cases which could not be managed at the PHC clinic level.

3.3 Study design

This study used a multi-method design. A retrospective review of maternity case records was used as the primary quantitative research approach. Qualitative data was collected in the form of semi-structured in-depth interviews. Qualitative data collection was used to obtain a detailed perspective on the research problem (Skinner 2007: 318). Semi-structured in-depth interviews were aimed at exploring reasons for late and under-attendance at ANC clinics during pregnancy.

Phase one describes the process of quantitative data collection from maternity case record files. Phase two deals with the collection of qualitative data through semi-structured in-depth interviews with pregnant adolescents. The research steps followed in both phases are described according to the following areas:

Phase 1: Retrospective data collection tool (Objective one and two).

- Population and sampling.

- Research instrument and data collection procedure.
- Validity and reliability.

Phase one included a retrospective review of maternity case records of young pregnant adolescents who gave birth between 2011 and 2013. The review of maternity case records was conducted after delivery as by then it would provide a clear indication of the ANC service utilisation by the young mother. This information was compared with the recommended number of visits as well as the initiation of the first ANC booking (before 20 weeks), and compared to health outcomes. Analysis of the ANC records was the initial phase in attempting to identify maternal health and birth outcomes as well as the associated ANC attendance trends.

Phase 2: Semi structured in-depth interviews conducted with pregnant adolescents (Objective three).

- Population and sampling
- Research instrument and data collection procedure
- Trustworthiness
- Reliability

Phase 2:

Phase two highlights the qualitative aspect of the study. Pregnant adolescents between the ages 13-16 years were interviewed. Semi-structured in-depth interviews were used.

3.4 Phase 1: Retrospective data collection tool for maternity case records

All maternity case records of pregnant teenagers aged 13-16 years who booked for ANC at the research site between the periods of 2011-2013 were included in the study. Non-clinic cases (NCC's) and maternity records of patients below thirteen years or above sixteen years of age were not included in the study. Non-clinic cases were not investigated due to the lack of recorded ANC information which was a prerequisite to meet objectives of this study.

3.4.1 Research instrument and data collection procedure

A retrospective checklist was designed to extract data from the ANC records of adolescent mothers. The checklist was divided into four sections aimed at evaluating maternal and child health outcomes, as well as trends of ANC attendance. The checklist consisted of the following headings (Appendix E):

- Section A: Demographics
Demographical and socio-economic information of the sample group.
- Section B: Antenatal Medical Information
Retrieved information on health during pregnancy, an in-depth medical/general history as well as complications during pregnancy and delivery.
- Section C: Assessment of the newborn
Assessed the condition of the neonate at birth, quantified important values that were indicative of child health, such as weight, head circumference, gestational age and Apgar scores. The incidence of birth abnormalities was also documented.
- Section D: ANC Attendance
Assessed number of ANC visits throughout pregnancy as well as ANC attendance trends of adolescent mothers.

3.4.2 Validity

The validity of a measurement instrument refers to the degree to which the instrument measures what it is required to measure (Delpont and Roestenburg 2011: 172). Content validity of the retrospective data collection tool was strengthened by the following measures:

The checklist was reviewed by three registered midwives and one registered Advanced Midwife. All the relevant corrections recommended by the midwives and advanced midwife were considered. This aspect of establishing validity is referred to as ‘jury opinion’ and entails judgment of the tool by experts in the field (Delpont and Roestenburg 2011: 173).

3.4.3 Reliability

Reliability can be defined as the measuring instrument’s ability to obtain consistent numerical results each time it is applied (Delpont and Roestenburg 2011: 177). The primary concern of reliability is not with what is being measured, but more with how well it is being measured (Delpont and Roestenburg 2011: 178). Reliability of the retrospective data checklist was ensured by the following measures:

- Unclear/ambiguous items on the checklist were removed to ensure trustworthiness of the tool.
- The checklist was pre-tested by three registered midwives, who had assessed the same maternity case record document on three different occasions. This ensured reliability of the checklist.

3.5 Phase two: Semi-structured in-depth interviews conducted with pregnant adolescents

3.5.1 Population and Sampling

Respondents between the ages of 13-16 years old were selected for the interviews. This was done to ensure that the sample covered the full range of possible characteristics of interest. Interviews were conducted until data saturation was reached, i.e. no more new information was being gained from successive interviews and the researcher felt that information collected was adequate to answer research questions (Skinner 2007: 323). After five interviews were conducted data saturation had been reached.

3.5.2 Piloting

Piloting of the interview schedule was conducted with two participants between the ages 13-16 years old. This validated the data collection instrument and ensured that it was free from errors, easy to understand and provided the required information during data collection (Kimmie, Delany and Khumalo 2007: 195). After piloting, the interview schedule was amended accordingly to ensure an easy understanding of interviews questions (Appendix D: Interview schedule).

3.5.3 Research instrument and data collection procedure

3.5.3.1 Recruitment of research participants

- Despite Durban University of Technology (DUT) Institutional Research Ethics Committee's (IREC) approval to access participants telephonically after obtaining contact details from patient records, the DOH did not approve of this method of recruitment and found it to be against patient confidentiality. The DOH suggested that participants should be accessed while waiting in the ANC queue. Thus participants were approached by the researcher while waiting to access care in the ANC clinic at the research site. Prospective participants who met the inclusion criteria were invited to speak to the researcher privately in the ANC clinic consultation room.
- Prospective participants were introduced to the concept of the study and asked for verbal consent in order to participate in the study. Upon agreement, the researcher provided the participant with a 'research pack' which contained assent forms, consent forms and information letters (for the participant and her parent/guardian) (Appendix

C: Assent forms); (Appendix A: Consent forms); (Appendix B: Information letters). Information letters were thoroughly explained to the participant by the researcher. The participant was then informed that participation was voluntary and that she may leave the study at any time if she wished to do so without facing any repercussions.

- The participant was then requested to have the necessary forms filled in and returned in one week's time. The researcher had obtained the participant's contact details and arranged a follow up meeting in one weeks' time at the research site. It was also agreed that interviews would be conducted at the next follow-up visit.

3.5.3.2 Data collection (semi-structured in-depth interviews)

The interview was recorded on a digital audio recorder after obtaining permission from the interviewee. The discussion was directed to a certain degree by the interviewer, in order to ensure the required information was obtained. However, respondents were allowed to communicate in their own terms and perspective to encourage personal explanation and detailed responses. This method of data collection is generally used when in-depth information is required (Skinner 2007: 319).

Upon arrival the participant was taken to a quiet private room away from the main research site. The participant was requested to hand over completed and signed consent and assent forms. These forms were thoroughly checked by the researcher before commencement with further data collection.

The participant was given an option of speaking either in English or isiZulu during the interview. If isiZulu was to be chosen an interpreter was available to assist the researcher in conducting the interview. The interpreter was required to complete a confidential declaration form prior to conducting the interview with the participant (Appendix K: Confidential declaration by interpreter). The interpreter was mentored by the researcher prior to the interview on the approach to be used during the translation of interview questions. However, during this study all participants spoke fluent English and did not make use of the interpreter.

The researcher was dressed in a socially acceptable manner and used simple language which assisted in putting participants at ease, as well as gaining trust. The participants were offered juice/snacks and asked whether they needed to use the rest room before commencing with the interview. The researcher explained that the interview would be voice recorded purely for the

purpose of transcription. Prior to the commencement of the interview a demographics form was filled in by the researcher with information provided by the participant.

Interviews were semi-structured and in-depth in nature and an interview schedule containing a list of points to be covered during the interview was used (Appendix D: Interview schedule). These points provided a certain degree of structure to the interview process but did not inhibit the interviewer or interviewee from discussing other points that were important during the interview (Skinner 2007: 320). Each interview lasted approximately 30-45 minutes and was concluded by the researcher thanking the participant.

The participant was then provided with a courtesy gift which comprised of a baby and mother post-partum pack. Each pack contained the following items: sanitary pads; bathing soap; face towel; Vaseline; baby lotion; and Bio-oil. Health education pamphlets on post-partum care of mother and baby were also included in the gift pack. The participant was not made aware of this courtesy gift during the recruitment stage or prior to the completion of the interview. Transport money was also provided to the participant for bus/taxi fare to and from the research site on the day of the interview.

3.5.4 Trustworthiness

The following principles of credibility and dependability were used to ensure trustworthiness of the study.

3.5.5 Credibility

Credibility or authenticity is aimed at ensuring that the inquiry was conducted in a way that guarantees that the subject has been accurately identified and described (Schurink, Fouche and De Vos 2011: 419-420).

Credibility was ensured in the following ways:

- The researcher adopted well-established research methods.
- Purposive sampling was used for the selection of interview participants.

3.5.6 Dependability

Dependability entails ensuring that the research process is logical, well documented and audited (Schurink, Fouche and De Vos 2011: 420).

The following methods were used to ensure dependability:

- All interviews were conducted in the same manner, with the use of an interview schedule.
- Data was transcribed and analysed after each interview and verified by the researcher and another independent person.

3.6 Ethical Considerations

According to Strydom (2011: 129) ethics can be defined as “ a set of widely accepted moral principles that offer rules for, and behavioral expectations of, the most correct conduct towards experimental subjects and respondents, employers, sponsors, other researchers, assistants and students”.

The following methods were utilised to ensure that the entire research project ran its course in an ethically sound manner:

- The research proposal was reviewed and approved by the DUT IREC and the KZN DOH Research Ethics Committee (Appendix H: DUT IREC ethical clearance certificate) (Appendix I: Letter of approval from DOH).
- An ethical clearance number was issued by the DUT IREC (ethical clearance number: IREC 072/14).
- The researcher requested gatekeeper permission from the institutional management at the research site (Appendix G: Permission letter to Institutional Management).
- Gatekeeper permission was granted by the institutional management (Appendix J: Letter of approval from “Gatekeeper”).
- Written permission to access and review maternity case records was granted from the institutional management at the research site (Appendix J: Letter of approval from “Gatekeeper”).
- During phase one all data collected was coded. Personal details such as names and contact details of participants were not recorded in the retrospective data collection checklist. Only the recorded data on maternity case records was utilised.

- All data collected was securely stored in a locked cupboard accessible only to the researcher. Records will be kept for a period of five years before being shredded and disposed of appropriately.
- Participation was voluntary and informed assent and consent was obtained from all participants as well as their parents/guardians.
- Participants were informed that they may leave the study at any time if they wished to do so, without being subjected to any form of prejudice.
- Prior to commencement of the interview the researcher confirmed that the participant was agreeable to having the interview recorded. The nature of the study was reaffirmed and consent was re-established (Skinner 2007: 320). After the interview was completed the participant was reassured of confidentiality (Skinner 2007: 320).
- The participant's privacy and the emotional well-being was protected at all times during the course of the study.
- All data collected, inclusive of electronic data, was securely stored in a locked cupboard that was only accessible by the researcher. Data will be stored for a period of five years and thereafter destroyed.

3.7 Data Management and Analysis

Data was initially captured into Microsoft Excel Software and the process of cleaning and editing the data was completed. Statistical analysis was performed using SPSS Statistics version 18.0 (IBM, Somers, NY) and STATA (version 12, College Station, TX, USA).

The researcher was supervised by a registered midwife during the process of quantitative data collection. After completion of the data collection, data entry and data verification phases, descriptive analyses were conducted. Frequency distributions of categorical variables and means, standard deviation and ranges of continuous variables were calculated. Bar charts, line graphs, and pie charts were used to illustrate data variables and cross-tabulations. Bivariate associations between categorical variables were done using the Pearson's Chi squared test and Fischer's Exact test where applicable.

Multivariate regression modelling was done in a backward stepwise method with the inclusion of relevant covariates. Age, HIV status, ANC booking (early -vs- late) and ANC

attendance (under-utilisation -vs- recommended) were used as the independent variables. Anaemia, mode of delivery, condition of perineum, birth complications, gestational age, first and second APGAR and birthweight were used as dependent variables. Odds ratios were calculated for binary outcome variables. Ninety-five percent Confidence intervals were calculated and p values < 0.05 were considered statistically significant.

Qualitative data analysis of taped material entailed transcription and translation by a trained translator. Transcripts were then content analysed and the data explored in detail for common themes (Skinner 2007: 324). Common themes were then established into codes. Highlighting was used as a colour coding indexing system to identify different themes that emerged. Themes were added up until data saturation was reached. The data analysis process involved compilation of relevant notes as well as demographic and participant information. Data analysis was aided by the NVivoVersion 10 (QSR International) data analysis software.

CHAPTER 4

RESULTS

4.1 Introduction

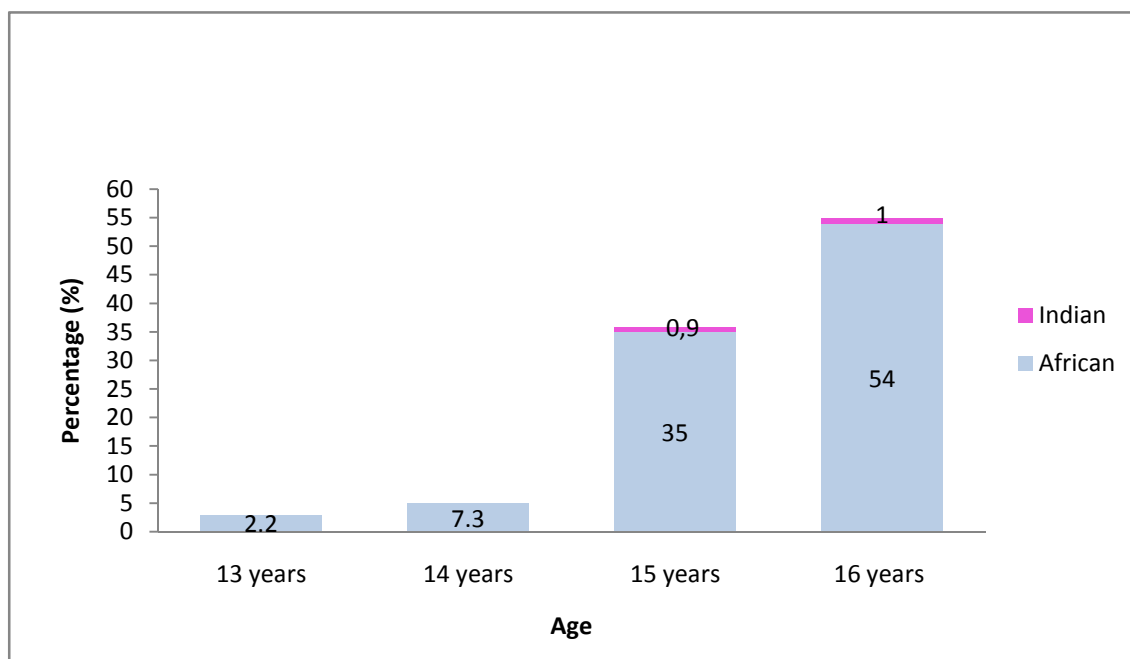
The aim of this chapter is to present the findings that were obtained from both the quantitative and qualitative aspects of the study. A retrospective review of 314 maternity case records over a period 2011-2013 were analysed for the quantitative phase, while in-depth interviews were used to obtain qualitative data.

4.2 Demographic Information

Maternity case records of 314 adolescents for the period of 2011-2013 were examined in this study. This comprised of adolescents between (13-16 years old) who gave birth at the hospital during the period of 2011-2013. In order to obtain vital data, the maternity case records were examined after delivery. All adolescents in the study, with the exception of four, were primigravidae, i.e., experienced pregnancy for the first time.

Table 4.1: Demographic characteristics of young adolescents (13-16 years old) attending a district hospital (2011-2013) (n=314).

Demographics	n (%)
<i>Age</i>	
13	7 (2.2)
14	23 (7.3)
15	112 (35.7)
16	172 (54.8)
<i>Marital status</i>	
Single	310 (98.7)
Married	4 (1.3)
<i>Race</i>	
African	308 (98.1)
Indian	6 (1.9)
<i>Employment</i>	
Unemployed	314 (100)



*p-value of < 0.05 was considered statistically significant.

Figure 4.1 Age of participants stratified by race (n=314).

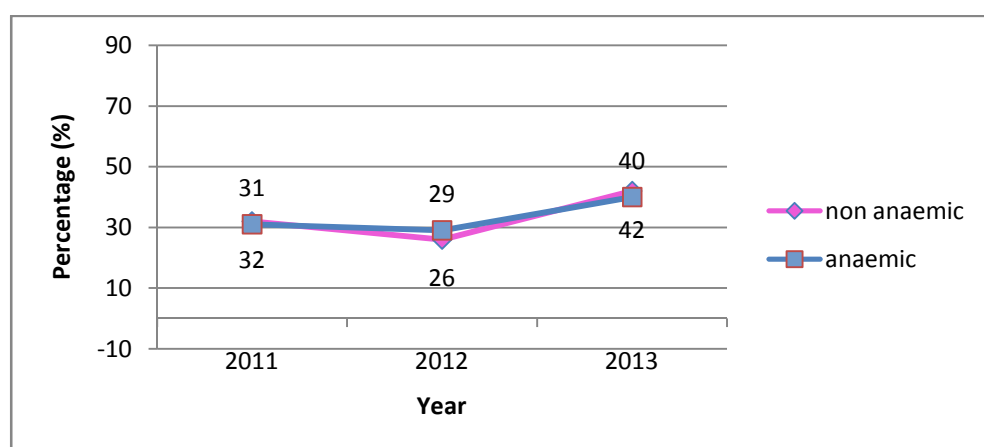
It is evident from Figure 4.1 that the majority of the participants were 16 years of age (55%), also known as older adolescents. The sample consisted predominantly of the African race group (98.1%), (Table 4.1). All participants were unemployed, which was expected due to their being of school-going age.

4.3 Medical and general history during pregnancy

Results indicated that only four participants were multigravidae. The most common health conditions experienced among pregnant adolescents in this study were Pregnancy Induced Hypertension (PIH) (31; 9.9%) together with Urinary Tract Infection (UTI) (33; 10.5%) and asthma (10; 3.2%) (Table 4.2). There was a notably higher occurrence regarding family history of twin pregnancies (14.6%), diabetes (11.8%) and TB (14%). The most common complication experienced during pregnancy amongst adolescents was anaemia (100; 31.8%) (Table 4.2). This may be related to the nutrient deficient diets of adolescents as well as the demanding nutritional needs during puberty.

Table 4.2: Antenatal medical and general history of adolescent participants aged (13-16) between the period 2011-2013 (n=314).

Medical/General History	n (%)
ANC Medical Information	
<i>Parity</i>	
0	312 (99.4)
1	2 (0.6)
<i>Gravida</i>	
1	310 (98.7)
2	2 (0.6)
3	2 (0.6)
Medical/general history	
PIH	31 (9.9)
UTI	33 (10.5)
Asthma	10 (3.2)
Genital warts	9 (2.9)
Epilepsy	3 (1)
Cardiac problems	1 (0.3)
TB	1 (0.3)
Family history	
Twins	46 (14.6)
Diabetes	37 (11.8)
Tuberculosis (TB)	44 (14.0)
Congenital abnormality	8 (2.5)
Hypertension	29 (9.2)
Complications during pregnancy	
Anaemia	100(31.8)
Pre-eclampsia	3 (1)
Gestational diabetes	1 (0.3)



*p-value of < 0.05 was considered statistically significant.

Figure 4.2 Anaemia stratified by year 2011-2013 in adolescents aged 13-16 years at a district hospital on the North coast of KZN (p=0.89).

Trends of anaemic cases and non-cases are indicated in Figure 4.2. The proportion of anaemic clients decreased in 2012, and subsequently increased in 2013. This could be due to fewer births being recorded in 2012.

4.4 Obstetric outcomes during delivery

Table 4.3 Trends of obstetric outcomes during delivery among adolescents aged 13-16 years for the period 2011-2013 at a District hospital on the North coast of KZN (n=314).

Outcome	Total	2011	2012	2013
Total deliveries per year	314	98	85	131
Mode of delivery				
NVD	224 (71.3)	72 (32.1)	65 (29.0)	87 (38.8)
Assisted delivery	3 (1)	1 (33.3)	0	2 (66.7)
C-section	87 (27.7)	25 (28.7)	20 (23)	42 (48.3)
Condition of perineum				
Episiotomy	158 (50.3)	53 (33.5)	43 (27.2)	62 (39.2)
Natural tear	39 (12.4)	12 (30.8)	12 (30.8)	15 (38.4)
Intact	117 (37.3)	33 (28.2)	30 (25.6)	54 (46.2)
Adverse Delivery Outcomes				
CPD	38 (12.1)	10 (26.3)	8 (21.1)	20 (52.6)
Foetal distress	38 (12.1)	13 (34.2)	5 (13.2)	20 (52.6)
Breech presentation	3 (1)	2 (66.7)	1 (33.3)	0
Prolonged labour	2 (0.6)	1 (50)	0	1 (50)
Poor progress	15 (4.8)	6 (40)	6 (40)	3 (20)
Obstructive genital warts	2 (0.6)	0	0	2 (100)
Cord around neck	10 (3.2)	7 (70)	1 (10)	2 (20)

* p-value of < 0.05 was considered statistically significant.

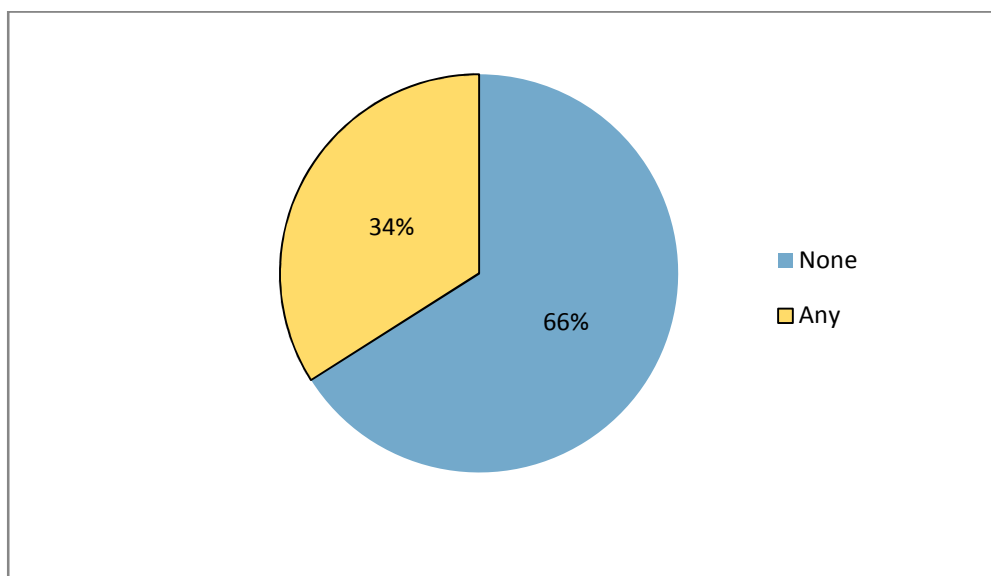


Figure 4.3 Adverse delivery outcomes; none = no problems experienced during delivery; any = any one of the recorded complications during delivery (CPD, foetal distress, breech presentation, prolonged labour, poor progress, obstructive genital warts, cord around neck).

