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UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

DEPARTMENT OF FAMILY MEDICINE

FACTORS ASSOCIATED WITH BIRTH BEFORE ARRIVAL (BBA) AT DR YUSUF DADOO HOSPITAL, KRUGERSDORP, WEST RAND, GAUTENG PROVINCE

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Medicine in Family Medicine

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DECLARATION

I, Oluwafolajimi Olusesi Fadahun, declare that this research report is my own work. It is submitted for the degree of Master in Family Medicine in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

Student number: 0710792J

Signature of candidate: ……

25th July 2019 in Johannesburg, South Africa.

DEDICATION

I dedicate this work to Almighty God who remains faithful to His word through the years.

ABSTRACT

INTRODUCTION: According to the WHO, the global maternal mortality rate in 2015 was 216 maternal deaths per 100 000 live births. The maternal mortality rate in South Africa is 138 per 100 000 live births. Although neonatal mortality has shown a decline from 37 deaths per 1,000 live births in 1990 to 18 in 2017, about 40% of this neonatal deaths occurred on the first day of life. Lack of skilled health personnel at delivery is believed to contribute to this high maternal and neonatal mortality rates. Birth before arrival (BBA) at a healthcare facility is associated with adverse maternal and neonatal outcomes. This study explored the factors associated with babies being born before arrival at Dr Yusuf Dadoo Hospital in Gauteng Province, South Africa.

METHODOLOGY: A prospective descriptive cross-sectional study on 133 mothers of babies born before arrival, undertaken over a six-month period (August 2017 to January 2018) in a district hospital in South Africa. A researcher administered questionnaire was used to collect the data. Participants were asked about their pregnancy history, details of the index pregnancy and delivery. Main outcome measures included delivery intention and reasons for BBA. Ethical approval was granted by the University of the Witwatersrand.

RESULTS: Majority of the participants were of South African origin, married, and unemployed with high school education. The mean age of participants was 28.2 years and majority of the women in the study were aged between 26 and 35 years. More than a third of the participants (51/133, 38.4%) resided outside West Rand district. During the study period a total of 3116 in-facility births and 157 babies were born before arrival (BBA). The study BBA incidence was 4.80%. The main reasons cited by participants for planning out of facility delivery were unpleasant experience with health facility, no benefit in hospital delivery and religious/cultural belief. Mothers with a history of BBA (OR 13.2 [95%CI 2.18 – 80.39]) and mothers who did not attend ANC (OR 13.2 [95%CI 2.18 – 80.39]) were more likely to have a BBBA in the index pregnancy.

CONCLUSION: The incidence of BBA is low in the study setting and is mostly an unintentional pregnancy endpoint. Efforts at reducing BBA and the consequent neonatal

complications need to promote antenatal clinic uptake and break the reinforcing influence of previous BBA on the index pregnancy.

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ACRONYMS

ANC	Antenatal Care
BBA	Birth Before Arrival
BBBA	Babies Born Before Arrival
CEO	Chief Executive Officer
DHIS	District Health Information System
DYDH	Dr Yusuf Dadoo Hospital
ED	Emergency Department
EMS	Emergency Medical Services
HREC	Human Research Ethics Committee
LBW	Low Birthweight
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MOU	Midwife Obstetric Unit
NMR	Neonatal Mortality Rate
PPH	Post-Partum Haemorrhage
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
VLBW	Very Low Birth Weight
WHO	World Health Organisation
Wits	University of the Witwatersrand
WRHD	West Rand Health District

CHAPTER ONE

INTRODUCTION

1.1 Background

Neonatal mortality continues to increase globally and now contributes substantially to child mortality rates. About 4.8 million deaths (80%) of the estimated 6 million global deaths in children under-5 years that occurred in 2015 were in the neonatal period. Furthermore, about 1 million (21%) of these neonatal deaths occurred on the first day of life [1,2].

Although maternal mortality ratio reduced by 45% worldwide between 1990 and 2013 from 380 maternal deaths per 100 000 to 210, sub-Saharan Africa (SSA) and Southern Asia remain the epicentre for maternal deaths with these two regions accounting for 86% of maternal deaths in 2013[2].

Problems with access to health care services is an important contributor to the morbidity and mortality figures worldwide. In 2015, the United Nations adopted a set of Sustainable Development Goals (SDGs) aimed at ensuring improvements in global development by 2030. The SDGs comprises of 17 goals and 169 targets which all the 193 UN member states including South Africa have committed to actualising[1]. The third SDG addresses health issues specifically, namely to ensure healthy lives and promote well-being for all at all ages. Access to maternal health care services is an important objective, as illustrated by one of the 13 targets under this goal:

3.7 Ensure universal access to sexual and reproductive health-care services, including family planning, information and education and integration of reproductive health into national strategies and programmes.

As a process indicator, access to sexual and reproductive health-care services (SDG 3.7), is a key determinant of the neonatal and maternal outcomes. In particular, access to facility-based services is a more specific measure of access. Not least, the proportion of babies who are born before arrival (BBA) is a measure of access, and therefore influences health outcomes, particularly of newborns. The proportion of BBAs suggests, by definition, the proportion of deliveries attended by skilled facility-based personnel and antenatal care attendance at facilities during pregnancy; these factors are believed to influence the neonatal and maternal morbidity and mortality picture in SSA [2].

Birth before arrival (BBA) at a healthcare facility is a major health concern in developing nations like South Africa. Babies born before arrival (BBBA) at a healthcare facility and their mothers are at increased risk for adverse neonatal and maternal outcomes which contribute to morbidity and mortality in obstetric care [3].

Previous studies have identified different factors that are responsible for driving BBA rates. These include high parity, unbooked mothers, preterm delivery at index pregnancy, past history of preterm delivery, short duration of labour, lack of birth and emergency preparedness during antenatal period, delays in seeking healthcare and reaching health facility [4-8]. Other risk factors for BBA are low socio-economic status, low level of education, cultural beliefs that encourage mothers to endure childbirth and to avoid healthcare facilities[9, 10.]

Factors described as being responsible for high BBA rates in South Africa include poor education, poor antenatal attendance, negative attitude by nurses, inadequate nursing skills to identify true labour, preterm and precipitate labour and cultural/traditional practices that encourage home delivery [11, 12, 13]. Other factors are accessibility factors: distance to health facility (the further away from the facility the higher the chances of BBA) and poor ambulance response to emergency call [14].

1.2 Rationale

Despite the government of South Africa's intervention in form of various maternal and child health programmes the maternal and neonatal mortality rates remain high. It is important to investigate the contribution of BBA to these high rates especially as a substantial proportion of neonatal deaths occur on the first day of life. However, no study has been conducted to determine factors contributing to BBA in Westrand District.

The aim of the research was to explore the factors associated with babies being born before arrival at Dr Yusuf Dadoo Hospital (DYDH), findings from this research may be used by policy makers to design interventions to address gaps in maternal and newborn health concerns.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this section, the current study will be situated within the body of current knowledge and provide context by the recognition, retrieval and synthesis of relevant information.

The following research engines were used Google Scholar, PubMed and PubMed Clinical Queries and Cochrane database. Search words used included: "birth before arrival," and "factors". The chapter starts with description of birth before arrival then a review of literature on the epidemiology of BBA and factors associated with birth before arrival.

2.2 Definition and epidemiology of BBA

Birth before arrival is not defined consistently across different studies. For instance, Parag et al categorises BBA into two groups: planned home births which are attended by skilled birth attendants and unplanned deliveries without skilled birth attendant which are more common in developing and less-developed countries[5]. Another study defined BBA as birth outside a designated delivery unit of a health facility when the mother had booked or planned for hospital delivery [8], this definition may exclude mothers who are unbooked. A study conducted at a tertiary hospital in South Africa defined BBA as delivery outside the hospital or clinic setting including delivery at home, on the roadside and in the ambulance on the way to the hospital [11]. The definition of BBA (also called out-of-hospital, unplanned or accidental births/deliveries), used in this study was the birth of a child that occurs outside a healthcare facility [13]. These births may occur at home or in transit before the mother reaches the healthcare facility.

The presence of skilled birth attendant at every delivery is a vital intervention to reduce maternal morbidity and mortality. Skilled birth attendant refers to the presence of a medical doctor, midwife or nurse trained to manage normal pregnancy, childbirth and immediate postnatal period. In addition, the skilled birth attendant has access to necessary equipment and is able to promptly identify, manage and refer complications in mother and newborns [2]. Traditional birth attendants who are not formally trained are not considered as skilled birth attendants. Births before arrival are often unsupervised by skilled health personnel and are associated with higher rates of perinatal morbidity and mortality when compared to deliveries supervised by trained health personnel [3, 11].

Globally, 71% of births had a skilled attendant in attendance in 2014 with SSA recording a 55% presence[15]. However, 91% of deliveries in South Africa were supervised by a skilled birth attendant in 2012 [15].

