Knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who have received a caesarean section

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Declaration

I, Carien Möller, declare that this research report is my own work. It is being submitted for the degree of Master of Medicine in the branch of Anaesthesiology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signature:.....

On the..... day of ....., 20.....

Signed at:.....

Abstract

Very little is known about the knowledge that South African women have concerning labour and anaesthesia, particularly spinal anaesthesia for caesarean section, and also which sources they can access to obtain this information.

The aim of this study was to describe the knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who had received a caesarean section at Chris Hani Baragwanath Academic Hospital (CHBAH).

The research design was a prospective, contextual, cross-sectional descriptive study. A self-administered questionnaire was developed and consisted of three categories: demographic data and antenatal care attendance, sources of knowledge and an assessment of the level of knowledge. A convenience sampling method was used to enrol 86 primiparous women over a 13 month period.

Women's scores for level of knowledge ranged from 3 (20%) to 13 (86.67%) out of 15. The mean score out of 15 was 7.84 (SD 2.12) which is 53%. When asked to choose a source of knowledge of spinal anaesthesia before admission to hospital, most women selected no information, 25 (29.07%), midwives, 13 (15.12%), and family and friends, 11 (12.79%). After admission to hospital, the anaesthetist, 29 (33.72%), the midwife, 18 (20.93%), and no information, 10 (11.63%) were the most commonly selected options. Neither age ($p = 0.45$), level of education ($p = 0.84$), sources of knowledge (before admission to hospital $p = 0.84$, and after admission to hospital $p = 0.38$), number of antenatal visits ($p = 0.5$) or urgency of the operation ($p = 0.46$) were found to have any statistically significant effect on the level of knowledge.

From this study it can be concluded that primiparous women have a limited knowledge of spinal anaesthesia when presenting for caesarean section. Women often rely on "non-medical" sources of information, but midwives and anaesthetists are still common sources of information. Medical professionals are therefore ideally placed to improve women's knowledge of spinal anaesthesia.

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Chapter One: Overview

1.1 Introduction

This chapter gives an overview of the study and includes the background, problem statement, aims and objectives, research assumptions, research methodology, data collection, significance of the study, an outline of the research report and a summary of the chapter.

1.2 Background

According to the Patients' Rights Charter (1), all patients have a basic human right to informed consent. Informed consent is "to be given full and accurate information about the nature of one's illnesses, diagnostic procedures, the proposed treatment and risks associated therewith and the costs involved." This is particularly important for the anaesthetist, who must obtain informed consent for every anaesthetic procedure to be performed (2).

Patients are empowered to give informed consent by the provision of information in an unhurried, relaxed setting. The anaesthetic consultation is an ideal setting to do this, and should ideally occur a few days prior to surgery. However, a thorough consultation of adequate coverage is not always possible. (2)

Obtaining informed consent for anaesthesia from women in labour can be particularly difficult (3). A woman in labour may require the insertion of an epidural for analgesia, or a spinal or general anaesthetic for an emergency caesarean section. Pain, the use of opioid analgesics, anxiety and exhaustion can impair the informed consent process (3). A consultation with an anaesthetist before the onset of labour may improve the anaesthesia experience for women and decrease anxiety by providing them with important information (4).

A study by Swan et al. (5) on 40 primiparous women in Australia, found that those who had attended antenatal classes had a better recall of the risks of epidural anaesthesia, compared to those who had not attended classes. Informed consent for spinal anaesthesia in emergency caesarean sections has many similarities with that for the insertion of an epidural, as both can be a sudden, unforeseen event occurring when the woman is in labour (6). It can thus be assumed that a similar improvement in the level of knowledge of spinal anaesthesia would be seen if women were educated during the antenatal period.

White et al. (3), however, noted that patients frequently failed to attend antenatal classes and preferred to rely on other sources of knowledge, such as family and friends. Studies by Raynes-Greenow et al. (7) and Paech et al. (8) in Australia, and Harkins et al. (9) in the United States of America (USA) examined which sources of information of anaesthesia women utilised during their pregnancy. All of these studies found that women often accessed multiple and varied sources to prepare themselves for labour anaesthesia. The preferred sources included family and friends, the obstetrician and the midwife. A surprisingly small number of women used books, magazines or the internet to gain further knowledge. Several studies from Australia (8, 10, 11) found that local women also viewed the anaesthetist as an important and reliable source of information.

Very little is known about the knowledge that South African women have concerning labour and anaesthesia, and which sources they access to obtain this information. Research published by Chalmers (12) in 1990 highlighted the fact that an important shift is occurring amongst the South African population: from the traditional beliefs concerning health and illness, to the now widely accepted Western ideas. The author was concerned that this transition from the use of a traditional education on childbirth to the use of a Western healthcare system would be associated with a consequent loss of sufficient preparation for the experience of childbirth.

Traditionally, women received information about labour from female elders. Although this information may have been incorrect, the experience of childbirth usually matched what was taught in this antenatal education. (12)

Some South African women now rely upon Western health care for their pregnancy and delivery. Although they receive better physical care, their emotional preparedness for labour has decreased. Their knowledge of Western delivery practices is poor, while they have simultaneously rejected their traditional teachings. (12)

The only other study, that could be identified, that assessed the level of South African women's knowledge concerning labour and analgesia since the work by Chalmers (12), was a qualitative study by Ibach et al. (13) amongst 30 Western Cape women attending a public health sector antenatal clinic. The authors showed that these women had a profound lack of knowledge of labour analgesia and received little antenatal education concerning this topic.

1.3 Problem statement

Some South African women are faced with the ideas of two cultures: the traditional beliefs of the African society and the modern discoveries of the West. However, instead of acquiring an additional culture, they appear to have lost their own culture without gaining the Western one. (12)

It is important for the different role players, especially anaesthetists, to evaluate their practice of obtaining informed consent in order to ensure that they comply with the Patients' Rights Charter (1) and that all patients are given full and accurate information. Currently, the level of patients' knowledge of spinal anaesthesia, and from which sources this knowledge is obtained, is not known in primiparous women who have received caesarean sections with spinal anaesthesia at Chris Hani Baragwanath Academic Hospital (CHBAH).

1.4 Aim and objectives

1.4.1 Aim

The aim of this study was to describe the knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who had received a caesarean section at CHBAH.

1.4.2 Objectives

The primary objectives of this study were to:

- describe the knowledge of spinal anaesthesia for caesarean section in primiparous women
- describe the sources of knowledge of spinal anaesthesia for caesarean section in primiparous women
- correlate the age of primiparous women with the knowledge of spinal anaesthesia for caesarean section.

The secondary objectives of this study were to:

- compare the level of education of primiparous women with their knowledge of spinal anaesthesia for caesarean section
- compare the sources of knowledge (medical versus non-medical) of spinal anaesthesia for caesarean section with the knowledge of spinal anaesthesia for caesarean section in primiparous women
- compare the number of antenatal visits with the knowledge of spinal anaesthesia for caesarean section in primiparous women.
- compare the urgency of surgery with the knowledge of spinal anaesthesia for caesarean section in primiparous women.

1.5 Research assumptions

The following definitions were used in this study.

Anaesthetists: referred to any CHBAH doctor who administered an anaesthetic regardless of whether they had any specialised training in anaesthesia. This included interns, medical officers, registrars and specialist anaesthetists.

Primiparous: a patient of 18 years and older who had given birth for the first time.

Knowledge: as it related to spinal anaesthesia in this study, referred to an understanding of the procedural events, the benefits and risks related to this technique.

Sources of knowledge: referred to any form of published or unpublished literature, or any person from which a patient may have obtained knowledge of spinal anaesthesia. In this study, sources of knowledge were classified as follows:

- "medical sources" which included any information obtained from trained health care professionals and was thus considered to be accurate, and
- "non-medical sources" which included information gained from the internet, popular media and any person without formal medical training. This information may have been correct but may also have contained inaccuracies.

Level of education: in this study referred to the highest academic qualification that a patient had completed. The level of education was classified as

- "lower level of education" which included those with no formal education and those who had completed primary school and high school, and
- "higher level of education" which included those who had completed a tertiary education.

Urgency of surgery: refers to the timing of the decision to do a caesarean section for a patient. An elective surgery refers to a decision made before the patient presented in labour and an emergency surgery refers to a decision that was made during labour.

1.6 Research methodology

1.6.1 Study design

This was a prospective, contextual, cross-sectional, descriptive study.

1.6.2 Study population

The study population were primiparous women who received a spinal anaesthetic for caesarean section.

1.6.3 Study sample

Sample Size

The sample size of 86 was calculated in consultation with a biostatistician and using nQuery Advisor® 7.0 software.

Sampling method

A convenience sampling method was used.

Inclusion and exclusion criteria

Inclusion criteria:

- primiparous women aged 18 years and older
- who received spinal anaesthesia for caesarean section
- who could adequately communicate in English.

Exclusion criteria:

- women who were in pain or who had just received analgesia
- women who received a sedative during their caesarean section
- women admitted to high care and intensive care units post caesarean section
- women who received a spinal anaesthetic but were converted to a general anaesthetic
- women who received an epidural anaesthetic during labour, but were given a spinal anaesthetic for caesarean section
- women who declined to complete the questionnaire.

1.6.4 Data collection

Development of questionnaire

A questionnaire (Appendix F) was developed following an extensive literature review and validation by three specialist anaesthetists with a special interest in obstetric anaesthesia. The questionnaire consisted of three sections: demographic data and antenatal care attendance, sources of knowledge and an assessment of the level of knowledge.

Data collection process

The data was collected from 1 November 2013 to 28 November 2014. The researcher approached women in the post-caesarean section wards eight or more hours after their surgery was completed. Those women who were interested in participating were provided with an information letter (Appendix E). Completion of the questionnaire provided implied consent. The researcher was available to assist women in understanding the questions and completing the questionnaire if necessary.

1.6.5 Data analysis

Data analysis was done in consultation with a biostatistician and using STATISTICA 12 (Statsoft®, USA) software.

1.7 Significance of the study

Some South African women are transitioning from a traditional view of childbirth to a more Western one. This could result in a considerable lack of knowledge, as a result of traditional teachings being rejected and because Western knowledge is difficult to access. (12)

The work by Ibach et al. (13) was the only other study, that could be identified, that assessed the level of South African women's knowledge concerning labour and analgesia since the work by Chalmers (12). Ibach et al. (13) suggested that since some South African women are generally less educated and have limited access to sources of information, antenatal education should be of great importance. The anaesthetist has an important part to play in providing patients with information in this type of setting (2).

According to Brink (14), "a research study should have the potential to contribute to health sciences knowledge in a meaningful way." The results of this study may identify whether a lack of knowledge does truly exist, and if so, which areas of knowledge are lacking. It will also identify which sources of information women access and may assist in improving the reliability of the information provided by these sources.

1.8 Outline of study

Chapter One: Overview of study
Chapter Two: Literature review
Chapter Three: Research methodology
Chapter Four: Results and discussion
Chapter Five: Summary, limitations, recommendations and conclusion

1.9 Summary

This chapter discussed the background of the study, problem statement, aims and objectives, research assumptions, demarcation of the study, ethical considerations, research methodology, data collection, significance of the study, and validity and reliability of this study.

In Chapter 2, a review of relevant literature will be discussed.

Chapter Two: Literature review

2.1 Introduction

This literature review begins by examining patients' rights and how these rights influence the practice of obtaining informed consent for caesarean section.

It briefly examines caesarean section rates and the types of anaesthesia that can be administered to women having caesarean sections. Spinal anaesthesia is then discussed in more detail and its physiological effects and possible complications are considered.