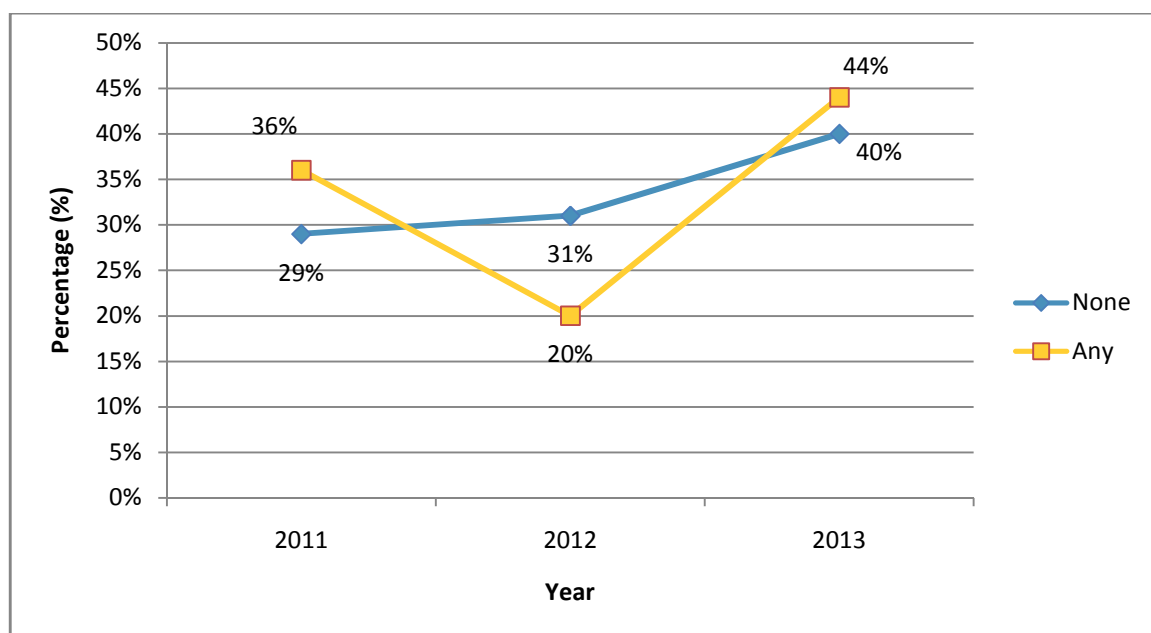


Figure 4.4 Adverse delivery outcomes stratified by year 2011-2013; none = no problems during delivery; any= any one of the recorded complications during delivery (CPD, foetal distress, breech presentation, prolonged labour, poor progress, obstructive genital warts, cord around neck).

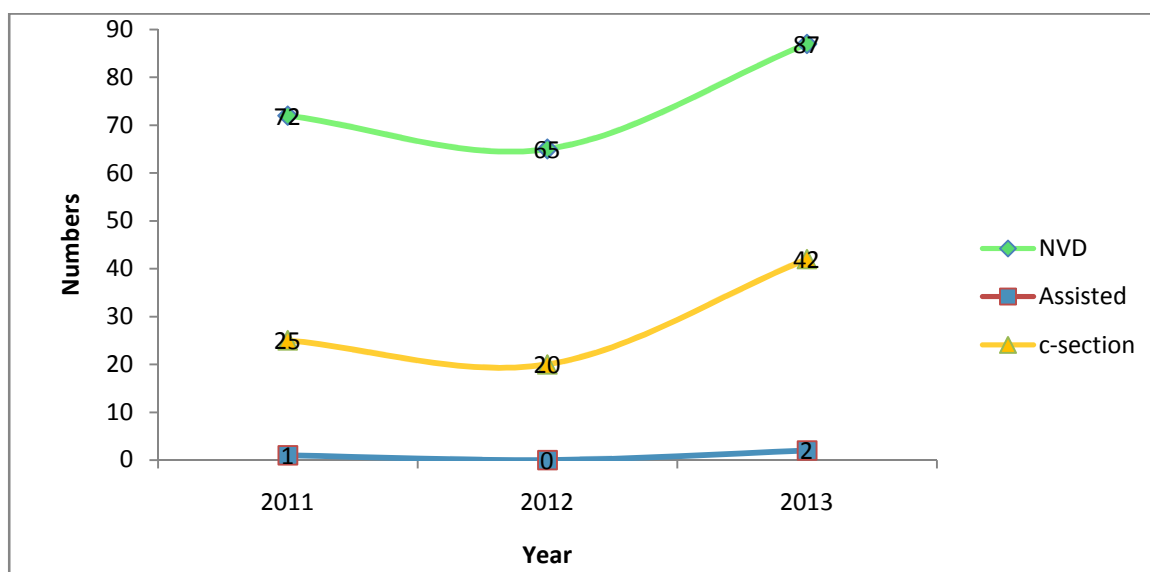


Figure 4.5 Mode of delivery trends in adolescent pregnancies aged 13-16 years for the period 2011-2013 (n=314).

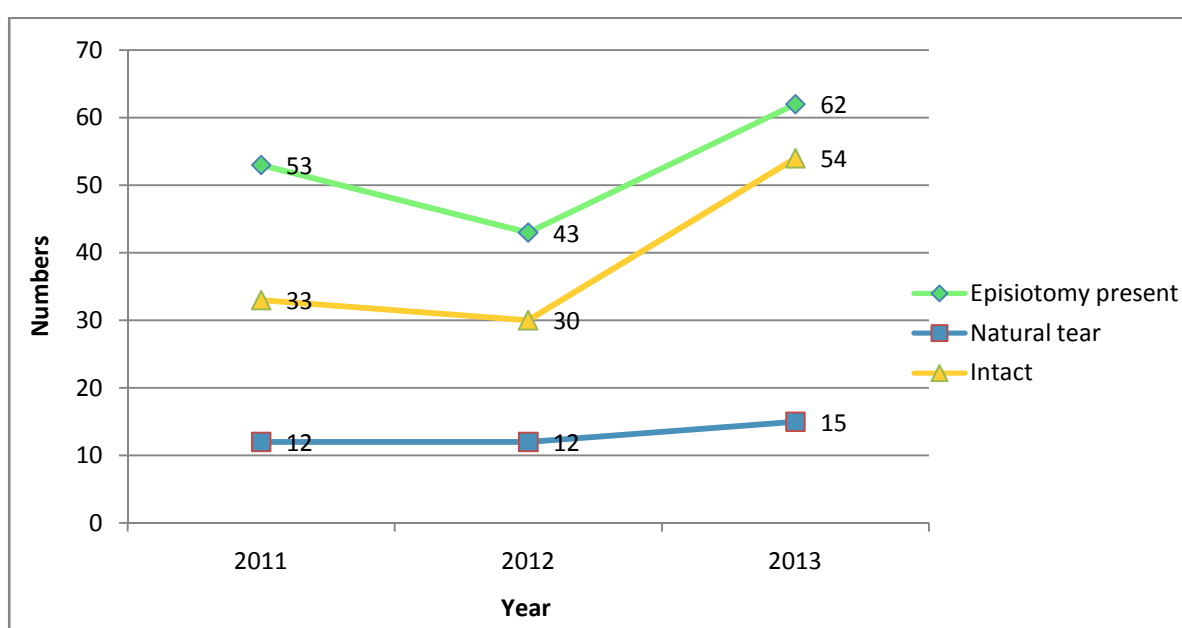


Figure 4.6 Trends in condition of perineum trends among adolescent pregnancies (13-16 years) for the period 2011-2013 at a district hospital on the North coast of KZN, (n=314).

Trends of obstetric outcomes in adolescent pregnancies from 2011-2013 are depicted in Table 4.3. The majority of deliveries were natural via normal vaginal delivery (NVD) (71.3%). Caesarean sections (C-sections) contributed to 27.7% of all deliveries. It was surprising to note that only three deliveries were assisted. Assisted delivery is when a baby is extracted using instruments such as forceps or a vacuum.

A trend in the mode of deliveries over the last three years is indicated in Figure 4.5. Of particular interest was the increase (22; 25.3%) of C-sections from 2012-2013. This could possibly be linked to the increase in incidence of CPD and foetal distress during the same period (Table 4.3). Additionally, fewer births were recorded for in 2012 as opposed to 2011 and 2013, thus a lower percentage (20; 23%) of C-sections in 2012.

Half of the participants required episiotomies (158; 50.3%) as depicted in Table 4.3. This was probably due to young adolescents not being fully physically developed for pregnancy and birth. It was disturbing to note that 12.4% of participants experienced natural tears during delivery. This may be due to the episiotomy not being done timeously (Table 4.3). The number of episiotomies conducted decreased between 2011 and 2012 by 6.3%. This could be due to the drop in incidence of CPD, as CPD was a common indication for episiotomy (Table 4.3). Intact perineums were found among (37.3%) of participants post-delivery; this may be due to the high proportion of 16 year old participants (172; 54.8%) who were possibly better physiologically developed for delivery than younger adolescents (Table 4.3); (Table 4.1).

4.5 Birth Outcomes

There were only four stillborn babies and two neonatal deaths (NND's) (Table 4.4). The majority of babies (92.3%) had normal Apgar scores of 7-10 at one minute (1st Apgar) and (96.8%) at five minutes (2nd Apgar) after birth. Twenty-four babies had low 1st Apgar scores and ten babies had low 2nd Apgar scores. Generally, infants' Apgar scores increase between one to five minutes of birth. It is possible that fourteen babies' Apgar scores increased when the 2nd Apgar scoring was taken at five minutes after birth (Table 4.4).

A large proportion of babies were born at term with normal head circumference and birth weight; however 2.2% were preterm, 9.6% had SGA head circumference and 10.2 % were born with low birth weight (Table 4.4.). Birth weight and head circumference can be directly influenced by gestational age at delivery. Preterm babies may be more likely to be of a lower birth weight and have SGA head circumference.

Table 4.4 Birth outcomes associated with adolescent pregnancies (13-16 year olds) for the period 2011-2013 at a district hospital (n=314).

Outcome	N(%) 314
<i>Birth weight</i>	
Low birth weight (LBW)	32 (10.2)
Normal	282(89.8)
<i>Head circumference</i>	
Normal	284 (90.4)
SGA	30 (9.6)
<i>Gestational age at delivery</i>	
Preterm (< 37 weeks)	7 (2.2)
Term (≥ 37 weeks)	307 (97.8)
<i>Condition at birth</i>	
Alive	308 (98.1)
Stillborn	4 (1.3)
Neonatal death (NND)	2 (0.6)
Apgar scores (n=310)	
<i>1st Apgar score at (1 min)</i>	
< 7 (low)	24 (7.7)
7-10 (normal)	286 (92.3)
<i>2nd Apgar score at (5 mins)</i>	
< 7 (low)	10 (3.2)
7-10 (normal)	300 (96.8)

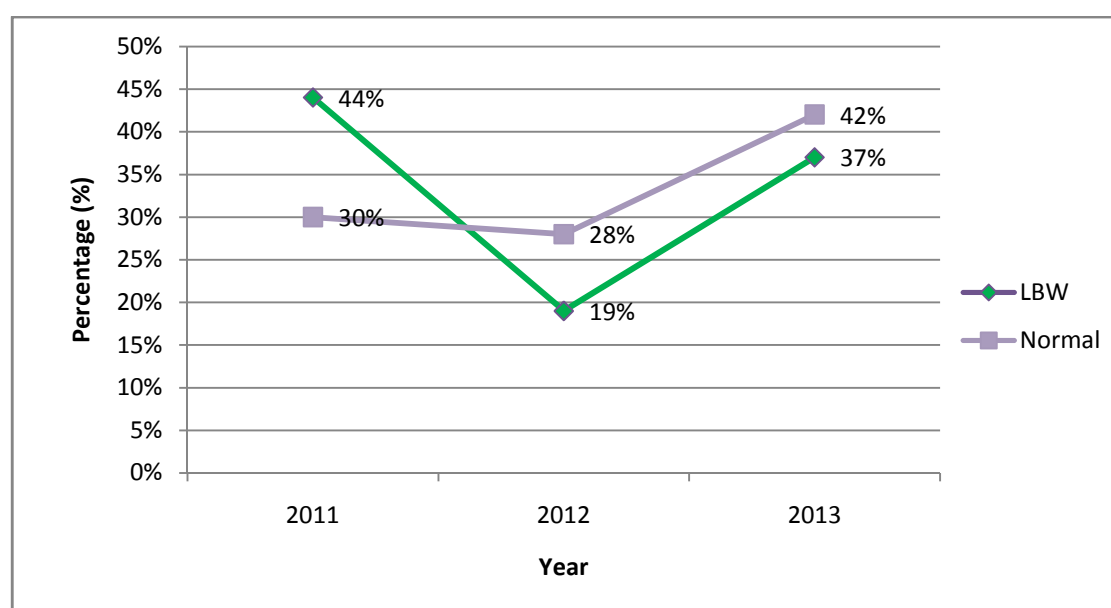
Table 4.5 Trend in birth outcomes among adolescents aged 13-16 years, at a district hospital for the period (2011-2013), (n=314).

Birth outcome	Total n (%)	2011	2012	2013	p value
Birth weight					
LBW (<2500 g)	32 (10.2)	14 (43.8)	6 (18.7)	12 (37.5)	p=0.25
Normal (≥ 2500g)	282 (89.8)	84 (29.8)	79 (28)	119 (42.2)	
Head circumference					
SGA (<33 cm)	7 (2.2)	2 (28.6)	1 (14.3)	4 (57.1)	p=0.37
Normal (≥33 cm)	307 (97.8)	96 (31.3)	84 (27.4)	127 (41.3)	
Gestational age at delivery					
Preterm (<37 wks)	7(2.2)	2 (28.6)	1(14.3)	4 (57.1)	p=0.37
Term (≥37 wks)	307 (97.8)	97 (31.6)	84 (27.4)	126 (41)	
Condition at birth					
Alive	308 (98.1)	97 (31.5)	83 (26.9)	128 (41.6)	p=0.85
Stillborn	4 (1.3)	1 (25)	1 (25)	2 (50)	
NND	2 (0.6)	1 (50)	1 (50)	0	
Birth abnormality (n=310)					
Any	4(1.3)	2 (50)	0	2 (50)	p=0.57
Nil	306 (98.7)	96 (31.4)	84 (27.4)	126 (41.2)	

Table 4.6 Trend table for birth outcomes among adolescents (13-16 years) at a district hospital for the period of 2011-2013.

Year	Mean (SD)	Range	p value
Head Circumference (cm)			
2011	34.31 (1.63)	30-38	p=0.37
2012	34.45 (1.57)	29-40	
2013	34.26 (1.54)	28-38	
Gestational Age (weeks)			
2011	38.40 (1.85)	32-42	p=0.37
2012	38.16 (1.64)	32-42	
2013	38.04 (2.09)	29-42	

Both normal births and LBW decreased in 2012 and increased in 2013 (Figure 4.7). Similar trends with head circumference and gestational age at delivery were depicted in (Table 4.5). The smallest head circumference was 28cm which was reported in 2013, with the largest being 40 cm in 2012 (Table 4.6). The minimum gestational age at birth was 29 weeks (Table 4.6).



*p-value of < 0.05 was considered as statistically significant

Figure 4.7 Birth weight trends in adolescent pregnancies 2011-2013; Low birth weight LBW = < 2500 g, Normal birth weight = \geq 2500 g, (p= 0.25).

4.6 ANC Utilisation

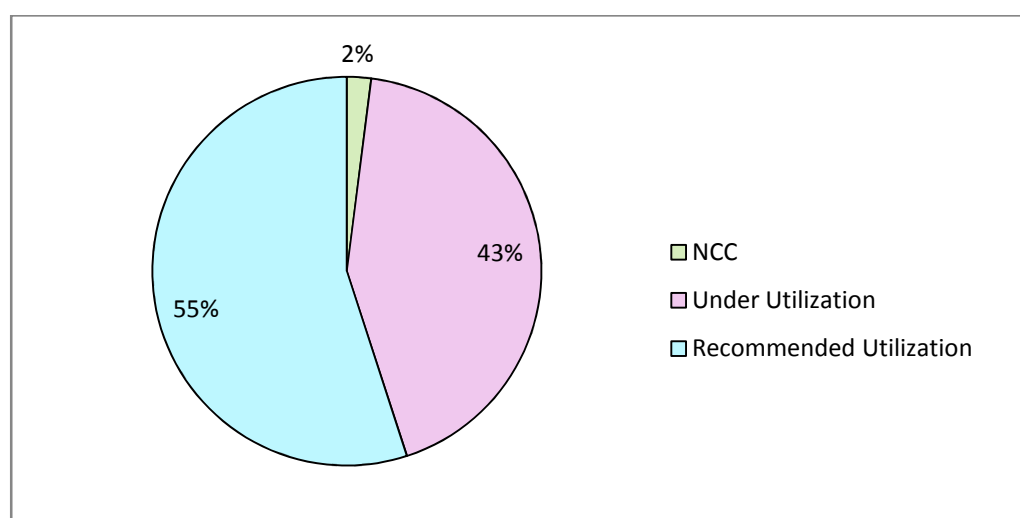


Figure 4.8 Number of ANC visits attended by adolescent clients n= (314), Non clinic case NCC= 0 visits, underutilization = 0 – 3 visits; recommended utilization = 4-5 visits.

Two percent (n=7) of adolescent participants did not book for ANC at all prior to birth; these participants are often referred to as non-clinic cases (NCC's). It was alarming to note that 134 (43%) under-utilised ANC services by only attending between 0-3 visits (Figure 4.8).

Table 4.7. Trends in ANC attendance 2011-2013 (n=314).

Outcome	Total	2011	2012	2013	p value
ANC Utilization					
Non – bookers	7 (2.2)	3 (42.9)	1 (14.3)	3 (42.9)	p=0.05
Underutilization	134 (42.6)	45 (33.6)	26 (19.4)	63 (47)	
Recommended utilization	173 (55.1)	51 (29.5)	57 (32.9)	65 (37.6)	

An increase of 27.6 % in under-utilisation of ANC from 2012 to 2013 was noted (Table 4.7). Late ANC booking could account for this, as late booking could influence the number of visits made during the course of the pregnancy. Recommended ANC utilisation was shown to steadily increase from 2011-2013.

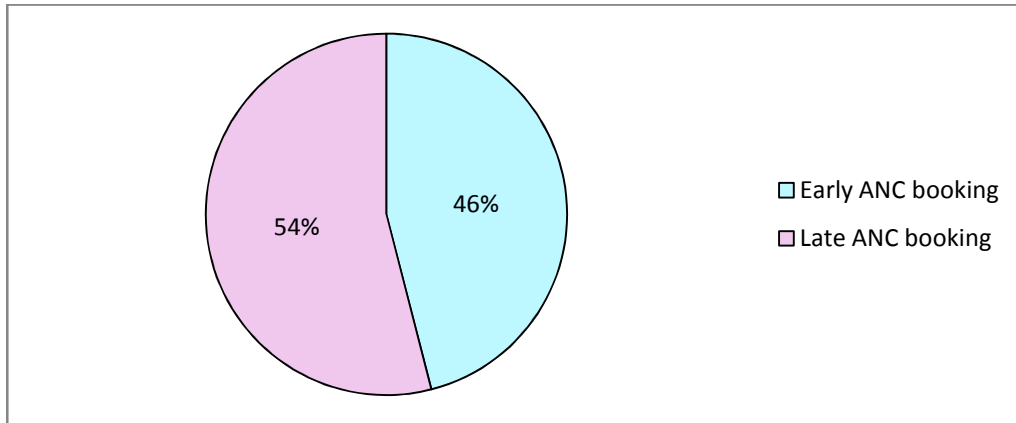


Figure 4.9 Proportion of early and late ANC booking; Early ANC booking = < 20 weeks, Late ANCBooking ≥ 20 weeks.

The majority of clients booked for ANC services late. Only 46% of clients engaged in early service utilisation (Figure 4.9).

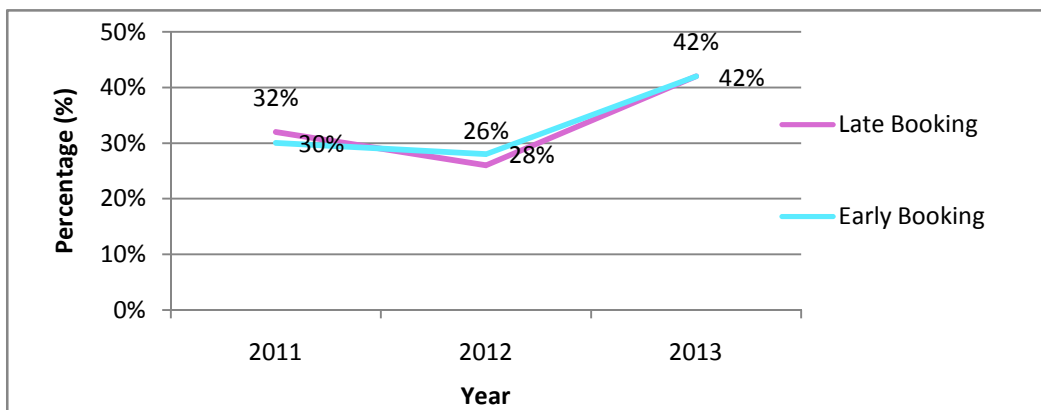


Figure 4.10 ANC booking stratified by year 2011-2013; Early booking = < 20 weeks; late booking= ≥ 20 weeks (p=0.89).

In Figure 4.10 early booking is shown to decrease in 2012 by (2 %) and increase in 2013 by (14 %); similar trends are indicated with late booking. This could be due to fewer pregnancies in 2012.

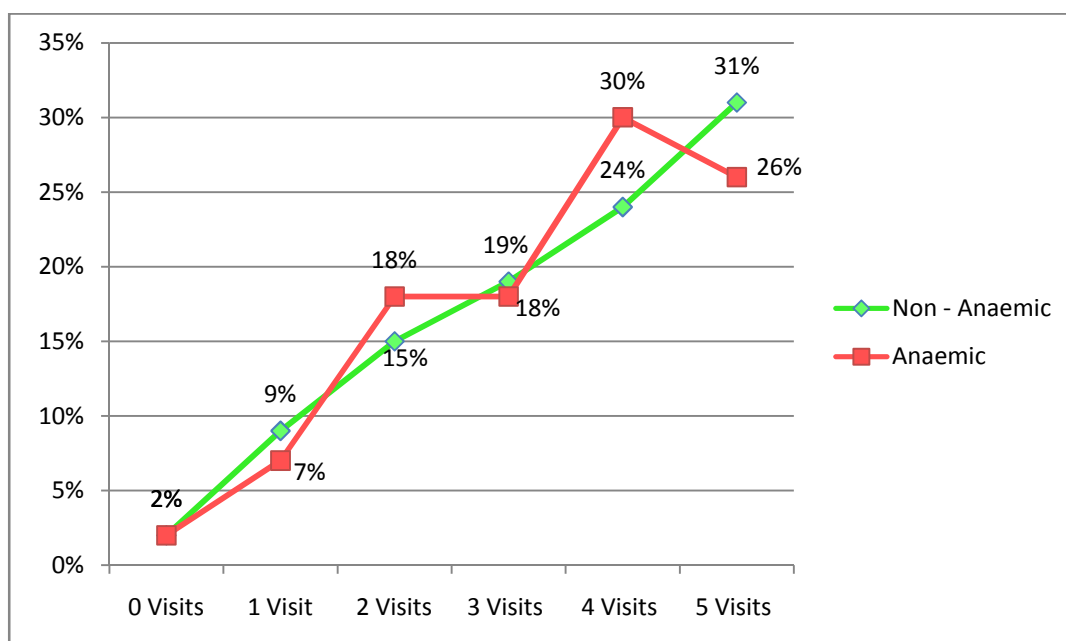


Figure 4.11 Prevalence of anaemia stratified by number of ANC visits among adolescents aged 13-16 years at a district hospital for the period 2011-2013. Non clinic cases NCC = 0 visits, under-utilisation = 1-3 visits; recommended utilisation = 4-5 visits.