BBA rate is a measure of accessibility to perinatal care within a community [14] .Thus a high BBA rate is a reflection of sub-optimal perinatal care. Consequently, adverse neonatal and maternal outcomes are not unexpected. Potter et al conducted a study in 1984 to investigate the factors associated with BBA in New Sommerset Hospital Cape Point, Cape Town. The study recommended the introduction of a midwife obstetric unit closer to the catchment area for the hospital to improve accessibility to perinatal care. Implementation of this recommendation contributed to a reduction in the BBA rate in the study area from 10% to 3% of all births i.e. a 70% decline. Thus, findings from this study provided the evidence for future interventions and references in the study of community oriented approach for access to perinatal care in South Africa. The minimum BBA rate of 1.5% below which interventions to improve access are not likely to be cost-effective or to have a significant benefit has been referenced in subsequent studies [13, 16]. Accordingly, BBA rate higher than 1.5% is unacceptable and warrants investigation [14 .] The prospective nature of this study and the use of a blend of quantitative and qualitative information helped to unveil the deep causes of BBA.

In the background of high HIV antenatal prevalence in South Africa[17], babies born before arrival (BBBA) to a mother infected with HIV may have an increased risk for mother to infant transmission of HIV. This invariably may contribute to the high neonatal mortality rate in South Africa. In South Africa, the neonatal mortality rate is 15 per 1000 live births with half of these neonatal deaths taking place in the first day of life and up to three-quarters during the first week of life [12,18] .Also, sepsis and birth asphyxia, which are major causes [18] of neonatal deaths are more prevalent among babies born before arrival[11] . Similarly, increased neonatal mortality rates and unfavourable clinical outcomes among very-low-birth-weight neonate BBA have been reported [3, 5, 11.] Furthermore, BBBA are more likely to have lower birth weights - a risk factor for neonatal death; and more likely have longer hospital stays than in-born babies when admitted during the perinatal period [5]. This further shows that, being a BBBA is a latent risk factor for mortality, which should be a source of concern.

Adverse maternal outcomes associated with BBA include an increased risk to develop lacerations to the genital tract, prolonged third stage of labour, postpartum haemorrhage (PPH), postnatal anaemia and sepsis [4, 5, 11, 19,]. The maternal mortality rate in South Africa is 130 per

100 000 [20]. The contribution of BBA to the high mortality rate in South Africa is uncertain but it is known that obstetric haemorrhage, hypertension and HIV related infections are responsible for over 60% of the maternal mortality[21].

There is paucity of data on BBA especially in developing countries like South Africa. The BBA rate varies between developed and developing countries: BBA rates of less than 1% have been reported in some developed countries [9, 19] and rates of more than 50% in some developing countries [10, 22].

In the United Kingdom an incidence of 2.3% was recorded in 2014 [23] while in Australia despite an increase over a 20-year period the incidence was 0.43% in 2011 [24]. This picture is different in the developing world, a study done in Nigeria reported a rate of 16.8% and another study in Ethiopia reported a BBA rate of 90% [22, 25].

The BBA rate in South Africa stands at 5.4% [26] with provincial and district differences. According to Potter et al the acceptable BBA rate in South Africa is 1.5% [14.] Therefore the current BBA rate of 5.4% exceeds the acceptable level of 1.5% and warrants investigation to determine the contributing factors[14].

2.3 Factors associated with BBA

Multiple factors such as level of education of mothers, uptake of antenatal services, parity, socio-economic variables, cultural practices, accessibility to health facility, skills and attitude of health care workers interact and contribute to the occurrence of birth before arrival at a healthcare facility.

2.3.1 Level of education of mother

Studies from developing countries indicate that the educational level of women is an important predictor of health service utilization [6, 27, 28]. Researchers in Philippines reported that providing health information in the official language (English) and not in the local dialect may require women with low level of education to depend on other people including health staff to interpret and understand the health information. This could act as a deterrent to access health services [27]. Similarly, Akinyemi et al utilizing the Nigeria demographic health survey data reported that

women with no formal education are more likely to drop out of the maternity continuum of care, with higher rates of BBA reported in this group of women [28].

On the contrary, studies from Kenya[8] and South Africa[16] did not show any significant association between level of education of mothers and BBA. The South African study[16] was conducted in a similar setting to the current study and the findings may be more relevant to this study.

2.3.2 ANC services utilization/uptake

Antenatal care provides opportunity for the pregnant woman to have contact with the healthcare professional and also allows them to access health services to improve the health of the mother and child as well as promote a good outcome for the pregnancy. The components of effective antenatal care are risk identification, prevention and management of pregnancy-related or concurrent diseases and health education and health promotion. Provision of antenatal care is a strategy to address the direct causes of maternal mortality and to reduce foetal and neonatal deaths due to obstetrical complications[2].

The WHO recommends that every pregnant woman should attend at least eight ANC contacts during pregnancy[2]. This recommendation was adopted as policy in South Africa on 1 April 2017. However, the approved protocol for this study was based on the recommended minimum four ANC visits for women without any risk factors in pregnancy under the Basic Antenatal Care (BANC) guidelines [29]. Data from the WHO indicate that only 52% of pregnant women in the developing countries received the minimum number of ANC visits in 2014 [2]. In South Africa, 92% of women reported attending one or more ANC visits [15].

Being unbooked has been identified as a risk for BBA [5, 8, 11, 30, 31] even in regions with high ANC utilization [32]. For instance a case-control study in Glasgow, Scotland showed a higher incidence of BBA among unbooked mothers, mothers who booked late or mothers who were poor attenders of antenatal care[32]. A similar trend of higher incidence of BBA among unbooked mothers was reported in Japan[30.] The ANC uptake in South Africa is high at 92% [15], studies conducted in South Africa have also confirmed that poor uptake of ANC services is a risk factor for BBA[5, 11]. Thus, the association between ANC utilization and BBA reported from the above studies[5, 11, 30, 32] is relevant to the current study.

Research findings from countries with low ANC utilization remain consistent with the above findings. A mixed method study conducted in Tanzania[31] and a case-control study carried out in Kenya[8] both showed that low ANC attendance is a predictor of BBA.

2.3.3 Parity

Multiparity is a risk factor for the occurrence of BBA [8, 30, 32]. Multiparous compared to primiparous mothers are more prone to shorter duration of labour and also have a higher incidence of pre-labour spontaneous rupture of membranes [5,] The shorter duration of the second stage of labour in this group of mothers may led to delivery of their babies before arrival at the hospital. A Japanese study which reviewed obstetric cases over a five year at a major hospital in Tokyo, suggested that BBA may result from non-acceptance of mothers in labour at hospitals due to shortage of obstetricians and neonatologist in the hospital. Hence, some of the mothers (multiparous) delivered before they could find a suitable birthing centre[30]. However, the relevance of this finding to the current study is limited due to the different setting: the maternity unit in the Japanese study is obstetrician led which is different to the midwife driven maternity units in obtained in South Africa. In addition, the study design (retrospective cross-sectional study) weakens the ability to determine association between multiparity and BBA. Equally, the findings of a case control study[8] from multiple sites conducted in Kenya-a developing country like South Africa, demonstrated an association between multiparity and BBA.

2.3.4 Gestational age at delivery and duration of labour

Literature demonstrates that gestational age at delivery and duration of labour are significantly different between BBA and in-hospital delivered mothers[5, 8, 11, 32].

A case-control study which investigated the effect of giving birth before arrival on pregnancy outcomes at a referral hospital in Mombasa, Kenya reported a higher proportion of preterm labour and shorter duration of labour among mothers of BBBA[8]. Similarly, another case-control conducted in a peri-urban setting in South Africa reported that they were more preterm babies in the cases (BBBA) this was attributed to the unanticipated onset of labour which led to delivery before arrival at the hospital[5]. The peri-urban nature of the setting of the South African study[5] makes it relevant to the current study.

2.3.5 Access to healthcare

Access to health care defined as the freedom to utilise health services which comprises of three interrelated concepts namely: physical location of health facility relative to the population served, affordability the degree of fit between the health service related costs and the ability of households to meet these costs and acceptability providers' attitudes to and expectations of patients and vice versa [33]. These three concepts are used to directly evaluate access to health care.

In the context of BBA, access refers to the "degree of fit" between the needs of pregnant women during labour and delivery and health system responses. Kildea et al. argue that the closure of maternity units over a 20-year period in Australia contributed to a 47% increase BBA rate during the study period. The closure of these maternity in rural and urban parts of Australia limited access in terms of availability of birthing centres for women in labour. Although, the researchers did not investigate characteristics of BBA mothers or factors associated with BBA, this retrospective study findings highlight the importance of availability of health facility as a component of access to health care services[24].

Also, difficulty in getting money for treatment/ consultation and distance to health facility were reported as the most common reasons for the high dropout from maternity care continuum in Nigeria [28]. The study demonstrated that only half of the women who received ANC had a skilled birth attendant at their delivery. Women living in rural areas, in poor wealth index and with low/no formal are more likely to drop out of the maternity continuum of care.

Data from South Africa indicate that most women in South Africa do access obstetric care services. Despite this high uptake of maternity services, evidence suggests that barriers limiting women from accessing these services exist with variations in the extent of barriers being experienced across geographic areas and between socio-economic groups [15]. Majority of the participants in a cross-sectional study conducted in Bloemfontein, South Africa reported delay in emergency medical services response as a reason which contributed to the occurrence of BBA [34]. Similarly, Alabi et al reported lack of transport, poor security at night that hindered mothers from traveling and unavailability of waiting areas at health facilities as contributory factors to the occurrence of BBA [13]. In terms of acceptability of maternity services, a survey to explore women's experience of childbirth and early postnatal care in Tshwane District found only 48% and 55% of mothers felt they had been treated with a lot of respect and were satisfied with their treatment during their confinement respectively [35]. Mothers between 17 and 24 years,

mothers with limited formal education and women from another province or a neighbouring country reported more negative experiences during labour ($p<0.001$) [35] . Literature shows that disrespectful care during labour discourages women from delivering health facilities [15, 36].