The literature review then looks at women's knowledge of neuraxial anaesthesia, as well as the sources of knowledge that women access to gain information. It also discusses the amount of information women wish to be provided with prior to giving informed consent for neuraxial anaesthesia, and how much information is actually disclosed by anaesthetists.

Next, the literature review examines whether labouring women, who are experiencing high levels of pain and anxiety, can actually understand information on risks and thus give informed consent for neuraxial anaesthesia.

The literature review explores the role of antenatal education and how this may be influenced by women's attitudes to pregnancy and labour. It then discusses the mediums that can be used to improve the delivery of information, as well as the ideal time to provide such information to women.

Lastly, the literature review looks at South African childbirth knowledge and how the transition from traditional to Western practices has changed the childbirth experience for some women. It also examines what is known concerning South African women's knowledge of labour and anaesthesia.

2.2 Patients' rights and informed consent for caesarean section

During the Apartheid era the majority of South Africans were denied their fundamental human right to health care services (15). In 1999 the South African Department of Health developed a National Patients' Rights Charter (1) in order to uphold and protect this right. The Health Professions Council of South Africa has adopted these rights as principles of good practice to which all health care professionals are expected to adhere (15).

The South African Patients' Rights Charter (1) stresses the fact that everyone has a right to information and a right to receive such information in a manner that they can understand. It states that all people have "a right to be given full and accurate information about the nature of one's illnesses, diagnostic procedures, the proposed treatment and risks associated therewith and the costs involved." Every person "has the right to participate in decision-making on matters affecting one's own health."

It remains the anaesthetist's responsibility to obtain informed consent for any anaesthetic procedure, prior to surgery. The ideal time for an anaesthetist to obtain informed consent is a few days before the surgery, as this creates a stress-free setting for imparting information and thorough discussion. (2)

In obstetric patients, spinal anaesthesia for caesarean section is commonly administered to women who have not had the opportunity to consult with an anaesthetist prior to the onset of labour. These women may be experiencing high levels of pain and anxiety, and this could result in them not enjoying all of the advantages of an anaesthetic consultation. (4) However, several studies (11, 16-18) have disproved the assumption that labouring women cannot give informed consent.

Despite the presence of these stressors and the time constraints related to emergency surgery, all women have the right to be informed about benefits and risks associated with anaesthesia for caesarean section.

2.3 Anaesthesia for caesarean section

The number of caesarean section deliveries continues to rise globally (19, 20). In the United Kingdom (UK), the number of caesarean sections has risen from 3.4% in 1964 – 1966 to 21% in 2000 – 2002 (19). The Saving Mothers 2008 – 2010: Fifth Comprehensive Report on the Confidential Enquiry into Maternal Deaths (CEMD) in South Africa report showed that the number of caesarean sections in the public health sector has increased from sum 85 000 in 2001 to sum 200 000 in 2010 (20). The caesarean section rate was estimated to be 15% (20). This rise is possibly due to improved intra-partum monitoring, an increased number of older and obese parturients and a lower threshold for surgery in view of the current medico-legal climate (21, 22). The Saving Mothers 2011 – 2013: Sixth Comprehensive Report on the CEMD in South Africa had not been published at the time of completion of this study and although the Tenth interim report on the CEMD in South Africa (23) was available, it did not contain updates on the above information.

Sixty years ago in the UK anaesthesia during labour was an important direct cause of maternal deaths. The CEMD in the UK reports that anaesthesia for caesarean section is now 30 times safer than in the 1960s, with direct deaths due to anaesthesia for caesarean sections decreasing from 32 in 1964 – 1966 to only 7 in 2006 – 2008. (24)

According to the Saving Mothers 2008 – 2010 report (20) anaesthetic-related deaths accounted for 2.5% of the total underlying causes of maternal death in 2008 – 2010. This percentage has remained relatively stable over the years, with 2.8% being recorded in 2002 – 2004 and 2.7% in 2006 – 2008 (20). The Tenth interim report of the CEMD in South Africa (23) reported that the institutional maternal mortality rate per 1 000 000 live births for anaesthetic complications was 4.38 in 2008 – 2010, 3.39 in 2011 and 3.29 in 2012.

The Saving Mothers 2008 – 2010 report (20) showed that there had been a steady increase in the number of anaesthetic deaths in South Africa with 91 recorded in the 2000 – 2002 period, 107 in 2004 – 2006 and 121 in 2008 – 2010. However, this was possibly as a result of improved reporting of maternal deaths and also the increasing number of caesarean sections performed.

The number of anaesthetic deaths is related to the choice of anaesthetic technique (19, 20). When deciding on the anaesthetic technique for a caesarean section, the anaesthetist must consider the patient's physiological status, the indications for the operation, how urgent the operation is, and the mother's and obstetrician's wishes. Anaesthesia for caesarean section includes general and neuraxial techniques (25, 26).

2.3.1 General anaesthesia

Prior to the 1960s, the majority of caesarean sections and instrumental deliveries were done under general anaesthesia (GA) and this was a major primary cause of maternal death. The most important reasons for the deaths were failure to manage the airway and also the aspiration of acidic gastric contents. (19)

Despite the significant decrease in maternal deaths due to anaesthesia since the 1960s, the CEMD in the UK reports that GA for caesarean section remains a major direct cause of maternal death (24). In South Africa, failed intubation accounted for 50 % of GA related maternal deaths in 2008 – 2010 (20). The use of neuraxial anaesthesia as a safe alternative has increased over the past 60 years (19).

2.3.2 Neuraxial anaesthesia

Neuraxial anaesthesia refers to spinal and epidural blocks. The principal site of action for neuraxial blockade is the nerve root. A local anaesthetic is injected into the cerebrospinal fluid (CSF) in the subarachnoid space for a spinal anaesthetic, and into the epidural space for an epidural anaesthetic. The injected local anaesthetic then bathes the nerve roots and results in autonomic, sensory and motor blockade depending on the dose and volume of the local anaesthetic injected. While spinal anaesthesia requires only a small volume of local anaesthetic, epidurals require large volumes to achieve the same effects. (25, 26)

Since spinal anaesthesia is the focus of this study, it will be discussed in more detail. Spinal anaesthesia is defined as “loss of sensation produced by [the] injection of local anesthetic solution(s) into the spinal subarachnoid space.” (27) The advantages of this technique are the avoidance of airway manipulation and possible aspiration, the use of smaller volumes of drugs that may pass from the mother to the foetus and the ability of mothers to be awake for their caesarean sections (25, 26). Single-shot spinal anaesthesia for healthy patients is the preferred method of anaesthesia in resource poor settings and can also be safely administered for emergency caesarean sections (28). The Royal College for Anaesthetists recommends that over 95% of elective and 85% of emergency caesarean sections should be performed under neuraxial anaesthesia (29).

2.3.3 Important physiological effects of spinal anaesthesia

The physiological responses of spinal anaesthesia result from the autonomic blockade at the spinal nerve roots. This results in a decreased sympathetic nervous system output with an unopposed parasympathetic nervous system output. (25, 26) Women receiving spinal anaesthesia should be made aware of the following important physiological effects.

Cardiovascular effects

The sympathectomy produced by the local anaesthetic blockade results in a decrease in heart rate and contractility, and a fall in the arterial blood pressure (BP). The decrease in BP results from vasodilatation of venous capacitance vessels, pooling of blood in the periphery and a decreased venous return to the heart. (25, 26) The normal physiological responses that would correct these effects are also impaired by spinal anaesthesia (30).

Gastrointestinal effects

Spinal anaesthesia usually causes unopposed parasympathetic activity in the gut and results in gastrointestinal hyperperistalsis. This produces nausea and vomiting in up to 20% of patients receiving spinal anaesthesia. (25)

Urinary tract effects

Spinal anaesthesia blocks both sympathetic and parasympathetic bladder control. This results in urinary retention until the anaesthesia has worn off (26).

2.3.4 Complications of spinal anaesthesia

Women should be made aware of the possible complications of spinal anaesthesia. The complications of spinal anaesthesia can occur at the time of administration, shortly after the administration or postoperatively (31).

Complications at the time of administration

The anaesthetist may fail to locate the correct lumbar space for the injection of local anaesthetic or the block may be found to provide inadequate analgesia for surgery (31). The failure rate for spinal anaesthesia in the UK is 2.9% (32).

The spinal needle may be inserted too high and puncture the spinal cord. This can result in permanent nerve damage. (31) Loo et al. (33) reported a 1:13 000 incidence of this serious complication.

There is a 1:10 000 risk that the local anaesthetic can be accidently injected into the systemic circulation (34). This may result in tonic-clonic seizures and severe cardiotoxic effects such as hypotension, atrioventricular heart block and arrhythmias (26).

Complications shortly after the administration

The rapid block of sympathetic outflow to the vasculature, as described above, is usually compounded by the aortocaval compression caused by the gravid uterus, causing a severe hypotension. Clinical signs of a marked fall in blood pressure include nausea and vomiting and a sudden decrease in the level of consciousness. (30) In the rare event of the acute under-filling of the left ventricle, this will lead to vagus nerve mediated hypotension and bradycardia (the Bezold-Jarisch reflex). If not promptly treated, this can result in a cardiac arrest. (31)

A high motor block or total spinal block results from a rapid cephalad spread of sensory blockade and paralysis with associated hypotension, respiratory distress and loss of consciousness (31). If the motor blockade extends above the level of the sixth cervical vertebra, diaphragmatic weakness and respiratory arrest may occur (30). The incidence of high spinals is 1:3000 procedures (35).

Complications occurring postoperatively

Post dural puncture headaches (PDPHs) are an important complication of spinal anaesthesia. The pathophysiology of PDPH is a loss of CSF after a needle has punctured the dural layer, which may result in intracranial hypotension (31). A study by Lambert et al. (36) in the USA revealed an incidence of between 1.2% and 5.2% depending on the needle gauge used.

Trauma to the epidural veins during the administration of spinal anaesthesia can often cause a small, self-limiting bleed (26). However, spinal haematomas can occur in the presence of bleeding disorders and low platelet counts (31). By avoiding spinal anaesthesia in these patients, the incidence is low, with only 1:220 000 being reported (26).

Infective complications such as meningitis and epidural abscesses are rare as a result of the use of strict aseptic techniques (31). The incidence of meningitis after neuraxial anaesthesia is reported to be 1:100 000 (33).

Low back and pelvic pain is a common occurrence during pregnancy as well as the postpartum period. The aetiology of this condition is poorly understood and several clinicians were concerned that this may be another complication of spinal anaesthesia. However, research has shown no correlation between spinal or epidural anaesthesia and low back and pelvic pain. (37-39)

2.4 Antenatal information regarding neuraxial anaesthesia

When obtaining informed consent for spinal anaesthesia from a woman in labour, the anaesthetist must find a way to explain the above complications and their incidences in a way that the woman can understand.

Several studies (3, 5, 6, 8-11, 18, 40, 41) found in the literature investigated knowledge of labour analgesia and obtaining consent for epidural anaesthesia. Informed consent for spinal anaesthesia in emergency caesarean sections has many similarities with that for the insertion of an epidural, as both can be sudden, unforeseen events occurring when the woman is in labour (6). Therefore it is possible to extrapolate much of the information gained from studies of the knowledge of epidurals to patients receiving spinal anaesthesia.

Several of these studies (3, 5, 11, 40) concentrated on providing women with knowledge and then testing that knowledge in the postpartum period. Only a few studies (7, 13, 42) concerning women's baseline knowledge of neuraxial anaesthesia could be identified.

2.4.1 Prior knowledge of neuraxial anaesthesia

A study by Raynes-Greenow et al. (42) in 2010 tested Australian women's level of knowledge with 16 "true" or "false" questions to examine their general knowledge of labour analgesia prior to providing them with either a standard information pamphlet or an additional labour analgesia decision aid. Prior to the intervention the two groups in their study achieved a mean score of 53.4% (SD of 21) and 54.3% (SD of 20) respectively. When the authors tested patients' knowledge scores after the

intervention, those in the study group scored 65% in comparison to those in the control group who scored 56%.