The prevalence of anaemia among the adolescents was relatively higher irrespective of antenatal attendance (Figure 4.11). Anaemia may have been identified later on in pregnancy rather than in earlier ANC visits. Another plausible explanation could be that pregnancy related complications required more than four ANC visits, therefore, those pregnant women who were anaemic attended more ANC visits.

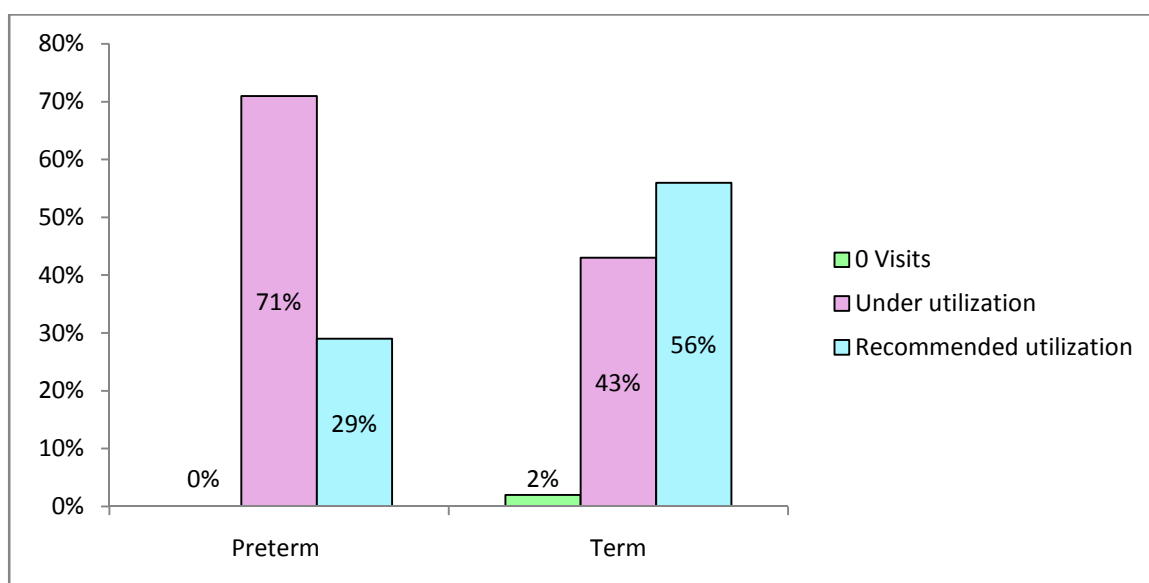
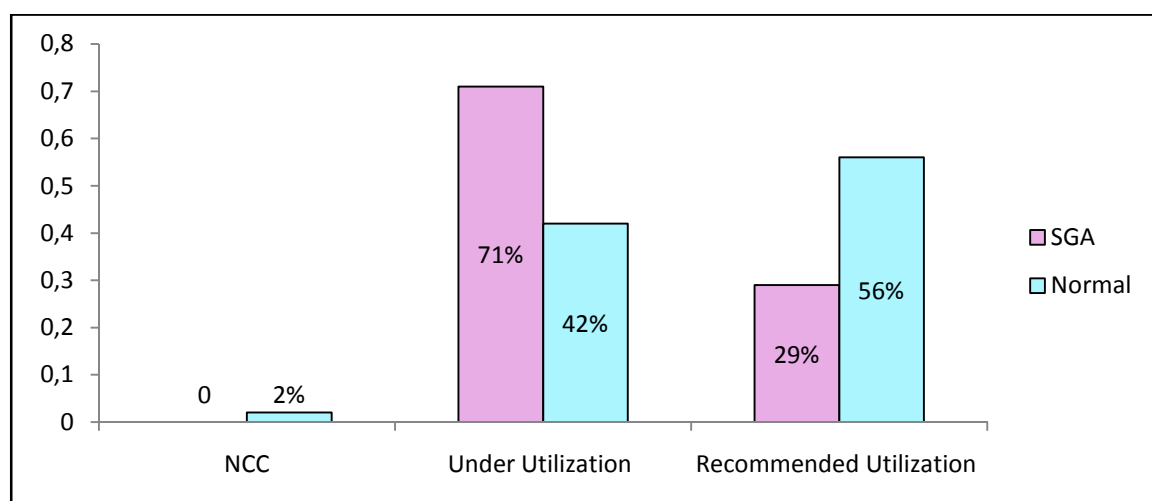


Figure 4.12 Gestational age at delivery stratified by ANC utilization at a District hospital among 13-16 year olds for the period 2011-2013. 0 visits = NCC's, under-utilisation = 1-3 visits, recommended utilisation = 4-5 visits, ($p = 0.31$).

Preterm delivery was found to be linked with under-utilisation of ANC services (Figure 4.12).



*p-value of < 0.05 was considered as statistically significant.

Figure 4.13 Head circumference stratified by ANC utilisation; Small for gestational age (SGA) head circumference = < 33 cm's, normal head circumference = > 33 cm's, 0 visits = NCC's, 1-3 visits under-utilisation, 4-5 visits = recommended utilisation, (p= 0.31).

Results identified a greater proportion of babies with a SGA head circumference (71%), born to participants who under-utilised ANC visits (1-3 visits) (Figure 4.13). Among those adolescents who attended the recommended number of ANC visits, only 29 % of babies had SGA head circumference, suggesting a link between under-utilisation of ANC services and babies born with SGA head circumference. Small for gestational age head circumference may be indicative of preterm delivery and LBW.

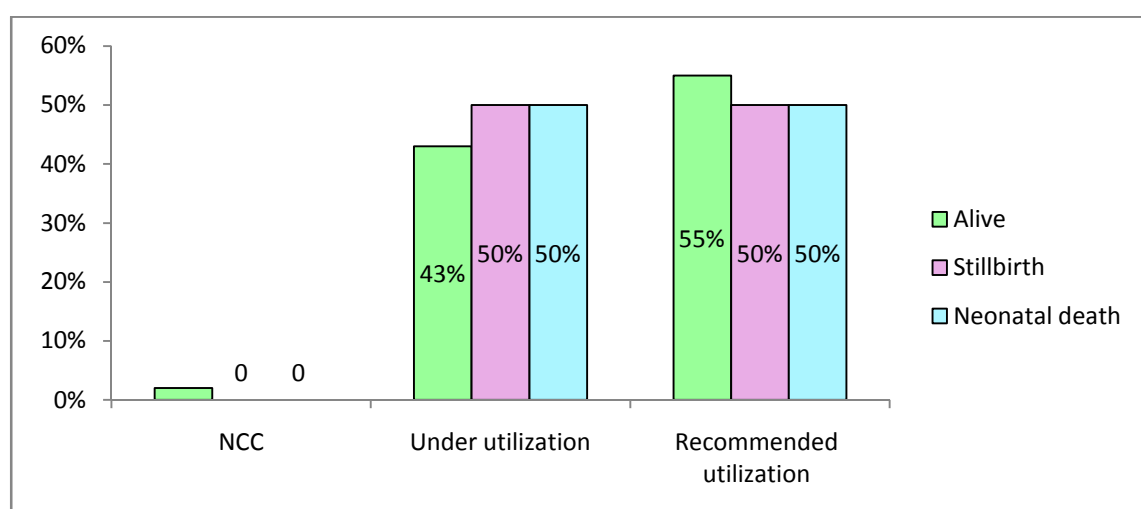
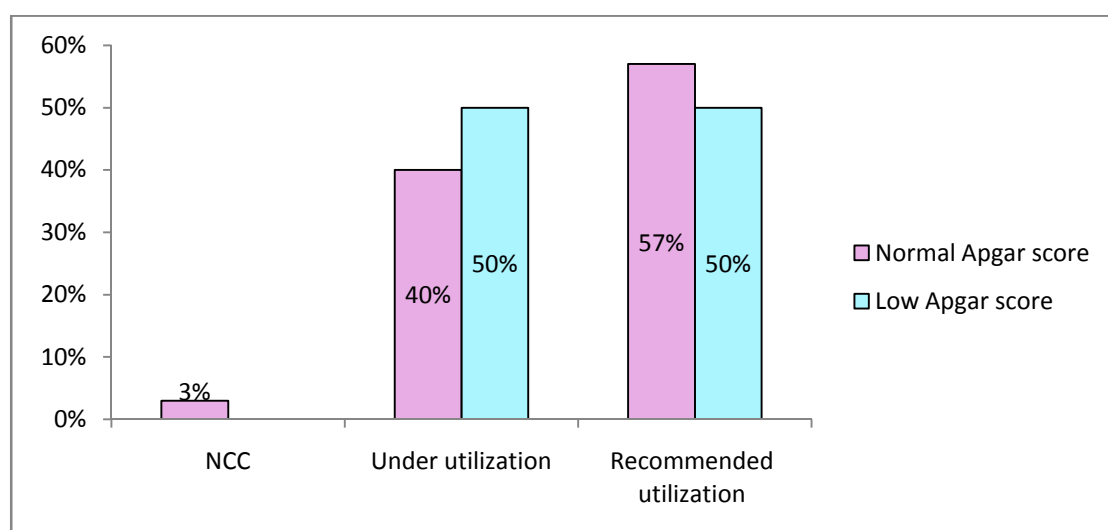


Figure 4.14 Condition at birth stratified by ANC utilisation among young adolescents (13-16 years) at a district hospital for the period 2011-2013. 0 visits = NCC's, 1-3 visits = under-utilisation, 4-5 visits = recommended utilisation.

No significant associations were noted between stillbirths, neonatal deaths and under-utilisation/recommended utilisation of ANC services. More than half (55%) of the babies born alive were found under the ANC recommended utilisation category (Figure 4.14).



*p-value of < 0.05 was considered as statistically significant

Figure 4.15 Apgar scores stratified by ANC utilisation in adolescents at a District hospital for the period 2011-2013. Low Apgar score = < 7; normal Apgar score = 7-10, (p=0.34).

Findings indicated that an increase in the number of ANC visits was directly proportional to an increase in the percentage of babies born with a normal Apgar score (Figure 4.15). The highest percentage of normal Apgar scores (57%) was found among mothers attending the recommended number of 4-5 ANC visits.

Late ANC booking was found to be linked to a 57% incidence of anaemia (Table 4.8). Participants received iron supplements as well as nutritional education on iron-rich sources of food earlier on in the pregnancy due to early booking.

Low birth weight (LBW) was found to be related to late ANC booking (Table 4.8). Fifty-three percent of LBW babies were born to mothers who booked late for ANC (Table 4.8). There was no significant association between normal birth weight and ANC booking.

A relationship was found between late ANC booking and low Apgar scores (70.8%). In contrast with anticipated findings, late booking was found to be related to a higher proportion of normal Apgar scores (52.1%) (Table 4.8). Surprisingly, late ANC booking was linked with term deliveries and early booking with preterm deliveries. Three of the four cases of birth abnormalities were found among adolescent mothers who accessed ANC late (Table 4.8). Early booking is shown to decrease the chances of most problems during delivery, with the

exception of breech births and obstructive genital warts and cord around neck (Table 4.8). According to Table 4.8, late booking was linked with 63% of all cases of PIH, as well as 53.6% of all cases of UTI's. All cases of gestational diabetes and TB were found with late ANC bookers.

Table 4.8 Maternal and neonatal outcomes in pregnant adolescents at a district hospital, between the period 2011-2013 (n=314).

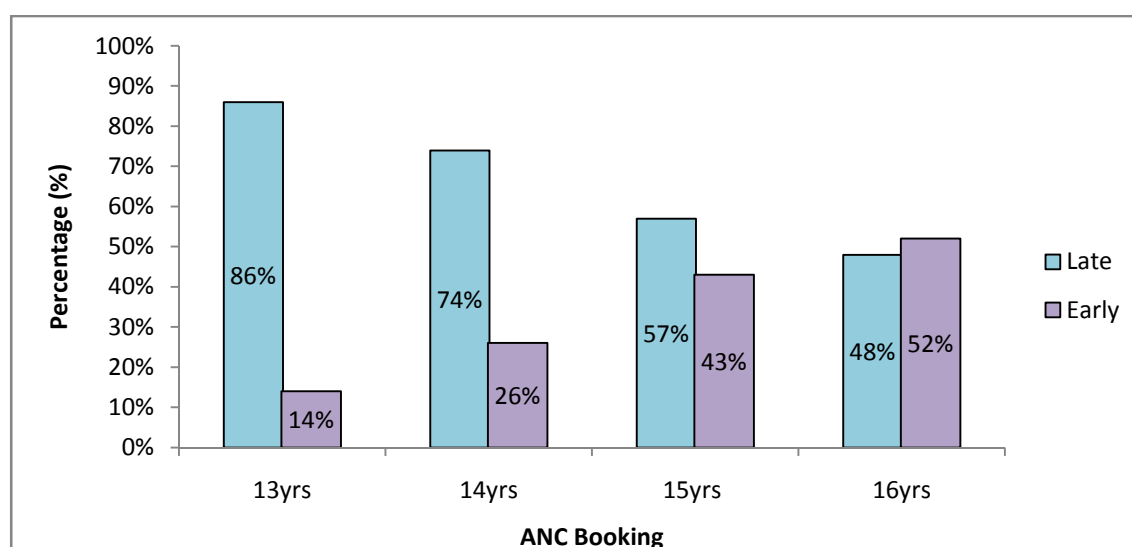
Outcome	Total	Early booking	Late booking	p-value
Maternal Anaemia				
Yes	100 (31.8)	43 (43)	57 (57)	p=0.23
No	214 (68.1)	102 (47.7)	112 (52.3)	
Birth weight				
LBW < 2500 g	32 (10)	15 (46.9)	17 (53.1)	p=0.76
Normal ≥ 2500 g	282 (89.8)	141 (50)	141 (50)	
Head circumference				
SGA < 33 cm	7 (2.2)	3 (42.9)	4 (57.1)	p=0.17
Normal at term 33 to 37 cm	307 (97.8)	217 (70.7)	90 (29.3)	
1st Apgar scores n=310				
Low Apgars < 7	24 (7.7)	7 (29.2)	17 (70.8)	p=0.09
Normal Apgars 7 to 10	286 (92.3)	137 (47.9)	149 (52.1)	
Gestational age at delivery				
Preterm < 37 weeks	7 (2.2)	4 (57.1)	3 (42.9)	p=0.55
Normal ≥ 37 weeks	307 (97.8)	141 (45.9)	166 (54.1)	
Birth Abnormalityn=310				
Yes	4 (1.3)	1 (25)	3 (75)	p=0.63
No	306 (98.7)	141 (46.1)	165 (53.9)	
Adverse delivery outcomes				
CPD	38 (12.1)	16 (42.1)	22 (57.9)	
Foetal distress	38 (12.1)	16 (42.1)	22 (57.9)	
Breech	3 (1)	3 (100)	0	
Prolonged labour	2 (0.6)	1 (50)	1 (50)	
Poor progress	15 (4.8)	7 (46.7)	8 (53.3)	
Obstructive genital warts	2 (0.6)	2 (100)	0	
Cord around neck	10 (3.2)	6 (60)	4 (40)	
Medical and general history during pregnancy				
PIH	30 (9.6)	11 (36.7)	19 (63.3)	
Epilepsy	3 (1)	2 (66.7)	1 (33.3)	
Diabetes	1 (0.3)	1 (100)	0	
TB	1 (0.3)	1 (100)	0	
UTI	28 (8.9)	13 (46.4)	15 (53.6)	
Asthma	9 (2.9)	7 (77.8)	2 (22.2)	
Genital warts	7 (2.2)	4 (57.1)	3 (42.9)	
HIV status n=311				
Positive	25 (8.0)	12 (48)	13 (52)	p=0.47
Negative	286 (92)	132 (46.2)	154 (53.8)	

*p-value < 0.05 was considered statistically significant.

Table 4.9 Average gestational period of first ANC booking 2011-2013in (weeks).

Year	Mean (wks)	Std. Dev	Min	Max
2011	20.45	6.00	5	33
2012	20.84	6.90	9	37
2013	20.59	6.17	9	37

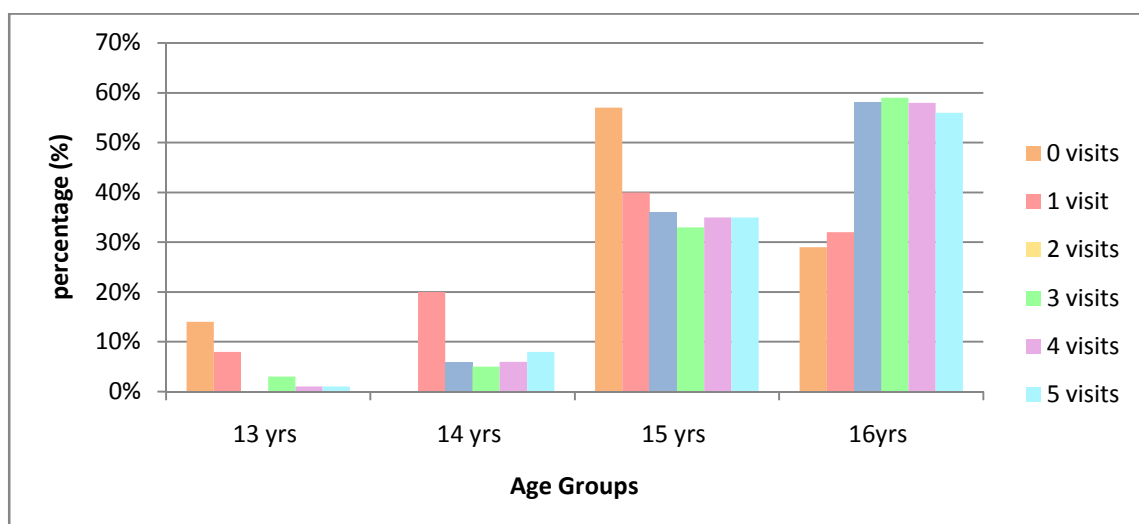
The earliest ANC booking was at five weeks which was noted in 2011, while the latest booking at 37 weeks was documented in 2012 and 2013 (Table 4.9). The average gestational age of first ANC visits was above 20 weeks, which was deemed as late ANC booking.



*p-value of < 0.05 was considered as statistically significant.

Figure 4.16 Age stratified by ANC booking in adolescents at a district hospital for the period of 2011-2013. Early booking = < 20 weeks; Late booking = \geq 20 weeks, ($p = 0.02^*$).

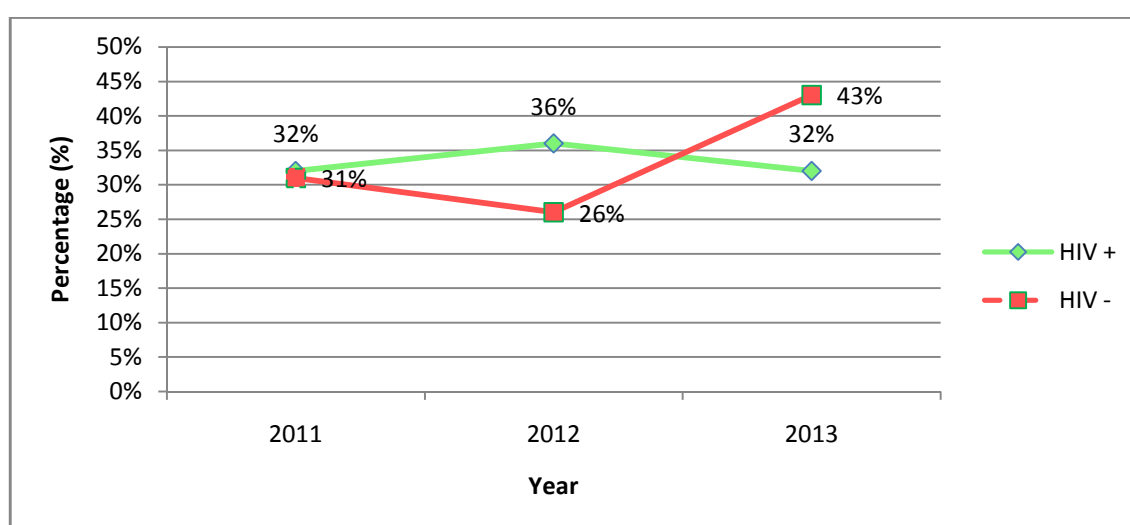
Results showed that young maternal age was significantly associated with late ANC booking ($p=0.02^*$) (Figure 4.16). Eighty-six percent of 13 year-olds booked late for ANC, 74% of 14 year-olds and 57% of 15 year-olds also booked late. Older maternal age was associated with early booking. This could be due to a higher level of knowledge and maturity in older adolescents. Furthermore, older adolescents may be more knowledgeable regarding the signs and symptoms of pregnancy.



*p-value of < 0.05 was considered as statistically significant.

Figure 4.17 Age stratified by ANC utilisation in young adolescents at a district hospital for the period 2011-2013. 0 visits = Nil attendance; 1-3 visits = under-utilisation; 4-5 visits = recommended utilisation, (p= 0.10).

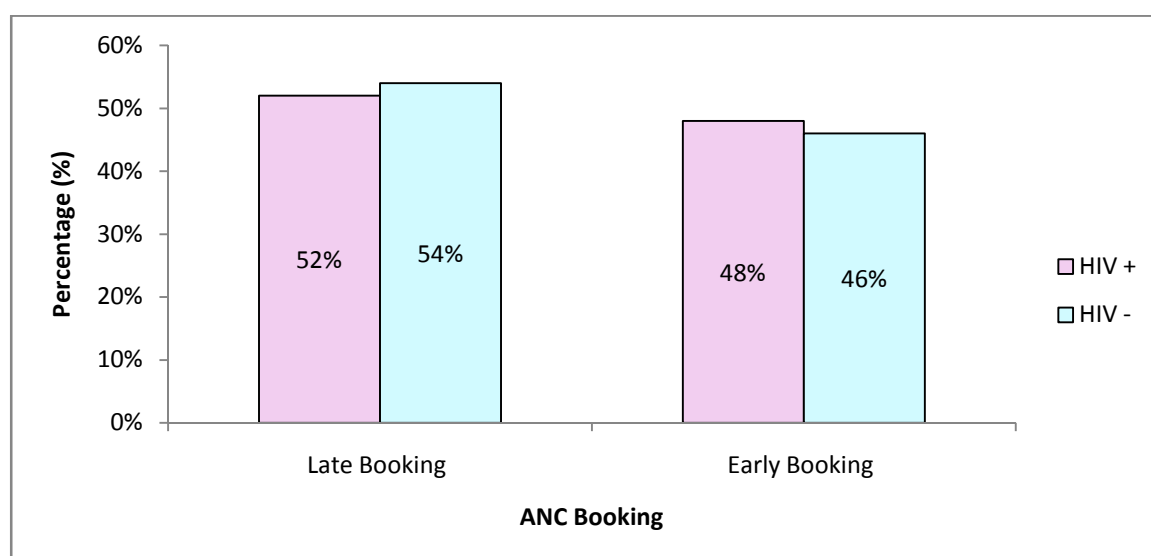
The highest proportion of non-clinic cases (NCC's = 0 visits) was found among fifteen year-olds (57%). Among thirteen year-olds only 2% of girls attended the recommended 4-5 visits during pregnancy. In the sixteen years age group, however, the majority of participants attended 4-5 ANC visits throughout pregnancy. Generally, younger adolescents (13-14 years) were found to underutilize ANC services. This comparison should be interpreted with caution as there were many more 16 year olds compared to 13 year olds so this was a skewed distribution of age.