2.3.6 Traditional practices/ Cultural beliefs

Cultural beliefs continue to play an important role in the decisions that women make with regard to choice of place of birth. In traditional societies, beliefs that discourage hospital delivery and the use of herbs to ease the pain of labour and speed up delivery are widespread in African countries [13, 31, 37]. These practices contribute to BBA. In Zambia, community value of endurance in labour encourages the use of herbal medicines and a delay in seeking healthcare intervention for childbirth [37]. Similarly, in rural Eastern Cape Province, the use of "baboon's urine" a form of traditional medicine to ease labour and the belief that a woman who delivers in the hospital is not a real women are contributing factors to BBA [13].

2.4 The 'three delay' model

The three delays model developed by Thaddeus and Maine has been used extensively as a pathway-based framework to investigate reasons for maternal mortality in developing countries and delay by mothers of babies born before arrival in seeking medical attention when in labour [16, 38, 39, 40]. These reasons are classified according to 3 phases. In BBA, the first two phases are major contributors:

Phase 1: Delay in decisions to seek care associated with the user.

Phase 2: Delay due to issues relating to accessibility of health facility.

Phase 3: Delay in receiving adequate health care.

Phase 1 delay are due to factors of decision-making, socio-cultural factors, financial and opportunity cost.

Phase 2 delay are affected by factors such as distance to healthcare facility, availability and cost of transportation; road conditions.

Phase 3 delay factors that influence the promptness of provision of effective care to the woman on her arrival at the health facility; availability of trained personnel and their competence, availability of supplies and equipment.

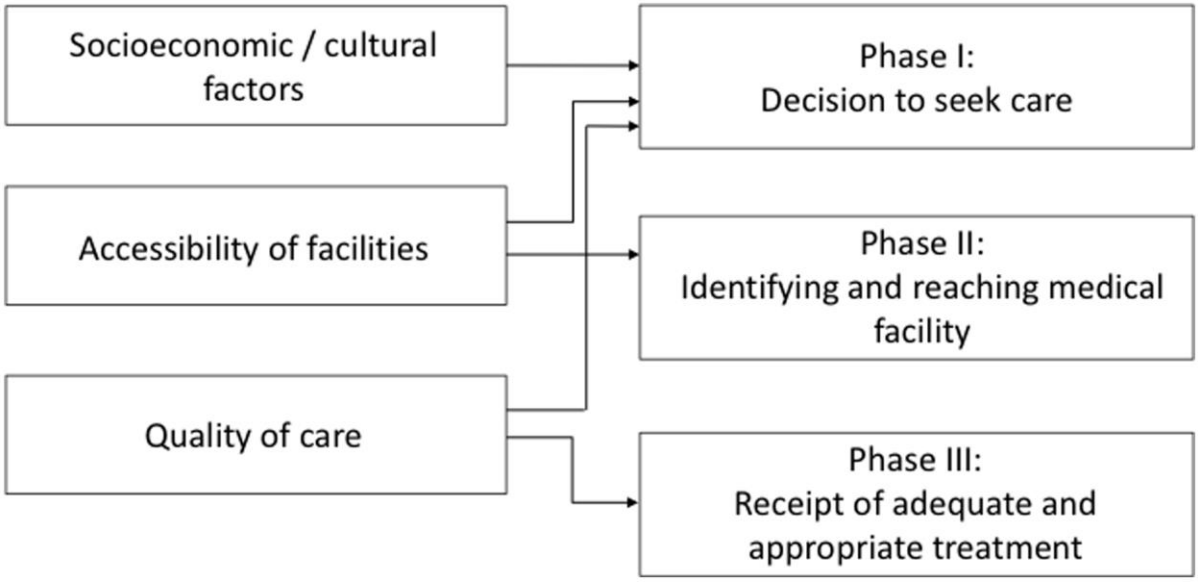


Figure 1: 'Three delay' model

In investigating reasons for BBA mothers' delay seeking care early in labour using the three delay model in Nkangala District South Africa, the researchers identified the following- unaware that they were in labour, labour went too fast, reluctance to call ambulance while waiting for establishment of labour as the most common reasons in Phase 1. Reasons given for Phase 2 delay were delay in response of the ambulance, failure to reach ambulance on cell phone and difficulty to locate the hospital while in labour. No reasons were related to Phase three delay in this study [16].

The three delays model helps to identify and document source/s of delays and areas where improvements can be implemented to save lives of women and babies.

2.5 Prioritization of South African programmes to tackle maternal and child mortality

The Department of Health currently provides free health care services for pregnant women which is rendered as a component of primary health care. Other programs by the government of South Africa aimed at improving the maternal and child health indices include:

The prevention of mother to child transmission of (PMTCT) This is a comprehensive programme which includes the uptake of antenatal services, HIV testing during pregnancy, antiretroviral treatment (ART) for HIV positive pregnant women, safe childbirth practices and appropriate infant feeding, uptake of infant HIV testing and other postnatal healthcare services

The National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD). This committee is tasked with the responsibility of recording, investigating institutional maternal deaths and recommending ways to reduce maternal mortality[41].

The Campaign for Accelerated Reduction in Maternal and Child Mortality in Africa (CARMMA). CARMMA is aimed at ensuring efficient coordination effective implementation of existing national programmes that promote maternal and infant health [42].

2.6 Summary

In conclusion, review of literature confirms that BBA is a cause of perinatal morbidity and mortality.

Literature recognises unbooked or poor ANC attendance[5, 11, 30, 31], higher gravidity[8, 30, 32] preterm delivery [5, 8, 32], and precipitate labour [5, 8, 11, 32] as predictors for having a BBA. However, the role of accessibility to health care in the occurrence of BBA was more prominent in the low and medium income settings [13, 15, 28, 34, 36].

In contrast, available research is inconclusive with regards to the association between maternal educational status and BBA [6, 8, 16, 27, 28].

CHAPTER THREE

METHODOLOGY

3.1 Research question

What are the reasons for babies being born before arrival of their mother at Dr Yusuf Dadoo hospital?

3.2 Aim and objectives

3.2.1 Aim

The aim of the research was to explore the factors associated with babies being born before arrival at Dr Yusuf Dadoo Hospital (DYDH).

3.2.2 Objectives

1. To determine the proportion of babies born before arrival before presenting at Dr Yusuf Dadoo Hospital.
2. To describe sociodemographic characteristics of mothers of babies born before arrival at Dr Yusuf Dadoo Hospital.
3. To describe the maternal factors (pregnancy and delivery history) that are associated with babies being born before arrival of their mothers at Dr Yusuf Dadoo Hospital.

3.3 Study design

A prospective cross-sectional study was undertaken at the postnatal ward of DYDH.

3.4 Study site

The study was conducted at the postnatal ward of Dr Yusuf Dadoo Hospital, Krugersdorp. It is a district or level one hospital located in the West Rand area of Johannesburg, Gauteng Province and serves two vital roles: providing support to primary health care as well as providing generalist services to out-patients and in-patients.

Dr Yusuf Dadoo Hospital receives BBBA and their mothers from the West Rand district.

3.5 Study period

- The first part of the study period was the pilot study which commenced from 1st to 10 July, 2017; after approval by the Human Research Ethics Committee of University of the Witwatersrand.
- The second part of the study period began with the actual data collection which took place from 1st of August, 2017 to 31st of January, 2018.

3.6 Study population

All mothers of babies born before arrival at hospital and all mothers of babies born at Dr Yusuf Dadoo Hospital were the target population.

3.7 Study sample

Using STATA version 14 statistical software, the confidence interval was taken at 95% and the expected sample error of 5% was used with a power of 80%. According to the DHIS database, the prevalence of BBA in Gauteng was 5.0% in 2009. Hence, the hypothesised proportion of BBA was taken as 5%. The study sample required was calculated to be 133. Convenience sampling was used to select the participants. Sampling continued till the sample size was attained by the end of the six month study period.