In an earlier study in 2007, Raynes-Greenow et al. (7) conducted interviews with 25 primiparous Australian women to describe their level of knowledge of labour analgesia. Rather than formally testing the level of knowledge, they asked women to describe how knowledgeable they perceived themselves to be. All but one women felt that they were very knowledgeable about all options available to them for labour analgesia. However, when questioned more closely, known risks were often based on the experiences of family and friends or incorrectly attributed to the wrong form of analgesia.

Raynes-Greenow et al. (7) proposed that women may not have been concerned with remembering the specific risks of the various methods of analgesia, but rather whether they had a positive or negative feeling toward a specific option. The authors were concerned that the gap that evidently exists between perceived and actual knowledge may impair the informed consent process.

2.4.2 Sources of information of neuraxial anaesthesia

A number of studies (7-9) found that the sources of information utilised by women were often multiple and varied. Harkins et al. (9) postulated that this was possibly due to a lack of a formal system to disseminate information on labour analgesia at the institution where their study was done. Raynes-Greenow et al. (7) proposed that accessing multiple sources contributed to women feeling more knowledgeable and well prepared for labour.

Several of these sources were identified in the study by Harkins et al. (9). They investigated the information sources accessed by women in the USA in choosing an epidural for delivery. Women reported that they were most reliant on their obstetrician for information regarding labour analgesia. The most important sources of information that women accessed were the obstetrician (34%), family and friends (21%), previous experience (18%), childbirth classes (12%) and books (8%). The authors found it surprising that only 1% of the women reported using the internet as

a source. They suggested that it may become a more commonly accessed source in the future.

Although similar sources of information are reported in other studies (7, 8, 10, 11), the percentages of women accessing each source appear to vary from country to country. Bethune et al. (10) compared women's knowledge and their desire for knowledge of the complications of neuraxial anaesthesia in the UK and Australia. The researchers recruited 100 women from each country to participate in the study. For both the UK group and the Australian group midwives (sum 85 and sum 92 respectively) and family and friends (sum 74 and sum 85 respectively) were the most important sources of information. For sum 79 of the UK women, the media (which included information leaflets) was also an important source of knowledge, while more women in Australia (sum 55) compared to the UK (sum 13) reported receiving information from their obstetrician and the anaesthetist.

The obstetrician and anaesthetist as important sources of information amongst Australian women were confirmed in another study by Cheng et al. (11) which explored women's recall of the risks of neuraxial anaesthesia after their surgery. They were asked where they obtained the information and to rate the most reliable source of this information. Although the authors did not provide the exact numbers, the majority of women in their study reported that the anaesthetist was the main source of information regarding the risks of this procedure. Family and friends and midwives also played an important role. The anaesthetist was seen as the most reliable source of information.

These results were similar to a Canadian study by Pattee et al. (18). Sixty women who had received an epidural for normal vaginal delivery were asked from where they had received the most useful information regarding this procedure. The anaesthetist (40%) and antenatal classes (38%) were considered the most useful sources. The other sources included the obstetrician (10%), the family doctor (5%) and reading material (5%).

Although the exact figures were not provided, Stewart et al. (40) found that midwives, rather than anaesthetists or obstetricians, were the medical professionals with the greatest influence on women's choice of labour analgesia in the antenatal period. The authors proposed that this could be because, in their setting, otherwise

healthy patients will not meet with other health care professionals in the antenatal period.

In the Australian study by Raynes-Greenow et al. (7) in 2007, however, the most common source of information of labour analgesia was anecdotal knowledge gained from family and friends, despite the fact that 23 out of the 25 women had attended some form of antenatal classes. Although most women used several sources of information to prepare for labour, they did regard some of these sources as being more reliable than others. Since family and friends were considered trustworthy and honest, any anecdotal information gained from this source was viewed in a similar light. Magazines, on the other hand, were considered to be an unreliable source of information.

In a study by Paech et al. (8) amongst 316 Australian women who had received epidural anaesthesia, friends and family accounted for 52% of the named sources of information, while anaesthetists only accounted for 24%. The authors found most women used multiple sources of information regarding epidurals prior to labour, although 5% reported having received no antenatal information regarding this procedure. In this study women with a tertiary education were more likely to have obtained their information form antenatal classes (65% versus 43%, $p < 0.001$) and hospital-generated resources (56% versus 40%, $p < 0.006$). In contrast, the study by Cheng et al. (11) showed that sources of information were not influenced by the maternal level of education, ethnicity, the urgency of the surgery, gestation, parity, or prior experience of neuraxial anaesthesia.

2.4.3 The amount of information women want to know prior to neuraxial anaesthesia

Jackson et al. (41) investigated what 60 Canadian women in active labour wanted to be told about epidural anaesthesia before consenting and also whether they felt that they were able to understand the risks of epidural anaesthesia while in labour. Every woman in this study wanted to be told about all the potential complications of epidurals. Although 48 (80%) of patients reported being aware of the existence of risks, this knowledge did not seem to reduce patients' desire for an epidural (8.4 on a

scale of 0 to 10 for desire to have an epidural). Although the exact figures were not provided, for the women in this study the most important complications were seizure, death, paralysis and effects on the baby. Of least importance were headache, confinement to bed and prolongation of labour. Half of the women (52%) did not feel that it was necessary to disclose the incidence of risks, although 21% wanted to know of risks greater than 1:10.

The study by Bethune et al. (10) investigated the "level of risk" at which women who had received an epidural wanted to be informed about the complications of epidural anaesthesia. They found that the desired level of risk their subjects wanted ranged from 1:1 to 1:1 000 000 000. Most of the women chose levels of risks between 1:1000 and 1:100 000. Some women, although they were the minority, wanted to be informed about every possible complication, irrespective of its incidence.

Kelly et al. (43) distributed questionnaires to 100 British obstetric patients who had received spinal or epidural anaesthesia during their labour. The questionnaire briefly explained 10 possible complications of spinal and epidural anaesthesia. Women were asked to rate whether they would have liked to know the information on each complication before the procedure. Of the women, 82 – 94% wanted to be informed of less severe but common risks, and 70 – 77% wanted to be informed of severe but rare risks. Women's desire to be told about these risks was not influenced by the type of anaesthesia, ethnicity, age, parity, the urgency of the procedure or previous experience.

The study by Pattee et al. (18) amongst 60 Canadian women attempted to describe which risks patients wanted clear information on. Women completed surveys after having received epidurals for normal vaginal deliveries. Questions were scored on a scale from 0 to 10. The women participating in this study wanted all risks disclosed to them before consenting, but rated the most severe risks as the most important. Convulsions (9.3/10), death or paralysis (9.4/10) and effects on the baby (9.4/10) were the most highly rated complications that women wanted clear information on. All women wanted the informed consent process to be done before the onset of labour.

2.4.4 The amount of information disclosed by anaesthetists prior to neuraxial anaesthesia

The information that women desire prior to neuraxial anaesthesia unfortunately is not always the information that the anaesthetist will choose to discuss with them.

An Australian study by Black et al. (23) in 2006 investigated which risks anaesthetists discussed most frequently with their patients prior to neuraxial anaesthesia. The commonly discussed risks were similar for both the antenatal setting and prior to an emergency neuraxial anaesthesia. However, a larger percentage of anaesthetists reported discussing risks with their patients in the antenatal setting, while the percentage of anaesthetists discussing these risks dropped in an emergency setting. These risks were listed with the percentages of anaesthetists discussing each risk in the antenatal setting and emergency setting. The five most commonly discussed risks were:

- post dural puncture headache (96.1% and 86.2%),
- block failure (93.3% and 78.3%),
- permanent neurological injury (90.3% and 78.2%),
- temporary leg weakness (79.3% and 68.4%) and
- hypotension (78.3% and 62.8%). (23)

However, in the study by Jackson et al. (41), women stated that the risks they felt were most important were seizure, death, paralysis and effects on the baby.

In 2007 Brull et al. (44) asked Canadian anaesthetists to disclose risks that they most commonly discuss with their patients prior to administering regional anaesthesia. They were also encouraged to indicate the incidences of each complication that they disclosed to their patients. The most commonly disclosed risks in this group were headache (90%), infection (74%) and local pain or discomfort (73%). These risks were also perceived to have the highest incidence. The severe complications such as paralysis (43%), death (32%) and cardiac arrest (18%) were rarely disclosed. When asked why they discussed risks with their patients, 74% of anaesthetists reported that it was to enable the patient to make an informed choice. The remaining 26% cited medico legal reasons as their most important drive to disclose risks.

2.4.5 Imparting knowledge and obtaining informed consent during labour

Imparting information to women in labour can be difficult because of the pain, sleep deprivation and emotional turmoil that many women experience during labour (16).

An American study by Affleck et al. (16) in 1998 questioned the assumption that successfully educating the labouring patient on the risks of epidural anaesthesia was frequently impossible. The 101 labouring women participating in the study received a standardised anaesthetic consultation prior to the insertion of an epidural. The same 13 possible risks concerning epidurals were discussed with all women. Women were also asked to document their level of pain on a visual analogue scale. Within 24 hours after delivery, women were asked to recall as many risks of epidurals as they could and this was correlated with their pain scores.

All patients were able to recall their anaesthetic consultation as well as the insertion of the epidural. The average number of risks that women could recall was 2.0 (SD 1.3). The authors of this study were able to compare their results with similar studies in other patient groups and found that women in labour have similar rates of recall as patients receiving chemotherapy for cancer and also patients receiving ophthalmic and plastic surgery. (16)

The level of pain that women reported ranged from 0 to 100 with a mean of 78 (SD 25). The study found no statistical difference in the recall of risks between women with mild (<30) and moderate (30-70) pain, and those women with severe pain (>70). (16)

The Canadian study by Jackson et al. (41) also assessed whether 60 actively labouring women could understand the risks of epidural anaesthesia and therefore, give informed consent. Recruited women had to select scores on visual analogue scales to rate their pain and their ability to understand information. The average severity of pain was scored as 7.5 out of 10, while the ability to understand was scored as 4.9 out of 10. Women's ability to understand was not found to correlate with labour pain, previous epidural experience, level of education or age. The women in this study also indicated with a score of 8 out of 10 that they would have liked to discuss the risks of epidurals before going into labour.

2.4.6 The role of antenatal education in improving knowledge

Spinal anaesthesia is commonly administered to women who have not had the opportunity to speak with an anaesthetist prior to the onset of labour. These women may be experiencing high levels of pain, anxiety and other distractions. This could result in these patients not enjoying all of the advantages of the preanaesthetic visit. (4) The antenatal period is obviously an important time to give information about options for labour analgesia, as well as educating women on spinal anaesthesia for caesarean section. The obstetric anaesthetist should play a part in making sure that complete and accurate information is available to women in the antenatal period. (3)

A 1994 study by Swan et al. (5) from Australia found that epidural information obtained at antenatal classes significantly improved women's recall of risks associated with the procedure. Women were scored one point for each area of risk that they could recall and given a score out of three. The median score for antenatal class attendees was 2.31 and 0.92 for those with no antenatal education. Amongst their subjects, 33% could not remember any discussion of epidural risks prior to the insertion of the epidural and 69% of these were in the group that did not attend antenatal education. The authors therefore felt that antenatal education could improve the process of obtaining informed consent during labour.

In contrast, in the study by Affleck et al. (16), there was no statistically significant difference in the number of risks of epidurals recalled by women who attended antenatal classes (42% of the 101 women) and those who did not.