*p-value of < 0.05 was considered as statistically significant.

Figure 4.18 HIV status in young adolescents stratified by year 2011-2013, (p=0.47).

The percentage of HIV positive pregnant women increased from 2011-2012 and thereafter decreased in 2013, with the highest prevalence of HIV positive pregnant women in 2012 (Figure 4.18).



A p-value of 0.05 was considered as statistically significant.

Figure 4.19 HIV status stratified by ANC booking among young adolescents at a district hospital for the period 2011-2013. Early booking = < 20 weeks; late booking = \geq 20 weeks, (p=0.99).

Fifty-two percent of pregnant adolescents who were HIV positive booked late for ANC. This could be due to the fear of HIV testing during ANC (Figure 4.19).

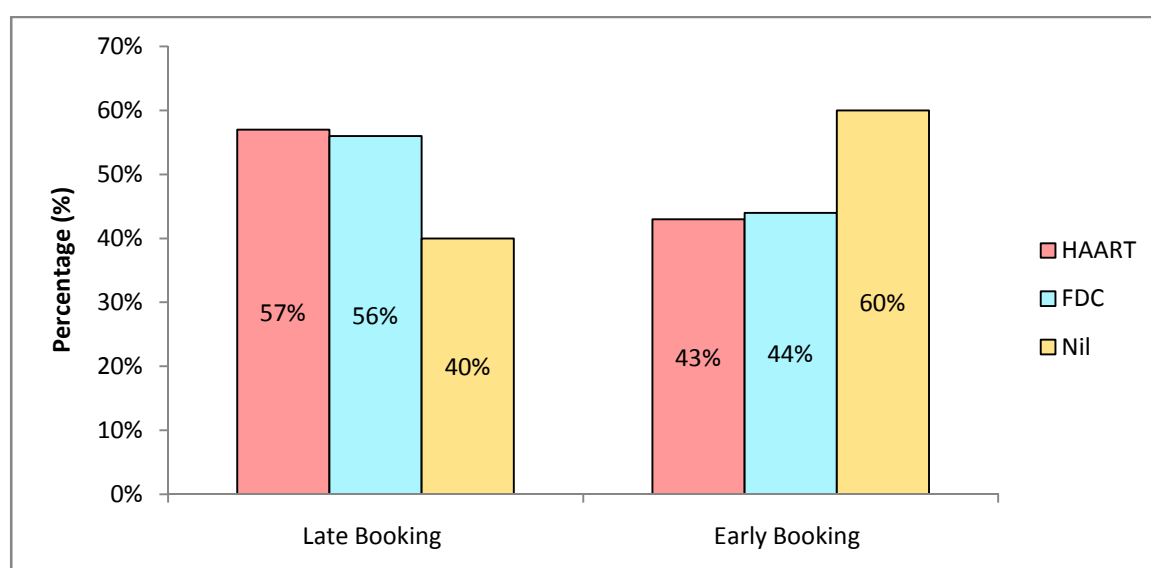


Figure 4.20 HIV therapy stratified by ANC booking; early booking = < 20 weeks; late booking = \geq 20 weeks HAART: Highly Active Antiretroviral Therapy; FDC: Fixed Dose Combination.

The majority of HIV positive participants who booked late were on HAART and FDC therapy. Among those HIV positive patients booked early for ANC, the majority (60%) had not been initiated on treatment (Figure 4.20). There is a possibility that treatment may have been initiated but not documented in the maternity case record.

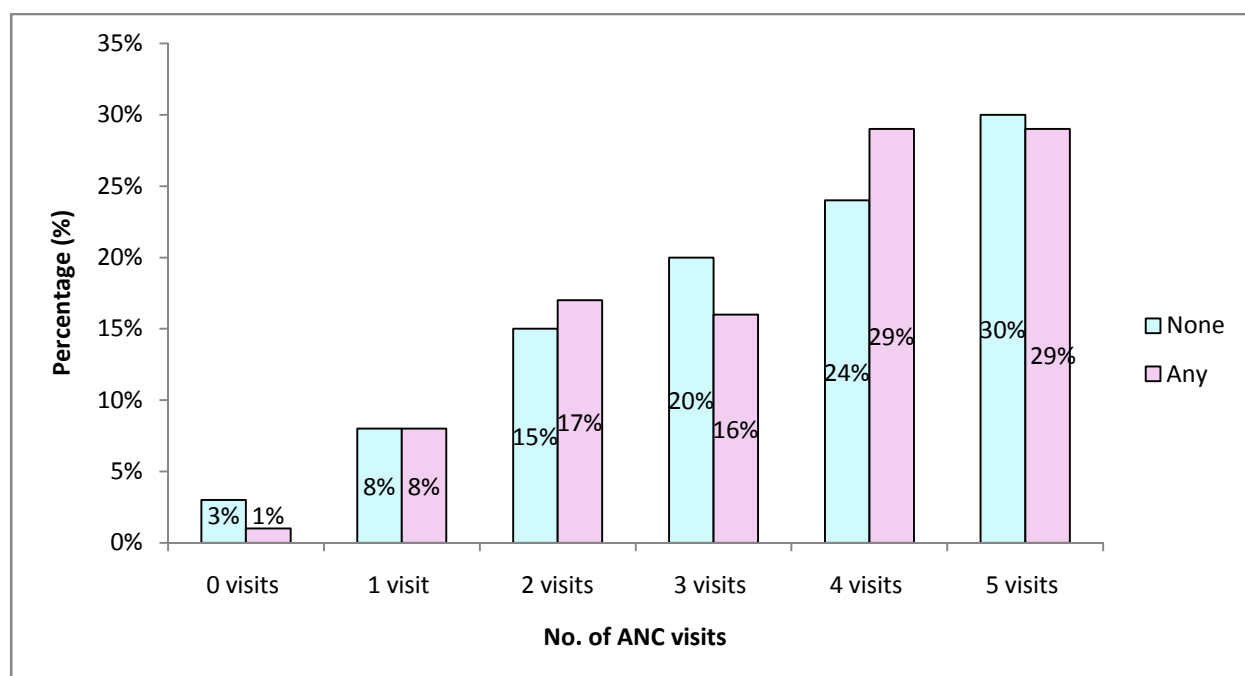


Figure 4.21 Adverse delivery outcomes in adolescent pregnancies stratified by ANC utilisation, for the period 2011-2013. None = nil problems during delivery; any = any problem during delivery.

In contrast with the expected findings, the highest percentages of complications were found in those women who attended 4-5 ANC visits. This could be due to complicated pregnancies requiring more ANC visits than non-complicated pregnancies (Figure 4.21).

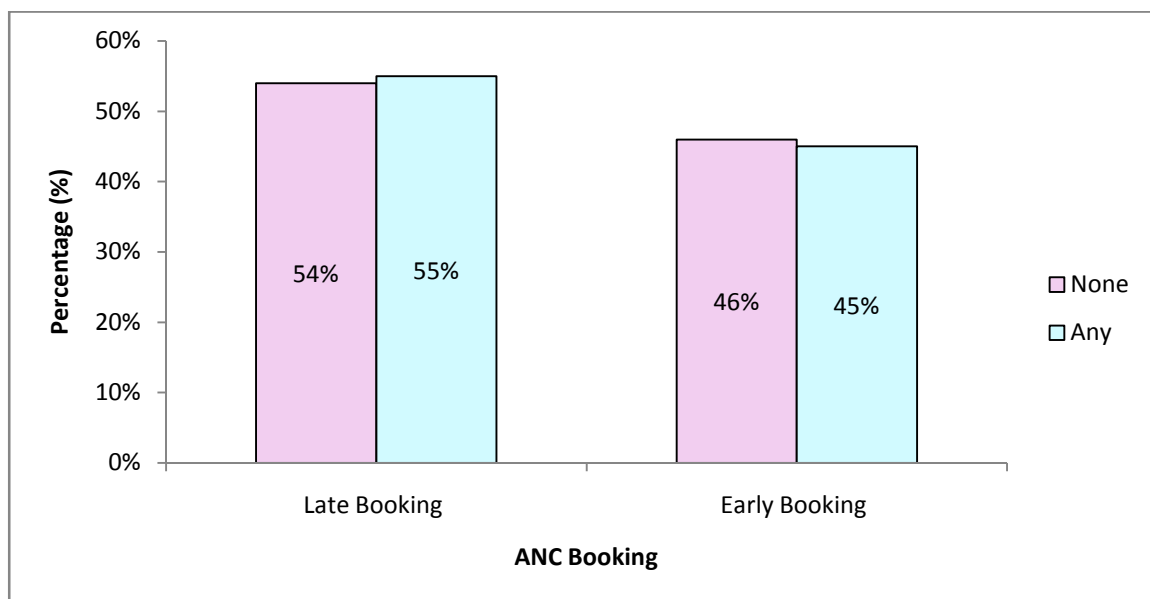


Figure 4.22 Adverse delivery outcomes stratified by ANC booking in adolescent pregnancies at a district hospital. Early booking = < 20 weeks; late booking = \geq 20 weeks.

Late ANC booking was linked with the majority of adverse delivery outcomes that were experienced (Figure 4.22).

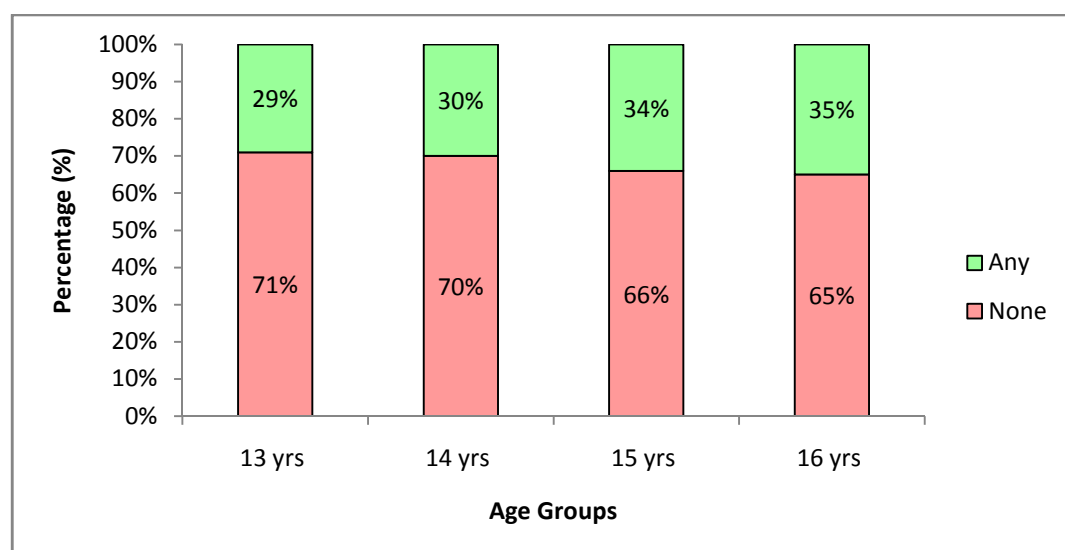


Figure 4.23 Age stratified by adverse delivery outcomes among adolescent pregnancies at a district hospital. None = nil complications during delivery; any = any complications during delivery.

This comparison should be interpreted with caution as there were many more 16 year olds compared to 13 year olds; so this was a skewed distribution of age. Adverse delivery outcomes were not associated with age. The highest percentage of adverse delivery outcomes (35%) was found among 16 year-old mothers, while the lowest proportion was found in the youngest age group (13 year-olds) (Figure 4.23).

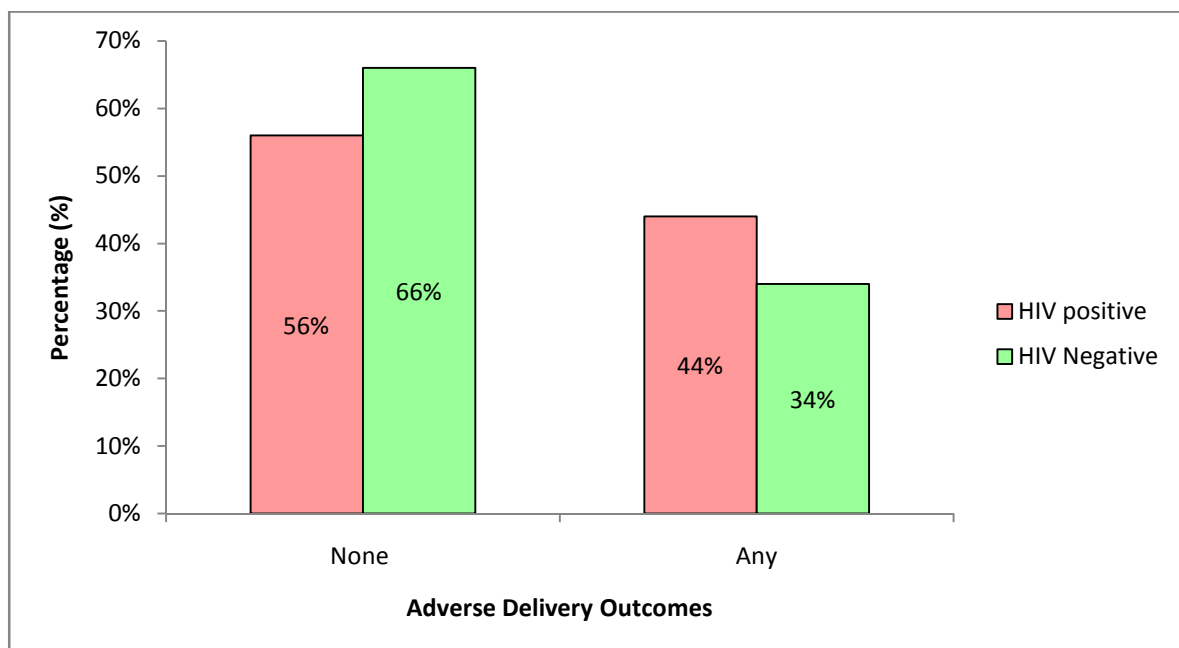


Figure 4.24 Adverse delivery outcomes among adolescent pregnancies stratified by HIV status, at a district hospital.

Forty-four percent of problems during delivery were related to adolescent mothers who were HIV positive (Figure 4.24).

Table 4.10 Adjusted logistic regression models of maternal health outcomes using age, HIV status, ANC attendance and ANC visits as independent variables (n=314).

	Anaemia		Mode of delivery Δ		Condition of perineum \Diamond	
	OR	CI	OR	CI	OR	CI
Age						
13-14	1.00		1.00		1.00	
15-16	0.82	0.35; 1.94	0.90	0.20; 3.88	1.24	0.54; 2.83
HIV						
Negative	1.00		1.00		1.00	
Positive	2.04	0.90; 4.66	1.45	0.62; 3.41	0.36	* 0.16; 0.84
ANC attendance						
Early booking [†]	1.00		1.00		1.00	
Late booking \pm	1.26	0.78; 2.03	0.95	0.58; 1.56	1.07	0.67; 1.7
No. of ANC visits						
Under utilisation ϕ	1.00		1.00		1.00	
Recommended utilisation [‡]	0.99	0.61; 1.60	0.69	0.42; 1.14	1.48	0.92; 2.37

*p<0.05 was considered as significant

([†]Early booking; < 20 weeks); (\pm Late booking; \geq 20 weeks); (ϕ Under utilization; 0-3 ANC visits); ([‡] Recommended utilization; 4-5 ANC visits);

(Δ Mode of delivery; NVD, C-section, assisted delivery); (\Diamond Condition of perineum; intact, episiotomy, natural tear)

Table 4.11 Adjusted logistic regression models of birth outcomes using age, HIV status, ANC attendance and ANC visits as independent variables (n=314).

	Adverse delivery outcomes [•]		Gestational age		1 st Apgar		2 nd Apgar		Birth weight	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
<i>Age</i>										
13-14	1:00		1:00		1:00		1:00		1:00	
15-16	0.88	0.38; 2.03	1.05	0.23; 4.77	0.38	0.05; 2.90	2.66	0.34; 20.56	1.48	0.48; 4.61
<i>HIV</i>										
Negative	1:00		1:00		1:00		1:00		1:00	
Positive	1.54	0.67; 3.52	1.23	0.27; 5.65	1.0	0.22; 4.56	1:00	0.22; 4.52	1.21	0.34; 4.29
<i>ANC attendance</i>										
Early booking [†]	1:00		1:00		1:00		1:00		1:00	
Late booking [±]	1.03	0.65; 1.66	0.77	0.32; 1.87	2.10	0.88; 5.00	0.48	0.20; 1.15	0.85	0.41; 1.76
<i>No. of ANC visits</i>										
Recommended utilization [‡]	1:00		1:00		1:00		1:00		1:00	
Underutilization [§]	0.89	0.53; 1.36	2.64	*1.04; 6.74	1.37	0.61; 3.08	0.73	0.32; 1.63	1.26	0.61; 2.63

*p-value < 0.05 was considered as significant

([†]Early booking; < 20 weeks); (± Late booking; ≥ 20 weeks); (ϕ Under utilization; 0-3 ANC visits); (‡ Recommended utilization; 4-5 ANC visits);

([•] Adverse delivery outcomes; CPD, foetal distress, breech, prolonged labour, poor progress, obstructive genital warts); (Gestational age; preterm, < 37 weeks; Term, ≥ 37 weeks); (Birth weight; LBW, <2500 g; Normal, ≥ 2500g)

Logistic regression models included age, HIV status, ANC attendance and number of ANC visits as independent variables or explanatory variables while information on various maternal and birth outcomes were used as the dependant variables. The condition of perineum was significantly associated with HIV status (OR=0.36; 95% CI=0.16; 0.84; $p<0.05$) (Table 4.10). HIV positive mothers were more likely to have an intact perineum post-delivery. However, HIV positive adolescents were twice as likely to be diagnosed with anaemia compared to HIV negative mothers (results not significant).

Underutilisation of ANC (i.e less than 4 visits) was significantly associated with lower gestational age (<37 weeks) (OR=2.64; 95% CI=1.04; 6.74; $p<0.05$) (Table 4.11). None of the other outcomes tested showed any significant association with age, HIV status, ANC attendance or number of ANC visits.

4.7 Qualitative Results and Discussion

This chapter presents the results of data obtained from the in-depth semi-structured interviews with adolescent mothers who had accessed ANC during their pregnancy at the research site. The results and discussion have been structured according to the themes and sub-themes that were identified through analysis of data which was collected to investigate potential barriers to the access of ANC amongst adolescents.

Five individual semi-structured interviews were conducted. Participants were interviewed until a point of data saturation was reached. The following main questions were asked, with suitable probing questions:

1. How did you feel when you found out you were pregnant?
2. When you were pregnant, how did you feel about going for check-ups at the hospital?
3. What do you think can stop you and other young girls from going for check-ups during pregnancy?
4. What do you think are the benefits of going for check-ups while you are pregnant?
5. What do you think can be done to make it easier for young mothers to attend hospital check-ups?

Some of the emergent themes included emotional vulnerability, financial barriers, and health care system barriers.

4.8 Demographic Profile of the Participants

Demographic information was considered of great importance as it provides a socio-cultural descriptive profile of the factors that contribute to the experiences and views of pregnant adolescents.

Participants ranged between ages 14-16 years-old. The sample included two sixteen year-olds, one fifteen year-old, and the last participant was fourteen years of age.

- All participants were African.
- Financial support was provided to participants by parents and partners.
- All participants lived at home and had access to piped water and electricity.
- All participants were single and unemployed.

4.9 Emergent Themes

There were a few concepts in the interviews that emerged as themes and sub-themes which will be further discussed in this chapter. Verbatim quotations are included in order to support the results and are written in italics.

A. Emotional vulnerability

Fear and Loneliness

The interview process enabled participants to recall their experiences when first discovering they were pregnant. Upon confirmation of pregnancy, many participants experienced feelings of fear, shyness, loneliness and nervousness. This was supported by findings of an Aboriginal study in Australia amongst young women between 16-21 years of age, where respondents reported feelings of shock, surprise or fear after confirmation of pregnancy (Reibel *et al.* 2015: 49). Most participants in this study realised the impact of their pregnancy on their families and were ashamed of their actions. One participant stated that it was better to die than deal with the shame of falling pregnant.

According to Reibel *et al.* (2015: 49) young women expressed vulnerability at their first visit to the clinic for confirmation of pregnancy. Many participants openly stated during the interview that they were fearful of the nurses' judgement and scolding upon the first clinic visit. The response of one participant revealed that she felt disrespected by the nurses while accessing ANC.

(Participant 1: age 15) "It was about my age, I was just afraid to say my age. I actually didn't even want to say my age. Because I was the only one who was small."

(Participant 1) "They (nurses) talk in a rough way, in a rude way, they (nurses) don't have respect."

(Participant 4: aged 16) "I felt so scared, I was so shy. I felt like committing suicide the first time I found out that I was pregnant."

(Participant 5) "Ay yes I did feel so lonely, cos I couldn't like cope you know."

Shame and Disgrace

The majority of participants expressed a fear of nurses and other patients when attending ANC clinics. Some participants felt embarrassed and also feared judgement by older women waiting in the clinic queue. The young mothers in this study felt that they were demeaned by older mothers. The findings from this study concurred with that of Smith and Roberts (2009: 625) which was undertaken in the UK. In this study pregnant adolescents felt that older mothers "looked down upon them" while they were accessing care. These young mothers also felt uncomfortable waiting in the same queue as older mothers.

(Participant 2: aged 14) "So you have decided to have a baby at an early age, what you think of yourself, they (people at clinic) said foolish things to us."

B. Barriers to accessing antenatal care

Financial Barriers

Financial problems were conveyed as a barrier to accessing ANC, especially where the clinic was far away and there was a need for money for transport. Most participants had poor families and were dependent on their families financially. According to a Ugandan study on health seeking behaviour during pregnancy, adolescents felt powerless due to insufficient

financial and social support (Atuyambe *et al.* 2009: 786). Results from this study indicated that adolescents required financial support for transportation; however they lacked financial resources. Pell *et al.* (2013: 7) found that money for food while waiting in the ANC queue was an indirect cost for women. An adolescent's decision to seek ANC was found to be strongly influenced by partners or parents who were providers of financial support (Atuyambe *et al.* 2009: 788). Results from research conducted in Lesotho indicated that financial constraints were a major barrier to access of care amongst pregnant adolescents ≤ 19 years of age (Phafoli, Van Aswegan and Albert 2007: 17f).