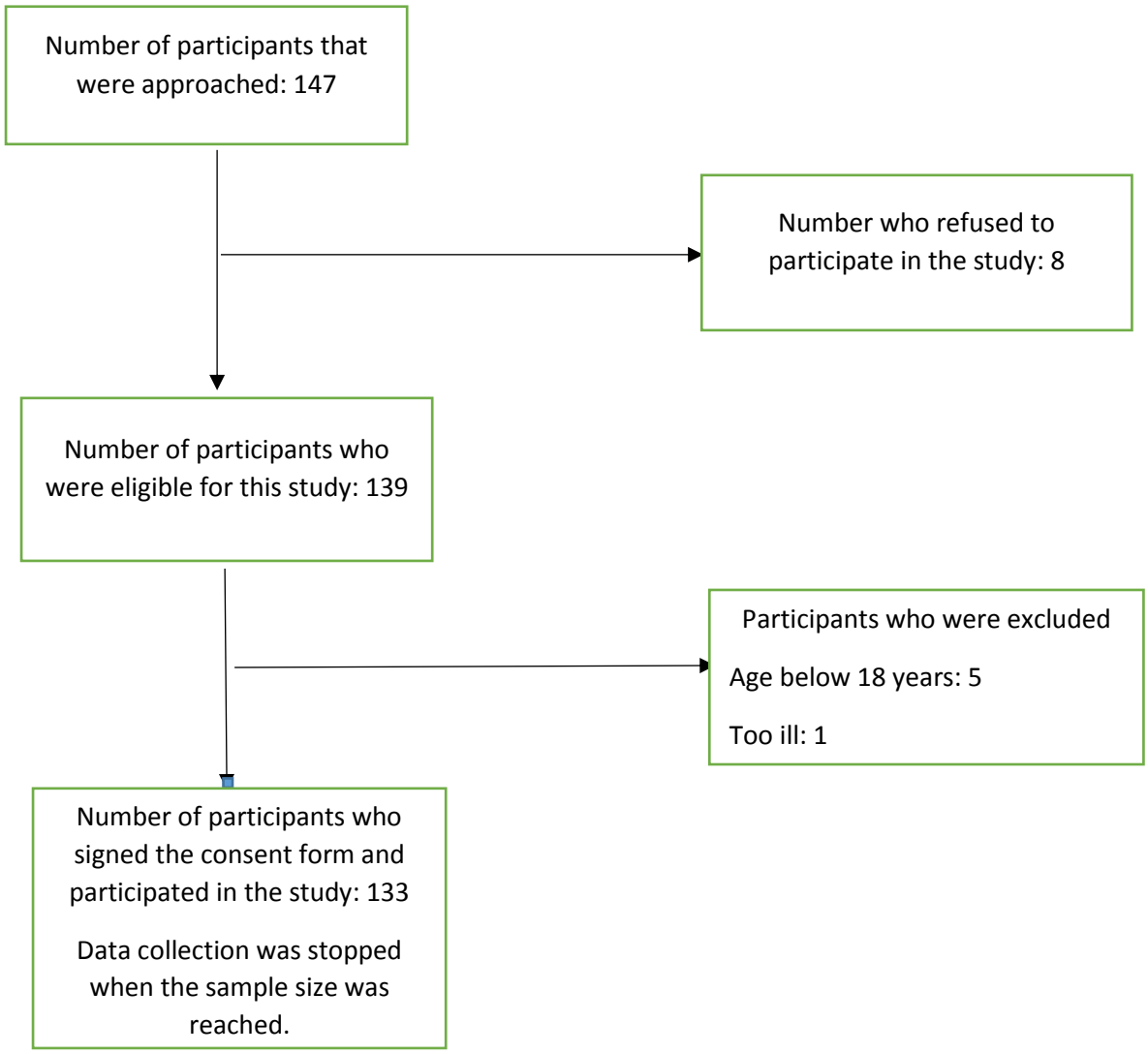
Mothers of babies born before arrival at hospital who presented to Dr Yusuf Dadoo Hospital and all mothers of babies born at Dr Yusuf Dadoo Hospital during the study period and who met the inclusion criteria comprised the study sample.

As per the hospital protocol, mothers of babies born outside a health facility and their babies, on arrival at DYDH, are received at the emergency department. At the emergency department, they are assessed by the casualty officer and admitted to the post-natal ward of the hospital where both mother and baby are further evaluated and observed for 6-12 hours by the medical and nursing staff.

The researcher accessed information of mothers of babies born before arrival at the emergency department register and then went to the postnatal ward to meet the mothers to administer the

questionnaire. The researcher interviewed the mothers of BBBA at the postnatal ward during the study period.

Figure 2: Flow chart showing the selection process of the participants



3.8 Inclusion criteria

- Mothers of babies born before arrival at hospital who present to Dr. Yusuf Dadoo Hospital, 18years and older.
- Mothers of babies born before arrival who are able to give consent.

3.9 Exclusion criteria

- Mothers who are too sick/ill to participate; i.e. to answer questions.

3.10 Data collection

The researcher briefly introduced himself to the patients and explained the purpose of the study to them. He informed them that information that they provide would be treated with confidentiality. Every patient was given an information sheet (which explained the purpose of study and provided contact details of the researcher) and consent form.
Patients who refused to participate in the study and those who did not meet the inclusion criteria were excluded from the interview. Informed consent was obtained from the patients who met the inclusion criteria and decided to participate in the study. The researcher then proceeded to interview the patients. The completed questionnaires were kept safe by the researcher. Each patients file were coded with a colour coding in order to avoid repetition of using the same file. The data information were transferred into MS excel spread sheet of the researcher's computer which was password coded.

3.11 Measuring tool/instrument

An interviewer administered questionnaire (Annexure 1) was the primary tool for collecting data and it was written in English. The questionnaire is a validated tool used for a research carried out in Nigeria that examined the patterns and factors associated with dropout in the continuum of maternity care (antenatal, delivery and postnatal) [28].

The first part of this questionnaire was been modified for this study which is the basic characteristics of the participants (questions1-8). The basic characteristics will include socio-demographic features (like age, nationality, level of education, employment status, and marital status), head of household, and place of residence. The second part of the questionnaire covers the pregnancy and delivery history (questions 9-24).

3.12 Pilot study

A pilot study was conducted in July, 2017 at the postnatal ward of DYDH with a sample of seven participants. The selection of the participants and the data collection followed the same process as the main study. The data was coded and analysed and these participants were excluded from the research sample. The aim of this pilot study was to estimate the time to complete the questionnaire and to see if the patients understood the questions. The conclusion of this study showed that the questionnaires could be answered within 15 minutes. The need to include a question on awareness on where to go during when in labour (q15) under the "pregnancy section" was clear. There was no question that needed to be removed. The participants had no complaints with the questionnaire and the data collection process went smoothly. The final questionnaire for the main study was prepared with this conclusion.

3.13 Data analysis

Data were entered into the windows 10 MS-Excel spread sheet and imported to the statistical software (STATA 14) for coding and analysis. Descriptive statistics was used to describe the sociodemographic features of the participants. The association between the demographic characteristics and the pregnancy details were tested using chi square and logistic regression. Descriptive statistics in form of frequency tables was used to investigate the reasons given by the participants. Statistical significance was considered in this study if $p < 0.05$ and confidence interval of 95%.

In order to examine the reasons for BBA in the index pregnancy, the participants were categorised into two groups i.e. participants who intended to have hospital delivery and participants who intended to have out-of-facility delivery. The reasons cited by the participants were classified according to the three delays model proposed by Thaddeus and Maine[39].

3.14 Ethical considerations

- Participants who refused to participate in the study were treated according to the hospital protocol for mothers of babies born before arrival and their right to refuse was respected. The hospital protocol on the management of BBA was adhered to during the study, hence the researcher did not need to intervene in the management of any participants.
- Written permission to conduct this study was obtained from the CEO of Dr Yusuf Dadoo hospital (annexure 4).
- Ethics clearance was obtained from the Human Research Ethics Committee of the University of Witwatersrand (annexure 5).

3.15 Funding of the research

The cost of the study was funded by the researcher.

CHAPTER FOUR

RESULTS

This chapter presents the results of the data collected during the six-month study period. A total of 139 mothers were eligible to participate in the study, five of these mothers were less than 18 years thus excluded and one mother was transferred to the regional hospital for further care due to the development of obstetric complications. Hence, the sample size of 133 participants who agreed to participate.

4.1 Incidence of Birth Before Arrival (BBA)

The born before arrival (BBA) incidence was calculated by dividing the total number of BBA by the total number of in-facility births (livebirths, stillbirths) and BBA. During the study period a total of 3116 in-facility births and 157 babies were born before arrival (BBA) at Dr Yusuf Dadoo Hospital (DYDH). This translates to a BBA incidence of 4.80%.

4.2 Socio-demographic characteristics and pregnancy details of participants

Table 1: Sociodemographic characteristics of participants

Characteristic	Frequency (N=133)	Percentage (%)
Age		
Mean=28.2 SD=5.7		
18 – 25 years	47	35.34
26 - 35 years	73	54.89
>35 years	13	9.77
Nationality		
South African born	88	66.17
Foreign born	45	33.87
Level of education		
No schooling	6	4.51
Grade 1-4	6	4.51
Grade 5-8	38	28.57
Grade 9-12	78	58.65
Tertiary education	5	3.76
Employment Status		
Unemployed	102	76.69
Employed	31	23.31
Unemployment reason		
No job	93	91.18
Studying	9	8.82
Marital status		
Single	62	46.62
Married/spousal relationship	70	52.65
Divorced	1	0.75
Widow	0	0
Residence		

Within West Rand district	82	61.65
Outside West Rand district	51	38.35
Access to electricity		
Yes	92	69.17
No	41	30.83
Access to water		
Yes	100	75.19
No	33	24.81
Head of household		
Self	20	15.04
Husband/partner	79	59.40
Father	10	7.52
Mother	10	7.52
Grandmother	2	1.50
Grandfather	1	0.75
Other	11	8.27

Majority of the participants were of South African origin, married, and unemployed with high school education. The mean age of participants was 28.2 years and majority of the women in the study were aged between 26 and 35years. More than a third of the participants reside outside West Rand district with their partners as head of the household. Most of the households had access to water and electricity.