White et al. (3) highlighted that some women do not attend antenatal classes despite their availability in several countries, or that they prefer to rely on other sources of information such as family and friends, newspapers and magazines. For these reasons the authors felt that health care professionals could not rely on information given during the antenatal period.

This is a similar finding to the study by Raynes-Greenow et al. (7) in 2007. The authors found that despite the fact that 23 out of the 25 women had attended some form of antenatal classes, the most common source of information of labour analgesia was anecdotal knowledge gained from family and friends. This type of information was also regarded as highly reliable and trustworthy.

Fortescue et al. (6) noted that women often consider the need for an emergency caesarean section as something that will not occur in their pregnancy and therefore do not obtain information about it in the antenatal period.

2.4.7 Perceptions of childbirth education

Although providing antenatal education to women may have certain benefits, the information may not be helpful to all patients. Hallgren et al. (45) did a qualitative study amongst 11 Swedish women in 1995 to assess women's perceptions of childbirth and childbirth education. This population routinely receive antenatal and postnatal classes. Women were interviewed at about the 27th week of pregnancy and invited to attend antenatal classes. At approximately the 36th week of gestation women were again interviewed and a final interview was done one to three weeks postpartum. From these interviews the authors identified four common themes regarding women's perceptions of childbirth and how they were influenced by the experience of childbirth education. The women were then classified into four groups.

The first group of women thought of childbirth as a threatening event to either wholeness of body or person. The four women in this group were generally not motivated to attend childbirth education and felt that augmenting their knowledge would only serve to increase their fear. They generally felt unprepared for all aspects of their labour. (45)

The second group included only one woman, and she perceived labour as a joyful but frightening event. This woman tended to focus on the positive aspects of childbirth while avoiding negative information. Childbirth education was viewed as helpful, although it increased her fear. At the postpartum interview the woman reported that the information gained was of no value to her during labour. (45)

A third group saw childbirth as a normal process and a challenge. In this group of four, women set themselves certain conditions that would make the childbirth process 'normal'. These women actively searched for further knowledge and were highly motivated to attend antenatal classes. Although the classes caused some anxiety, most women rejected information that was incongruent with their views of a

‘normal’ process. When conditions during their labour then diverged from their beliefs, these women felt unprepared. (45)

The last group included two women and they believed that childbirth was a trustworthy life event. These women had realistic expectations of childbirth and did not avoid or stress the importance of preparation. The women reported that they enjoyed the antenatal classes and the fellowship with other women. They felt that the knowledge thus gained, positively influenced their labour experience. (45)

The authors concluded that women received the information in antenatal classes in varied ways and that this education should take the individual’s perceptions of childbirth into consideration. (45)

2.4.8 Mediums for improving the delivery of information of neuraxial anaesthesia

Antenatal education may not be helpful to certain women and giving information during labour, although not impossible, is complicated. Several studies (3, 6, 40, 46, 47) looked at ways in which the delivery of information and recall of this information could be improved.

Straessle et al. (46) attempted to show that written information could improve the knowledge gained and the overall satisfaction with the anaesthetic consultation. In this single-blind randomised control trial amongst patients undergoing elective orthopaedic surgery one group was given an information leaflet prior to their anaesthetic consultation and asked not to share this with the anaesthetist. The control group received no written information. The study showed an increased gain in knowledge as well as patient satisfaction in the group that received the information leaflet. The group that received the leaflet scored 75% in a postoperative questionnaire, while the control group scored 62%.

The authors proposed several reasons for the success of the leaflet. The simple language in which it was written was free of medical jargon and facilitated understanding. The leaflet also served as a trigger for discussion with the

anaesthetist and consequently improved communication. Patients could also keep the leaflet to refer to later or to discuss with their families. (46)

A Canadian study by Cheung et al. (47) highlighted the importance of the use of language in designing written educational materials. They were concerned that illiteracy and poor comprehension skills remain a significant problem, even in a developed country like Canada. They tested the success of a graphically illustrated booklet written at a Grade 6 reading level for improving patients' knowledge of risks of anaesthesia, perioperative instructions and the role of the anaesthetist.

Patients were given 10 "true" or "false" questions to test their knowledge in the postoperative period. Amongst the control group who did not receive the booklet, the level of education of patients significantly influenced their knowledge prior to the anaesthetic consultation (a median score of 5 out of 10). This was not the case in the study group (a median score of 9 out of 10). After the anaesthetic consultation, both groups displayed similar test scores for knowledge mentioned above (median scores of 8 and 9 out of 10 respectively), illustrating that the booklet and anaesthetic consultation had similar levels of efficacy in imparting knowledge. (47)

White et al. (3) measured the level of knowledge in UK women who had received a written information card in addition to the standard verbal information prior to receiving an epidural and a control group that only received verbal information. On the first day after their delivery, they were asked 11 questions pertaining to the information they had received prior to the epidural insertion. The information card was found to improve the women's knowledge in 8 out of the 11 questions, including those women who were in considerable distress at the time of discussion. The midwives and anaesthetists who used the information card also reported that it was useful as a reminder to discuss certain risks and reinforced the verbal information given.

A study by Stewart et al. (40) investigated the success of the Obstetric Anaesthetists' Association (OAA) research-based information leaflet, titled "Pain Relief in Labour" (48). The leaflet is freely available in the UK and world-wide via the internet. It has been translated into 37 languages, although none are official South African languages, except for English. This leaflet does not contain much information on

spinal anaesthesia, but a separate leaflet entitled “Your anaesthetic for Caesarean section” is available. (49)

Unfortunately the study by Stewart et al. (40) did not include the latter leaflet in their research. Although it appeared that women receiving the “Pain Relief in Labour” leaflet in the antenatal period were more knowledgeable and felt more satisfied with their level of knowledge (81% felt satisfied) than the control group who did not receive the leaflet (64% felt satisfied), there was no statistically significant difference between these groups ($p = 0.16$). The authors postulated that this was as a result of their small sample size of 76 patients.

Raynes-Greenow et al. (42) performed a study in 2010 amongst 596 primiparous Australian women to determine whether the informed consent process for labour analgesia could be improved by the use of a “decision aid”. This “decision aid” included a specially developed booklet and audio guide explaining a wide range of pharmacological and non-pharmacological options for labour analgesia. Women in the control group were only given a standard pamphlet developed by the Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Women’s knowledge was assessed by asking women “true” or “false” questions related to general knowledge concerning labour analgesia. The knowledge of the group that had received the “decision aid” improved from 53.4% to 65.1%, while the control group showed no significant change.

2.4.9 The timing of imparting information on neuraxial anaesthesia

Providing women with knowledge can also be optimised by selecting the appropriate time to impart information.

In the study by Raynes-Greenow et al. (7) most of the 25 participants admitted that they had avoided seeking more information on labour analgesia during the early stages of their pregnancy. They were more concerned with the development of the foetus at this stage and only started reading about pain management during the last trimester.

Similarly, the study by Stewart et al. (40) amongst women in the UK, found that 66% of the 76 women wanted to receive information on labour analgesia toward the end of the third trimester, as well as an opportunity to discuss the information that they had received. However, the authors were concerned that if women they were only provided with information toward the end of the third trimester, those who delivered at an earlier gestation would be denied important knowledge.

2.5 South African childbirth knowledge

There has been an important shift occurring from the traditional South African beliefs concerning health and illness, to the now widely accepted Western ideas. This is also true for pregnancy and labour. (12) The next section further explores this transition from a traditional to a Western childbirth, as well as discussing a more recent South African study on women's knowledge and sources of knowledge.

2.5.1 The transition of traditional South African childbirth to Western practices

Research published by Chalmers (12) in 1990 highlighted the important differences in traditional South African childbirth and new Western practices. Traditionally, pregnant women relied heavily on trusted female family members to provide them with knowledge and to help prepare them for childbirth. As young girls, they may even have been allowed to be present at another women's labour in order to learn. Despite the fact that some information obtained this way may have been inaccurate, the preparation obtained was at least comparable with the women's experience of childbirth. Their labour was positively influenced by the strong social support available. They also received a great deal of support in the postpartum period.

Today, many women rely upon Western health care for their pregnancy and delivery. Although they now receive better physical care, their emotional preparedness for labour has decreased. Their knowledge of Western delivery practices is poor, while they simultaneously have rejected their traditional teachings. (12)

The role of childbirth educator and emotional supporter has now fallen to the already overburdened health care professional. Healthcare professionals must cope with a large workload and are also not specifically trained in educational skills. This is illustrated by the fact that knowledge concerning labour, including spinal anaesthesia, remains poor despite antenatal clinic attendance. (12)

2.5.2 Knowledge and sources of knowledge of labour in South Africa

A qualitative South African study undertaken by Ibach et al. (13) in 2004 analysed the knowledge and expectations of labour amongst first time mothers. Thirty healthy, primigravid women were interviewed in their third trimester of pregnancy while attending a public sector antenatal clinic in the Western Cape. In their study the authors defined ‘few’ as less than six women, ‘several’ as a group of 6 to 14 women and ‘most’ as 22 or more women.

An important finding in this population was that the overall knowledge of labour and obstetric anaesthesia amongst these women was poor. Most women indicated that they knew labour would be painful, but only a third could remember the signs that heralded the onset of labour, the different types of delivery and also the possibility of needing surgery. Only a few women could offer a limited knowledge on spinal anaesthesia. Several women felt that experiencing labour was the only way to obtain knowledge of childbirth. (13)

The expectations of labour pain varied amongst the women. Most anticipated severe pain, but some underestimated this pain and two patients did not expect labour to be painful at all. Half of the women felt that labour pain was a positive, necessary experience to facilitate bonding with the baby. Despite this, the majority of women felt that labour pain should be alleviated. Several women reported being fearful of labour pain. One woman indicated that seeking further knowledge would possibly augment this fear and that she would rather remain ignorant. (13)

Many women reported that their sources of knowledge of labour were female relatives or friends. Several women received their knowledge from the clinic nurse. This limited antenatal education included complications of pregnancy and signs of the start of labour, but lacked information on pain and options for analgesia. A few

had obtained information from other patients presenting to the antenatal clinic and only one patient had used popular press. (13)

Since some South African women are generally less educated and have limited access to sources of information, antenatal education should be of great importance in this setting (13). The anaesthetist may have an important part to play in providing these patients with accurate information (2).

2.6 Summary

In Chapter Two, patients' rights and how these rights influence the practice of obtaining informed consent for caesarean section was discussed. It briefly examined caesarean section rates and the types of anaesthesia that can be administered to women having caesarean sections. Spinal anaesthesia was discussed and its physiological effects and possible complications were considered.

The chapter looked at women's knowledge of neuraxial anaesthesia, as well as the sources of knowledge that women access to gain information. It discussed the amount of information women wish to be provided with prior to giving informed consent for neuraxial anaesthesia, and also how much information is actually disclosed by anaesthetists. This chapter reviewed studies that proved that labouring women who are experiencing high levels of pain and anxiety, can actually understand information on risks and thus are able to give informed consent for neuraxial anaesthesia.

It explored the role of antenatal education and how this may be influenced by women's attitudes to pregnancy and labour. It then discussed the mediums that can be used to improve the delivery of information, as well as the ideal time to provide such information to women.

Lastly, Chapter Two looked at South African childbirth knowledge and how the transition from traditional to Western practices has changed the childbirth experience for some women. It also examined what is known concerning South African women's knowledge of labour and anaesthesia.

In Chapter Three the problem statement, aim and objectives, ethical considerations, the research methodology, and validity and reliability of the study will be discussed.

Chapter Three: Research methodology

3.1 Introduction

This chapter contains the problem statement, aim and objectives, demarcation of study field, ethical considerations, the research methodology and validity and reliability of this study.