(Participant 5: age 16) "Ok, some of us we come from different families for e.g. most of our parents are not working so ay, I won't have like money to go to the clinic and stuff you know."

Attitude of HCW

Health care workers at the clinic were perceived by the young mothers in this study as being rude and unfriendly. Participants felt that nurses lacked respect for them and this was a deterrent to accessing care. Some participants expressed a fear of nurses when attending the clinic. They found that nurses did not give them respect due to their young age when falling pregnant. This was consistent with the findings by Reibel *et al.* (2015: 52), in which young women reported concern about being respected by which ever service provider they saw. Furthermore, some participants in this study stated that nurses shouted at them. This concurred with results of research by Smith and Robert (2009: 626), where negative treatment from health care professionals was found to hinder access to care. Atuyambe *et al.* (2009: 790) found that a bad attitude and rudeness was displayed by some HCWs towards adolescents. Research by Phafoli, Van Aswegan and Albert (2007: 17f) indicated similar findings, where the attitude of service providers, as well as adolescents' fear of ill-treatment by nurses, was found to contribute to a delay in attending for ANC. These practices were found to discourage adolescents from accessing care (Atuyambe *et al.* 2009: 790).

It is evident that HCW play an important role in a pregnant adolescent's access of maternity services. South African research has reported that midwives treated pregnant adolescents better when parents accompanied them to clinic visits, as they could not shout easily at them in the presence of parents (James, Rall and Strumpher 2012: 5). Young women in this study felt embarrassed when shouted at by HCWs. In London, a research study amongst women of different ages found that women who had negative previous experiences with health care

providers found it easier to avoid, rather than to engage, in maternity care services (Callaghan, Buller and Murray 2011: 9). When adolescents have bad experiences while accessing care, they may be discouraged from making further visits.

A report compiled by the South African Department of Basic Education (2009: 18), indicated that despite the initiation of the adolescent-friendly clinic initiative in SA, young people are still faced with stigma and negative attitudes by HCWs. This may discourage adolescents from accessing ANC services. A systematic review of the literature regarding the attitudes of maternal health care providers towards women of different ages found that reported negative patient interactions superseded positive ones. Evidence also showed the physical abuse towards women, a lack of privacy, poor communication and authoritarian attitudes of HCWs (Mannava *et al.* 2015: 1). All participants in the current study agreed that total privacy and patient confidentiality was maintained during the consultation and examination by the midwife. Patient confidentiality was found to have an effect on whether adolescents access care as well as the sharing of important health information with the midwife (Duggan and Adejumo 2012: e66). Patient HCW confidentiality is pivotal in obtaining vital information on the health status from the pregnant adolescent.

In a New Zealand study amongst adolescent women, participants avoided health care providers with whom they had formerly had negative experiences, or where they anticipated negative attitudes from the provider (Makowharemahihi *et al.* 2014: 56-58). Prior interactions played an integral role in the decision-making process of these adolescents while accessing care. A client's perception of the health care provider's behaviour is a key determinant of client/provider communication. The perception of a negative attitude by clients would reduce communication with the provider (Callaghan, Buller and Murray 2011: 11). A HCWs non-judgemental attitude may assist in putting the adolescent at ease during examination and also ensure co-operation. In a study by Andrew *et al.* (2014: 11) nurses expressed frustration when women did not consider the advice given to them. The expectations of adolescent mothers were not met as they were subjected to a lack of compassion at health care facilities (Atuyambe *et al.* 2009: 789). A good attitude and patience displayed by the health care provider would encourage the adolescent to share important information pertaining to her health.

(Participant 1: age 15) “It’s the nurses the way they talk to us. Sometimes, yes, we are pregnant we can see our mistake. But like if you a human being you have to talk to the other person in a mannered way. Like you got some respect, show some respect about it.”

(Participant 5: aged 16) “If someone (nurses) shouts at you, you won’t like stand that person. I suppose that most of the teenagers will fail to come to the clinic if someone (nurse) is shouting at them.”

When possible strategies were requested from participants regarding the attitude of HCW, the following intervention was suggested;

(Participant 4) “I think it will be like easier if they will get friendly nurses.”

Participants conveyed that if nurses were friendly and did not scold them, it would make it easier for adolescents to attend for ANC. The participants would be able to speak to nurses freely without any fear of being scolded or judged. In a study by Kennedy *et al.* (2013: 8) adolescents described the most important feature of a youth-friendly health service to be friendly health service providers. A friendly service provider was described by adolescents as being someone with a non-judgemental and kind attitude, who understood adolescents and who maintained confidentiality (Kennedy *et al.* 2013: 8). A Ugandan study indicated that adolescents experienced a lack of compassion at health care facilities (Atuyambe *et al.* 2009: 789). One participant expressed that nurses had no respect for adolescent mothers due to their age; this added to the anxiety of the adolescent while waiting in the queue. Similar results were found in a study by Duggan and Adejumo (2012: e64), where adolescents felt that they were not respected by HCWs. The initiation of a greeting by HCWs, as well as placing importance on what the adolescent says, was perceived as a display of respect which was important to the adolescent. Adolescent mothers felt that a ‘smiling’ HCW would contribute to making them feel comfortable and at ease (Duggan and Adejumo 2012: e64).

Research based in Mpumalanga in SA indicated that youth-friendly service programmes are limited in the sub-district. Only 70% of services were found to be tailor-made and youth-friendly, which is below the DOH’s target of Primary Health Services (Geary *et al.* 2014: 1). The training of nurses on youth-friendly health services is an important intervention in promoting the use of reproductive and maternal health services in SA (Geary *et al.* 2014: 6).

Long Queues

Most participants mentioned that long queues and increased patient waiting time posed a challenge in the ANC clinic. This was seen as an obstacle; however, participants indicated the necessity to wait in a long queue in order to access maternity services as they were essential during pregnancy. One participant indicated that adolescents need to access care swiftly in order to get back to school. Long waiting periods made patients feel uncomfortable and some became hungry and tired whilst in the queue. A participant related that standing in the queue for a long time with adults was a source of distress. Participants already felt judged by adult clients when they entered the clinic and conveyed that standing in a queue for prolonged periods of time with adults caused additional fear and embarrassment. Antenatal care clinics in SA do not have separate facilities or specifically allocated times for adolescents and older women. All pregnant women of different ages access care in the same facilities at the same time (James, Rall and Strumpher 2012: 5). In a study on adolescents' perceptions in a South African ANC clinic environment, participants communicated that they were conscious of being the youngest among other women attending for ANC. More particularly, they were uncomfortable sitting in a queue with older women (James, Rall and Strumpher 2012: 5). Duggan and Adejumo (2012: e65) found that system barriers such as long queues contributed to long waiting times. Participants in the same study also found that they were unfamiliar with the hospital system flow, which led to an additional wastage of time (Duggan and Adejumo 2012: e65).

(Participant 5: aged 16) "Sometimes you find the queues are very long. But then otherwise there's nothing we can do at the end of the day we need to attend ANC."

(Participant 4: aged 16) "Because I was scared at that time and had to stand in the queue with adults and I was the one who was youngest there."

When participants were asked for possible interventions to alleviate this issue, the following was suggested:

(Participant 4) "And a special day for clinic for teenagers, if they will have the special day for them."

(Participant 4) "Because as I said before they are still in school. They have got maybe 2 hours to go to the clinic then go to school. If they have that special day I think it will be best for teenagers."

Long queues at the ANC clinic were found to be a hindrance to accessing care. This was consistent with a study on the initiation of maternity care among adolescents in Maori New Zealand, where system barriers led to a delay in timely access to maternity care (Makowharemahihi *et al.* 2014: 59). Participants expressed the importance of attending school as well as the clinic during pregnancy. One adolescent suggested a special day be allocated for all pregnant adolescents to attend clinics, as they need to get back to school and the clinic is only open during the week.

Distance travelled to access ANC services

The long distances from home to the clinic, together with transportation costs, were viewed as a challenge when accessing ANC. Many participants related that the distance of the clinic from home can prevent young women from accessing care. Two participants expressed that if the clinic were close to home they could just walk home when they were done and it would save money. In this study all participants travelled to a clinic using public transport. It was expressed that money was needed to access transportation and due to financial constraints this posed a challenge. The findings from a Ugandan study concurred with this, as transport was found to be a key deterrent in an adolescent's access of care (Atuyambe *et al.* 2009: 791). Even in a developed country such as rural Canada, research among women of different ages indicated that participants experienced challenges accessing maternity care due to the lack of flexibility in timing and location (Sutherns and Bourgeault 2008: 870).

(Participant 2: aged 14) "I'm staying far away from the clinic, so it costs me too much for me to travel."

(Participant 4: aged 14) "Ay especially those who are staying in rural areas the clinics are so far and sometimes if they are pregnant they don't go to the clinic."

HIV Status

The fear of HIV testing was repeatedly expressed by participants in this study as a factor that would keep young women from attending a clinic. Due to the risky behaviour of adolescents and the lack of condom use, participants feared HIV testing during the initial clinic visit. It is evident that despite the South African Government's fight against HIV and constant voluntary testing and counselling (VCT) campaigns to encourage testing, a fear of testing still exists amongst the country's youth. A South African study carried out in the Eastern Cape found that there was inadequate knowledge of STI's and their prevention among adolescents

(Bana *et al.* 2010: 158). Results from the same study also indicated that alcohol and dagga (marijuana) were the most common substances used by young people. The use of substances may promote risky behaviour among adolescents, thereby increasing the likelihood of contracting HIV as well as falling pregnant. Research conducted in a Durban-based university among undergraduate students found that a large proportion of students' knowledge on STD's, symptoms and prevention was unsatisfactory (Hoque and Ghuman 2011: 3719). Poor knowledge of the prevention of sexually transmitted diseases (STD's) places adolescents at an increased risk of contracting HIV.

In the current study, participants conveyed that young women were already in a state of vulnerability due to the pregnancy and would be subjected to further stress if they were to be diagnosed with HIV/AIDS. Participants further expressed that HIV testing at ANC was a source of distress to adolescents. A South African study by Kanku and Mash (2010: 563) based in the rural town of Taung in the North West Province and conducted among young women and men; found that most adolescents perceived falling pregnant to be a negative event with consequences such as the risk of HIV. In a research study undertaken in Ghana, Kenya and Malawi on factors affecting ANC attendance among women of all ages, women were cautious about attending ANC as they would be informed of their HIV status and if positive, they would be susceptible to stigma by their husbands (Pell *et al.* 2013: 7). It is evident from the responses of participants that the youth are deeply affected by discovering their status, because of risky behaviour and the associated stigma. This may further impact on the late initiation of ANC services among this vulnerable group.

(Participant 4: age 14) "Some of us are still young and to check your status and know if you are HIV positive at this age. You already stressed that you are pregnant then you will be stressed that you have HIV. It will be a big problem."

(Participant 1: age 15) "Yes they can be afraid of the HIV status because firstly if you didn't use a condom during sex with your partner and you haven't tested before. Now if you coming to the clinic or hospital definitely they will do some check-ups for you. So they (the girls) are not sure what is gonna come out, cos they don't trust their partner."

Lack of knowledge

A participant related that some adolescents were not knowledgeable regarding the ANC services available and the benefits of attending; these girls end up delivering at home without

accessing any maternity care services. Another participant expressed that adolescents lacked knowledge on pregnancy and that it was important to attend ANC to gain more knowledge. A lack of knowledge of the benefits of early ANC attendance was found to hinder access of care by adolescents (Phafoli, Van Aswegan and Albert 2007: 17e). Poor knowledge of the signs and symptoms of pregnancy may also contribute to the late initiation of maternity care services. In a study by Makowharemahihi *et al.* (2014:57) one of the leading deterrents was the lack of information on the ANC process. Knowledge of the benefits of ANC is important to empower adolescents, as well as to encourage early booking for ANC.

(Participant 4: aged 14) "They (pregnant adolescent) will call a grandmother from next door to deliver the baby. They don't go to the clinic."

(Participant 4: aged 14) "I think they (pregnant adolescents) don't know, they haven't been taught about the clinic."

(Participant 5: aged 16) "As we (pregnant adolescents) are still young and stuff we need to learn more about this, you know."

C. Emotional and financial support

Family Support

The initial response of parents when informed of the pregnancy was anger and disappointment. Once the pregnancy was accepted by the family, however, it helped the adolescent to accept being pregnant. This is consistent with the findings from the study by Phafoli, van Aswegan and Albert (2007: 17g), where unplanned pregnancies resulted in parental disbelief. In a study based in Ghana, parents expressed anger and shock when they discovered their adolescent daughters were pregnant (Gyesaw and Ankomah 2013: 777). Some participants mentioned that their father's reaction to discovery of the pregnancy to be much more intense and difficult to handle.

Participants highlighted the positive impact of family and partner support during pregnancy. Emotional and financial support from family and partners were conveyed by participants as being crucial in acceptance of the pregnancy and access of ANC services. Female family members played a key role in providing support and reassurance to the young mother, as well as in promoting ANC initiation. Some participants expressed that they were given spiritual encouragement by female family members which helped them to deal with fears associated

with pregnancy. Similar findings were revealed in a study among adolescents in Lesotho, where female family members were providers of psychological support, while male family members were providers of financial support (Phafoli, Van Aswegen and Albert 2007: 17g). Research by Makowharemahihi *et al.* (2014: 58) undertaken in New Zealand among pregnant adolescents < 20 years of age, found that participants with good support systems were assisted by family and friends to direct them through the process of selecting a maternity care service provider.

(Participant 2: aged 14) "It's their (family/boyfriend) support. It teaches me a lot and encourages me to think that now I will be a mum, I must accept it and nothing will happen to me."

(Participant 2: aged 14) "Yes, especially my mum, my mum told me that it (pregnancy) is nothing, like she even quoted to me from the Bible."

Partner Support

From participants' responses it was deduced that partner support formed an important coping mechanism for adolescents. Most of the participants who were interviewed were well supported by their partner. Acceptance of the pregnancy by the partner helped these young women come to terms with the pregnancy. Partner support was found to promote concern over well-being of the unborn baby. A participant's health seeking decisions seemed to have been influenced by the partner's views on the pregnancy. Two participants expressed that strong support was provided by the boyfriends. One participant's boyfriend prevented her from terminating the pregnancy. Partner support and acceptance of the pregnancy was seen to play a vital role in the access of care. This finding is supported by a London study where a lack of partner involvement was found to be a barrier in accessing care (Smith and Roberts 2009: 626).

(Participant 1: aged 15) "Firstly I would just say like if I want something to eat, he (boyfriend) will surely bring it at the very same time. If I'm going to the hospital or clinic he takes me over there. If I want something at school like to go and buy because we are at the same school, he goes and buys for me, he carries my bag."

(Participant 2: aged 14) "Yes my boyfriend says I'm now accepting it to become a mother. Because if I have an abortion there are a lot of things that I am putting myself at risk."

When participants were questioned on the role played by family support, the following was mentioned:

(Participant 4: aged 16) “They (family) were advising me, they were able to give me money to go to the clinic. They were able to say if I’m working so hard, they say no you mustn’t work hard; have a rest because you are pregnant.”

Family support was clearly an important factor in an adolescent’s initiation of ANC. From adolescents’ accounts it was deduced that all adolescents had strong family support which encouraged and supported them in accessing care. Reibel *et al.* (2015: 49) reported that the risk of irregular or non-ANC attendance increases when family support is not present. Family support was found to have a direct influence over an adolescent’s access of care. This was supported by findings from a study by Kennedy *et al.* (2013: 7), where many adolescents indicated that encouragement and support from parents, friends and the community would make accessing services easier.

D. Importance of education

School

Many participants expressed the importance of school. This was consistent with findings from a South African-based study in five Cape town schools, where pregnant adolescents expressed a desire to remain at school as they considered academic qualifications to be important in obtaining employment (Chigona and Chetty 2008: 276). In SA education is regarded by young people as being of great value. Young South African women are aware that unwanted pregnancies disrupt educational aspirations and impose greater financial difficulties in the context of high poverty and unemployment rates (Department of Basic Education 2009: 12).

During this study, a participant with good family and partner support expressed the importance of schooling during pregnancy and after the baby is born. Participants communicated that ANC services needed to be rendered swiftly in order for them to finish quickly and return back to school. Antenatal clinics in the public sector are operational only during weekdays. This posed a challenge as all participants in our study were at school and found it difficult to attend the ANC clinic. Study findings from Chigona and Chetty (2008: 268) indicated that many pregnant adolescents deemed support from educators as being

insufficient. This was due to some teachers being unwilling to provide catch-up lessons when pregnant adolescents missed classes due to motherhood. Adolescents in the same study found that a lack of empathy from teachers, as well as pressure from teachers and fellow learners, was distressing (Chigona and Chetty 2008: 270-276). This could be due to the perception that pregnant adolescents may be a bad influence on other young women in the school setting (Ramulumo and Pitsoe 2013: 758). Support and understanding from educators is of critical importance to encourage young mothers to return to school after delivery.

Research by Gyesaw and Ankomah (2013: 777) found that many parents displayed concern at adolescents not being able to continue with their education once they have given birth. A report on teenage pregnancy in SA has indicated that the chances of an adolescent mother's re-entry into the school system decreases when there is unavailability of child care support (Department of Basic Education 2009: 13). All participants in this study conveyed good family support after acceptance of the pregnancy. This could help in promoting schooling during pregnancy and after delivery, and in turn improve the chances of employment and subsequent improved socio-economic circumstances.

(Participant 4) "They (pregnant adolescents) still have to go to school; it's very important."

(Participant 4) "Week days we have to be in school, we only got a few hours to go to the clinic then go back to school."

Health education rendered during ANC

All participants agreed that health education rendered by nurses at ANC was very useful. Most information provided was new to the adolescent. Participants mentioned that they were educated on nutritional supplements, baby care, breastfeeding and what to do if they suspect a problem during pregnancy. In contrast, findings from a study by Atuyambe *et al.* (2009: 788) revealed that adolescents had poor knowledge of the health care available to them. Adolescent clients from a study based in KZN felt that maternity care could be improved by strengthening health education, especially amongst adolescent clients as they were young and had no previous experience. Adolescents found that very little educational material was distributed to them on pregnancy-related issues. Health education on physical and psychological changes that occur during pregnancy and the postpartum period were deemed as crucial by adolescents (Duggan and Adejumo 2012: e65-66). Research by Wilson-Mitchell, Bennett and Stennett (2014: 4736) indicated that the health education provided to

adolescents while waiting in ANC queues on nutrition, lactation and childbirth preparation was deemed as helpful by adolescents. Adolescents from a study in Lesotho felt the need for health education on the importance of attending ANC clinics (Phafoli, Van Aswegan and Albert 2007: 17g). In a study by Kennedy *et al.* (2014: 7) it was found that adolescents perceived nurses to be a knowledgeable and trustworthy source of quality information on sexual and reproductive health issues. The provision of educational materials plays a significant role in reinforcing education given at the ANC clinic. Health education tailored for specific needs of the youth is important in empowering adolescents and promoting access of care in preparation for birth.

(Participant 5) “The nurses help us a lot as ama-teenagers; they tell us lots of stuff we not aware about.”

E. Benefits of attending ANC

Health Education and Empowerment

Participants reported health education and knowledge to be an important benefit of attending clinic; most participants felt that nurses provided important information on pregnancy. Participants felt empowered by health education given during ANC. This is consistent with findings from a study by Reibel *et al.* (2015: 50) which found that young women indicated that they were mainly educated by midwives during pregnancy. Participants indicated that they learnt about things they never knew. It was also expressed that midwives formed an important part of their support structure. A study on maternity care among adolescents in New Zealand yielded contrasting results, where adolescents indicated that there was a lack of sufficient and appropriate information for adolescents and this was seen as a barrier (Makowharemahihi *et al.* 2014: 52). The findings by Smith and Roberts (2009: 626) showed that young parents have poor knowledge on available support structures. A lack of knowledge about ANC was found to be a barrier to accessing care.

(Participant 1: age 15) “Yes it’s good because to know what is right during pregnancy and what is wrong during pregnancy. The pills, how to wash your hands, no long nails. Yes and what to do like if you bleeding or so. You have to come to the hospital immediately; you also have to know that.”

(Participant 5: age 16) “She won’t have knowledge if she doesn’t attend ANC.”

Health and Well-being

It was interesting to note that despite all participants having unplanned pregnancies, it was evident that there was a great degree of concern for the well-being of the unborn baby. Participants communicated that ANC attendance was important for the health and well-being of their unborn baby. Results from Reibel *et al.* (2015: 50) support this, as young women reported that clinic visits were needed for the baby's health and well-being. In a study in Papua New Guinea pregnant women perceived that ANC attendance played a key role in ensuring a safe delivery for the mother and child (Andrew *et al.* 2014: 12). In this study, all participants were knowledgeable about the importance of attending ANC clinic to ensure health and well-being.

(Participant 4: age 14) "To know your health and to know your baby if he's well."

CHAPTER 5

DISCUSSION

Adolescent pregnancy statistics in SA are a cause for serious concern (Kyei 2012:134). Late initiation of ANC or under-attendance is a common occurrence amongst adolescents, which in turn minimises the time for treatment and interventions of possible risk factors (Phafoli, Van Aswegan and Alberts 2007: 17-17a). This research aimed at investigating under-attendance and the delay in initiating ANC among adolescents, as well as its association with adverse maternal health outcomes. This study was of great significance in the light of achieving previous MDG's and the new SDG's linked with maternal and child health (Figures 4 and 5). The quantitative findings of this study indicated that young maternal age was significantly associated with late ANC booking (* $p=0.02$). Logistic regression models found that the condition of perineum was significantly associated with HIV status (OR= 0.36; 95% CI=0.16; 0.84; $p<0.05$) (Table 4.10). HIV positive mothers were more likely to have an intact perineum post-delivery. However, HIV positive adolescents were twice as likely to be diagnosed with anaemia compared to HIV negative mothers (results not significant). Under-utilisation of ANC (i.e less than 4 visits) was significantly associated with lower gestational age (<37 weeks) (OR=2.64; 95% CI=1.04; 6.74; $p<0.05$) (Table 4.11). Adverse delivery outcomes were not found to be associated with age. Late ANC booking was linked with most adverse delivery outcomes. The majority of sixteen year-olds attended the recommended number of ANC visits, while the younger adolescents (13-14 years old) underutilised ANC services. Low birth weight, low apgar scores as well as the incidence of maternal anaemia and PIH were found to be related to late ANC booking. Most adolescents (98.1%) delivered live babies, with birth abnormalities noted in four babies. Two percent of babies were delivered preterm, and 10.2% were of LBW. The qualitative findings highlighted the perceived barriers to ANC by pregnant adolescents. Interviews indicated the following to hinder access of care: financial barriers, attitudes of HCWs, system barriers and fear of HIV testing.