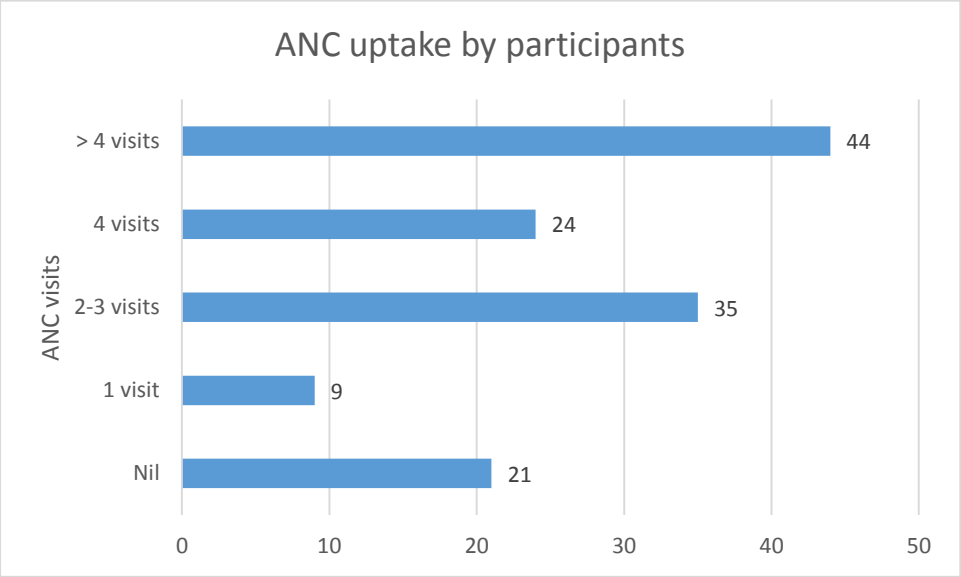
Table 2: Pregnancy details of participants

Characteristic	Frequency (N=133)	Percentage (%)
Previous Pregnancy		
Parity		
Primiparous	9	6.77
Multiparous (2-4 deliveries)	114	85.71
Grand multiparous (≥5 deliveries)	10	8.52
History of BBAs		
Yes	21	15.79
No	112	84.21
Number of BBBAs		
1	16	76.19
2	5	23.81
Index Pregnancy		
Antenatal Care (ANC)		
Unbooked	21	15.79
Booked	112	84.21
Place of Antenatal Care (ANC)		
Local clinic	111	99.11
GP	1	0.89
Hospital	0	0
Others	0	0
Number of ANC visits		
<4	44	39.29
≥4	68	60.71
Delivery plan during ANC		
Yes	108	96.43

No	4	3.57
Problems during pregnancy		
Yes	6	4.51
No	127	95.49
Onset of labour		
Preterm	15	11.28
Term	111	83.46
Postdate	2	1.50
Unsure	5	3.76
Decision of place of delivery		
Self	122	91.73
Husband/partner	2	1.50
Father	0	0
Mother	4	3.01
Grandmother	1	0.75
Grandfather	0	0
Other	4	3.01
Place of delivery		
At my home/relative's home	102	75.94
In transit	26	19.55
Other	6	4.51
Assistance during delivery		
Health worker	34	25.56
Traditional midwife/attendant	2	1.50
Relative	32	24.06
Neighbour	46	34.59
Friend	2	1.50
Don't know/can't remember	0	0
No help	17	12.78
Delivery intention		

Out of facility	6	4.51
Hospital delivery	127	95.49
Stillborn	2	1.50
Immediate birth outcome		
Well	126	94.74
Admitted to paediatric ward	5	3.76
Stillborn	2	1.50

Figure 3: ANC uptake by participants



Majority of the participants were booked 112/133; 84.21%. Of the booked participants, 44/112; 39% attended more than four ANC visits followed by 31% of the participants who attended two or three ANC visits. 21.4% of the booked participants attended four ANC visits and 8% attended only one ANC visits.

4.3 Association between delivery intention and sociodemographic characteristics /delivery details

4.3.1 Association between delivery intention and sociodemographic characteristics

Table 3: Association between delivery intention and sociodemographic characteristics

	Delivery intention		
	Hospital delivery (%)	**Out of facility delivery (%)**	**p value**
Age			
18 – 25 years	42 (33.07)	5 (83.33)	0.061
26 – 35 years	72 (56.69)	1 (16.67)	
>35 years	13 (10.24)	0 (0)	
Nationality			
South African born	83 (65.35)	5 (83.33)	0.663
Foreign born	44 (34.65)	1 (16.67)	
Level of education			
No schooling	6 (4.72)	0 (0)	0.215
Grade 1-4	6 (4.72)	0 (0)	
Grade 5-8	38 (29.92)	0 (0)	
Grade 9-12	73 (57.48)	5 (83.33)	
Tertiary education	4 (3.15)	1 (16.67)	
Employment Status			
Unemployed	97 (76.38)	5 (83.33)	1.000
Employed	30 (23.62)	1 (16.67)	
Unemployment reason			
Studying	8 (8.25)	1 (20.00)	0.376
No job	89 (91.75)	4 (80.00)	
Marital status			
Single	60 (47.24)	2 (33.33)	0.698
Married/spousal relationship	66 (51.97)	4 (66.67)	
Divorced	1 (0.79)	0 (0)	

Widow	-	-	
Residence			
Within West Rand district	78 (61.42)	4 (66.67)	1.000
Outside West Rand district	49 (38.58)	2 (33.33)	
Access to electricity			
Yes	40 (31.50)	1 (16.67)	0.666
No	87 (68.50)	5 (83.33)	
Access to water			
Yes	94 (74.02)	6 (100)	0.336
No	33 (25.98)	0 (0)	
Head of household			
Self	20 (15.75)	0 (0)	0.321
Husband/partner	75 (59.06)	4 (66.67)	
Father	8 (6.30)	2 (33.33)	
Mother	10 (7.87)	0 (0)	
Grandmother	2 (1.57)	0 (0)	
Grandfather	1 (0.79)	0 (0)	
Other	11 (8.66)	0 (0)	

There was no statistically significant association between sociodemographic characteristics of participants delivery intention.

4.3.2 Association between delivery intention and pregnancy details

Table 4: Association between delivery intention and pregnancy details

	Delivery intention		
	Hospital delivery (%)	**Out of facility delivery (%)**	**p value**
Previous Pregnancy			
Parity			
Nulliparous	7 (5.51)	2 (33.33)	0.073
Multiparous	110 (86.61)	4 (66.67)	
Grand multiparous	10 (7.87)	0 (0)	
History of BBAs			
Yes	17 (13.39)	4 (66.67)	0.006
No	110 (86.61)	2 (33.33)	
Number of BBBAs			
1	12 (70.59)	4 (100)	0.532
2	5 (29.41)	0 (0)	
Index Pregnancy			
Antenatal Care (ANC)			
Booked	17 (13.39)	4 (66.67)	0.006
Unbooked	110 (86.61)	2 (33.33)	
Place of Antenatal Care (ANC)			
Local clinic	109 (99.09)	2 (100)	1.000
GP	1 (0.91)	0 (0)	
Hospital	-	-	
Others	-	-	
Number of visits			
<4	43 (39.09)	1 (50.00)	1.000

≥4	67 (60.91)	1 (50.00)	
Delivery plan during ANC			
Yes	106 (96.36)	2 (100)	1.000
No	4 (3.64)	0 (0)	
Complications during pregnancy			
Yes	8 (6.30)	0 (0)	1.000
No	119 (93.70)	6 (100)	
Onset of labour			
Early	14 (11.02)	1 (16.67)	0.101
On time	107 (84.25)	4 (66.67)	
Late	1 (0.79)	1 (16.67)	
Unsure	5 (3.94)	0 (0)	
Decision of place of delivery			
Self	118 (92.91	4 (66.67)	0.057
Husband/partner	1 (0.79)	1 (16.67)	
Father	-	-	
Mother	4 (3.15)	0 (0)	
Grandmother	1 (0.79)	0 (0)	
Grandfather	-	-	
Other	3 (2.36)	1 (16.67)	
Place of delivery			
At my home/relative's home	96 (75.59)	5 (83.33)	0.301
In transit	26 (20.47)	0 (0)	
Other	5 (3.94)	1 (16.67)	
Assistance during delivery			
Health worker	33 (25.98)	1 (16.67)	0.177
Traditional midwife/attendant	1 (0.79)	1 (16.67)	
Relative	30 (23.62)	2 (33.33)	
Neighbour	45 (35.43)	1 (16.67)	

Friend	2 (1.57)	0 (0)	
Don't know/can't remember	-	-	
No help	16 (12.60)	1 (16.67)	
Birth outcome			
Well	120 (94.49)	6 (0)	1.000
Admitted to paediatric ward	5 (3.94)	0 (0)	
Stillborn	2 (1.57)	0 (0)	

As depicted in the table above, history of BBA and ANC attendance were statistically significantly associated with participants' delivery intention. The relationship between decision on place of delivery and delivery intention showed a borderline statistical association.

4.3.3 Association between delivery intention and history of BBA

Participants with a history of BBA were more likely to have an out-of-facility delivery in the index pregnancy compared to participants who have never had a BBA (X^2 (1) = 12.2, p-value 0.006).

4.3.4 Association between delivery intention and ANC uptake

Participants who did not attend ANC were more likely to have an out-of-facility delivery in the index pregnancy compared to participants who attended ANC (X^2 (1) = 12.2, p-value 0.006).