3.2 Problem statement

Some South African women are faced with the ideas of two cultures: the traditional beliefs of the African society and the modern discoveries of the West. However, instead of acquiring an additional culture they appear to have lost their own culture without gaining the Western one. (12)

It is important for the different role players, especially the anaesthetists, to evaluate their practice of obtaining informed consent in order to ensure that they comply with the Patients' Rights Charter (1) that all patients are given full and accurate information. Currently, the level of women's knowledge of spinal anaesthesia, and from which resources this knowledge is obtained, is not known in primiparous women who have received caesarean section with spinal anaesthesia at CHBAH.

3.3 Aim and objectives

3.3.1 Aim

The aim of this study was to describe the knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who had received a caesarean section at CHBAH.

3.3.2 Objectives

The primary objectives of this study were to:

- describe the knowledge of spinal anaesthesia for caesarean section in primiparous women
- describe the sources of knowledge of spinal anaesthesia for caesarean section in primiparous women
- correlate the age of primiparous women with the knowledge of spinal anaesthesia for caesarean section.

The secondary objectives of this study were to:

- compare the level of education of primiparous women with their knowledge of spinal anaesthesia for caesarean section
- compare the sources of knowledge (medical versus non-medical) of spinal anaesthesia for caesarean section with the knowledge of spinal anaesthesia for caesarean section in primiparous women
- compare the number of antenatal visits with the knowledge of spinal anaesthesia for caesarean section in primiparous women.
- compare the urgency of surgery with the knowledge of spinal anaesthesia for caesarean section in primiparous women.

3.4 Demarcation of study field

This study took place at CHBAH. This is a 2888-bed, central teaching hospital situated in Soweto, Johannesburg, and is affiliated to the University of the Witwatersrand. The maternity unit of this public sector hospital serves as a referral centre for many clinics and secondary level hospitals in the Gauteng province, as well as accepting patients from other major referral centres in South Africa and beyond. (50) In 2014, 7974 caesarean sections were performed at the maternity unit of CHBAH of which greater than 90% were done under spinal anaesthesia (Mostert E, 2015, personal communication, January 16).

3.5 Ethical considerations

Approval for the study was obtained from the Human Research Ethics Committee (Medical) (Appendix A) and the Post Graduate Committee (Appendix B), Faculty of Health Sciences of the University of the Witwatersrand.

Approval was obtained from the CHBAH Medical Advisory Committee (Appendix C) and the Head of Department of CHBAH Department of Obstetrics and Gynaecology (Appendix D) to conduct research in the hospital and specifically, to conduct interviews with obstetric patients.

Nursing Manager of the CHBAH Maternity Unit was also informed of the study.

The researcher invited primiparous women to participate in this study, and those who agreed were given an information letter (Appendix E). Women were informed that participating in the study was voluntary and that they could withdraw from the study at any time, without having to provide a reason. Completion of the self-administered questionnaire was considered as implied consent.

The questionnaire, whether complete or incomplete, was placed into an unmarked envelope which was dropped into a sealed box. The researcher was not privy to the details of those health care professionals involved in the patient's care. Only the researcher and supervisors had access to the collected data. These measures ensured that anonymity and confidentiality were maintained. The data will be kept in a secure cupboard for a period of six years after the completion of this study.

This study was be conducted in adherence to the principles of the Declaration of Helsinki (51) and the South African Good Clinical Practice Guidelines (52).

3.6 Research methodology

3.6.1 Study design

This was a prospective, contextual, cross-sectional descriptive study.

Prospective studies measure variables that will occur during the course of the study (14). The variables for this study will be measured at the time the study takes place.

Contextual studies separates certain components from the larger context (53). This study examined primiparous women who had a spinal anaesthesic for caesarean section.

In cross-sectional studies data is collected at one point in time from different participants (14). This study was conducted eight or more hours after women received a spinal anaesthetic for caesarean section and looked at women's knowledge of spinal anaesthesia prior to them having received the anaesthetic.

Typical descriptive studies examine the characteristics of a single study population. There is no intervention or treatment. The description of the variables provides knowledge of the study population and can help to identify inadequacies of current practice (54). This was a descriptive study in that the women's knowledge and sources of knowledge were described.

3.6.2 Study population

The study population were primiparous women who received a spinal anaesthetic for their caesarean section.

3.6.3 Study sample

Sample Size

The sample size was calculated in consultation with a biostatistician and using nQuery Advisor® 7 software. A sample of 43 primiparous women who have had a spinal anaesthetic for caesarean section would estimate the mean knowledge of spinal anaesthesia for caesarean section to an accuracy of within 5%. This calculation assumed a standard deviation of 16.7% and a confidence interval of 95%.

However, considering the secondary objectives of comparing the level of education (lower- and higher level), sources of knowledge (medical and non-medical), and number of antenatal visits with knowledge respectively, the sample size was doubled to 86.

Sampling method

A convenience sampling method was used. Convenience sampling is a process whereby the researcher gathers conveniently accessible data (14). Available primiparous women in the post-caesarean section wards were enrolled into the study until the desired sample sized was reached (54).

Inclusion and exclusion criteria

Inclusion criteria:

- primiparous women aged 18 years and older
- who received spinal anaesthesia for caesarean section
- who could adequately communicate in English.

Exclusion criteria:

- women who were in pain or who had just received analgesia
- women who received a sedative during their caesarean section
- women admitted to high care and intensive care units post caesarean section
- women who received a spinal anaesthetic but were converted to a general anaesthetic
- women who received an epidural anaesthetic during labour, but were given a spinal anaesthetic for caesarean section
- women who declined to complete the questionnaire.

3.6.4 Data collection

Development of questionnaire

A draft questionnaire was developed after an extensive literature review. This draft was reviewed by three specialist anaesthetists with a special interest in obstetric anaesthesia. The questionnaire was written in simple English, but any unfamiliar words or statements were clarified by the researcher at the time of data collection.

The questionnaire (Appendix F) consisted of three categories: demographic data and antenatal care attendance, sources of knowledge and an assessment of the level of knowledge. The last category consisted of 15 questions to which women could respond with “correct”, “incorrect” or “don’t know”. These questions aimed to establish what knowledge the patient had when she gave her consent for the procedure, rather than what she learned during and after the insertion of the spinal anaesthetic.

The data collected included:

- patient demographics (the age and level of education),
- antenatal care practices (the place of attendance, the number of visits and whether their caesarean section was planned or not),
- the sources of knowledge of spinal anaesthesia for caesarean section,

- the patient's level of knowledge of the procedural events, benefits and risks of spinal anaesthesia for caesarean section.

Data collection process

The data collection period was from 1 November 2013 to 28 November 2014. The researcher alone was responsible for assisting women in completing the questionnaire, as well as the collection and storage of the data generated.

The researcher approached women in the post-caesarean section wards eight or more hours after their surgery was completed. Since active labour and the need for emergency surgery can impair the informed consent process (4), this delay in approaching patients to participate in the study, was beneficial. Those women who were interested in participating were provided with an information sheet (Appendix E) and completion of the questionnaire provided implied consent. Women were told that being in the study was voluntary and that they could withdraw from the study at any time, without having to provide a reason.

Although this was a self-administered questionnaire, the researcher was available to assist women in understanding the questions and completing the questionnaire. Each questionnaire was assigned a study number to facilitate capturing of the data, but contained no information that could identify participants. The questionnaire, whether complete or incomplete, was then placed into an unmarked envelope which was dropped into a sealed box to further protect patient confidentiality. The sealed box was only opened once all the data was collected.

3.6.5 Data analysis

The raw data was entered into an Excel 2010 (Microsoft®, USA) spreadsheet. Data analysis was done in consultation with a biostatistician and using STATISTICA 12 (Statsoft®, USA) software. The levels of knowledge were not normally distributed overall, but when broken into groups, the levels of knowledge of each group was

normally distributed. For descriptive analysis of data that were normally distributed, mean and standard deviation (SD) were used. For subgroup comparisons the Student's t-test was used for normally distributed data (comparing urgency of surgery with knowledge and comparing level of education with knowledge) and the Mann-Whitney test for non-normally distributed data (comparing antenatal visits with knowledge). Spearman Rank was used to correlate age and knowledge. When the data was broken into groups for comparing sources of knowledge with knowledge of anaesthesia, all groups met the assumptions for normal distribution (Kolmogrov and Smirnov) and variance (Bartlett's test) and therefore ANOVA testing was used to compare means between groups. Testing was done at the 0.05 level of significance and 95% confidence intervals were calculated where indicated. Unanswered questions or questions that were not completed according to the given instruction were excluded from the specific analysis.

3.7 Validity and reliability of the study

The validity of a study determines the extent to which it actually reflects the characteristic being measured (54). The reliability of a study refers to the consistency of the measures of a study (14).

The validity and reliability of this study was ensured by the following.

- Using an appropriate study design.
- Calculating the sample size in consultation with a biostatistician.
- Face and content validity of the questionnaire had been ensured, as it was based on an extensive literature review and review by three specialist anaesthetists with a special interest in obstetric anaesthesia.
- The use of simple language contributed to the accuracy of the data collected.
- One researcher collected all the data thereby ensuring standardisation of the process.
- A resting period of at least eight hours post-caesarean section ensured that women had adequate time to recover before completing the questionnaire.
- Checking every data entry point for accuracy.

- Data analysis being done in consultation with a biostatistician.

3.8 Summary

This chapter discussed the problem statement, aim and objectives, ethical considerations, the research methodology, and validity and reliability of the study. Chapter Four will follow, covering the results obtained and a discussion of these.

Chapter Four: Results and discussion

4.1 Introduction

This chapter contains the results as per the research objectives and the discussion thereof.

The primary objectives of this study were to:

- describe the knowledge of spinal anaesthesia for caesarean section in primiparous women
- describe the sources of knowledge of spinal anaesthesia for caesarean section in primiparous women
- correlate the age of primiparous women with the knowledge of spinal anaesthesia for caesarean section.

The secondary objectives of this study were to:

- compare the level of education of primiparous women with their knowledge of spinal anaesthesia for caesarean section
- compare the sources of knowledge (medical versus non-medical) of spinal anaesthesia for caesarean section with the knowledge of spinal anaesthesia for caesarean section in primiparous women
- compare the number of antenatal visits with the knowledge of spinal anaesthesia for caesarean section in primiparous women
- compare the urgency of surgery with the knowledge of spinal anaesthesia for caesarean section in primiparous women.

4.2 Sample realisation

The data was collected over a period of 13 months, from the start of November 2013 to the end of November 2014. During this time, 87 postpartum women at CHBAH consented to complete the questionnaire. Of these, one participant was excluded due to incomplete data. The data analysis therefore included 86 women.

4.3 Results

P-values of < 0.05 were considered statistically significant and 95% confidence intervals were calculated where indicated. Numbers and percentages were rounded to two decimal places.

4.3.1 Demographics

The demographics of the study population is summarised in Table 4.1.

The mean age of the study population was 23 years (SD 3.96).

Since women were allowed to select more than one option when reporting on where they received care in pregnancy, the result of the addition of all the options is greater than 100% (n=86)

Women also reported on which clinics, or hospital based antenatal clinics, they visited in the antenatal period. These were grouped according to the number of women that visited each. There were 30 clinics that were visited by one patient each. These clinics were grouped as “other” on Table 4.1.