The study sample consisted of a majority of adolescents belonging to the African race group (Figure 4.1). Almost all adolescents in the study were primigravidae (pregnant for the first time), with the exception of four participants who were multigravida. All, except four, participants were unmarried (Table 4.1). This may be due to the fact that most adolescent pregnancies were out of wedlock and unplanned and that the four participants who were

married did so only after discovering the pregnancy. In contrast, a study in Jerusalem among Jewish and Muslim women found that 96% of pregnant adolescents below the ages of nineteen years were married. This was attributed to the religious norms in Jerusalem where women get married very young, soon after attending secondary school (Geist *et al.* 2006: 192). In certain societies adolescent pregnancies are routine occurrences and socially accepted. In SA among the African race group, great importance is placed on fertility and a young women's ability to become a mother. At times, young women may feel pressurised to prove fertility to their partner and society.

In this study none of the participants were employed; which could be due to participants being of school-going age (13-16 years old). Thus, most participants would have been dependant on family members and partners for financial support and this can further influence decision-making powers as well as health care seeking behaviours. Adolescent pregnancy has been recognised to have negative impacts on the educational achievements of adolescent girls. South Africa accounts for one of the highest levels of educational attainment in sub-Saharan Africa. Education is valued and has been recognised as crucial in obtaining good employment as well as financial security by young people (Kaufman, De Wet and Stadler 2001: 155). Research based in Soweto, Johannesburg, with focus group discussions among young women who had given birth as teenagers and young men, indicated that returning to school post-delivery is not always guaranteed as many young women may move into the homes of their partners and may be subjected to decision-making by in-laws (Kaufman, De Wet and Stadler 2001: 155). Although most girls intended to return to school post-delivery (Kaufman, De Wet and Stadler 2001: 156), adolescent childbearing may present them with many obstacles requiring numerous compromises (Kaufman, De Wet and Stadler 2001: 158), which may be a hindrance to a young woman's educational accomplishment and may result in decreased job opportunities and poor socio-economic status (Mchunu *et al.* 2012: 426).

The majority of the study population (90.5%) consisted of older adolescents ranging from 15-16 years-old. Younger adolescents 13-14 years of age only made up 9.5% of the sample (Figure 4.1). The majority of BANC services are offered at PHC level. Patients with increasing levels of complications are referred to level 1 (district), level 2 (regional) and level 3 (tertiary) hospitals (Department of Health 2007: 15-16; Mametja 2009: 3). According to the BANC clinic checklist, adolescents < 16 years of age are considered as high-risk and are not eligible for basic care at a PHC level. After categorisation as high-risk, the adolescent is

referred to a hospital to access advanced ANC services (Pattison 2005: 17). A study based in California analysing hospital documentation indicated that women belonging to a younger maternal age group (10-13 years) were at an increased risk for both low birth weight infants (2.5 times more likely) and preterm delivery (3.4 times more likely), which was independent of socio-economic status (Duplessis, Bell and Richards 1997: 187). Contrasting results were found in a study in Cameroon which compared the outcomes of adolescents and adult pregnancies (Fouelifack *et al.* 2014: 1). The results indicated no significant differences regarding pregnancy outcomes between early (10-14 years), middle (15-17 years) and late adolescence (18-19 years). A European study in Estonia concurred with the findings of Duplessis, Bell and Richards (1997), indicating the higher risk of LBW infants and preterm delivery among adolescents by comparison with adults aged 20-24 (Haldre *et al.* 2007: 45-48). The outcomes of adolescent pregnancies among the sample in this study will be discussed further on in this chapter.

Most of the participants were primigravidae, this could be due to the young maternal age and possibility of the pregnancy being unplanned. A study in Mozambique among pregnant adolescents found that HCWs in rural and urban hospitals tend to underestimate the seriousness of diseases in primigravidae and young pregnancies (Granja *et al.* 2001: 306). This may in turn lead to a delay in adequate treatment and management of health conditions during pregnancy.

Pregnancy Induced Hypertension (9.9%), UTI (10.5%) and asthma (3.2%) were amongst the highest proportion of health problems during pregnancy (Table 4.2). Records included information on the family history of participants. A large portion of the history was comprised of the following: twin pregnancies (14.6%); TB (14%); diabetes (11.8%); and hypertension (9.2%) (Table 4.2). Hypertensive disorders during pregnancy, such as pre-eclampsia and eclampsia, occur more often among primigravidae patients and are accountable for a large population of maternal deaths in women under 20 years of age (Granja *et al.* 2001: 306). In this study, 33.1% of adolescents experienced complications during pregnancy.

In this study, pre-eclampsia and gestational diabetes together consisted of only 3.9% of complications experienced during pregnancy (Table 4.2). Pre-eclampsia is known as a syndrome where pregnant women develop high blood pressure together with protein in the urine. Complications of pre-eclampsia may lead to premature delivery, and maternal and

foetal death (Lin *et al.* 2015: 449). Research by Yasmin, Kumar and Parihar (2014: 9) indicated that 53.1% of adolescent pregnancies experienced complications during pregnancy and delivery. In India Talawar and Venkatesh (2013: 81) found that among a sample group of 13-19 year-olds (n=100) and 20-24 year olds (n=100) preterm delivery and pre-eclampsia were found to be significant complications of adolescent pregnancies.

A large proportion of participants suffered from anaemia (hemoglobin levels of < 11 g/dl) (100; 31.8%) (n=314) (Table 4.2). This could be a result of increased iron demands during puberty and menstruation (Hamad, Jalambo and Abed 2012: 534). According to Visser and Herselman (2013: 166) anaemia can be regarded as sign of poor nutrition and poor health, which may be indicative of socio-economic difficulty in many settings. Improved feeding practices such as exclusive breast feeding for the first six months, as well as the availability of fortified complimentary foods and iron supplements, are of value in preventing maternal and infant anaemia (Visser and Herselman 2013: 167). Exclusive breast feeding for six months may pose a challenge to the adolescent mother as she may need to return to school soon after delivery. Thus, health education during ANC visits on the expressing as well as safe storage of breast milk is crucial. The findings of a study based in Nigeria among pregnant women aged 17-45 years indicated that (218; 54.5%) of the study population (n=400) were anaemic. The majority of women in the same study also booked late for ANC (49%) (Olatunbosun *et al.* 2014: 3-4).

In this study 57% of adolescents with anaemia had accessed ANC late (Table 4.8). According to the BANC guidelines, screening for anaemia is conducted at the first visit and again at 32 weeks of gestation. All pregnant women in SA receive ferrous sulphate and folic acid supplements throughout pregnancy; this is an important strategy in the prevention of anaemia (Pattison 2005: 29). Timely ANC interventions can aid in prevention of and prompt treatment of anaemia. Research by Conde-Agudelo, Beliza and Lammers (2005: 342) conducted among adolescents and adults from Latin America, reported that adolescents aged ≤15 years were at an increased risk for maternal anaemia by comparison with adults ages 20-24 years-old. Results from the above research concurred with the findings of this study, which were that 100/314 adolescents experienced anaemia during pregnancy (Table 4.2). A study conducted in the Gaza strip reported hemoglobin testing on 202 pregnant females attending ANC and 316 non-pregnant school-going adolescents (Hamad, Jalambo and Abed 2012: 533). The results indicated the overall prevalence of Anaemia to be 33.5% among pregnant females versus 27.2% in non- pregnant females. One in three female students in the

sample was found to be anaemic. The findings indicated that female students were anaemic prior to conception and that pregnancy did not increase anaemia in adolescents. This emphasised the need for preconception care during pregnancy, as well as early ANC booking by adolescents, to ensure screening and treatment. A cohort study among Korean women found that preconception anaemia was linked with an increased risk of preterm birth, LBW and SGA babies (Yi, Han and Ohrr 2013: 337). The risk of adverse birth outcomes was found to increase with the severity of anaemia. Contrasting results were found in a study based in West Africa, which indicated that maternal anaemia was not linked to LBW (OR=1.2; CI=0.6, 2.2) or preterm birth (OR=1.3; CI=0.7, 2.4) (Koura *et al.* 2012: 283).

In the current study 52% of HIV positive adolescents booked late for ANC; this could have contributed to the late diagnosis and treatment of anaemia (Table 4.8). Late booking could have been due to the participant's fear of HIV testing. HIV positive adolescents in this study were twice as likely to be diagnosed with anaemia compared to HIV negative mothers (results not significant). A South African study which entailed a retrospective cohort data analysis of 408 pregnant women of various age groups who were HIV positive, found that the CD4 count was a significant risk factor for anaemia during pregnancy and post-delivery (Nandlal *et al.* 2014: 1). Anaemia was more common among women in the advanced stage of HIV infection (CD4 < 200 cells/mm³). A local study based in KZN at the Empangeni Hospital indicated similar findings, where HIV infection was observed to increase the likelihood of anaemia during pregnancy and was more common among cases (56%) than among controls, (37%) [OR=2.11; 95% CI=1.123, 3.21; $p \leq 0.005$] (Hoque, Hoque and Kader 2009: 68). Upon initiation of ANC, screening for HIV is of great importance. This would help in the PMTCT of HIV during pregnancy, delivery as well as post-delivery.

Nevirapine has been extensively utilised in the treatment of established HIV infection in adults and also plays a significant role in PMTCT. It is beneficial when administered alone as a single dose to the mother at the onset of labour and one dose given to the baby 72 hours post-delivery. When Nevirapine is given to HIV positive pregnant women it quickly passes through the placenta into the foetus and the effects remain through the first week of life. The particular timing of administration of Nevirapine to a labouring mother is pivotal, as two-thirds of infants born with HIV are infected in the birth canal. Nevirapine is a cost-effective solution to MTCT, as it is available at the low cost of < R10 in SA (Saloojee 2002). According to the South African ARV guidelines (Department of Health 2013b: 10), fixed dose combination (FDC) should be initiated immediately in all women who test HIV positive

at the first visit at any gestational age. Women who attend the first ANC visit and who are currently on lifelong ART should continue the ART regime if on a compatible regime, or change to FDC. The patient's viral load should be checked once pregnancy is confirmed (Department of Health 2013b: 10). If an unbooked patient who is in labour and tests HIV positive presents at the hospital, Nevirapine is given in labour and FDC should be started post-delivery if the patient decides on breastfeeding (Department of Health 2013b: 10).

A normal vaginal delivery (NVD) was experienced in 71.3% of deliveries while 27.7% required C-sections and three required assisted deliveries (Table 4.3). Surprisingly one would expect a higher percentage of C-sections among adolescents due to the possible under-developed physiology of adolescents; however, the majority of deliveries were via NVD. Similarly, a study in Nepal showed that NVD was the most common mode of delivery among 77.4% of adolescents as well as 74.6% of young adults (Pun and Chauhan 2011: 50). A smaller proportion of C-sections among adolescents could be due to smaller babies in the adolescent age group (Talawar and Venkatesh 2013: 82).

In this study, more than a quarter of the sample required C-sections which arose from adverse delivery outcomes (Table 4.3). This may be anticipated due to the pelvis of young adolescents not having been fully developed to accommodate vaginal deliveries (Ezegwui, Ikeako and Ogbuefi 2012: 150). A local study in Empangeni, Northern KZN, found the C-section delivery rate among adolescents to be 20% (n= 1236), which was significantly lower than that of adults (n=6600); (25 %); (p<0.05) (Hoque and Hoque 2010: 171). Conversely, Pun and Chauhan (2011: 52) found that C-sections were more common in young adults (21.7 %) than in adolescent group (19.6%). This was supported by results from a Turkish study among primigravidae adolescents (1548) and adult women (11230), where C-section rates were significantly higher in adults than adolescents (p<0.001) (Kara, Uygur and Yesildaglar 2003: 231). Another study based in Turkey concluded that C-section deliveries were significantly lower than adults (17.12% vs. 28.84%) (Zeteroglu, Sahin and Gol 2005: 121). Numerous studies indicated that a common indication for C-sections in adolescents was CPD (Talawar and Venkatesh 2013: 82; Ezegwui, Ikeako and Ogbuefi 2012: 147; Duvan *et al.* 2010: 114). Cephalopelvic disproportion (CPD) is when a baby's head or body is too large to fit through the mother's pelvis (Cephalo Pelvic Disproportion 2015). In this study only three adolescent mothers had assisted delivery, which is when instruments such as forceps or a ventouse suction cup are used to extract a baby (Forceps or Vacuum Delivery 2015) (Table 4.3). This was consistent with findings from Thaithae and Thato (2011: 342) in a study in

Thailand, which found the rate of assisted deliveries was less frequent in young mothers. Research conducted in the United Kingdom (< 20 years n=4126); (20 to < 35 years n=17615) found that young women < 20 years had a significantly lower incidence of instrumental deliveries [OR=0.5; CI=0.5; 0.6; p<0.05] (Gupta, Kiran and Bhal 2008: 165). In contrast with the above studies, a local study by Hoque and Hoque (2010: 4) found a higher rate of assisted delivery via vacuum in adolescents (4.4%) as opposed to (2.7%) in adults (p=0.001). This may be attributed to poor maternal effort to push the baby out during the delivery process. Contributory factors to this are a lack of physical strength and immaturity, as well as a lack of previous experience of delivery noted in the adolescent maternal group. According to the SA Saving Babies Report 2010-2011 (Pattinson 2013), the assisted delivery rate in SA was found to be less than 1% which was considered very low. The findings of this report suggested that a very low percentage of assisted deliveries could be due to the lack of skill in performing such a delivery, which may lead to a C-section being performed instead. A negative correlation was found between intrapartum asphyxia and trauma rate with the vacuum. This may be indicative that HCWs are not using the vacuum and are instead referring patients for C-sections (Pattinson 2013: 14, 35). The very low percentage of assisted deliveries within our study population could also be due to a similar reasoning of the lack of skilled HCWs in assisted deliveries. In Africa there is a ratio of 2.3 HCWs per 1000 population by comparison with America, where there are 24.8 HCWs per 1000 population (Naicker *et al.* 2009: 60). According to an article by the Heath systems trust in 2015, SA has a shortage of health care professionals due to unappealing working conditions in the public sector. The South African government is attempting to reverse the 'brain drain' of skilled health care professionals in the country in order to improve health care services in the country (Urbach 2015).

It was noteworthy that 50.3% of adolescent mothers required episiotomies during delivery, while 37.3% had an intact perineum after delivery (Table 4.3). In this study the condition of perineum was significantly associated with HIV status (OR=0.36; 95% CI=0.16; 0.84; p<0.05) (Table 4.10). HIV positive mothers were more likely to have an intact perineum post-delivery. This may be due to the possible avoidance of invasive procedures such as episiotomy during delivery of HIV positive mothers, in order to minimize risk of MTCT during delivery. Results of a meta-analysis suggested that an elective C-section at 38 weeks in HIV positive mothers may reduce vertical transmission rates during childbirth. However, potential benefit versus risk of surgery associated complications as well as high cost factors

should be taken into consideration (Teasdale, Marais and Abrams 2009:2). A South African study based in Empangeni among adolescents and adults found that a significantly higher rate of episiotomies 44% was performed on adolescents (n=1236; $p<0.05$) during delivery, compared with 20.4% in adult women (n=6600) (Hoque and Hoque 2010: 173). A study in Latin America found similar results, with adolescents being at a higher risk of assisted delivery and episiotomy (Conde-Agudelo, Belizan and Lammers 2005: 342). In the current study 12.4% of mothers sustained natural tears of the perineum during delivery (Table 4.3). This could be linked to cephalo-pelvic disproportion (CPD), large for gestational age babies, premature bearing down, and shoulder dystocia. It could also be assumed that if mothers were given timely episiotomies they would not have sustained natural tears. Research by Fouelifack *et al.* (2014: 1) found that adolescents required twice as many episiotomies than adults (OR=2.15; 95% CI=1.59-2.90; $p<0.005$). Results of the same study found the likelihood of perineal tears among adolescents to be significantly higher than the adult group (OR=1.45; 95% CI=1.16-1.82), which may be due to physiological immaturity. Sodi (2009: 19) outlined that the body of a woman has to naturally grow to such an extent that it can accommodate a developing baby easily. An underdeveloped body would pose problems for both the mother and the baby she carries. Adolescents may be considered as not fully physically developed to comfortably accommodate a baby (Sodi 2009: 19). Adverse obstetric outcomes in adolescent pregnancies could be due to lower maternal age, underdeveloped reproductive systems, as well as the combined influence of poor ANC attendance and a host of other factors. Zeteroglu, Sahin and Gol (2005: 119) argued, however, that biological immaturity was not a significant problem in adolescent pregnancy. Due to the anatomical and physiological immaturity of pregnant adolescents they may be susceptible to more maternal complications. Thus, the need for the focus to be on the reproductive needs of this vulnerable group during the antenatal period (Fouelifack *et al.* 2014: 2). Contrasting findings were observed in a study by Sukanich, Rodgers and McDonald (1986: 31) where no relationship was found between young maternal age < 16 years, physical maturation and adverse pregnancy outcomes.

Most adolescents had no problems during delivery (65.6%), while (34.4%) experienced adverse delivery outcomes (Figure 4.3). The most common complications during delivery were CPD (12.1%), foetal distress (12.1%), poor progress (4.8%) and cord around the neck (3.2%). A small percentage of problems were attributed to breech presentation (1%), prolonged labour (0.6%) and obstructive genital warts (0.6%) (Table 4.3). Research by Kara,

Uygur and Yesildaglar (2003: 231) confirmed foetal distress, CPD and breech presentation as major causes for a C-section. Data from Figure 4.23 reveals that problems during delivery were not associated with maternal age.

In this study the majority of babies were born alive, followed by four (1.3) stillborns and two (0.6) neonatal deaths (Table 4.5). Low Apgar scores (both 1st and 2nd scores) accounted for 7.7% and 3.2% respectively. Only 32(10.2%) of the babies were born with LBW and 89.8% had a normal birth weight (Table 4.4). Pun and Chauhan (2011: 52) expressed that unfavourable birth outcomes could be due not only to a lower maternal age, but also to a disadvantaged socio-economic background, the quality of ANC rendered, as well as family and partner support.

Results in Table 4.5 show that most deliveries were at term; only seven (2.2%) of babies from adolescent mothers in this study were born preterm. Recent research in Nepal by Pun and Chauhan (2011: 50) concluded similar findings, where no correlations were found between preterm birth and adolescent pregnancy (7% vs 11.5%, $p=0.141$). This was also corroborated by Kara, Uygur and Yesildaglar (2003: 232), who compared birth outcomes in adolescent and adult pregnancies and found no differences between the two groups in terms of mean gestational age, mean birth weight and mean 1st and 2nd Apgar scores in newborn babies. The findings of a study in India, however, indicated that prematurity ($p<0.005$) was found to be a significant neonatal outcome among adolescent pregnancies (Talawar and Venkatesh 2013: 82). Research from Thailand also reported that adolescent pregnancies were associated with increased risks of preterm deliveries (Thaithae and Thato 2011: 342). This study found no association between preterm gestational age at birth and adolescent pregnancy (Table 4.8).

In this study seven (2.2%) adolescents delivered preterm and 42.9% of preterm deliveries were linked with a late ANC booking (Table 4.8). The majority of adolescents delivered babies with a normal weight while 32 (10.2%) delivered LBW babies (Table 4.4). Results from a comparative study in Cameroon between adolescent ($n=560$) and adult deliveries ($n=5997$) found that adolescent deliveries which comprised of 9.3% of the study population had significantly higher rates of preterm and post term deliveries (Fouelifack *et al.* 2014: 1). Findings from Gupta *et al.* (2005: 165) indicated a higher incidence of preterm labour among adolescents $n=4126$ (OR=1.4; 95% CI=1.1-1.7). Numerous studies found a link between adolescent pregnancy and LBW babies (Kuo *et al.* 2010: 447; Talawar and Ventkatesh 2013: 82; Thaithae and Thato 2011: 342). In our study underutilisation of ANC (i.e less than 4

visits) was significantly associated with lower gestational age (< 37 weeks) (OR=2.64; 95% CI=1.04; 6.74; $p<0.05$) (Table 4.11). Under attendance of ANC visits may have hindered the process of screening as well as preventing and controlling of health conditions that may have led to preterm delivery. Premature delivery was also indicated as a risk factor in numerous research studies in the adolescent group (Talawar and Venkatesh 2013: 82; (Thaithae and Thato 2011: 342; (Fouelifack *et al.* 2014: 1).

Lifestyle factors such as smoking and alcohol intake in adolescents may influence birth outcomes. Most noteworthy was a study in Taiwan which found an increased risk of LBW in adolescents if they smoked during pregnancy (Kuo *et al.* 2010: 451). Maternal pre-pregnancy size is a good predictor of infant birth size. In the case of young adolescents who tend to weigh less, be shorter in stature and have lower BMI's than adults, smaller infants may be anticipated (Geist *et al.* 2006: 192). In this study maternal pre-pregnancy size and lifestyle habits of pregnant adolescents were not investigated.

Most babies in this study had a normal head circumference at birth; this is in keeping with the fact that 89.8% of babies had a normal birth weight and 97.8% of babies were born at term (Table 4.5). The head circumference may be influenced by gestational age at birth and birth weight. Head circumference could also be determined by hydrocephalus, SGA, or large for gestational age (LGA) babies. Small for gestational age and normal head circumference accounted for seven 7(2.2%) and 307(97.8%) respectively (Table 4.5). Small for gestational age head circumference could be due to 10.2% of LBW babies, as well as 2.2% of preterm deliveries in the sample (Table 4.5).

Late booking was linked with maternal age; the majority (86%) of thirteen year-olds booked for ANC late, followed by 74% of fourteen year-olds and 57% of fifteen year-olds, whilst only 48% of sixteen year-olds booked late (Figure 4.16). Older maternal age was linked with early booking (Figure 4.16). This could be due to older adolescents being more mature and having better knowledge pertaining to pregnancy-related requirements. Younger adolescents may be unsure of the signs and symptoms of pregnancy, which could in turn influence late booking for ANC. In keeping with age, younger adolescents may attempt to conceal the pregnancy due to possible embarrassment and judgement by elders and peers in the community; this may lead to a further delay in accessing care.

In this study the mean gestational period of ANC booking was initiated above 20 weeks which was considered as late booking (Table 4.9). The earliest ANC booking was initiated at

five weeks (year 2011), while the latest booking was at 37 weeks (2012 and 2013, Table 4.9). Maternal records revealed that two percent of adolescents did not attend ANC at all (NCC) (Figure 4.8). The national DOH aims at all pregnant females initiating ANC before 20 weeks of gestation (Pattinson 2005: 10). Findings from numerous studies have indicated that young maternal age was linked to late ANC initiation, and is a common problem among adolescents (Ezegwui, Ikeako and Ogbuefi 2012: 147; Trinh and Rubin 2006: 5; Omar *et al.* 2010: 222). In contrast, a study in Tanzania found no evidence of delayed initiation of ANC among an adolescent group (Gross *et al.* 2012: 6).