4.3.5 Association between person taking decision on place of delivery and participants' marital status

The study participants were principally responsible for deciding on the place of delivery. However, this decision was shown to be influenced by the participants' marital status. Among the married participants, the decision on choice of delivery was taken by the participant or their spouses. While among the unmarried participants, this decision was taken by the participants or any of the following people the participants' mother, grandmother, friend or neighbour (p-value 0.001).

4.4 Logistic regression

4.4.1 Univariable analysis

In logistic regression analysis, women with a history of BBA were 12.9 times more likely to have a BBA in the index pregnancy compared to women who never had a BBA (OR: 12.9; 95% CI: 2.198664 – 76.17083; p= 0.005).

The likelihood of having a BBA in the index pregnancy was statistically significantly higher for women who did not attend ANC compared to women attended ANC (OR: 12.9; 95% CI: 2.198664 – 76.17083; p= 0.005).

4.4.2 Multivariate analysis

Table 5: Adjusted predicting factors associated with BBA

	Odd ratio	P value	95% Confidence interval
History of BBA			
No	1		
Yes	13.2	0.005	2.18 – 80.39
Antenatal Care (ANC)			
Booked	1		
Unbooked	13.2	0.005	2.18 – 80.39

In a multivariable model, history of BBA and ANC attendance remained statistically associated with having a BBA in the index pregnancy. Women with a history of BBA were 13.2 times more likely to have a BBA in the index pregnancy compared to women who never had a BBA (p= 0.005). Similarly, participants who did not attend ANC were 13.2 times more likely to have a BBA in the index pregnancy compared to the participants who attended ANC (p= 0.005).

4.5 Reasons for BBA

In order to examine the reasons for BBA in the index pregnancy, the participants were categorised into two groups i.e. participants who intended to have hospital delivery and participants who intended to have out-of-facility delivery. The reasons cited by the participants were classified according to the three phases proposed by Thaddeus and Maine[32].

Due to the possibility of multiple responses by the participants, the total number of responses are more than the study sample size.

4.5.1 Participants' reasons for birth before arrival

Participants who intended to have their babies in the hospital (n=127)

Table 6: Reasons for BBA by participants who intended to have hospital delivery

Type of delay	Reason for the delay	Number of women
Phase 1 delay	Labour went too fast	40
Phase 1 delay	I was not aware that I was in labour	12
Phase 2 delay	Delay in response by EMS	68
Phase 2 delay	No transport to the hospital	14
Phase 2 delay	Distance of home to hospital	8
Phase 2 delay	No access to phone contact EMS	3

Participants who intended to have out-of-facility delivery (n=6)

Table 7: Reasons for BBA by participants who intended to have out of facility delivery

Phase of delay	Reason for the delay	Number of women
Phase 1 delay	Unpleasant experience with health facility	2
Phase 1 delay	Bad attitude of health care worker	1
Phase 1 delay	There is no benefit in hospital delivery	1
Phase 1 delay	Religious/cultural beliefs	1
Phase 1 delay	I did not get permission to go to the hospital	1

CHAPTER 5

DISCUSSION

5.1 Incidence

The BBA incidence obtained in this study (4.80%) is lower than the rate (5.76%) for West Rand District in 2015 according to the DHIS [26]. It is important to note that the BBA incidence rate obtained from this study does not include the BBA figures from private and the other public maternity facilities in West Rand district (Leratong hospital, Carletonville hospital, Mohlakeng MOU, and Bekkersdal West MOU).

However, the BBA rate from this study is comparable to 4.6%, the BBA incidence rate obtained in a similar study conducted in a peri-urban setting in Mpumalanga Province, South Africa [16]. On the contrary, the current study rate is high compared to rates of 3% and 1.8% which were obtained from two other South African studies [5, 11]. Although the BBA prevalence obtained in the current study is lower than the hypothesised rate of 5.0%, it still warrants further investigation and development of interventions aimed at addressing the identified causes of poor perinatal care. This is based on the recommendation by Potter that BBA rates higher than 1.5% suggests poor access to perinatal care and need to be investigated [14].

5.2 Sociodemographic characteristics

The sociodemographic characteristics are discussed below under the following sub-headings: age, nationality, level of education, employment status, marital status, residence, and head of household.

5.2.1 Age

The age range of the participants was 18 to 45 years with a mean age of 28.2 years and the commonest age group being 18-25 years. The mean age in this study was higher than the Kenyan study[8] (25.2 years), but slightly lower to the findings of two South African studies [13, 16] (27 years). The most common age group in this study was similar to the Kenyan[8] and South African studies[13, 8]. Participants in this study were limited to mothers 18 years or older and this

may contribute to disparity in the mean age when compared to other studies. In addition, there is a high level of teenage pregnancy in South Africa and exclusion of pregnant women less than 18 years may have limited the investigation of the association between age and BBA in this study.

5.2.2 Nationality

Sixty six percent of the participants were South African-born. Similarly, a Japanese study [30] revealed that the majority of participants were Japanese-born. This reflect the place where the study was conducted. Nationality has been shown to be associated with BBA, foreign nationals are more likely to deliver out of facility [30, 43]. The current study did not reveal any association between nationality and BBA. However, the relatively high number of foreign-born participants in this study may be due to their poor knowledge of ways of accessing the South African health system. Furthermore, perception of poor service or past experience of disrespectful care during childbirth at public health facilities as shown by another study conducted in Tshwane, South Africa[35] may contribute to the large proportion of foreign-born participants with BBBA in this study.

5.2.3 Level of education

Majority of the participants in this study had Grade 9 or higher education. The participants' level of education in this study is similar to findings from a study conducted in an urban district-Nkangala District, Mpulanga Province, South Africa[16]. On the contrary, other studies from South Africa, Kenya, and Tanzania [8, 13, 31, 34,] reported a lower level of education in participants. Although, a study conducted in rural or patriarchal communities revealed that low level of education was a risk factor for having a BBA [8] this study did not show any association between education and BBA. The peri-urban nature of the West Rand District may be responsible for the comparatively high level of education observed among the participants in this study.

5.2.4 Employment Status

More than three-quarters of the participants were unemployed. This is similar to findings from other studies [16, 8] that reported high level of unemployment. Majority of those unemployed had no job or any form of employment while the remainder were studying. The relatively high level

of education is not in keeping with the low employment status of the participants and it highlights the poor socio-economic status of the participants.

5.2.5 Marital Status

Just over half of the participants were married, 46.6% were single and only one participant was divorced. Similarly, studies from Kenya[8] and Tanzania[31] showed that married mothers accounted for the majority of the participants. Conversely, other local studies revealed that the majority of the participants were single mothers [13, 16].

5.2.6 Residence

The majority of the participants resided within West Rand District, this was in contrast to findings in the Kenyan study[8] which showed that just above a tenth of mothers of BBBA resided within the study area, thus was a risk factor for having BBA. Similarly, studies from France[44] and Nepal[45] show that long distance travelled to maternity units was associated with risk of BBA. However, a South African study[5] carried out in a similar setting did not demonstrate any association between distance to a maternity unit and BBA. Findings from this study suggests that maternity and perinatal care at DYDH may be more acceptable and available to participants hence their willingness to travel longer distances to attend this facility. The longer distances travelled during labour made these participants more prone to deliver before they arrive at the hospital.

5.2.7 Head of household

There was a predominance of husband or partner headed households followed by households headed by the participants. Although there was no significant association between head of household and having a BBA, this finding is in keeping with proportion of participants who are married or in spousal relationships.

In summary, none of the participants' socio-demographic characteristics investigated in this study demonstrated any statistically significant association with having a BBA.

5.3 Pregnancy details

5.3.1 Parity

The majority of the participants in this study were multiparous. Despite the high proportion of multiparous participants in this study, no significant association with having a BBA was detected. This is contrary to findings from earlier studies which established higher parity as a risk factor for BBA [4, 5, 16, 30, 31]. Due to previous birthing experiences, mothers in labour were less likely to seek health care on time with an intention to delay presentation at maternity unit till they perceive they are almost giving birth. Also, multiparous compared to primiparous mothers are more prone to shorter duration of labour [3, 5]. The foregoing explanation is underscored by results from this study which shows that majority of the cases of precipitate labour were reported by the multiparous participants (0/31, 29/31, 2/31 for primiparous, multiparous and grand multiparous respectively Person chi^2 (10) =27.8, p-value 0.024).

5.3.2 History of BBA

About one in six of the participants had a previous history of BBA. Importantly, this study confirms that history of BBA is a significant predictor of having BBA in the index pregnancy. This concurs with findings from other studies [16, 42] and it is attributed to absence of adverse outcomes associated with previous out-of-facility or home deliveries, hence the hesitation to have deliveries in health facility. A similar trend was noted among participants with history of BBA in this study, more than three-quarters of this category of participants reported one episode of previous BBA and the remaining being repeat episodes. In contrast, where delivery outside the health facility was observed to contribute to death of babies, a consequent reduction in BBA rate occured[5]. The current study did not however investigate neonatal mortality in previous BBA cases. This finding suggests that a favourable outcome with a BBA may be a motivation for women to plan for an out-of-facility delivery in future pregnancies as they may have a misconception that hospital delivery offers no additional benefit.