Table 4.1 Demographic data of the study participants

Demographic	n (%)
Schooling completed	
• None	1 (1.16%)
• Primary school	5 (5.81%)
• High school	56 (65.12%)
• University/college	24 (27.91%)
Number of antenatal visits	
• None	3 (3.49%)
• 1 – 3 times	15 (17.44%)
• 4 – 6 times	31 (36.05%)
• >6 times	35 (40.70%)
• No response	2 (2.33%)
Care in pregnancy	
• None	1 (1.16%)
• Antenatal clinic	75 (87.21%)
• General practitioner	3 (3.49%)
• Private gynaecologist	2 (2.33%)
• Antenatal clinic at a hospital	38 (44.19%)
• Other	0 (0%)
Number of women to visit antenatal clinics (each)	
• Stredford	6 (6.98%)
• Michael Maponya, Tladi	5 (5.81%)
• Barney Molokoane, Freedom Park	4 (4.65%)
• Diepkloof	3 (3.49%)
• Chiawelo, Jabavu, Lenasia South, Mandela, Sisulu, Protea Glen	2 (2.33%)
• Other (one visit each)	30 (34.88%)
• No response	7 (8.14%)
Number of women to visit hospital antenatal clinics (each)	
• CHBAH	30 (34.88%)
• Jabulani Hospital	1 (1.16%)
• Did not attend a hospital antenatal clinic	48 (55.81%)
• No response	7 (814%)
Urgency of caesarean section	
• Emergency	73 (84.88%)
• Elective	13 (15.12%)

4.3.2 Primary objective: describe the knowledge of spinal anaesthesia for caesarean section in primiparous women

The level of knowledge of spinal anaesthesia for caesarean section was tested with multiple choice questions. Patient's scores ranged from 3 (20%) to 13 (86.67%) out of 15. The mean score out of 15 was 7.84 (SD 2.12) which is 53%. Table 4.2 summarises the number of "correct", "incorrect" and "don't know" answers for each question.

Table 4.2 Summary of responses to multiple choice questions

Question	Correct n (%)	Incorrect n (%)	"Don't know" n (%)
SA is an option for CS	82 (95.35%)	2 (2.33%)	2 (2.33%)
GA is an option for CS	37 (43.02%)	24 (27.91%)	24 (27.91%)
In healthy women, SA is safer than GA	35 (40.70%)	16 (18.60%)	35 (40.70%)
SA is not harmful to baby	63 (73.33%)	7 (8.14%)	16 (18.60%)
SA is injected into the back with a needle which is then removed	46 (53.49%)	8 (9.30%)	32 (37.21%)
Legs will feel heavy and numb	81 (94.19%)	4 (4.65%)	1 (1.16%)
May develop hypotension	32 (37.21%)	9 (10.47%)	45 (52.33%)
SA does not cause back pain	36 (41.86%)	20 (23.26%)	30 (34.88%)
SA may cause nausea and vomiting	19 (22.09%)	41 (47.67%)	26 (30.23%)
SA may cause PDPH	7 (8.14%)	46 (53.49%)	33 (38.37%)
SA may cause permanent paralysis	7 (8.14%)	68 (79.07%)	11 (12.79%)
SA provides analgesia for 4 – 6 hours	60 (69.77%)	9 (10.47%)	17 (19.77%)
Ask for analgesia before sensation returns	50 (58.14%)	13 (15.12%)	23 (26.74%)
Awake enough post SA to hold baby	48 (55.81%)	30 (34.88%)	8 (9.30%)
SA does not impair breastfeeding	71 (82.56%)	5 (5.81%)	10 (11.63%)

* SA = spinal anaesthesia, CS = caesarean section

4.3.3 Primary objective: describe the sources of knowledge of spinal anaesthesia for caesarean section in primiparous women

Women were asked to select one source of knowledge before and after admission to hospital for labour. The sources of knowledge are summarised in Table 4.3.

“General practitioner” was only given as an option for a source of knowledge before admission to the hospital, since women would be unlikely to consult with such a health care professional in the hospital setting.

In the “sources before” group, the majority of women, 25 (29.07%), reported not having received any information. After admission to hospital, the most common source of knowledge was the anaesthetist, with 29 (33.72%) women choosing this option.

Both women that had selected “other” in the “sources before” group wrote “the doctor” as their source of knowledge. Four women from the “sources after” group also wrote “the doctor”, and one patient wrote “theatre”.

Five responses were excluded from the “sources before” group and four from the “sources after” group because women had selected more than one option. Two women did not respond to the “sources after” question.

Table 4.3 Sources of knowledge before and after the onset of labour and admission to hospital

Source	Before admission to hospital, n (%)	After admission to hospital, n (%)
Family and friends	11 (12.79%)	3 (3.49%)
Internet	5 (5.81%)	4 (4.65%)
Books	2 (2.33%)	2 (2.33%)
Magazines	2 (2.33%)	1 (1.16%)
Other patients	3 (3.49%)	1 (1.16%)
Midwife	13 (15.12%)	18 (20.93%)
General practitioner	3 (3.49%)	Not applicable
Gynaecologist	7 (8.14%)	7 (8.14%)
Anaesthetist	8 (9.30%)	29 (33.72%)
Other	2 (2.33%)	5 (5.81%)
No information received	25 (29.07%)	10 (11.63%)
No response given	0 (0%)	2 (2.33%)

4.3.4 Primary objective: correlate the age of primiparous women with their knowledge of spinal anaesthesia for caesarean section

Since the levels of knowledge was found not to be normally distributed for the overall group, the age of women were correlated to their level of knowledge with a Spearman Rank test. As Spearman's rho was found to be 0.0037, no correlation existed between the variables as shown by a p value of 0.97.

4.3.5 Secondary objective: compare the level of education of primiparous women with their knowledge of spinal anaesthesia for caesarean section

For the analysis of this data, the levels of education were divided into “lower level” and “higher level”. “Lower level” included those with no schooling, primary school and high school educations. The “higher level” group included all those that had completed a tertiary education at a university or college.

Analysis of the data was carried out to test for an association between the level of education of women and their level of knowledge. Parametric analysis of continuous variables was carried out using the Student’s t-test with equal variance.

Table 4.4 below shows that women with a “higher level” of education scored slightly better for their level of knowledge at 54.38% (SD 13.37) than those with a “lower level” at 51.90% (SD 13.71). Statistically there was no difference between the level of knowledge of the two groups (t = -0.75 [84], p = 0.45). The mean difference between the levels of knowledge of the two groups was 2.47 with a 95% confidence interval of -4.04 – 8.98, which was not significant.

Table 4.4 The comparison of women’s level of education and level of knowledge

	Obs	Mean	Std. Err	Std. Dev.	95% CI
Group					
Lower level	62	51.9	1.74	13.71	48.42 – 55.39
Higher level	24	54.38	2.73	13.37	48.72 – 60.02
Combined	86	52.59	1.46	13.59	49.68 – 55.51
Diff.		2.47	3.27		-4.04 – 8.98

p value = 0.45

4.3.6 Secondary objective: compare the sources of knowledge (medical versus non-medical) of spinal anaesthesia for caesarean section with the knowledge of spinal anaesthesia for caesarean section in primiparous women

Women reported on sources of knowledge “before coming to hospital” (Table 4.5) and “after coming to hospital” (Table 4.6). Since some women selected more than one option or did not give a response, five women were excluded from the first group and six were excluded from the second. Sources of knowledge were divided into “medical” (midwives, general practitioners, gynaecologists and anaesthetists) and “non-medical” (family and friends, the internet, books and magazines). The last group contained those women that reported not receiving any information.

The assumptions for normality and equal variance were met for all groups and ANOVA testing was used to compare means between groups. The p values for both the “before coming to hospital” and “after coming to hospital” groups were > 0.05, therefore not significant (F = 0.18 [80], p = 0.84 and F = 0.96 [79], p = 0.38 respectively).

Table 4.5 The comparison of sources of information before admission to hospital

Sources of variation	Degrees of freedom	Sum of squares	Mean square
Between groups	2	62.78	31.39
Within groups	78	13546.35	173.67
Total	80	13609.14	170.11

p value = 0.84

Table 4.6 The comparison of sources of information after admission to hospital

Sources of variation	Degrees of freedom	Sum of squares	Mean square
Between groups	2	330.86	165.43
Within groups	77	13231.53	171.84
Total	79	13562.39	171.68

p value = 0.38

4.3.7 Secondary objective: compare the number of antenatal visits with the knowledge of spinal anaesthesia for caesarean section in primiparous women

Two women failed to respond to this question and were therefore excluded (n = 84). For analysis of this data, antenatal visits were grouped into ≤ 6 visits and > 6 visits. The two groups were then compared for level of knowledge using a Mann-Whitney test. The p value was 0.50 (z = -0.68) and thus not significant. The results of this test is summarised in Table 4.7.

Table 4.7 The comparison of number of antenatal visits with level of knowledge

Antenatal visits	Obs	Rank sum	Expected
≤6	49	2008.5	2082.5
>6	35	1561.5	1487.5
Combined	84	3570	3570

p value = 0.50

4.3.8 Secondary objective: compare the urgency of surgery with the knowledge of spinal anaesthesia for caesarean section in primiparous women

Analysis of the data was carried out to test for an association between emergency and elective surgery and women's level of knowledge. Parametric analysis of continuous variables was carried out using the Student's t-test with equal variance.

Table 4.8 shows that women who had an elective caesarean section scored lower for their level of knowledge at 50% (SD 10.21) than those who received emergency surgery at 53.05% (SD 14.11). Statistically there was no difference between the level of knowledge of the two groups (t = 0.75 [86], p = 0.46). The mean difference between the levels of knowledge of the two groups was 3.05 with a 95% confidence interval of -5.1 to 11.21, which was not significant.

Table 4.8 The comparison of the urgency of surgery and level of knowledge

	Obs	Mean	Std. Err	Std. Dev.	95% CI
Group					
Emergency	73	53.05	1.65	14.11	49.76 – 56.35
Elective	13	50	2.83	10.21	43.83 – 56.17
Combined	86	52.59	1.46	13.59	49.68 – 55.51
Diff.		3.05	4.1		-5.1 – 11.21

p value = 0.46

4.4 Discussion

Very little is known about the knowledge that South African women have concerning labour analgesia and anaesthesia, and which sources they currently make use of to obtain this information. This study aimed to describe the knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who have received a caesarean section at CHBAH.

There is very little research, both internationally and nationally, to compare this study's results to. Most studies assessed women's knowledge of the risks of obstetric anaesthesia (5, 10, 11, 16, 17), while this study described women's knowledge of the procedural events, risks and benefits of spinal anaesthesia for caesarean section.

In this study, the mean score out of 15 was 7.84 (SD 2.12) which is 53%. This is similar to a study by Raynes-Greenow et al. (42) in which Australian women's level of knowledge of labour analgesia were tested prior to providing them with either a standard information pamphlet or an additional labour analgesia decision aid. Prior to the intervention the two groups in their study achieved a mean score of 53.4% (SD 21) and 54.3% (SD 20) respectively.

It is not possible to say whether the women's score in this study describes a high or low level of knowledge and whether this level of knowledge is adequate for the informed consent process. In the qualitative study by Ibach et al. (13) amongst

Western Cape primigravidas the authors concluded that women had a significant lack of knowledge of the labouring process, analgesic options and obstetric anaesthesia.

The women in this study had scores ranging from 3 (20%) to 13 (86.67%) out of 15. Similarly, Jackson et al. (17) found that British women's knowledge of the risks of obstetric general anaesthesia ranged from 8% to 85%. The study by Bethune et al. (10) which compared knowledge of the risks of epidural anaesthesia amongst Australian and British women, found that their knowledge ranged from < 10% to > 90%.