Contrary to expected results, this study found that the majority of preterm deliveries (57.1%) occurred in adolescents who booked early for ANC, while 166 (54.1%) of deliveries at term were linked with late ANC bookings (Table 4.8). Two major problems during delivery were CPD and foetal distress, with 57.9% of each found in late bookers (Table 4.8). Almost ten percent (9.6%) of medical problems (n=314) during pregnancy were attributed to PIH, while 63.3% of all PIH cases were found in mothers who initiated ANC late (Table 4.8). This can be argued as PIH can only be diagnosed after 20 weeks of gestation, high blood pressure observed earlier than 20 weeks would indicate that a patient had pre-existing hypertension which was not induced due to pregnancy. Hypertensive disorders of pregnancy, however, are of great importance as PIH may lead to pre-eclampsia and subsequent eclampsia, thereby putting both mother and foetus at risk. Early screening and management of PIH is vital in maintaining good maternal and infant outcomes during pregnancy. Four cases of infants born with birth abnormalities were documented; three of these cases booked late for ANC. This is indicative that a detailed family history is vital during ANC, as this would enable necessary genetic counselling and screening of adolescents at risk.

Two cases of obstructive genital warts were found in early bookers (Table 4.8), while non-obstructive genital warts were noted in seven patients. Adolescents are prone to many STD's due to unprotected sex. In some instances obstructive genital warts may be an indication for a C-section, thus highlighting the importance of timely ANC. In HIV positive pregnant mothers, the early diagnosis of obstructive genital warts is of particular importance. During a NVD obstructive genital warts may hinder the foetus and cause bleeding, which can increase the chances of MTCT during delivery. In an effort to minimise risk during delivery, patients diagnosed with extreme obstruction may be referred for C-sections. In this study 25 (8%) of adolescent mothers were HIV positive (Table 4.8). Late booking was linked with HIV status as 13 (52%) of HIV positive mothers booked late for ANC, while 53.8% of HIV negative

adolescents booked late for ANC (Table 4.8). It was revealed that 44% of HIV positive adolescent mothers experienced adverse delivery outcomes (Figure 4.24). Early booking in this vulnerable population would enable the development of a suitable birth plan, including PMTCT.

Results from a study among 21 pregnant adolescents from Lesotho attributed late ANC booking to a lack of knowledge on the importance of ANC, denial of the pregnancy by the boyfriend, as well as structural variables related to service provision (Phafoli, Van aswegen and Alberts 2007: 1). Research in Zimbabwe amongst adolescent mothers found significant correlations between the barriers of ANC attendance and future planned non-utilisation of ANC in Bulawayo ($p < 0.05$) (Chaibva, Roos and Ehlers 2009: 20). The most significant barriers were high ANC fees; unfriendly health care personnel; poor family support; fear of HIV testing; and limited decision-making powers. The timing of the first ANC visit may be influenced by the distance to the health care facility and the lack of available transportation, most especially in rural areas (Ntuli 2007: 48).

Results presented in Figure 4.17, which investigated the utilisation of ANC services, revealed maternal age to be directly linked to ANC utilisation. The majority of sixteen year-old participants attended the recommended 4-5 visits during pregnancy. The national DOH aims at all pregnant women attending ANC at least four times during pregnancy (Pattinson 2005: 10). According to stats by the Demographics and Health survey (DHS), 94% of all pregnant women attend ANC at least once (Pattinson 2005: 10). It was of importance to note that only 2% of thirteen year-olds and 14% of fourteen year-olds attended the recommended number of ANC visits during pregnancy (Figure 4.17).

There is a common belief that the private health sector provides services that are better than that of the public sector (Urbach 2015). Approximately 84% of the South African population is reliant on the public sector for health care services as they do not have medical aid (Doctor Shortage Hits Rural South Africa 2012). The South African DOH has country-wide responsibility for health care services, in particular the public sector health care (Healthcare in South Africa 2015). Due to the high levels of unemployment and poverty in SA, health care has become a burden for the state (Healthcare in South Africa 2015). Additionally, understaffing of public health care ANC clinics may mean that patients have to wait in long queues to access care.

It is evident from Figure 4.12 that preterm deliveries are linked with the under-utilisation of ANC services; 71% of adolescent mothers who delivered prematurely had under-utilised ANC services (0-3 visits). Similar findings were observed in Figure 4.13, which presented that 71% of infants with SGA head circumference were born to mothers who under-utilised ANC services. In this sample, stillbirths and neonatal deaths were not associated with ANC utilisation. An increase in the number of ANC visits during the course of pregnancy was directly proportional to an increase in the percentage of babies born with normal Apgar scores (7 to 10) (Figure 4.15). Figure 4.22 indicates that 55% of adolescents (n=108) who experienced complications during delivery (CPD, foetal distress, breech presentation, prolonged labour, poor progress, obstructive genital warts, cord around the neck), had initiated ANC late, while 54% of patients without any complication during delivery also booked late. One of the aims of SDG 3 is to ensure universal access to sexual and reproductive health care services by 2030. The access of reproductive health services by adolescents is crucial in preventing maternal and child related mortality. Strengthening the access to ANC and post-natal services among adolescents will prove to promote maternal and child health.

It is evident that a relationship may be observed with positive birth outcomes, including infant survival at birth, and recommended ANC utilisation. This is in keeping with MDG 4, which is aimed at the reduction of mortality among children under the age of five years by two-thirds between 1990 and 2015, thereby promoting child survival in our country (United Nations 2013: 24-33). Aims of the newly implemented SDG 3 are to reduce global maternal mortality to less than 70 per 100,000 live births and to put an end to preventable deaths of newborns and children under five by the year 2030 (Open Working Group Proposal for Sustainable Development Goals 2014). Adequate utilisation of ANC services is pivotal in maximising the screening and treatment of health conditions during pregnancy. In this study it was evident that under-utilisation was a common practice among younger adolescents. This could result from a fear regarding disclosure of pregnancy as well as fear of judgement by HCWs. Poor socio-economic support may also play a role in the access of care by younger adolescents, as adolescents require financial support in the form of transport money to get to the clinic and money to buy food. Timely ANC utilisation therefore needs to be encouraged among the adolescent group.

The information gathered in the qualitative interviews concluded that the nurse's attitude; a fear of HIV testing; health system barriers; a lack of knowledge and financial barriers hinder an adolescent's access to ANC services. The participants acknowledged the importance of attendance; however they were easily affected by the judgemental attitudes of HCWs and other older mothers while accessing ANC care. Health care providers played an important role in supporting and preparing the adolescent for pregnancy and birth. Family, partner support and encouragement were found to be driving factors in adolescents attending for ANC. Interventions aimed at improving adolescent-specific service delivery is the key in promoting ANC attendance amongst this very vulnerable population. Some of the limitations were:

- The views and experiences of un-booked pregnant adolescents were not represented in this study, as the recruitment process took place while patients were waiting in the queue to access care.
- There may be a possibility of researcher bias among the pregnant adolescents during face-to-face interviews.
- Qualitative data was not generalisable to other contexts; it gave a good account of barriers experienced by pregnant adolescents accessing care at the research site.
- Some incomplete records were noted. However existing records were of adequate quality.
- Non clinic cases were not investigated in the retrospective review. This was due to NCC's not containing ANC information which was a prerequisite to meet objectives of this study.
- Despite nurses explaining questions relating to family history in layman's terms to adolescents there is still a possibility of recall bias.
- Some information was recorded however was not legible.
- Not all pregnant adolescents between the ages 13-16 years residing within the catchment area may have attended ANC at the study institution. Therefore, it may be possible that there were more pregnant adolescents in the catchment area.

CHAPTER 6

RECOMMENDATIONS AND CONCLUSION

This chapter discusses the recommendations and conclusion based on the findings of this study.

The study's findings revealed a number of barriers to an adolescent's access of care. The following suggestions are made by the researcher to aid in improving access to services.

- Customised ANC services which cater specifically for the needs of adolescents are required. Public health institutions should consider including special queues or special days on which adolescents can access ANC services. When among their peers, adolescents would be more comfortable to attend ANC.
- To ensure shorter queues and a reduced waiting time, more HCWs need to be employed in keeping with the patient: nurse ratio. This would improve working conditions for midwives as well as reducing patient waiting times. In the provision of swift ANC services to adolescents, this would enable them to return to school after ANC appointments.
- Health care workers attending to the ANC of adolescents need to be trained specifically on how to deal with adolescents. Positive and empowering attitudes are needed from HCWs. Health care workers should adopt a sensitive and strategic approach towards dealing with pregnant adolescents, as the initial encounter during the first ANC visit is influential on the adolescent's decision to attend for further ANC visits.
- Family/partner support must be encouraged at all levels. Partner involvement must be encouraged during ANC; this will encourage adolescents to attend for the prescribed visits.
- The use of mobile clinics to provide ANC services for hard-to-reach populations should be considered. This would help to alleviate the challenge of the increased cost regarding transportation in the case of adolescents living far away from the ANC clinic.

- The enhancement of health promotion activities that focus on maternal health and the importance of early ANC attendance, as well as empowerment of pregnant adolescents. This should be co-ordinated by the DOH. Relevant media sources such as radio, TV and billboards should be utilised to promote ANC attendance.
- The strengthening of ANC outreach programmes to reach those adolescents who are still in school. This will aid in providing a support system to those adolescents as well as promoting the completion of schooling post-delivery.
- Ensure the provision of ample health education materials on pregnancy to the pregnant adolescent. A ‘starter pack’ with relevant IEC materials on ANC, pregnancy and PMTCT must be provided to every pregnant adolescent booking for ANC. Educational materials should also be placed at strategic sites (schools, taxi ranks, libraries) as well as being distributed at community-based health promotion events such as Imbizo’s.
- Reinforce continuing educational programmes, mentoring and coaching of HCWs. This will ensure that midwives are appropriately trained on BANC before placement in the maternity setting.
- Re-evaluation of the midwifery educational curriculum, to integrate content that is specific to the special needs of pregnant adolescents.

This research has established that late ANC initiation among adolescents in SA is prevalent. The study reports that the most common barriers to accessing ANC are financial barriers, the attitudes of HCWs, system barriers and a fear of HIV testing. The significance of early initiation and proper utilisation of ANC services among the vulnerable adolescent population cannot be over-emphasised.

Early ANC utilisation can enhance maternal and child outcomes in keeping with the SDG 3, to “ensure healthy lives and promote well-being for all” (Figure 4), as well as the essential element for achieving SDG 3, which aims at ensuring healthy lives, knowledge and the inclusion of women and children (Figure 5) (United Nations 2014: 18-20).

In our study the majority of adolescents accessed ANC late. Positive maternal and birth outcomes were linked with early ANC attendance, while maternal age was found to be a significant factor in the early access of care. Older adolescents attended ANC earlier than

those of younger age groups. Timely initiation and adequate utilisation of ANC forms part of a life-saving strategy for mothers and neonates. The numerous benefits of early ANC initiation are a motivating factor to enhance health promotion of ANC among the adolescent population. Urgent population-based strategies are required to encourage timely initiation of ANC among adolescents.

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APPENDIX A

CONSENT FORM

Statement of Agreement to Participate in the Research Study:

Warm Greetings!

My name is Trishka Govender and I am a student doing a research study at university. To allow your daughter/ward to take part in this study you will need to fill in this form.

- I hereby confirm that I have been informed by the researcher, _____ (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,
- I have also received, read and understood the above information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my daughter's/ward's sex, age, date of birth, initials and diagnosis will be included into a study report without mentioning her name anywhere in the study.
- I am aware that my daughter's/ward's voice will be taped on a voice recorder during the interview.
- In view of the requirements of research, I agree that the information collected during this study can be processed in a computer by the researcher.
- My daughter/ward may, at any stage, decide to drop out of the study without being discriminated against.
- I have had enough opportunity to ask questions and (of my own free will) declare myself prepared to give permission for my daughter/ward to participate in the study.
- I understand that important new findings developed during the course of this research which may relate to my daughters/wards participation will be made available to her.

Full Name of Participant Date Time Signature / Right Thumbprint

I, _____ (name of researcher) herewith confirm that the above parent/guardian has been fully informed about the nature, conduct and risks of the above study.

Full Name of Researcher Date Signature

Full Name of Witness (If applicable) Date Signature

Full Name of Legal Guardian (If applicable) Date Signature

APPENDIX A: CONSENT FORM (ISIZULU)

UKUNEZELA KWESITHATHU

NGIYAVUMA (ukuba ingxenywe yocwaningo)

Ukubingelela okukhethekileyo!

Igama lami ngingu Trishka Govender (umcwaningi) ngingumfundi owenza ucwaningo kwizifundo zase-Nyuvesi. Ukuze ube ingxenywe yalolucwaningo kuzomele ugcwalise leli-form, ukusho ukuthi ufuna ukuba ingxenywe yalolucwaningo.

ISIVUMELWANO SOKUBAMBA IQHAZA KUCWANINGO LWEZIFUNDO

Ngiyavuma ukuthi ungazisile owenza ucwaningo, ----- (igama lomcwaningi) ngocwaningo uqobo, ukuziphatha, okuhle Kanye nokubi ngocwaningo – Inombolo mayelana nenqubo yocwaningo:---
-----,

- Nami ngiyitholile, ngayifunda ngayiqondisisa imininingwane engenhla (imininingwane yobambe iqhaza) mayelana nocwaningo.
- Ngiyaqonda ukuthi imiphumela yocwaningo, okubalwa imininingwane yami ubulili, iminyaka, usuku lokuzalwa, izinhlamvu zokuqala zamagama ami nemiphumela yokuhlolwa kuyoba ingxenywe yocwaningo ngaphandle kokuveza igama lami nomaphi kulolucwaningo.
- Ngiyazi ukuthi izwi lami liyoqoshwa ngesikhathi kuxoxiswa name.
- Ngokubheka izidingo zalolucwaningo, ngiyavuma ukuthi umcwaningi angalufaka lonke ulwazi alutholile ngesikhathi socwaningo kwi-computer
- Nginganquma/khetha ukuphuma nomanini ekubeni ingxenywe yocwaningo, lokhu ngeke kudale ukuba ngibandlululeke.
- Ngibenethuba elanele lokubuza imibuzo (ngokwami ngingaphoqiwe). Ngazitshela ngokwami futhi ngazimisela ukubamba iqhaza kulolucwaningo.
- Ngiyazi ukuthi imiphumela emisha nebalulekile etholakele kulolucwaningo ibe ihlobene noma iqondene nami ngiyokwaziswa ngayo.

**IGAMA ELIPHELELE LOZOBAMBA IQHAZA
SAYINA/ISITHUPHA (RIGHT)**

USUKU

ISIKHATHI

Mina,----- (igama lomcwaningi) ngiyaqinisekisa ukuthi lo obhalwengenhla okunguye obambe iqhaza wazisiwe ngokuzokwenziwa, ukuziphatha nobungozi balolucwaningo.

IGAMA ELIPHELELE LOMCWANINGI

USUKU

SAYINA

IGAMA ELIPHELELE LOFAKAZI (MAYEKHONA)

USUKU

SAYINA

IGAMA LOMZALI/OBHEKE UMNTWANA (MAYEKHONA)

USUKU

SAYINA



APPENDIX B

LETTER OF INFORMATION: PARTICIPANT

Warm Greetings!

My name is Trishka Govender and I am doing a research study at university. I would like to invite you to be part of this study. Below you will find more information about the study.

Title of the Research Study: The impact of access to antenatal care on maternal health outcomes among young adolescents on the North coast of KwaZulu-Natal, South Africa

Principal Investigator/s/researcher: Trishka Govender (B. Tech)

Co-Investigator/s/supervisor/s: Dr Poovendhree Reddy (PhD) (Supervisor) _____

Mrs ShanazGhuman (Masters) (Co-supervisor) _____

Brief Introduction and Purpose of the Study:

Outline of the Procedures:

- If you decide to take part in this study you will be given a form to fill in to give your permission (assent form). You will be given another form (consent form) to take to your parent or the person who is looking after you to fill in. You must bring both forms back to Osindisweni hospital and give them to me in a week's time.
- You will need to come to the Osindisweni hospital Nurses home boardroom. You will be allowed to speak in the language you are comfortable with (isiZulu/English).
- I will ask you some questions (interview) about hospital check-ups while you were pregnant. This will be done in a private room away from other people; it will take about 1 hour to finish. Your voice will be taped on a voice recorder.
- Other girls will be taking part in this study; their interviews will be done on different days.

Risks or Discomforts to the Participant: Not applicable

Benefits: This study will help to find out what makes it hard for young girls to go for check-ups during pregnancy. The information will help to make it easier for pregnant young girls to go for the check-ups; this will help to make sure the mother and baby are well. The results of the study will help other people who want to learn more about this topic.

Reason/s why the Participant May Be Withdrawn from the Study: You are free to drop out of the study at any time; there will be no problems for you if you choose to drop out. You will continue to get the same health care services from the hospital.

Remuneration: You will not get any money to take part in the study. You will get (bus/taxi fare) to travel to the hospital and back home for the meetings. You will be given snacks during the meetings.

Costs of the Study: You will not have to pay any money to take part in the study.

Confidentiality: Your name will not be written anywhere in the study. Your name will be kept a secret; no one will know that you have taken part in this study. The meeting will take place in a quiet room away from people.

Research-related Injury: Not Applicable

Persons to Contact in the Event of Any Problems or Queries:

Trishka Govender (Researcher) 0325419305

Poovendhree Reddy (Research Supervisor) 031 3732808

Shanaz Ghuman (Co-supervisor) 031 3732807

Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the DVC:

TIP, Prof F. Otieno on 031 373 2382 or dvctip@dut.ac.za.

APPENDIX B: LETTER OF INFORMATION (PARTICIPANT) (ISIZULU)

UKUNEZELA KWESIBILI

INCWADI YOLWAZI OLUDINGWA: OZOBA INGXENYE YOCWANINGO

Ngiyakubingelela ngokukhethekileyo!

Igama lami ngingu Trishka Govender ngenza uphenyo/ucwaningo lwezifundo zasenyuvesi. Ngifisa ukuxoxisana nawe ukuba yingxenye yalolucwaningo. Ngenzansi uzothola okuningi mayelana nalolucwaningo

ISIHLOKO SALOLUPHENYO/CWANINGO: Ubungozi bokungalutholi usizo ngesikhathi kwamantombazanyana akhulelwa esemancane kwi-Nyakatho yogu le Kwazulu Natal, Eningizimu Afrika

INHLOKO YOCWANINGO/YOPHENYO: Trishka Govender (B. Tech)

ABAMBISENE NAYE/NABO (ABAMPHETHE): Dr Poovendhree Reddy (PhD) kanye no Mrs Shanaz Ghuman (Masters)

UKUPHAWULA KAFUSHANE NGENHLOSO YALOLUCWANINGO:

NANSI IMIGOMO EZOLANDELWA:

- Uma ukhetha ukuba yingxenye yalolucwaningo uzonikwa i-form ozoligcwalisa ukunika imvume/ lokuvuma ube yingxenye yocwaningo. Uyonikwa elinye i-form lokuvuma (uyamukela ukuba ingxenye)ucwaningo oyolinika umzali noma ongaphansi kwakhe ukuze aligcwalise. Uyowabuyisa womabili ama-forms awanike mina lingakapheli isonto, khona la Osindisweni esibhedlela
- Kuyodingeka ukuthi ufike Osindisweni esibhedlela egumbini elihlala abahlengikazi. Uyovunyelwa ukukhuluma ulimi okhululekile ngalo okungaba isiZulu noma isingisi
- Ngiyokubuza imibuzo (sixoxisana) mayelana nokuhlolwa kwakho emtholampilo ngesikhathi usakhulelwe. Lokhu kuyokwenzelwa egumbini elikhethekile elingenaye omunye umuntu, kuyothatha ihora elilodwa kuphela. Liyoqoshwa izwi lokho kusetshenziswe isiqophi- mazwi
- Amanye amantombazane ayobamba iqhaza kulolucwaningo wona ayophendula imibuzo yocwaningo ngezinye izinsuku

UBUNGOZI NOMA UKUNGAKHULULEKI KWABAZOBAMBA IQHAZA: Ngeke kwenzeke

UKUSIZAKALA: Lolucwaningo luzosiza ukuthola ukuthi kungani kube nzima kumantombazane asemancane akhulelwe ukuyohlolwa emtholampilo ngesikhathi esakhulelwe. Lolucwaningo luzokwenza kube lula kumantombazanyana akhulelwe ukuya kohlolwa emtholampilo ukuze impilo yomntwana nomama izoba yinhle. Imiphumela yalolucwaningo izosiza abanye abafuna ukufunda kabanzi ngalesisihloko

IZIZATHU EZINGADALA LOYO OBAMBE IQHAZA AHOXISWE KULOLUCWANINGO:

Ukhululekile ukuphuma noma ukuhoxa kulolucwaningo noma ingasiphi isikhathi, ngeke ibekhona inkinga uma ukhetha ukushiya. Uyoqhubeka uthole ukunakekelwa okufanayo nobukuthola ngaphambilini esibhedlela

AMAHOLO: Angeke ukhokhelwe-mali ngokuba ingxenywe yalolucwaningo. Uzokhokhelwa imali yokugibela (ibhasi/Taxi) ukuza esibhedlela neyokugoduka uma kade uze kulemihlangano. Uyokuthola okokubamba umoya ngezikhathi zemihlangano

IZINDLEKO ZOCWANINGO: Awuzukhokha mali ngokubamba iqhaza kulolucwaningo

IZIMFIHLO: Igama lakho ngeke libhalwe ndawo kulolucwaningo. Igama lakho liyohlala liyimfihlo, akekho oyokwazi ukuthi uke wabamba iqhaza kulolucwaningo. Imihlangano iyobanjelwa egumbini elinokuthula futhi elikude nendawo enabantu

UKULIMALA OKUHLANGENENALOLUCWANINGO: Ngeke kwenzeka

ABANTU ABANGATHINTWA MAKUNENKINGA NOMA IMIBUZO:

Trishka Govender (umcwaningi) 032 5419035

Poovendhree Reddy (induna yomcwaningi) 031 3732808

Shanaz Ghuman (olekelela induna yocwaningo) 031 373 2807

Abaqondene nenqubo yocwaningo nokuziphatha batholakala ku 031 373 2900. Ukungagculiseku kubikwa ku DVC: Prof F. Otieno kwi namba ethi -031 373 2382 noma dvctip@dut.ac.za



APPENDIX B

LETTER OF INFORMATION: PARENTS/GUARDIANS

Warm Greetings!

My name is Trishka Govender and I am doing a research study at university. I would like to invite your daughter/ward to be part of this study. Below you will find more information about the study.

Title of the Research Study: The impact of access to antenatal care on maternal health outcomes among young adolescents on the North coast of KwaZulu-Natal, South Africa

Principal Investigator/s/researcher: Trishka Govender (B. Tech)

Co-Investigator/s/supervisor/s: Dr Poovendhree Reddy (PhD) (Supervisor) _____
Mrs Shanaz Ghuman (Masters) (Co-supervisor) _____

Brief Introduction and Purpose of the Study: I am doing a study at Osindisweni hospital to learn about why teenage mothers do not go to the hospital for check-ups during pregnancy. By knowing the reasons, we can make health care services for pregnant teenagers better and encourage them to go to the check-ups so that the mother and baby will be healthy.

Outline of the Procedures:

- If you allow your daughter/ward to take part in this study you will be given a form (consent form) to fill in to give your permission for your daughter/ward to take part. Your daughter/ward will be given another form (assent form) to fill to say that she wants to take part in the study. Your daughter will bring both forms back to Osindisweni hospital and give them to me in a week's time.
- Your daughter/ward will need to come to the Osindisweni hospital *Nurses home boardroom*. She will be allowed to speak in the language that she is comfortable with (isiZulu/English).
- I will ask her some questions (interview) about hospital check-ups while she was pregnant. This will be done in a private room away from other people; it will take about 1 hour to finish. Your daughter's/ward's voice will be taped on a voice recorder.
- Other girls will be taking part in this study; their interviews will be done on different days.

Risks or Discomforts to the Participant: Not applicable

Benefits: This study will help to find out what makes it hard for young girls to go for check-ups during pregnancy. The information will help to make it easier for pregnant young girls to go for the check-ups; this will help to make sure the mother and baby are well. The results of the study will help other people who want to learn more about this topic.

Reason/s why the Participant May Be Withdrawn from the Study: Your daughter/ward is free to drop out of the study at any time; there will be no problems for her if she chooses to drop out. She will continue to get the same health care services from the hospital.

Remuneration: Your daughter/ward will not get any money to take part in the study. She will be given (bus/taxi fare) to travel to the hospital and back home for the meetings. Snacks will be provided for her during the meetings.

Costs of the Study: Your daughter/ward will not have to pay any money to take part in the study.

Confidentiality: Your daughter's/ward's name will not be written anywhere in the study. Her name will be kept a secret; no one will know that she has taken part in this study. The meeting will take place in a quiet room away from people.

Research-related Injury: Not Applicable

Persons to Contact in the Event of Any Problems or Queries:

Trishka Govender (Researcher) 032 5419035

Poovendhree Reddy (Research Supervisor) 031 3732808

Shanaz Ghuman (Research Co-supervisor) 031 3732807

Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the DVC: TIP, Prof F. Otieno on 031 373 2382 or dvctip@dut.ac.za.

APPENDIX B: LETTER OF INFORMATION (PARENTS/GUARDIANS) (ISIZULU)

UKUNEZELA KWESIBILI

INCWADI YOLWAZI OLUDINGWA UMZALI / OBHEKE UMNTWANA

Ngiyakubingelela ngokukhethekileyo!

Igama lami ngingu Trishka Govender ngenza uphenyo/ucwaningo lwezifundo zasenyuvesi. Ngifisa ukuxoxisana nendodakazi yakho/abantu bakulendawo ukuba yingxenye yalolucwaningo. Ngenzansi uzothola okuningi mayelana nalolucwaningo

ISIHLOKO SALOLUPHENYO/CWANINGO: Ubungozi bokungalutholi usizo ngesikhathi kwamantombazanyana akhulelwa esemancane kwi-Nyakatho yogu le Kwazulu Natal, Eningizimu Afrika

INHLOKO YOCWANINGO/YOPHENYO: Trishka Govender (B. Tech)

ABAMBISENE NAYE/NABO (ABAMPHETHE): Dr Poovendhree Reddy (PhD) kanye no Mrs Shanaz Ghuman (Masters)

UKUPHAWULA KAFUSHANE NGENHLOSO YALOLUCWANINGO: Lolucwaningo ngilwenza esibhedlela sasoSindisweni ukuze ngithole noma ngazi ukuthi kungani (omama) abakhulelwa besebancane bangayi ezibhedlela bayohlolwa ngesikhathi besakhulelwe. Uma sengizitholile izizathu lokhu kungasiza ukuthuthukisa izimpilo zabo (omama abancane) kanti futhi bagququzeleke ukukukhuthalela ukuyohlolwa emtholampilo ukuze umama nomntwana bezoba nempilo enhle.

NANSI IMIGOMO EZOLANDELWA:

- Uma umvumela undodakazi ukuba yingxenye yalolucwaningo uzonikwa i-form lokuvuma/lesivumelwano ozoligwalisa ukunikeza imvume yokuba abeyingxenye yocwaningo, nayo indodakazi iyonikwa i-form ehlukele kuneyakho yokuvuma ukuba ingxenye yocwaningo. Undodakazi uyowabuyisa womabili ama-forms awanike mina lingakapheli isonto, khona la Osindisweni esibhedlela
- Kuyodingeka ukuthi undodakazi afike Osindisweni esibhedlela egumbini elihlala abahlengikazi. Uyovunyelwa ukukhuluma ulimi lwakhe okungaba isiZulu noma isingisi
- Ngiyombuza imibuzo (sixoxisana) mayelana nokuhlolwa kwakhe emtholampilo ngesikhathi ekhulelwe. Lokhu kuyokwenzelwa egumbini elikhethekile elingenaye omunye umuntu, kuyothatha ihora elilodwa kuphela. Liyoqoshwa izwi lendodakazi yakho kusetshenziswe isiqophi- mazwi
- Amanye amantombazane ayobamba iqhaza kulolucwaningo wona ayophendula imibuzo yocwaningo ngezinsuku ezihlukile kunolwendodakazi yakho

UBUNGOZI NOMA UKUNGAKHULULEKI KWABAZOBAMBA IQHAZA: Ngeke kwenzeke

UKUSIZAKALA: Lolucwaningo luzosiza ukuthola ukuthi kungani kube nzima kumantombazane asemancane akhulelwe ukuyohlolwa emtholampilo ngesikhathi esakhulelwe. Lolucwaningo luzokwenza kube lula kumantombazanyana akhulelwe ukuya kohlolwa emtholampilo ukuze impilo yomntwana nomama izoba yinhle. Imiphumela yalolucwaningo izosiza abanye abafuna ukufunda kabanzi ngalesisihloko

IZIZATHU EZINGADALA LOYO OBAMBE IQHAZA AHOXISWE KULOLUCWANINGO:

Indodakazi/owendawo ukhululekile ukuphuma noma ukuhoxa kulolucwaningo noma ingasiphi isikhathi, ngeke ibekhona inking uma ekhetha noma enquma ukushiya. Uyoqhubeka athole ukunakekelwa okufanayo nabekuthola ngaphambilini kulesibhedlela

AMAHOLO: Indodakazi/owendawo akazokhokhelwa- mali ngokuba ingxenye yalolucwaningo. Uzokhokhelwa imali yokugibela (ibhasi/Taxi) ezengayo esibhedlela neyokugoduka uma kade eze kulemihlangano. Uyokuthola okokubamba umoya ngezikhathi zemihlangano

IZINDLEKO ZOCWANINGO: Indodakai/owendawo akazukhokha mali ngokubamba iqhaza kulolucwaningo

IZIMFIHLO: Igama lendodakazi/lowendawo ngeke libhalwe ndawo kulolucwaningo. Igama lakhe liyohlala liyimfihlo, akekho oyokwazi ukuthi uke wabamba iqhaza kulolucwaningo. Imihlangano iyobanjelwa egumbini elinokuthula futhi elikude nendawo enabantu

UKULIMALA OKUHLANGENENALOLUCWANINGO: Ngeke kwenzeke

ABANTU ABANGATHINTWA MAKUNENKINGA NOMA IMIBUZO:

Trishka Govender (umcwaningi) 032 5419035

Poovendhree Reddy (induna yomcwaningi) 031 3732808

Shanaz Ghuman (obambisene nenduna yocwaningo) 031 373 2807

Abaqondene nenqubo yocwaningo nokuziphatha batholakala ku 031 373 2900. Ukungagculiseku kubikwa ku DVC: Prof F. Otieno kwi namba ethi -031 373 2382 noma dvctip@dut.ac.za



APPENDIX C

ASSENT

Warm Greetings!

My Name is Trishka Govender (researcher) and I am a student doing a research study at university. To be a part of this study you will need to fill in this form, to say that you want to take part in this study.

Statement of Agreement to Participate in the Research Study:

I hereby confirm that I have been informed by the researcher, _____ (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,

- I have also received, read and understood the above information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be included into a study report without using my name anywhere in the study report.
- I am aware that my voice will be recorded during the interview.
- In view of the requirements of research, I agree that the information collected during this study can be processed in a computer by the researcher.
- I may, at any stage, drop out of the study, without discrimination.
- I have had enough opportunity to ask questions and (of my own free will) declare myself ready to take part in the study.
- I understand that important new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	Date	Time	Signature / Right Thumbprint

I, _____ (name of researcher) hereby confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	Date	Signature

_____	_____	_____
Full Name of Witness (If applicable)	Date	Signature

_____	_____	_____
Full Name of Legal Guardian (If applicable)	Date	Signature

APPENDIX C: ASSENT (ISIZULU)

UKUNEZELA KWESIBILI

ISIVUMELWANO

ISIVUMELWANO SOKUBAMBA IQHAZA KUCWANINGO LWEZIFUNDO

Ukubingelela okukhethekileyo!

Igama lami ngingu Trishka Govender ngingumfundi owenza ucwaningo kwizifundo zase-Nyuvesi. Ukuvumela indodakazi/owendawo ukubamba iqhaza kulolucwaningo kuzomele ugcalise leli-form

- Ngiyavuma ukuthi ungazisile owenza ucwaningo, ----- (igama lomcwaningi) ngocwaningo uqobo, ukuziphatha, okuhle kanye nokubingocwaningo – Inombolo mayelana nenqubo yocwaningo:-----,
- Ngiyitholile, ngayifunda ngayiqondisisa imininingwane engenhla (imininingwane yobambe iqhaza) mayelana nocwaningo
- Ngiyaqonda ukuthi imiphumela yocwaningo, okubalwa imininingwane yendodakazi yami/owendawo ubulili, iminyaka, usuku lokuzalwa, izinhlamvu zokuqala zamagama akhe nemiphumela yokuhlolwa kuyoba ingxenye yocwaningo ngaphandle kokuveza igama lakhe nomaphi kulolucwaningo
- Ngiyazi ukuthi izwi lendodakazi/wakulendawo liyoqoshwa ngesikhathi kuxoxiswa naye
- Ngokubheka izidingo zalolucwaningo, ngiyavuma ukuthi umcwaningi angalufakalonke ulwazi olutholile ngesikhathi socwaningo kwi-computer
- Undodakazi/owendawo nomanini anganquma/khetha ukuphuma ekubeni ingxenye yocwaningo, lokhu ngeke kudale ukuba abandlululeke
- Ngibe nethuba elanele lokubuza imibuzo (ngokwami ngingaphoqiwe) ngazitshela ngokwami futhi ngazimisela ukunika indodakazi yami/owendawo imvume yokubamba iqhaza kulolucwaningo.
- Ngiyazi ukuthi imiphumela emisha nebalulekile etholakele kulolucwaningo ibe ihlobene noma iqondene nendodakazi yami uyokwaziswa ngayo.

**IGAMA ELIPHELELELOZOBAMBA IQHAZA
SAYINA/ISITHUPHA (RIGHT)**

USUKU

ISIKHATHI

Mina,----- (igama lomcwaningi) ngiyaqinisekisa ukuthi lo obhalwe ngenhla ongumzali/obheke umntwanawazisiwe ngokuzokwenziwa, ukuziphatha nobungozi balolucwaningo

IGAMA ELIPHELELE LOMCWANINGI

USUKU

SAYINA

IGAMA ELIPHELELE LOFAKAZI (MAYEKHONA)

USUKU

SAYINA

IGAMA LOMZALI/OBHEKE UMNTWANA (MAYEKHONA)

USUKU

SAYINA

APPENDIX D: INTERVIEW SCHEDULE

APPENDIX D

RESEARCH ID

INTERVIEW SCHEDULE

SECTION A: DEMOGRAPHICS

1. How old are you?

2. How old were you when you had your baby?

3. How old is your baby?

4. Health facility/provider that sent you to the hospital

5. Marital status

Single ☐ Married ☐ Divorced ☐

6. Whom do you live with?

a. Parents ☐

b. Boyfriend ☐

c. Husband ☐

d. Friends ☐

e. Other _____

7. Religion

a. Christian ☐

b. Hindu ☐

c. Muslim ☐

d. Shembe ☐

e. Zionist ☐

f. Other _____

8. Highest grade passed at school?

a. Grade _____

9. What are you doing now?

a. Schooling ☐

b. Studying ☐

c. Working ☐

d. Other _____

10. Who takes care of your child?

- a. Parents ☐
- b. Grandparents ☐
- c. Nanny ☐
- d. Boyfriend/husband ☐
- e. Other _____

11. Who gives you money to take care of your child?

- a. Child support grant ☐
- b. Boyfriend ☐
- c. Parents ☐
- d. Grandparents ☐
- e. Other _____

12. Who do you live with?

- a. Parents ☐
- b. Grandparents ☐
- c. Boyfriend ☐
- d. Husband ☐
- e. Other _____

13. How many people are living in the same house with you?

- a. 1 - 2 ☐
- b. 2 - 4 ☐
- c. 4 - 6 ☐
- d. 6 and more ☐

14. Do you have?

- a. Lights ☐
- b. Tap water ☐

SECTION B: INTERVIEW QUESTIONS

1. How did you feel when you found out you were pregnant?
2. When you were pregnant how did you feel about going for check-ups at the hospital?
3. What do you think can stop you and other young girls from going for check-ups during pregnancy?
4. Why do you think it is good to go for check-ups while you are pregnant?
5. What do you think can be done to make it easier for young mothers to go for hospital check-ups?

APPENDIX E: RETROSPECTIVE DATA COLLECTION TOOL**RETROSPECTIVE DATA REVIEW TOOL****SECTION A: DEMOGRAPHICS**

1. Maternal age

2. Marital status

 Single

 Married

 Divorced

3. Occupation

 Employed

Specify occupation _____

 Unemployed

4. Race

 African

 White

 Indian

 Colored

5. Religion

 Christian

 Zionist

 Shembe

 Hindu

 Muslim

Other _____

SECTION B: ANTENATAL MEDICAL INFORMATION

6. Parity(Number of times a female has given birth to a baby excluding abortions)

7. Gravida(Number of pregnancies including abortion or fetal death)

8. Medical and General History during pregnancy

Hypertension	Epilepsy	Diabetes	Cardiac	TB
--------------	----------	----------	---------	----

Other _____

If yes to any of the above, give further details:

Medications during pregnancy (*including self and traditional medication*)

Family History

Twins	Diabetes	TB	Congenital	Other
-------	----------	----	------------	-------

9. Investigations

Rapid Syphilis test

POS	NEG	UNKNOWN
-----	-----	---------

Repeat Syphilis test

POS	NEG	UNKNOWN
-----	-----	---------

RVD Test

Date	REACTIVE	NON-REACTIVE	DECLINED
------	----------	--------------	----------

CD 4

DATE DONE	HAART	FDC
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 _____ Therapy

RVD retest at 32

REACTIVE	NON-REACTIVE	DECLINED
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 weeks

10. Complications during pregnancy

Anaemia ☐

Pre-eclampsia ☐

Eclampsia ☐

Gestational Diabetes ☐

Other ☐

If ticked other, provide details

11. Mode of delivery

NVD	Assisted Delivery	Caesarean Section
-----	-------------------	-------------------

12. Problems with delivery

SECTION C: ASSESSMENT OF THE NEWBORN

13. ☐ ALIVE ☐ STILLBORN ☐ NEONATAL DEATH

14. Birth weight kg
15. Head circumference cm
16. Gestational age weeks

17. Apgar score

1st Apgar score _____
2nd Apgar score _____

18. Birth abnormality ☐ Y ☐ N

If Yes, elaborate:

SECTION D: ANC ATTENDANCE

Participant Information				No. of ANC visits						Gestational period of 1 st visit					
Year	ID	Age (yrs)	Married	1 st visit	2 nd visit	3 rd visit	4 th visit	5 th visit	>5 visits	Before 13 wks	13-19 wks	20-24 wks	26-32 wks	34-36 wks	40 wks
2011	12a	14	Y		Y			Y				Y			

APPENDIX F: PERMISSION LETTER TO DOH

Miss Trishka Govender
Durban University of Technology
Dept. of Community Health Studies
Durban

01 October 2014

To: The Head KZN Department of Health
Education/Research Office

Dear Sir/Madam

RE: REQUEST FOR PERMISSION TO CONDUCT A STUDY

I am presently registered as a student at the Durban University of Technology in the Department of Community Health Sciences doing Masters in Environmental Health. The proposed title of my research project is: *'The impact of access to antenatal care on maternal health outcomes among young adolescents on the North coast of KwaZulu-Natal, South Africa'*.

Objectives of the study are;

1. To assess the trends of ANC service utilization by pregnant adolescents (13-16 years) over a three year period (2011-2013).
2. To evaluate the maternal health outcomes related to young adolescent pregnancies.
3. To identify factors that influence access to ANC among young adolescent pregnancies.

I hereby request your permission to conduct a research project at Osindisweni Hospital. My research proposal and ethical clearance certificate have been attached. Your support and permission to conduct the study at your facility will be appreciated.

Yours sincerely

Miss T Govender

.....

T Govender (Miss)
M Tech student
Contact number:
0787598641
Email address:
trishkag@yahoo.com

.....

P Reddy (Dr)
Supervisor
Contact number:
031 3732808
Email address:
PoovieR@dut.ac.za

.....

S Ghuman (Mrs)
Co-supervisor
Contact number:
031 3732807
Email address:
shanazg@dut.ac.za

APPENDIX G: PERMISSION LETTER TO INSTITUTIONAL MANAGEMENT

Miss Trishka Govender
Durban University of Technology
Dept. of Community Health Studies
Durban

01 October 2014

To Osindisweni Hospital Management

Dear Sir/Madam

RE: REQUEST FOR PERMISSION TO CONDUCT A STUDY

I am presently registered as a student at the Durban University of Technology in the Department of Community Health Sciences doing Masters in Environmental Health. The proposed title of my research project is: *'The impact of access to antenatal care on maternal health outcomes among young adolescents on the North coast of KwaZulu-Natal, South Africa'*.

Objectives of the study are;

4. To assess the trends of ANC service utilization by pregnant adolescents (13-16 years) over a three year period (2011-2013).
5. To evaluate the maternal health outcomes related to young adolescent pregnancies.
6. To identify factors that influence access to ANC among young adolescent pregnancies.

I hereby request your permission to conduct a research project at Osindisweni Hospital. My research proposal and ethical clearance certificate have been attached. Your support and permission to conduct the study at your facility will be appreciated.

Yours sincerely

Miss T Govender

.....
T Govender (Miss)
M Tech student
Contact number:
0787598641
Email address:
trishkag@yahoo.com

.....
P Reddy (Dr)
Supervisor
Contact number:
031 3732808
Email address:
PoovieR@dut.ac.za

.....
S Ghuman (Mrs)
Co-supervisor
Contact number:
031 3732807
Email address:
shanazg@dut.ac.za

APPENDIX H: DUT IREC ETHICAL CLEARANCE CERTIFICATE



Institutional Research Ethics Committee
Faculty of Health Sciences
Room HS 49, Mansfield School Site
Gate 8, Ritson Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2900

Fax: 031 3732407

Email: levishad@dut.ac.za

http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

19 November 2015

IREC Reference Number: **REC 50/14**

Ms T Govender
25 Croton Road
Brindhaven
Verulam

Dear Ms Govender

The impact of access to antenatal care on maternal health outcomes among young adolescents on the North coast of KwaZulu-Natal, South Africa

The IREC acknowledges receipt of your notification regarding the piloting of your data collection tool and submission of the relevant gatekeeper permission letters to the IREC. Please be advised that these documents served at the IREC meeting which was held on Monday, 16 November 2015. The committee requested that you be advised that commencing data without Full Approval from the IREC is unethical and is subject to penalty.

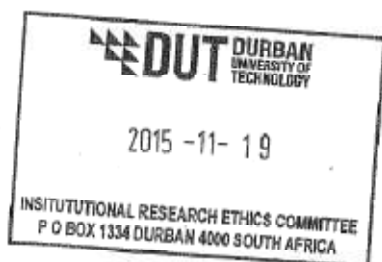
However, the committee has decided to allow you to continue with your project since you have admitted that it was an oversight on your behalf.

Please be advised that the IREC will be forced to withdraw ethics clearance should another problem arise.

Yours Sincerely



Professor J K Adam
Chairperson: IREC



APPENDIX I: LETTER OF APPROVAL FROM DOH



health

Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x9051
Pietermaritzburg
3200
Tel.: 033 – 3953189
Fax.: 033 – 394 3782
Email.: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM 295/14
Enquiries : Mr X Xaba
Tel : 033 – 395 2805

Dear Ms T. Govender

Subject: Approval of a Research Proposal

1. The research proposal titled 'The impact of access to antenatal care (ANC) on maternal health outcomes among young adolescents on the North Coast of KZN, South Africa' was reviewed by the KwaZulu-Natal Department of Health.

The proposal is hereby **approved** for research to be undertaken at Osindisweni Hospital.

2. You are requested to take note of the following:
 - a. Make the necessary arrangement with the identified facility before commencing with your research project.
 - b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.
3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely


Dr E Lutge


Chairperson, Health Research Committee

Date: 13/11/14

uMnyango Wezempilo . Departement van Gesondheid

Fighting Disease, Fighting Poverty, Giving Hope

APPENDIX J: LETTER OF APPROVAL FROM “GATEKEEPER”

	Department: Health PROVINCE OF KWAZULU-NATAL	Ethekwini District Osindisweni Hospital Private Bag X15 Verulam 4340 Oakford Road Verulam 4340 Tel.: 032-5419200, Fax.:032-5410340 Email.:Ntombenhle.Ngcobo@kznhealth.gov.za www.kznhealth.gov.za
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Date: 27/10/2014
Enquiries: Mrs NP Ngcobo
Ref: Ms T Govender

Miss T Govender
25 Croton Road
Brindhaven
Verulam
4340

RE: PERMISSION TO CONDUCT RESEARCH AT FACILITY

I have pleasure in informing you that permission has been granted to you by the Facility to conduct research on “The Impact of Access to Antenatal Care on Maternal Health Outcomes among Young Adolescents on the North Coast of Kwa-Zulu Natal, South Africa”


Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research.
4. The District Office/Facility will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to the District Office/Facility.

Thanking you.

Sincerely

Ethekwini District/Mrs NP Ngcobo
Ethekwini District/Osindisweni Hospital



uMnyango Wezempilo . Departement van Gesondheid
Fighting Disease, Fighting Poverty, Giving Hope

APPENDIX K: CONFIDENTIAL DECLARATION BY INTERPRETER

Confidential Declaration by interpreter (Only complete if applicable)

I (name) declare that:

- I assisted the investigator (*name*) to explain the interview questions to (*name of participant*)..... using the language medium of isiZulu.
- I conveyed a factually correct version of what was related to me.
- I am satisfied that the participant fully understood the interview questions and has had all her questions satisfactorily answered.
- The information I have received from the participant will be kept confidential.

Signed at (*place*)..... On

(*date*).....

.....

Signature of interpreter

APPENDIX L: EDITORS CERTIFICATE



Gillian Cruickshank
M.Ed (Higher Education)
082 – 6601050
gilliancruickshank1@gmail.com

TO WHOM IT MAY CONCERN

25th November 2015

re: Student Ms T. Govender – Master’s Dissertation

I confirm that I have proof-read Ms Govender’s M.Tech dissertation text in respect of grammar, punctuation, spelling, use of tenses, and the referencing format both in-text and on the reference list. A correlation has also been done regarding the matching of in-text references and the reference list. Some recommendations have been made to the student regarding realignment or the correction of specific elements where she needs to refer to her own notes or other source material. Such anomalies were found both in the text and on the reference list.

Gillian Cruickshank