5.3.3 Antenatal Care (ANC)

The WHO recommends that every pregnant woman should attend at least eight ANC visits during pregnancy. This recommendation was adopted as policy in South Africa on 1 April

2017. However, the approved protocol for this study was based on the recommended minimum four ANC visits for women without any risk factors in pregnancy under the Basic Antenatal Care (BANC) guidelines [29]. ANC refers to attendance at an antenatal care clinic, mothers were considered booked if they attended any ANC clinic.

The majority of the participants (84.2%) were booked, all but one of the booked participants attended ANC visits at their local clinics. This is lower than the national ANC uptake level of 92% [46]. Among the participants who attended ANC, 60.7% attended four or more ANC visits. ANC visits by pregnant women provides an opportunity to make delivery plans, receive health education, to detect and manage of complications. These further equips the expectant mothers to respond appropriately to onset of labour. Consistent with the literature[4, 5, 8, 11, 16, 30, 31] the participants who were not booked were more likely to have a BBA compared to participants who were booked. This study confirms that not attending ANC is a risk factor for BBA, as participants who were not booked were 12.9 times more likely to have a BBA compared to participants who were booked. In addition, the odds of having a BBBA was significantly lower among participants who attended more than four ANC visits compared to participants who did not attend any ANC visits in the current study. Similarly, a study conducted in rural Tanzania[31], showed that attending three or more ANC visits reduced the risk of BBA. Conversely, literature provides evidence that ANC attendance does not guarantee in-facility delivery by pregnant women [4]. In South Africa, ANC is free in the public health sector. Given the benefits of ANC visits and the associated risks of non-attendance of ANC clinics by pregnant women, further research should be considered to identify the reasons for the sub-optimal uptake of ANC.

5.3.4 Delivery Plan

In this study, delivery plan was defined as mother been informed of the expected date of delivery, mode of delivery and place of delivery. These are components of BANC which should be carried out during the first ANC visit based on the pregnant women's risk profile[29].

Almost all of the women who attended ANC visits (96.4%), reported making adequate delivery plan during ANC. This is a positive reflection on the completeness of ANC offered at the local clinics were the participants attended. It also highlights the benefits of ANC attendance during pregnancy. Noteworthy is the fact that one-third of the women (2/6) who intended to have their babies outside the health facility attended ANC visits and also reported having adequate

delivery plans during their ANC visits. Contrary to findings from a Kenyan study[35] which showed that non-satisfactory antenatal care and delivery plan are significant risk factors for having BBA, the current study did not demonstrate any association between delivery plan and having BBA.

5.3.5 Problems/complications during pregnancy

About 6.3% of the participants reported any problems/complications during the index pregnancy. The problems were one case of pedal edema, one case of urinary tract infection, two cases of PV bleeding (threatened miscarriage) and two cases of pregnancy induced hypertension. One of the participants who experienced pregnancy induced hypertension presented with HELLP syndrome and cervical laceration post-partum and was subsequently transferred to the regional hospital for further management. Although, all the participants who reported experiencing problems/complications during the index pregnancy were booked, the current study did not find any association between problems/complications during pregnancy and ANC attendance. This study did not explore maternal perinatal complications, further studies may be carried out to investigate the documented increased perinatal complications among mothers of babies born before arrival (BBBA) [8, 16].

5.3.6 Duration of pregnancy at labour

The majority of the participants (83.5%) reported that onset of labour in the index pregnancy was at term. Also, those who attended ANC visits were shown to be more certain of the duration of their pregnancy compared to the participants who did not attend ANC visits (X^2 (1) = 7.6371, p-value 0.028). The study findings suggests that labour in the index pregnancy was anticipated and having a birth before arrival was an unintended outcome which gives credence to the reasons adduced by the participants for BBA; these reasons are discussed in detail in the section on reasons for BBA.

5.3.7 Decision on place of delivery

The majority of the participants (91.7%) were responsible for the decision on where to go for their birthing experience-health facility. A similar trend was observed among women who intended to deliver their babies outside the health facility (66.7%). In addition, this study

revealed an association between the participants' marital status and the person who took the decision on the place of delivery. Among the married participants, the decision on the place of delivery was mainly taken by the participants and to a less extent by their spouses compared to the unmarried participants who were less likely to be responsible for this decision with their mothers, grandmothers, friends and neighbours taking this important decision (Person chi^2 (4) = 12.2721, p-value 0.001). Previous studies [8, 16] argue that poverty, low educational status and patriarchal culture make women dependent on men thereby weakening their ability to make decisions to seek help for their medical conditions. However, in the current study, majority of the participants showed significant level of independence in taking decisions related to their health and well-being. This may be attributed to the peri-urban setting of the study site and the high educational attainment of the participants.

5.3.8 Place of delivery

Similar to findings from previous studies [7, 16] more than three-quarters of the deliveries occurred at the participants or their relative's homes (75.9%) and about 20% occurred in transit. This study also showed that transport related problems contributed substantially to the place of delivery in the index pregnancy. Majority of the participants who intended to have their delivery at a health facility (65.35%) reported delay in response by EMS, long distance to hospital and lack of transport as reasons for their home deliveries.

5.3.9 Assistance during delivery

There was no skilled birth attendant present at most of the index deliveries (61.7%); the neighbours, relatives and friends assisted with the delivery. Absence of a skilled birth attendant during delivery increases the risk of birth injuries to mother and baby as well mortality[8, 16].

5.3.10 Immediate birth outcome

In this study, the immediate birth outcome refers to the state of the baby within the first 24-48 hours of birth, this covers the period before presentation at the hospital and the observation period in the postnatal ward. Majority of all neonatal deaths occurs within the first 24 hours of

life[15], babies born before arrival compared to babies born in health facilities are more prone to early neonatal death due to sepsis and birth asphyxia[11, 18]. In the current study, most of the babies were alive (126), five were admitted to the paediatric ward for further management and two were still born. Although all the participants were BBA, delivery intentions of the participants did not show any statistically significant association with immediate birth outcome, all the babies that were admitted to the paediatric ward and the still births were from the group of participants who planned to have their babies in the health facility. This difference may not be significant owing to the small sample size. This finding may suggest that some level of preparation was taken by participants who planned to have their babies outside the health facility. This opens a gap to investigate the type of preparations made by participants who opt to have out-of-facility births.

5.3.11 Delivery intention

Majority of the participants (95.5%) reported that they planned to deliver at a health facility. However, this intention was derailed by an interaction of factors which are discussed in detail in the following section on reasons for BBA.

5.4 Reasons for BBA

Regarding women who intended to have hospital delivery, the most common Phase 1 reasons were labour been too fast and participants not aware they were in labour. While the duration of the labour may be outside the control of the mothers, to avoid having a BBA, pregnant women should be encouraged during ANC to present at the hospital at the onset of labour. Also during ANC, signs of labour should be highlighted so that the pregnant women do not miss these signs when labour starts which may lead to them having a BBA. The participants who attended ANC reported having a delivery plan, the participants who did not attend ANC may have missed the opportunity to receive the necessary education and birth preparedness to reduce the occurrence of BBA. Thus, there is a need to improve on the level of ANC uptake in the West Rand district.

The most common reasons for Phase 2 delay were delay in response by EMS and no transport to hospital. The relatively high number of respondents who reported delay in EMS response

shows the level of dependence on the EMS for transportation to the hospital. Delays in ambulance response have been reported to contribute to the occurrence of BBA in South Africa[14, 15, 34]. The findings from this study suggests that EMS delays may have contributed to having BBA. Thus, strengthening of the EMS with provision of dedicated ambulances for maternity cases and a reduction in the response time may contribute to a decrease in the incidence of BBA.

Among participants who intended to have out-of-facility delivery, all their reasons were related to Phase 1 delay. Owing to the small number of women in this category of participants, a qualitative study may be better suited to explore in-depth the reasons for BBA.

5.5 Study limitations

- A prospective cross-sectional study was used to explore the reasons for birth before arrival, this limited the depth of understanding of the reasons for BBA. A qualitative study may be more suited to explore the reasons for birth before arrival especially among the small number of participants who planned to have out of facility births.
- Due to the small number of participants who planned to have out of facility births, sub-analyses of the data was impossible. This group of participants can only be described.
- The study relied on self-reporting by the participants in the completion of questionnaires. This may have led to recall bias a potential limitation of the study.
- The delayed outcome and/or complications among the babies born before arrival was not studied. This was not part of the study objectives, outcomes after discharge of the babies may influence the participants' delivery intentions in the future.
- Only mothers of BBA who presented at the hospital were included in the study. Non-inclusion of mothers who did not present at the hospital and the exclusion of mothers of BBA who are less than 18years may limit the generalizability of this study.

CHAPTER 6

6.1 CONCLUSION

This study found that BBAs occurred in a minority of deliveries at Dr Yusuf District Hospital and this was mostly an unintended end-point of pregnancy. EMS delays and transport challenges contributed substantially to this unintended outcome. The independent associations between BBA and a history of BBA and suboptimal ANC visits, suggest that the explanatory pathway of both behaviours may be related to negative perceptions and or poor pat experiences of perinatal care.

6.2 RECOMMENDATIONS

1. The researcher suggests that programmes to improve the ANC uptake be implemented. In addition, ANC visits should be used as avenue to emphasise the benefits of hospital delivery to the mother and baby.

2. The emergency medical services (EMS) be strengthened to improve their coverage and shorten response rate.

3. Further studies preferably qualitative needs to be conducted to explore reasons for BBA especially among those that plan out of facility deliveries.