The three questions that women in this study scored best in were "SA as an option for CS", 82 (95.35%), "Legs will feel heavy and numb", 81 (94.19%) and "SA does not impair breastfeeding", 71 (82.56%). The questions in which women in this study scored the lowest were all assessing knowledge of the risks of spinal anaesthesia. Women in this study only scored 7 (8.14%) for knowledge of PDPH and permanent paralysis (nerve damage) respectively, 19 (22.09%) for the risk of nausea and vomiting, and 32 (37.21%) for the risk of hypotension. From this it is clear that the knowledge of risks in this study is lower than that of Affleck et al. (16) where the most commonly recalled risks of epidural anaesthesia amongst American women were PDPH (58%), nerve damage (33%), pruritis (26%) and nausea and vomiting (17%) . The Australian women in the study by Cheng et al. (11) most commonly recalled the risks of block failure and conversion to GA (94%), inadequate block (93.3%), nerve damage (90.7%) and paralysis (90%).

These differences in results may be due to the women in this study having a greater knowledge of the events of spinal anaesthesia that they experienced, rather than the facts they were told. Another possibility is that the anaesthetists in this study's setting (the most common source of knowledge after admission to hospital for 29 women or 33.72%) tend to give more information on the events of spinal anaesthesia rather than its potential risks or that they each discuss different risks with their patients.

This study did not assess the type and amount of information that each anaesthetist discussed with their patients, but it can be assumed that it is as different as in the study by Cheung et al. (47) which looked at risks Canadian anaesthetists routinely discussed with their patients at the preoperative visit. The authors found that the information discussed varied widely amongst individuals. For example, when asked if

they discussed the possibility of PDPHs after spinal or epidural insertion with their patients, 86.2% said, “always”, 12.3% said “sometimes” and 1.5% said “never”.

According to Black et al. (55) the most commonly discussed risks of regional anaesthesia in labour by Australian anaesthetists were PDPH (86.2%), block failure (78.3%), permanent neurological injury (78.2%), leg weakness (68.4%) and hypotension (62.8%). The mean score of the women in this study therefore not only reflects their recall of information, but the type and amount of information that they received as well.

In this study the sources of knowledge used by women varied considerably. Before admission to hospital, the two most common sources of information were family and friends, 11 (12.79%), and midwives, 13 (15.12%). A large group of women, 25 (29.07%), reported not receiving any information on spinal anaesthesia. After admission to hospital, the most common sources of information were the anaesthetist, 29 (33.72%), and midwives, 18 (20.93%). Of the 86 women in this study, 10 (11.63%) reported not receiving any information about spinal anaesthesia while in hospital.

This study’s results were similar to other studies (7-9, 13) that also found that women use a variety of sources of knowledge. The study by Ibach et al. (13) amongst Western Cape women showed that many women (15 to 21) had received antenatal education from their female relatives and friends, a few (more than one but less than six) from other patients attending the clinic and only one patient from popular press.

In the study by Paech et al. (8) the most frequently used sources of epidural anaesthesia information by Australian women were friends or relatives (52%), parenthood classes (48%) and midwives or nurses (44%). The most commonly used sources of information by American women in the study by Harkins et al. (9) were a doctor (34%), a family member or friend (21%) and previous personal experience (18%). Raynes-Greenow et al. (7) reported that most of the women their study relied heavily on anecdotal information from family members and friends, but did not specify the exact number of women who do. Others in their study reported reading popular books, leaflets and magazines (7). Bethune et al. (10) found that women in Australia were more likely to receive information on epidural anaesthesia from an

anaesthetist or an obstetrician (sum 55) than their British counterparts (sum 13), and British women in turn were more likely to access the media as a source of information (sum 79).

This study failed to identify a statistically significant correlation between age and level of knowledge ($p = 0.97$). This is a similar finding to the study by Affleck et al. (16) where there was also no correlation between patient age and the number of risks women could recall in the postpartum period. Jackson et al. (41) similarly found that age had no impact on Canadian women's ability to understand information needed for informed consent for epidural anaesthesia.

When considering the secondary objectives of this study it is important to note that the sample size of 86 women was calculated based on the primary objectives of this study. The results of the secondary objectives may therefore be underpowered and should be interpreted with caution.

In this study, women in the "higher level" of education group scored a slightly better mean score for level of knowledge of spinal anaesthesia at 54.38% (SD 13.37) than those in the "lower level" of education group at 51.9% (SD 13.71). Statistically there was no significant difference in women's level of education and their level of knowledge ($p = 0.45$). This study's findings are similar to the studies by Pattee et al. (18) and Jackson et al. (41), where level of education did not impact on women's perceived ability to understand information on regional anaesthesia for informed consent.

This study showed no statistically significant difference between level of knowledge and medical and non-medical sources of knowledge before admission to hospital ($p = 0.84$) and after admission to hospital ($p = 0.38$). No similar studies that compare patients' level of knowledge with the sources of knowledge of anaesthesia could be identified. Studies by Cheung et al. (47) and Straessle et al. (46) reported on improving the recall of information by using information leaflets in addition to the preoperative anaesthetic interview, but neither of these compared the knowledge of patients with other sources of knowledge. The study by Raynes-Greenow et al. (7) found that although women accessed multiple and varied sources of information,

most did not have adequate information on labour analgesia. Their study did not find which sources resulted in this poor knowledge.

This study found no statistically significant difference in knowledge between those women who attended six or less antenatal clinic visits and those who attended more than six ($p = 0.5$). This study did not assess whether women received information during their antenatal visits, nor the amount and type of information that was given. This may not have been important because, although 42% of women in Affleck et al.'s study (16) attended their hospital's free antenatal classes, there was no difference in the rate of risk recall for epidural anaesthesia between those that attended, and those who did not. Ibach et al. (13) found that although several (7 to 14) Western Cape women reported receiving antenatal education from clinic nurses, this information was mostly on identifying the onset of labour and complications of pregnancy, rather than options for the management of labour pain. Fortescue et al. (6) found that less than 25% of British women had learned of emergency obstetric anaesthesia before the onset of labour, but that most of this information had come from antenatal clinic visits or classes.

In this study, the mean score of knowledge for spinal anaesthesia amongst those who had an emergency caesarean section was slightly higher (53.05%) compared to those that had elective surgery (50%), but this was not statistically significant ($p = 0.46$). This study's results may reflect that women are able to recall risks equally well whether they are in labour or not. This is similar to the findings of Pattee et al. (18) where Canadian women reported that the pain of labour did not influence their comprehension of the facts needed for informed consent (three on a visual analogue scale of 0 to 10 for agreeing with the statement). Affleck et al. (16) also found no difference in risk recall rate between women who were in mild and moderate pain at the time of obtaining informed consent for epidural anaesthesia, and those who were in severe pain.

This study's results were, however, different to the findings of Cheng et al. (11). Of those women who could spontaneously recall four risks of obstetric regional anaesthesia, 58.6% had an elective caesarean section and 32.5% had emergency surgery ($p = 0.001$). Of those who could provide more than four prompted risks, 65.7% had elective surgery and 70% had emergency surgery, although this was not

statistically significant (p = 0.94). The difference in results could be because this study's sample size may have been underpowered for this secondary objective.

4.5 Summary

In this chapter the results of this study have been presented and discussed as per the research objectives. In the final chapter a summary, the limitations, recommendations and conclusions of the study are presented.

Chapter 5: Summary, limitations, recommendations and conclusion

5.1 Introduction

This chapter includes a summary, the limitations, recommendations for clinical practice and further research, and a conclusion of the study.

5.2 Study summary

5.2.1 Aim

The aim of this study was to describe the knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who had received a caesarean section at CHBAH.

5.2.2 Objectives

The primary objectives of this study were to:

- describe the knowledge of spinal anaesthesia for caesarean section in primiparous women
- describe the sources of knowledge of spinal anaesthesia for caesarean section in primiparous women
- correlate the age of primiparous women with the knowledge of spinal anaesthesia for caesarean section.

The secondary objectives of this study were to:

- compare the level of education of primiparous women with their knowledge of spinal anaesthesia for caesarean section
- compare the sources of knowledge (medical versus non-medical) of spinal anaesthesia for caesarean section with the knowledge of spinal anaesthesia for caesarean section in primiparous women
- compare the number of antenatal visits with the knowledge of spinal anaesthesia for caesarean section in primiparous women.
- compare the urgency of surgery with the knowledge of spinal anaesthesia for caesarean section in primiparous women.

5.2.3 Methodology

This was a prospective, contextual, cross-sectional descriptive study. A draft questionnaire was developed after an extensive literature review. This draft was reviewed by three specialist anaesthetists with a special interest in obstetric anaesthesia. The questionnaire (Appendix F) consisted of three categories: demographic data and antenatal care attendance, sources of knowledge and an assessment of the level of knowledge.

A convenience sampling method was used. From 1 November 2013 to 28 November 2014 available primiparous women who received a spinal anaesthetic for their caesarean section were enrolled into the study until the desired sample sized of 86 was reached.

The researcher approached women in the post-caesarean section wards eight or more hours after their surgery was completed. Those women who were interested in participating were provided with an information sheet (Appendix E). Completion of the questionnaire provided implied consent. Although this was a self-administered questionnaire, the researcher was available to assist women in understanding the questions and completing the questionnaire.

The raw data was entered into an Excel 2010 (Microsoft®, USA) spreadsheet and analysed with the assistance of a biostatistician.

5.2.4 Main findings

Women's scores ranged from 3 (20%) to 13 (86.67%) out of 15. The mean score out of 15 was 7.84 (SD 2.12) which is 53%.

The questions that women scored the best in were mostly those relating to the procedural events of spinal anaesthesia and included "SA as an option for GA", 82 (95.35%), "legs will feel heavy and numb", 81 (94.19%), and "SA does not impair breast feeding", 71 (82.56%). The questions that women scored the least in assessed knowledge of the risks of spinal anaesthesia and included risk of PDPH (8.14%), permanent paralysis (8.14%) and nausea and vomiting (22.09%).

The sources of knowledge of spinal anaesthesia that women accessed were varied. The greater majority of women, 25 (29.07%), reported not receiving any information on spinal anaesthesia before admission to hospital. Those that had accessed resources before admission to hospital most frequently reported midwives, 13 (15.12%), and family and friends, 11 (12.79%), as sources of knowledge. After admission to hospital, the majority of women reported the anaesthetist, 29 (33.72%), and the midwife, 18 (20.93%), as the most important sources of knowledge. There were still 10 (11.63%) women who reported not receiving any information on spinal anaesthesia after admission to hospital.

Neither age ($p = 0.45$), level of education ($p = 0.84$), sources of knowledge (before admission to hospital $p = 0.84$, after admission to hospital, $p = 0.38$), number of antenatal visits ($p = 0.5$) or urgency of the operation ($p = 0.46$) were found to have any statistically significant effect on the level of knowledge. However, the secondary objectives should be interpreted with caution as the sample size was not powered for these analyses.

5.3 Limitations

The single geographical location and the use of a tertiary, public sector hospital setting may limit the study's generalisation to other patient groups in South Africa.

Only women who could adequately communicate in English were invited to complete the questionnaire. For some women, English may have been a second or third language and they may have found some questions difficult to understand. Translating the questionnaire into other languages and training interviewers to assist women in completing the questionnaire was, however, beyond the scope of this study. Instead, the researcher made herself available to help women in understanding the content of the questionnaire, if they required such assistance.

Since the study made use of self administered questionnaires it relied on women's recall of information obtained in the antenatal and preoperative periods, which may have been imperfect. Women may have relied on their recent experience of the spinal anaesthesia in trying to answer the questions correctly, instead of thinking back to their level of knowledge prior to the anaesthetic being administered.

The use of "true" and "false" type questions in the questionnaire may have increased the measured scores of knowledge by giving women a 50% chance of successfully guessing the correct answer and also by providing women with facts they may not have recalled spontaneously.

Another limitation was that the sample size of 86 women was calculated based on the primary objectives of the study. The results of the secondary objectives may therefore be underpowered and should be interpreted with caution.

5.4 Recommendations from this study

5.4.1 Clinical practice

The knowledge of spinal anaesthesia for caesarean section can be improved by educating both pregnant women and the medical professionals involved in their care. Many women reported not receiving any information on spinal anaesthesia in the antenatal period. Information leaflets with a particular focus on obstetric regional anaesthesia could be developed by the Department of Anaesthesiology and the Department of Obstetrics and Gynaecology.

Straessle et al. (46) found that patients who received a preoperative information form in addition to the routine anaesthetic visit had better scores for information gain and were more satisfied with anaesthesia care as a whole.

Presentations or information sessions conducted by anaesthetists could be presented at antenatal clinics. This would allow women the opportunity to meet with an anaesthetist and discuss questions before the onset of labour.

In the study by Stewart et al. (40) midwives, rather than anaesthetists or obstetricians, were the medical professionals with the greatest influence on women's choice of labour analgesia. Since midwives are a commonly accessed source of information in both the antenatal period and in labour, further training on the use of obstetric regional anaesthesia could improve the quality and amount of information that midwives give to their patients.

Doctors in the Department of Anaesthesiology could be encouraged to provide more knowledge on the risks of spinal anaesthesia in order to improve the overall informed consent process. Junior members of staff could be assisted in this by providing them with further education and a standardised list of risks, which would improve the quality of the information they provide to patients.

5.4.2 Further research

This study could be repeated at other hospitals in Johannesburg and in the rest of the country. It would also be beneficial to do the study amongst women attending private hospitals. This would allow for a comparison of level of knowledge and sources of knowledge amongst different patient groups, which could in turn identify areas where education programmes are required. The impact of instituting any educational programmes or tools, such as information leaflets and presentations, should also be followed up.

Further studies should use sample sizes that are powered to the secondary objectives identified in this study and could also examine the amount and type of

information on obstetric regional anaesthesia that South African anaesthetists, midwives and gynaecologists provide their patients with.

5.5 Conclusion

From this study it can be concluded that primiparous women have a limited knowledge of spinal anaesthesia when presenting for caesarean section. Women still rely on “non-medical” sources of information, but midwives are a vital source of knowledge, both before and after admission to hospital. Anaesthetists are the most common source of information for women after admission to hospital and they are therefore ideally placed to improve the knowledge of spinal anaesthesia imparted to their patients.

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Appendices

Appendix A: Human Research Ethics Committee (Medical) approval

M130304

R14/49 Dr Carien Moller

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M130304

NAME: (Principal Investigator)	Dr Carien Moller
DEPARTMENT:	Department of Anaesthesiology Chris Hani Baragwanath Academic Hospital
PROJECT TITLE:	Knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who have received a caesarian section
DATE CONSIDERED:	05/04/2013
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Estie Mostert
APPROVED BY:	Professor PE Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 31/05/2013

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 Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized 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 the application to the Committee. **I agree to submit a yearly progress report**

Principal Investigator Signature

Date 01/10/2013

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix B: University of Witwatersrand Post Graduate Committee approval

UNIVERSITY OF THE
WITWATERSRAND
JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172078

Reference: Ms Thokozile Nhlapo
E-mail: thokozile.nhlapo@wits.ac.za

13 March 2015
Person No: 0300883M
PAC

Dr C Moller
Po Box 787
Fontainebleau
2032
South Africa

Dear Dr Moller

Master of Medicine: Approval of Title

We have pleasure in advising that your proposal entitled *Knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who have received a caesarean section* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

Appendix C: CHBAH Medical Advisory Committee approval

Dr C Möller
Department of Anaesthesiology
University of the Witwatersrand
carien.moller@gmail.com
1 December 2013

The Medical Advisory Committee of Chris Hani Baragwanath Academic Hospital

I am a registrar in the Department of Anaesthesiology. I am currently doing research for the completion of my Master of Medicine in anaesthesiology degree. My research will aim to describe the knowledge and sources of knowledge of spinal anaesthesia in primiparous women who have received a caesarean section in an academic hospital. This would entail inviting women in the post-caesarean section wards to complete a questionnaire.

I would like to request your permission to carry out my research in Chris Hani Baragwanath Academic Hospital form 1 December 2013 to 28 February 2014. I have included a copy of my proposal with this letter, should you require more information on my proposed research. The letters of approval from the Human Research Ethics Committee and the University of the Witwatersrand Post Graduate Committee can be found in the appendices at the end of the document.

Thank you in advance!

Regards

Dr Carien Möller
Registrar in the Department of Anaesthesiology

Appendix D: CHBAH Department of Obstetrics and Gynaecology approval

Department of Obstetrics and Gynaecology

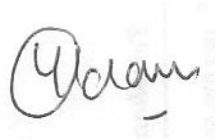
Chris Hani Baragwanath Academic Hospital, PO Bertsham 2013, South Africa. Telephone: t 27 11 933 8156 .Fax: t 011 938 1534

10 January 2014

Re: Knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who have received a caesarean section - Dr Carien Möller

Dear Carien,

I have read the protocol for your study. It is interesting and I'm sure will provide us with information that will help in the clinical setting. I am happy for the study to be conducted in the Department of Obstetrics & Gynaecology providing you have permission from the HREC (Wits) and the MAC at CHBAH.



Dr Y Adam

Head Dept. of Obstetrics and Gynaecology

Chris Hani Baragwanath Academic hospital

Appendix E: Information letter

CONSENT TO PARTICIPATE IN RESEARCH

Knowledge and the sources of knowledge of spinal anaesthesia in primiparous women who have received a caesarean section

Hello, my name is Carien Möller. I am a doctor who is studying further at the University of the Witwatersrand to become an anaesthetist. An anaesthetist is a doctor who specialises in giving patients medicines that make them sleep or special injections to take their pain away during an operation. As part of my studies I am doing a research study and I would like to invite you to take part.

I am trying to learn more about how much women who gave birth by caesarean section know about spinal anaesthesia and where they heard about it. Spinal anaesthesia is the special injection that you were given in your back before your operation.

If you agree to be in this study, I will ask you to complete a questionnaire about the injection in your back to see how much you know about it and where you heard about it. I will be available to explain any questions that you do not understand and to help you to fill in the answers on the questionnaire. This should not take longer than 10 minutes.

After you have answered the questions, we can discuss the things you were asked in the questionnaire and I will explain anything that you do not understand. You can ask any questions that you have about the study and we can talk for as long as you like. If you have a question later that you didn't think of now, you can contact me later.

The Human Research Ethics Committee (M130304) and the Postgraduate Committee of the University of the Witwatersrand have approved my study.

I do not believe that you will be hurt or upset by being in this study. If you take part in the study and believe that you have been hurt or upset in any way, you may stop being in the study.

Only my supervisors and I will look at the answers on the questionnaire. You will not be asked to write your name on the questionnaire and once you are finished, you should place the questionnaire in an unmarked envelope. You should then close the envelope and place it in the sealed box. I will not be able to tell which questionnaire belongs to which patient.

If you decide to be in this study, it will probably help you to learn more about the injection that you were given in your back. It will also show me important ways to teach other women coming for the same operation as you, about the injection in the back.

If you don't want to be in this study, you don't have to participate. Remember, being in this study is up to you and no one will be upset if you don't want to participate or even if you change your mind later and want to stop. Your doctors will continue to treat you whether or not you participate in this study.

For more information you may call me on 082 545 5720 or email me at carien.moller@gmail.com. You may also contact professor Peter Cleaton-Jones, chair of the Human Research Ethics Committee, at (011) 717 1234.

Completing this questionnaire means that you agree to be in this study. You will be given a copy of this form to keep.

Thank you very much for your time!

Regards

Carien Möller

Appendix F: Questionnaire

Questionnaire

Study number: _____

1. How old are you? _____

2. How much schooling have you completed?
   - ☐ None
   - ☐ Primary school
   - ☐ High school
   - ☐ College and/or university education

3. Where did you get care for your pregnancy? (You may choose more than one option)
   - ☐ Did not go for care
   - ☐ The “clinic” (An antenatal clinic)
     Name of clinic: _____
   - ☐ General practitioner (GP)
   - ☐ A private gynaecologist
   - ☐ Antenatal clinic at a hospital (such as Baragwanath)
     Name of hospital: _____
   - ☐ Other: _____

4. Please put a cross on how many times you went for care in your pregnancy, before labour started.

None	1 – 3 times	4 – 6 times	More than 6 times

5. Was your caesarean section an emergency operation or did you always know that you would have a caesarean section (elective)?
   - Emergency caesarean section
   - Elective caesarean section

6. Where did you get the most information on spinal anaesthesia (the injection in your back) **before** coming to hospital for the birth of your baby? (Please choose one option only)
    - ☐ Family members or friends
    - ☐ Internet
    - ☐ Books
    - ☐ Magazines
    - ☐ Other patients at the “clinic” (antenatal clinic)
    - ☐ Midwife or sister at the “clinic” (antenatal clinic)
    - ☐ General practitioner (GP)
    - ☐ “Gynaecologist”
    - ☐ Anaesthetist
    - ☐ Other (please state) _____
    - ☐ I did not receive any information

7. Where did you get the most information on spinal anaesthesia (the injection in your back) **after** coming to hospital for the birth of your baby? (Please choose one option only)
    - ☐ Family members or friends
    - ☐ Internet
    - ☐ Books
    - ☐ Magazines
    - ☐ Other patients in the labour ward
    - ☐ Midwife or sister in labour ward
    - ☐ “Gynaecologist”
    - ☐ Anaesthetist
    - ☐ Other (please state) _____
    - ☐ I did not receive any information

8. For each of the following, think about what you were told about spinal anaesthesia (the injection in your back) and put a cross on whether the statement is ‘true’ or ‘false’, or whether you ‘don’t know’.

a) When a woman comes for a caesarean section, the doctor can give her an injection in the back that takes away pain (a spinal anaesthetic).	True	False	Don’t know
b) When a woman comes for a caesarean section, the doctor can also give her medicines to make her sleep (a general anaesthetic).	True	False	Don’t know
c) For a healthy woman having a caesarean section, a general anaesthetic (getting medicines to make her sleep) is safer than a spinal anaesthetic (the injection in your back).	True	False	Don’t know
d) A spinal anaesthetic (the injection in your back) can harm your baby.	True	False	Don’t know
e) For a spinal anaesthetic (the injection in your back), the doctor puts a thin needle in your back and injects a medicine before removing the needle.	True	False	Don’t know
f) You were told that a spinal anaesthetic (the injection in your back) would make your legs feel heavy and numb.	True	False	Don’t know
g) Your blood pressure may fall after the doctor has given you a spinal anaesthetic (the injection in your back).	True	False	Don’t know

h) A spinal anaesthetic (the injection in your back) can cause back pain for several days afterward.	True	False	Don't know
i) A spinal anaesthetic (the injection in your back) may make you feel sick or cause you to throw up.	True	False	Don't know
j) A spinal anaesthetic (the injection in your back) may cause you to have a headache for several days afterward.	True	False	Don't know
k) A spinal anaesthetic (the injection in your back) could cause you to never move your legs again.	True	False	Don't know
l) You were told that a spinal anaesthetic (the injection in your back) would take away your pain for 4 to 6 hours.	True	False	Don't know
m) After a spinal anaesthetic, it is important to ask the sister in the ward for medicines for pain as soon as the feeling in your tummy starts to come back, and not to wait until you feel pain.	True	False	Don't know
n) After a spinal anaesthetic (the injection in your back) you will be awake enough to hold your baby soon after the caesarean section.	True	False	Don't know
o) A spinal anaesthetic (the injection in your back) may stop you from being able to breastfeed.	True	False	Don't know