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ANNEXURE 1: QUESTIONNAIRE

Factors associated with birth before arrival (BBA) at Dr Yusuf Dadoo Hospital, Krugersdorp, Gauteng province.

A. Personal Information

1. Code number:

2. Age: _____

3. Nationality: _____

4. Highest level of education: (tick the appropriate option)

No schooling	
Grade 1-4	
Grade 5-8	
Grade 9-12	
Diploma/university	

5. Employment status: (tick the appropriate option)

Unemployed	
Employed	
Student	

6. Marital status: (tick the appropriate option)

Single	
Married/spousal relationship	
Divorced	
Widow	

7. Where do you live? _____

Do you have electricity Y/N water Y/N ?

8. Who is the head of your household?	1. Self 2. Husband/partner 3. Father

	4. Mother 5. Grandmother 6. Grandfather 7. Other (specify)_____

B. Pregnancy history

9. How many pregnancies have you had? _____

10. How many baby deliveries have you had? _____

11. Where did you have these deliveries?

Year of delivery	Place of delivery

Details of pregnancy

12	Did you attend antenatal care (ANC) during your present pregnancy?	Yes/No
13	If yes to question 12, Where did you attend antenatal care (ANC) during your present pregnancy?	A. Local clinic B. GP C. DYD Hospital or other hospital D. Others, specify _____

14	How many times did you attend antenatal care (ANC) during your present pregnancy? (SA guidelines 4 visits in uncomplicated pregnancy)	A. Nil B. 1 C. 2-3 D. 4 E. > 4
15	If you attended ANC were you told where to go when in labour?	Yes/No
16	Did you experience any complication/problem during your present pregnancy?	Yes/No If Yes, specify_____ _____ _____
17	Did your baby arrive early, on time or late?	
18	Who took the decision on where to go when in labour?	A. Self B. Husband/partner C. Father D. Mother E. Grandmother F. Grandfather G. Other (specify)_____
19	Where was the delivery of your child/children?	A. At my home B. At the home of my relative C. In the ambulance D. Other, specify_____
20	Who helped you at the time of your last delivery?	A. Health worker B. Traditional midwife/attendant C. Relative (mother/aunt/sister) D. Neighbour E. Friend F. She does not know/she does not remember G. Other (specify)_____
21	How is the baby doing?	A. Well B. Admitted to Paediatric ward C. Passed away

22	Did you always intend to give birth outside the hospital?	Yes/No
23	If yes to question 22, what was the reason for this decision?	A. Unpleasant experience with health facility B. Bad attitude of health care worker C. High cost of maternity service D. There is no benefit in hospital delivery E. Religious/cultural reasons F. I did not get permission to go to the hospital G. Others(specify)_____ _____
24	If no to question 22, which of the following apply to you?	A. No transport to the hospital B. Distance of home to hospital C. No access to phone to contact EMS D. Delay in response by EMS E. I was not aware that I was in labour F. Labour went too fast G. Others(specify)_____

ANNEXURE 2: PATIENT INFORMATION SHEET

Title of Study: Factors associated with birth before arrival (BBA) at Dr Yusuf Dadoo Hospital, Krugersdorp, Gauteng province.

Good day,

Introduction: I am Dr Oluwafolajimi Olusesi Fadahun, a fourth year registrar in Department of Family Medicine at the University of the Witwatersrand and allocated at West Rand District. Research is just the process to learn the answer to a question. In this study, the researcher wants to know the reasons for mothers giving birth before arrival at a health facility. This study is a fulfilment of the requirement for the Master of Medicine in Family Medicine.

Invitation to participate: I invite you to participate in the study aimed at determining the factors associated with babies being born before arrival a health facility. The study is on **"Factors associated with birth before arrival (BBA) at Dr Yusuf Dadoo Hospital, Krugersdorp, Gauteng province".**

What is involved in the study: It entails completing questionnaire that requires you filling out personal information as well as answering questions about your pregnancy and delivery. Where translation of the questions is necessary, assistance will be sought from one of the hospital translators. The questionnaire will take about 20 minutes to complete.

Risks: There is no risk in participating in this study.

Benefits: The study might help us to understand factors associated with BBA and thus come up with some recommendations to pregnant women in future.

Alternative procedures: There is no alternative procedure in this study.

Participation is voluntary and you may withdraw from this study at any time without any effect on your treatment.

Confidentiality: The findings and recommendations of the study will be reported to the authorities of the hospital and the Department of the Health in order to help more women deliver in the hospital. Also, it may be published in peer-reviewed journal for academic purpose. In both cases, confidentiality of your personal details will be strictly observed and protected and the information presented will not identify you. Confidentiality will be maintained by coding and locking up all information gathered during the administration of questionnaire. The completed questionnaires will be accessible to the researcher and supervisors only.

Contact details of researcher: Should you wish to contact the researcher at any stage regarding any information, contact please contact Dr O. O. Fadahun at hospital number 011-951 6000 cell number 0791031844.

Contact details of HREC administrator: In the event of complaints/problems related to the study, please contact The Chairman, Wits Human research Ethics Committee 011-717 2552.

Thank you for taking the time to read this information document.

Yours sincerely,

Dr. O. O. Fadahun

ANNEXURE 3: CONSENT FORM

Dr Yusuf Dadoo Hospital, Krugersdorp

Consent form: Use of Clinical Information

This document must be explained to the patient/family member/guardians by a member of the clinical staff and copy of the signed document is to be given to the patient.

Dear Patient,

You are currently attending Dr Yusuf Dadoo Hospital, Krugersdorp to seek health care service. This hospital not only renders health care services but is also actively involved in conducting research aimed at improving the quality of care we deliver. From time to time, such research involves the use of patient information for research purposes. The use of such information is subject to:

1. Approval from the committee for research on human subjects (University of Witwatersrand).
2. Anonymity i.e. the identity of the patient from whose file information is extracted is never revealed to anyone but the researcher unless specific consent is obtained to do so. The information gathered does not contain the name of the patient but only a coded number so as to maintain anonymity.

The researcher would like to obtain your consent to use information that you will provide by answering questions for the purpose of this project, **"Factors associated with Birth Before Arrival (BBA) at Dr Yusuf Dadoo Hospital, Krugersdorp, Gauteng province"** subject to the aforementioned conditions.

Human Research Ethics Committee (HREC) protocol approval number M170408

I hereby confirm that I have been informed about the above research.

I have understood the nature, the benefits and risk related to this research as explained to me by the study doctor and as stated in the above information.

I am aware that the result of this research, including personal details regarding my age, sex and other medical conditions, will be dealt with in an anonymous way in this research.

If required, I agree that the data collected during this study can be processed in a computerized system by the study doctor.

All my concerns and questions have been fully addressed by the study doctor.

If I choose not to give consent, this will not compromise my treatment in any way. At any time I can choose to withdraw the consent and I am free to do so and will not be prejudiced in any way.

I---------- hereby give/do not give consent for my information to be used as per the abovementioned conditions for the purposes of the research.

Patient---------- Witness----------

Date---------- Date:----------

Should you wish to contact the researcher at any stage regarding this consent, contact Dr Yusuf Dadoo Hospital at 011 951 6000.

ANNEXURE 4: LETTER OF PERMISSION TO CONDUCT RESEARCH

Department of Health

OFFICE OF THE CHIEF EXECUTIVE OFFICER
DR. YUSUF DADOO HOSPITAL

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

ENQUIRIES : P.M. Sofohlo
TELEPHONE : (011) 951-6161
FAX : (011) 953-5952
REF NO : 1/7/2/1
E mail: : SofohloP@gpg.gov.za

Date : 20.01.2017

Attention Dr. Oluwafolajimi Fadahun

Family Medicine
West Rand District

RE: PERMISSION TO CONDUCT RESEARCH AT DR. YUSUF DADOO HOSPITAL

RESEARCH TITLE: FACTORS ASSOCIATED WITH BIRTH BEFORE ARRIVAL (BBA) AT DR. YUSUF DADOO HOSPITAL, KRUGERSDORP, WEST RAND, GAUTENG PROVINCE

Permission is hereby given to you Dr. Oluwafolajimi Fadahun to conduct research on the above mentioned topic at Dr. Yusuf Dadoo Hospital.

You are therefore expected to adhere and comply with the Ethics of research as stipulated in the research policy.

Regards

P.M. Sofohlo
CEO (Dr. Yusuf Dadoo Hospital)
Date: 20/01/2017.

DR. YUSUF DADOO HOSPITAL PRIVATE BAG X2006 KRUGERSDORP 1740 2017 -01- 20 CHIEF EXECUTIVE OFFICER

ANNEXURE 5: HUMAN RESEARCH ETHICS COMMITTEE CEARANCE CERTICATE

R14/49 Dr Oluwafolajimi Fadahun

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M170408

NAME: (Principal Investigator)	Dr Oluwafolajimi Fadahun
DEPARTMENT:	Family Medicine Dr Yusuf Dadoo Hospital, Krugersdorp
PROJECT TITLE:	Factors Associated with Birth Before Arrival (BBA) at Dr Yusuf Dadoo Hospital, Krugersdorp, West Rand, Gauteng Province
DATE CONSIDERED:	05/05/2017
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Richard Cooke
APPROVED BY:	Professor P. Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	14/06/2017

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004,10th floor, Senate House/3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially review March and will therefore be due in the month of March each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES