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**EXPERIENCES OF REGISTERED NURSES OF THEIR ROLE IN CARRYING OUT
THE INDUCED SPUTUM PROCEDURE IN DIAGNOSING
CHILDHOOD TUBERCULOSIS**

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UNDER THE SUPERVISION OF: Associate PROFESSOR SINEGUGU DUMA AND
DR PAT MAYERS

DECLARATION

I, Whasiefa Isaacs, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being or is to be submitted for another degree in this or any other university.

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Date: 15 August 2011

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ABSTRACT

Tuberculosis (TB) is an ancient disease dating back at least 5000 years, but the TB epidemic is said to be getting worse than at any other time in history (Puri & John, 1997: 12). Someone is infected with TB every second, with a death from TB every 15 seconds, and one out of every three of these infections being in a child (Zar, Hanslo, Apolles, Swingler & Hussey, 2005: 130).

The purpose of this study was to explore and describe registered nurses' experiences of their role with regard to the induced sputum procedure to diagnose childhood TB.

A descriptive qualitative research design was utilised to answer the research question 'What are nurses' experiences regarding their role in sputum induction in diagnosing childhood tuberculosis in a secondary paediatric hospital setting?'. The population for this study comprised registered nurses who were permanently employed and had been working in the secondary paediatric hospital research setting since February 2009, when the induced sputum procedure was introduced to replace gastric lavage in diagnosing childhood TB.

The sample was purposefully selected and consisted of eight registered nurses. Data collection methods used in this study included a demographic questionnaire and semi-structured interview guide. Thematic analysis was used in data analysis to discover the following themes: the role of involving the mother or caregiver; the role of assessment and monitoring; the role of controlling spread of infection; active participation role in diagnosis of TB; teaching and training role; and cost-saving role

The findings of the study showed that registered nurses at this secondary paediatric hospital setting experienced their role of carrying out induced sputum procedures to be directed towards providing quality paediatric TB care in making a diagnosis of childhood TB. Their experiences were further expanded to include the

provision of skills through training nurses in other categories in the induced sputum procedure.

Recommendations based on the findings of this study include the following:

- Further research on the role of professional nurses in both diagnosis and management of childhood TB at primary, secondary and tertiary levels to enlarge the scope of nurses at all levels of health care and thus improve health outcomes for children affected by TB. Development of short courses for in-service training of nurses in sputum induction as part of continuous professional development. This will both encourage cost savings and improve health outcomes for patients with TB.
- Policy-makers should consider recognition and protection of nurses who work with patients infected with TB, by improving the strategies for implementation of policies with regard to prevention of TB as an occupational health hazard in terms of the Occupational Health and Safety Act 85 of 1993.
- Childhood TB should be included in the curriculum of nursing programmes at both undergraduate and postgraduate levels, to ensure that nurses have all required knowledge and skills with regard to diagnosis and management of TB patients, including all necessary precautions to be taken before, during and after the sputum-induction procedure.

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University of Cape Town

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CHAPTER 1: INTRODUCTION AND ORIENTATION TO THE STUDY

1.1 Introduction

“Tuberculosis is an ancient disease that has left its traces in stone aged skeletons and Egyptian mummies dating back at least 5000 years”. Now the tuberculosis (TB) epidemic is said to have worsened more than at any other time in history (Puri & John, 1997: 12). Someone is infected with TB every second, and death from TB occurs every 15 seconds, one out of every of these three infections being in a child (Zar, Hanslo, Apolles, Swingler & Hussey, 2005: 130).

TB is caused by *Mycobacterium tuberculosis* (MTB), an aerobic, non-spore-forming, non-motile, delicate bacillus ranging in length from 1-10 µm. MTB is predominantly a human pathogen spread by droplet infection via the respiratory route. Airborne transmission occurs via aerosol droplet nuclei, which are smaller than conventional droplets. The droplets usually remain suspended in the atmosphere for prolonged periods of time. Young children may become infected after exposure to an adolescent or adult in the household with sputum smear-positive TB (Moore, Schaaf, Nuttall & Marais, 2009: 57).

Childhood TB is a major cause of morbidity and mortality in developing countries and causes a significant increase in the burden of disease (Marais & Pai, 2006: 249). The global incidence, morbidity and mortality of TB in children remain elusive due to the diagnostic challenges. South Africa, and particularly the Western Cape Province, has one of the highest TB rates in the world, reported at 638/100 000 members of the population in 2002 with an estimated annual risk of infection of 3.8% (City of Cape Town/Metropole Region TB Control Programme, 1997-2002: 1-2). Osborne (1995: 369) indicates that TB in children is a growing problem with important health implications.

The current study is part of the main project [REC: Ref. No. 045/2008, “Diagnosis of Tuberculosis in HIV-infected children – development of microbiological and

immunological strategies”] conducted on children from birth to 13 years at the research site. The procedure of induced sputum specimen testing was introduced by the research team at the beginning of January 2009 as part of the main project, where the researcher is employed as a research nurse.

Prior to 2009 the diagnosis of childhood TB at this research site was based on the gastric lavage protocol, where two consecutive gastric lavage procedures were conducted in children during the early-morning hours. A study in 2005 provided good evidence for a change from the two early-morning gastric lavages to a single induced sputum specimen to diagnose childhood TB (Zar et al., 2005: 130-132). In that study the researchers discovered that the diagnostic yield from a single induced sputum specimen was equivalent to that of three sequential gastric lavages. Gastric lavage has always been regarded as the recommended clinical practice for microbiological confirmation of TB in young children. However, researchers in the 2005 study discovered and reported that the induced sputum procedure could be done in an outpatient setting, and was less invasive and safer than the gastric lavage procedure (Zar et al., 2005: 130-132).

Another study comparing the induced sputum procedure to that of gastric lavage among 155 untreated for TB American adult patients in Pennsylvania reported that 194 gastric lavages were obtained and of these only 59 (30%) were positive for TB on culture. Then 344 samples were obtained from induced sputum, and of these 176 (51%) were positive for TB. The statistical difference between these results was $X^2=21.7$, $p<0.001$, and therefore significantly high (Jones, 1966: 403-404).

From 2009 the induced sputum procedure was introduced and was to be performed by day-duty nurses to alleviate the workload and shortage of registered nurses on night duty. This procedure can be performed within 30 minutes, compared to 45 minutes per gastric lavage on two consecutive early mornings. The change from doing gastric lavage to the induced sputum procedure also meant that children could be brought on an outpatient basis, thus saving hospital beds for admission of other patients. This was supported by other community studies, which showed the feasibility of collecting a single induced sputum procedure in an outpatient day

hospital setting (Hatherhill, Hawkrigde, Zar, Whitelaw, Tameris, Workman et al., 2009: 200).

1.2 Diagnosing TB in children

Making an accurate diagnosis of TB in children remains a challenge. Although bacteriological confirmation of TB in children remains a challenging venture, in a great number of children it is not difficult to establish an accurate diagnosis, even in the absence of sophisticated tests. The approach to diagnosing TB in children is, however, dependent on the resources available (Moore, Schaaf, Nuttall & Marais, 2009: 59).

Less than 15% of cases are sputum acid-fast bacilli (AFB) smear-positive, and mycobacterial culture yields are 30-40%. This is complicated by the absence of a practical 'gold standard' in diagnosing TB, as bacteriological confirmation is rarely achieved due to the predominantly paucibacillary (containing just a few bacilli) nature of childhood TB (Swaminathan & Rheka, 2010: 185).

In infants and young children, culture confirmation has relied on specimens from sequential gastric lavages. Gastric lavage is a procedure whereby gastric secretions are withdrawn from the child's stomach via a nasogastric tube. This has always been regarded as the standard procedure to diagnose TB in younger children, because they swallow their sputum and do not expectorate (Zar et al., 2005: 130).

Sputum induction is undertaken after a 2-3-hour fast by a registered nurse trained in this technique (Zar et al., 2005: 131). This procedure involves using hypertonic saline (normal saline with a high osmotic pressure) solution inhalation in expectorating children and adults. It is a safe, simple, non-invasive and repeatable diagnostic tool for obtaining secretions pooled in lower airways from children with chronic inflammation and infection in patients with cystic fibrosis (Gibson, Wlodarczyk & Hensley 1998: 1-2; Mussaffi, Fireman, Mei-Zahav, Prais, & Blau, 2008: 178-179).

Studies comparing gastric lavage with sputum induction in adults and children with suspected TB have reported that the diagnostic yield from sputum induction is higher (Jones, 1966: 403; Zar, Tannenbaum, Apolles, Roux, Hanslo & Hussey, 2002: 305-306; Zar, Tannenbaum, & Hanslo, 2003: 58-62; Zar et al., 2005: 131). According to Zar et al. (2002: 305-308), the procedure of inducing sputum was reported to have been safely performed by registered nurses in infants as young as 1 month of age at Red Cross Children's Hospital in Cape Town. It was also well tolerated in hypoxic (significantly low arterial saturation oxygen) children who had acquired immune deficiency syndrome (AIDS). However, continuous monitoring of children's arterial oxygen saturation during the procedure was not observed. Very few children were reported to not complete the procedure, and no child was reported to have clinically deteriorated in condition.

This non-invasive procedure is deemed to be well within the scope of registered nurses' practice, because the Scope of Practice (R2589) allows the registered nurse to maintain and supervise supply of oxygen to patients of all ages (South African Nursing Council (SANC), 2008:1-2). Similarly, a study performed in a day hospital setting in Worcester, South Africa, suggested that sputum induction can be performed safely by trained nurses. On condition that adequate monitoring of the patient's condition is performed and is satisfactory. This includes monitoring the oxygen saturation, which should be measured by non-invasive pulse oximetry and be retained above 95% (Hatherill et al., 2009: 199).

1.3 Nursing in the care and treatment of TB

Nurses have always had an important contribution in the care and treatment of people with TB. Nurses are the forerunners of TB primary health care in Cape Town and everywhere else in South Africa. Directly observed treatment (DOTS) short course is provided at nurse-managed primary health care clinics, which manage more than 90% of ambulatory TB treatment in the city (Simon, Dick, Zwarenstein & Lombard, 2005: 1).

Nurses in South Africa's public sector have to provide TB care in areas with poor human resources because of doctor shortages in public health settings. According to Rice (2001: 13), quality TB patient care is provided by nurses functioning as case managers through community support programmes. In KwaZulu-Natal it was reported that at community treatment sites nurses were given the responsibility to ensure that patients took their medication correctly. The programme ensured a high compliance rate and a high rate of completion of treatment (60% vs. 18% pre-starting of programme) (Wilkinson, 1994: 647-648). It was concluded that nurses play an important role in diagnosis and management of TB.

The estimated nursing caseload of childhood TB is between 15-20% of the total TB cases in developing countries (Marais, Gie, Schaaf, Beyers, Donald, & Starke, 2006: 1080). It is therefore envisaged that if the induced sputum technique proves to be feasible and registered nurses can perform it safely. This could ultimately result in nursing caseload relief because the induced sputum procedure is a quick and easy technique in comparison to gastric lavage.

1.4 Problem statement

Collecting an adequate sample for microbiological diagnosis of TB presents a significant challenge, particularly in small children who cannot produce a good sputum specimen. Gastric lavage, a procedure used to aspirate gastric secretions from children's stomachs, poses limitations in making a diagnosis of TB in children. These limitations include the need for an overnight fast, repeated specimens and hospital admission of children (Zar et al., 2005: 130-133). Furthermore, the procedure is time-consuming and unpleasant for both the patient and the nurses who conduct the procedure. Gastric lavage procedures were usually performed in an unventilated treatment room, and exposed nurses, patients and caregivers to infections.

The sputum induction procedure was introduced at the research setting in 2009 to replace gastric lavage due to the above identified limitations. After the new induced sputum procedure had been used there for more than 16 months, it was discovered

that it was not known how the registered nurses experienced their role in conducting the new procedure. It was therefore deemed to be essential to explore and describe the nurses' experiences of their role in carrying out the induced sputum procedure in diagnosing childhood TB as part of an ongoing major research project. This was important in determining any future implications for extension of this procedure to other primary and secondary health care settings.

1.5 Purpose of the study

The purpose of this study was to explore and describe the registered nurses' experiences of their role in carrying out the induced sputum procedure to diagnose childhood TB.

1.6 Research objectives

The research objectives were as follows:

- To explore the registered nurses' experiences of their role regarding carrying out the induced sputum procedure in diagnosing childhood TB in a secondary paediatric hospital in Cape Town.
- To analyse and describe the registered nurses' experiences of their role in carrying out the induced sputum procedure for diagnosing childhood TB in a secondary paediatric hospital in Cape Town.

1.7 Research question

The main research question was: What are the registered nurses' experiences of carrying out the sputum induction procedure in diagnosing childhood TB in a secondary paediatric hospital setting?

1.8 Definition of terms

For the purposes of this study, the following terms are defined as follows:

Registered nurse or nurse: A person who is registered as a nurse under section 16 of the Nursing Act 50 of 1978 as amended (Searle, 2000: 123).

Role: A person or a thing's function (Hawkins, 1991: 448).

Induced sputum: The collection of an adequate amount of lower-airway secretions (sputum) in patients who are not able to produce sputum spontaneously (Spanevello, 2009: 35).

TB: Tuberculosis (TB) is an infectious disease transmitted through the air in droplet nuclei that are produced when a person with active TB disease of the lung or larynx sneezes, coughs, speaks, or sings. Persons breathing air contaminated with these droplet nuclei may become infected with TB (Division of Public Health, 2010: 5).

1.9 Outline of the study

Chapter 1 discusses the introduction and background to the study, the problem statement, the aim and objectives of the study, and research question, and provides a definition of terms.

Chapter 2 discusses the literature review undertaken by the researcher for the study.

Chapter 3 describes the research methodology and data collection process of the study.

Chapter 4 provides detailed descriptions of the analysis methods used in the study

Chapter 5 provides a presentation of the results and findings of the study.

Chapter 6 presents the discussion, limitations, recommendations and conclusion of the study. This is followed by the list of references and appendices.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter consists of a review of the literature relevant to the current study. A literature search was conducted under five main areas: burden of childhood TB; diagnoses of TB in childhood; induced sputum versus gastric lavage in diagnosing childhood TB; controlling the spread of transmission of TB; and nurses' role in TB management.

Although some qualitative researchers often avoid extensive literature searches on the topic before entering the field, an upfront review of existing literature was conducted. It provided the researcher with important background knowledge of the topic researched, as suggested by Polit and Hungler (1997: 91). The information gained through the literature review also enabled the researcher to identify gaps with regard to the current study; these gaps confirmed the need for conducting the study as suggested by Conin, Ryan and Coughlan (2008: 38-42). Polit and Beck (2006: 58), suggest that some qualitative researchers often avoid extensive literature searches prior to collecting their own data. This is to ensure that prior studies do not change the way researchers perceive the findings from their own research.

The following databases were used to conduct the literature search: Pubmed, Science Direct, CIHNAL, EBSCO and secondary references, using the following key search terms: tuberculosis in children or childhood TB, diagnostic procedures in childhood TB induced sputum procedures, induced sputum procedures conducted by nurses, role of nurses in TB diagnosis and management. The search terms used included words such as 'diagnosing childhood TB' instead of 'diagnosing TB' because there were not many studies conducted where nurses were involved with induced sputum procedures involving only children to diagnose TB. The researcher then expanded the search to include all studies using induced sputum which

included children and adults. There was no limit to specific years, as the researcher wanted to have background knowledge from where induced sputum procedure to diagnose TB started to date. The language for all searches was conducted in English. The searches included studies from Africa, South Africa as well as international studies.

The literature review was conducted throughout the research process until the final stages of thematic analysis and the final writing up of the findings.

2.2 Burden of childhood TB

For the purpose of this research report, the heading 'Burden of childhood TB' is limited to include TB infection and mortality studies only. The literature review revealed that TB is the number one infectious killer of mankind. TB is among the top 10 leading causes of death in children worldwide. It kills more than 2 million people every year. In 1989 the World Health Organisation (WHO) estimated childhood TB deaths worldwide to be 300 000 in the below 15 years age group (WHO, 2003; Morcillo, 2007: 2). In the European region alone TB kills seven people every hour, and in 2005 children accounted for only 15 000 out of the 400 000 new cases reported by the 53 countries of the WHO European Region. However, the WHO still considers that cases of TB in children are under-reported in that region (WHO, 2007a).

In most health care modalities it is often unfortunate that children with TB are given low priority of care and are seen as the neglected group. It is therefore a priority of the WHO to have accurate and reproducible diagnostic tests available to children suspected of TB infection in high TB burden areas, to ensure their integration into the current national control programmes (WHO, 2011).

According to further reports from the WHO, childhood TB in India, China, Pakistan, the Philippines, Thailand, Indonesia, Bangladesh, and the Democratic Republic of Congo accounts for nearly 75% all the reported cases of childhood TB. Children below 14 years of age constitute around 49% of the 8.6 million TB infections in these countries. In contrast, in the USA, which has an estimated population of about 255 million, only 23 000 new cases of TB are reported annually, nearly 1200 of which are in children (Osborne, 1995: 369).

There has been a steep rise in the incidence and a decrease in the peak age prevalence of infectious TB in countries with a high prevalence of HIV infection. A decrease in the age of patients with infectious TB has been found, particularly in young adults - who are often the parents of young children diagnosed with TB. This finding suggests that children in developing countries - particularly Africa and South East Asia, where HIV is endemic - are at an increased risk of becoming infected with TB (Swaminathan & Rheka, 2008: 184).

An increased risk of infant TB-related morbidity and mortality has been reported in settings where TB and HIV are endemic in the Western Cape. The overall population incidence of culture-positive TB was reported to be higher in HIV-infected infants compared to the incidence of culture-positive TB in HIV-uninfected infants (Hessling, Cotton, Jennings, Whitelaw, Johnson, Eley et al., 2009: 108).

Young children may become infected after exposure to an adult with sputum smear-positive TB. Although findings suggest that adults (particularly mothers and/or primary caregivers) with smear-negative pulmonary TB are less infectious, they may still infect young children (Moore, Schaaf, Nuttall, & Marais, 2010: 57). Although much progress has been made to improve TB programmatic management, a lot still needs to be done. The global magnitude as well as trends in incidence, morbidity and mortality of childhood TB remain obscured due to a lack of a definitive diagnostic tools in many cases (Moore, Schaaf, Nuttall, & Marais, 2010: 57). However, the rapid progression of TB is more dangerous and frequent in children, and if not diagnosed and treated promptly may lead to death or chronic morbidity (Cremin and Jamieson, 1995: 107).

Children are seen as the neglected group in TB management and according to (WHO, 2007: 1-2) children have not formed part of the National TB programme. In 2006 it was reported by the WHO that the National TB programme has no clear diagnostic tools to diagnose childhood TB. There was also a lack of information surrounding the follow up of paediatric household TB contacts, and no clear guidelines for paediatric TB treatment regimens. Children are our future adults, globally. Future research should aim to address the current gaps in the international TB management of children.

2.3 Diagnosis of TB in childhood including adult respiratory diseases

The literature reviewed in relation to diagnosis of childhood TB revealed that there are limitations in diagnostic care modalities to accurately diagnose childhood TB. This is reported to be a global problem, which often leads to increased childhood morbidity and mortality (Schaaf, Beyers, Gie, Nel, Smuts, and Scott et al., 1995: 189; Rennert, 2006: 2); Morcillo, 2007: 15; Vellema, Durrheim, and Smith, 2008: 52). Many patients are left undiagnosed due to the inadequacy and sometimes non-availability of diagnostic tools in disease-endemic countries, which results in increased morbidity, prolonged transmission of TB disease and even death (Perkins, 2000: 182-188).

In developing countries paediatric TB notifications may be under-reporting the true incidence of TB due to diagnostic limitations. In Zambia diagnosis of TB in infants and young children is further complicated by the disease pattern in that age group being very non-specific or atypical. The diagnosis is usually by clinical classification rather than microbiological diagnosis. This has led to constraints in providing children at risk with appropriate chemoprophylaxis against TB in the management of childhood TB. Since HIV and TB remain problematic in the developing countries, it is imperative to develop a more reliable, cost-effective method to diagnose childhood TB (Osborne, 1995: 369). As children represent the future burden of TB disease, making efforts to find a diagnostic tool for TB in children could significantly reduce

the overall global burden of TB in years to come (Moore, Schaaf, Nuttall & Marais, 2009: 57-58).

Children with TB present with a different disease picture compared to adults, because they usually have a low bacillary load and cavities are also rarely seen on radiographs. Therefore, bacteriological diagnosis of paediatric TB is difficult due to the paucibacilliary nature of TB isolated from their clinical specimens. The first step is to obtain an adequate sample for bacterial examination, then to accurately detect and isolate MTB from this (Morcillo, 2007: 15). A study in Chennai, India, reported that the collection of an adequate sample for TB sputum microscopy presents a significant challenge, particularly for infants and young children who are unable to produce a good sputum specimen without the assistance of nurses in inducing sputum (Swaminathan and Rheka, 2010: 187).

Rennert (2006: 2) adds that the difficulty of diagnosing childhood TB in the absence of an accurate diagnostic tool is aggravated by the fact that MTB is difficult to obtain and isolate in children, where 95% of cases of pulmonary TB are usually negative for AFB. In a study conducted at a Lusaka hospital, in Zambia the rate of positive AFB smear/cultures for TB in paediatric cases was only 13% (Osborne, 1995: 372). Unfortunately, the children in that study were found to rarely expectorate sputum. Even where they used gastric lavage and sputum for older children who could expectorate, the majority were found to be negative on smear or culture (Osborne, 1995: 372). Yet Zar et al. (2005: 131) propose that a positive culture for TB may be very useful in the management of childhood TB, especially in the context of increasing multidrug-resistant TB (MDR-TB) and HIV/AIDS. Microbiological confirmation of TB is advantageous for definitive diagnosis, for optimum use of anti-tuberculous medication, and for epidemiological tracing of isolates.

2.3.1 Induced sputum versus gastric lavage in diagnosing childhood TB

Sputum is by far the best clinical material for the bacteriological diagnosis of pulmonary TB, but children often cannot produce sputum on their own (Donald, Fourie and Grange, 1999: 7). It has been reported that the success rate for sputum

induction in children is 68-100%. The use of sputum induction has also been found to be a safe and accurate procedure for diagnosing respiratory diseases in adults. It is generally reported as a safe procedure (Grootendorst, Henry, Pin, Rytala, Wark, Wilson & Djukonovic, 2002: 45-46).

Literature reviewed revealed that sputum induction was widely used for the diagnosis of TB at least three decades ago, because of its superior yield compared to gastric lavage. Both patients and nurses were reported to have preferred this method. It has enjoyed a modest revival recently because of its lower risk of nosocomial TB transmission, and much lower costs (Menziés, 2003: 676-677). A number of studies over the past decade have demonstrated that the diagnostic yield of a single induced sputum sample is as good as fibre-optic bronchoscopy, and the yield of repeated inductions is better than two early-morning gastric lavages (Al Zahrani, Al Jahdali, Poirier, Rene and Menziés, 2003: 1-6; Zar et al., 2002; 305-306; Zar, et al., 2005: 131; Hatherhill et al., 2009: 199).

Children below the age of 12 years are rarely able to expectorate and produce good sputum on their own. Gastric lavage has therefore been the diagnostic method of choice for diagnosing childhood TB in the past. The reason for using gastric lavage was that children often cough up then swallow their bronchial secretions. However, even under the best technical conditions, AFB can only be detected in 30-40% gastric lavage specimens from ill children (Morcillo, 2007: 15).

Literature reviewed revealed that in Brazilian hospitals the gastric lavage protocol is still the most commonly used method to diagnose childhood TB, even though it is a costly diagnostic tool since the children are required to stay in hospital for at least three days. A prospective systematic review of gastric lavages conducted by the Brazilian Ministry of Health between 1968 and 2008 revealed that the procedure lacked uniformity and standardisation (Maciel, Brotto, Sales, Zandonade and Saint'Anna, 2010: 2). It was concluded that there is a need for a standardised approach to the procedure of gastric lavage and for a less invasive, cost-effective technique to diagnose childhood TB in Brazil (Maciel et al., 2010: 2).

In Punjab and Haryana, India, use of sputum induction was reported to be an effective diagnostic method to obtain good, adequate sputum specimens for diagnosis of TB (Gupta and Garg, 2005: 144). In this study sputum induction was conducted in 100 adult patients and found to be successful in 97% where an adequate volume of sputum was obtained. The researchers mentioned that an experienced technician performed the induced sputum procedure under the supervision of a medical practitioner to ensure the safety of children by continuous monitoring of the observations (Gupta and Garg, 2005: 144). However, sputum induction can also be conducted by nurses, who can also monitor the condition of the child and thus ensure the safety of the patient.

Literature reviewed revealed that sputum induction with an aerosol of hypertonic saline was first introduced by Bickerman and colleagues in Europe as early as 1958 for diagnosing lung cancer in adult patients (Gupta and Garg, 2005: 82). It was later used to investigate diagnosing TB and other infectious lung diseases (Hargreave and Leigh, 1999: 52). Later, Jones (1966: 406-408) conducted a study of adult patients with suspected TB in America, examining the efficacy of 'aerolised' induced sputum, comparing it with spontaneous sputum specimens and gastric lavages. He found that induced sputum had a greater yield of AFB than gastric lavage, and recommended the induced sputum procedure as the next best diagnostic tool in the bacteriological diagnosis of pulmonary TB.

According to literature relating to another American study conducted in 1990, the induced sputum method was modified by several researchers to improve the standard of safety of the procedure for adult asthmatic patients. Nurses performed the induced sputum procedure, and assessment and monitoring of the patient's condition. Sputum induction by nurses was reported to be safe for mild asthmatic patients, with modification of the procedure for more severe asthmatic and chronic obstructive airway disease patients. Modification of the induced sputum procedure to ensure the safety of the patients entailed shortening the duration of inhalation of the hypertonic saline aerosol. The induced sputum procedure was found to be safe and successful for 85% of patients with chronic lung diseases (Hargreave and Leigh,

1999: 54-55; Pin, Gibson, Kolendowicz, Girgis-Gabardo, Denberg, Hargreave et al., 1992: 25-29; Fahy, Liu, Wong and Boushey, 1993: 1126-1129).

Literature reviewed show that safe sputum induction is possible in children as young as 5 years across the world, provided staff are trained (Zar et al., 2002: 305-306; Grootendorst et al., 2002: 45-46; Zar et al., 2005: 131). Researchers from the Schneider Children's Medical Centre in Israel reported successful and safe sputum induction procedures in children as young as 6 years. Another study of 30 Malawian children with suspected TB reported that diagnosis was confirmed by staining or culture of induced sputum in eight individuals (28%). However, most children were older than 5 years and the yield from gastric lavage was not measured. The procedure was well tolerated by all patients and found to be safe and effective as a diagnostic tool for TB in children (Parry, Kamoto, Harries, Wirima, Nyirenda, Nyangulu and Hart, 1995: 72-76).

In another study protocols similar to those used in adults were applied by trained research nurses to children, with pre-medication and monitoring similar for adults, using an induced sputum technique with hypertonic saline solution inhalation in children (Mussaffi et al., 2008: 178-179). This was reported as a safe, simple, non-invasive and repeatable diagnostic tool for obtaining secretions pooled in lower airways from children with chronic inflammation and infection in patients with cystic fibrosis. It was concluded that the greatest benefit of the induced sputum procedure was in its application to the study of airways inflammation in children, in whom the use of bronchoscopy was very limited for ethical and safety reasons. The authors stressed the importance of trained personnel in performing induced sputum procedures (Mussaffi et al., 2008: 178-179).

Previous studies reviewed showed that patients' tolerance and nurses' preference for the sputum induction procedure as well as its safety are important for accurate diagnosis of TB in young children Zar et al., 2002: 305-30; Zar et al., 2003: 58-62; Zar et al., 2005: 1316).

The procedure is also feasible in developing country settings with adequate human resources, including trained nurses. Sputum induction is feasible, effective and well

tolerated in children, including infants or HIV-infected patients. As a result, sputum induction has become the preferred standard diagnostic investigation at most paediatric hospitals for suspected pulmonary TB (Zar et al., 2002: 305-30; Zar et al., 2003: 58-62; Zar et al., 2005: 1316).

In another study of young children (median age 9 months) admitted for acute pneumonia at Red Cross Children's Hospital in Cape Town, it was reported that sputum induction was safely and effectively performed by registered nurses (Zar et al., 2003). However, in 16 children with TB confirmed by culture, the yield from induced sputum was similar to that from gastric lavage. Clinical suspicion of TB was low since those children were admitted with suspected pneumonia. Although the procedure was stopped in 7 out of 210 children who developed excessive coughing, it was concluded that the induced sputum procedure is safe in children with lung disease (Zar et al., 2003: 58). A later study at the same hospital in 2005, comparing induced sputum with gastric lavage, also revealed that sputum induction was safe and effectively useful for microbiological confirmation of TB in young children. The technique was also preferred over gastric lavage for diagnosis of pulmonary TB in both HIV-infected and HIV-uninfected children (Zar et al., 2005: 134).

Literature reviewed show that sputum induction is a safe and effective procedure to diagnose TB, even in young infants, but should only be performed in settings where nursing staff have received adequate training to perform the procedure safely (Moore et al., 2009: 60). One of the strategies used to ensure that nursing staff have received adequate training has to include the following: Good adherence to the standard operating procedure for induced sputum procedure with emphasis on monitoring of the child's observations before, during and after the induced sputum procedure.

2.4 Controlling the spread of transmission of TB

According to literature reviewed, nurses are identified as the first health care group at increased risk of becoming infected with TB. They probably have the highest rate of infection with TB of all health care workers, this being due to the often prolonged close contact between hospital nurses and their patients. Protecting health care workers, patients and their families involves practical measures relating to appropriate environmental control and relevant personnel and patient protection WHO (1997: 478).

Literature reviewed revealed that in Switzerland, when the nurses performed induced sputum procedures at hospital cases with suspected TB were isolated in a single, well-ventilated room for infection control purposes. It was concluded that nurses in hospitals and primary health care facilities should follow strict infection control policies to protect themselves, their patients and the patients' families from contracting nosocomial TB infection (Schoch, Rieder, Tueller, Altpeter, Zellweger and Rieder, 2007: 81).

The French National Institute of Health and Medical Research Council propose that "infection control procedures for the protection of personnel and patients must be carried out according to local anti-infection control policy (Paggiaro, Chanez and Holz, 2002: 4). The WHO (2007b: 2) concludes that the spread of childhood TB infection is directly attributable to exposure to an adult with sputum smear-positive pulmonary TB by AFB. A study in a UK hospital reported that nurses had to care for all children with TB in a side ward until all family members had been screened for TB, because it was thought that the family was the source of the child's TB infection. Infection control by nurses to staff, patients and families to stop the spread of the disease within health care institutions was proposed (Bell, 2004: 48).

Literature reviewed has placed strong emphasis on infection control policies in developing countries, where the risk of nosocomial TB infection is highest. However, research conducted has proven that some health care facilities rarely adhere to such policies in developing countries. For instance, in a study conducted to assess the

measures against acquiring TB among health care workers in 22 lower-level health units offering TB care to patients in Mbarara, a rural district in south-western Uganda, the authors found a lack of facemasks worn by staff and patients alike (Nansera, Bajunirwe, Kabakyenga, Asiimwe, and Mayanja-Kizza, 2010: 312-319). Although the health care workers have not viewed the lack of infection control to be a challenge in rendering TB and HIV care, the authors recommend that the Health Ministry in Uganda enforces stricter infection control policies to curb the spread of nosocomial TB infection. A study looking at reduction of nosocomial transmission of TB in US hospitals found use of the N95 respirator mask to be an effective protective measure against TB infection if worn by nurses working in hospitals (Schwartzman and Menzies, 1999: 1276). The authors further recommend the use of the mask in hospitals, because it is cost-effective and filters at least 95% of respirable particles of 1-5 μm in diameter, allowing a below 10% leak around the mask if worn correctly by hospital staff (Schwartzman and Menzies, 1999: 1276).

Moore, Schaaf, Nuttall and Marais (2009: 62) state that no infection control policy or guideline on the management of TB is complete without infection control measures being clearly delineated. The authors further state that infection control measures should include a well-ventilated room for carrying out the induced sputum procedures, and nurses performing it should wear personal respiratory protection masks (N95 respirator mask); any mother or caregiver who is coughing should also be asked to wear a mask and be referred for investigation for TB. Puri and John (1997: 271) contend that health workers wear masks to protect themselves against TB when working in the TB wards. They add that a facemask can reduce the risk of infecting others when worn by a TB suspect.

2.5 Nurses' role in TB management

The literature reviewed revealed multiple roles played by nurses in the management of TB, including involvement in diagnosis of TB and infection control (WHO, 1997: 478; Puri and John, 1997: 271; Schwartzman & Menzies, 1999: 1276; Zar et al., 2002: 305-306; Al Zahrani et al., 2003: 1-6; Bell, 2004: 48; Zar et al., 2005: 131;

Mussaffi et al., 2007: 178-179; Hatherhill et al., 2009: 199; Moore, Schaaf, Nuttall and Marais, 2009: 60; Swaminathan and Rheka, 2010: 187).

A South African study on a rapid situational analysis conducted in Tshepo health district in Free State Province to assess TB control and management reported that nurses play an important role in recognising signs of TB, which places them in a position to diagnose TB early. The authors also explained that these nurses acted as coordinators of the TB programme, coordinating all TB services from staff management to patient TB care management at facility level of the Tsepo health district. (Janse van Rensburg, Engelbrecht, Heunis, Steyn, Matebesi, Summerton et al., 2000: 20-24). It was also reported that the nurses were involved in collection of sputum from adult patients for bacteriological assessment to make an accurate diagnosis of TB (Janse van Rensburg et al., 2000: 20-24). Another study of primary health care nurses working in Mpumalanga Province of the same country reported that they played a pivotal role in suspecting and diagnosing TB in children (Vellema, Durrheim and Smith, 2008: 53).

In July of 1996, in line with the national health departmental policy, the Cape Town Metropole in the Western Cape Province adopted the WHO TB control strategy of DOTS, where detection and treatment of infectious pulmonary TB for adults and children were prioritised as a role of the nurses. Successful implementation of these nurse-based clinics in the Western Cape, particularly in the Cape Metropole, has provided evidence that microbiological confirmation of pulmonary TB remains the most cost-effective diagnostic tool in TB management, despite the growing HIV epidemic (De Villiers and Toms, 2005: 68).

According to De Villiers and Toms (2005: 68-71), TB is diagnosed in patients (adults and self-expectorating older children) via a nurse-based algorithmic, bacteriologically based case definition of TB (this algorithm is designed for TB trained nurses and if the patient had two positive TB smears bacteriologically, then it was sufficient for the nurses to make a TB diagnosis and start TB treatment). These TB-trained nurses have proven that two positive smears of sputum for AFB are ample to accurately diagnose TB and start TB treatment as needed without delay. In further management

within these primary health care clinics, all patients were symptomatically screened for TB. Children below 5 years of age who had been exposed to an adult who was smear-positive for AFB were also excluded for TB. If children were negative for TB after investigation, the nurses started them on TB prophylaxis.

The literature also revealed that nurses have an important role to play in the control and management of TB in all health care facilities. Puri and John (1997: 272) assert that the role of the nurse in TB management includes factors such as health promotion and, in particular, how to decrease the risk of spreading TB infection, screening of possible suspects who have been in contact with the TB-infected patient, completion of TB treatment, and education in relation to possible side-effects to TB drugs.

Sissolak, Marais and Mehtar (2011: 2-9) explored the experiences of ward nurses concerning multiple aspects which influence infection with and prevention and control of TB, and increasing the potential risk of nosocomial transmission of TB in hospitals. They found that South Africa requires effective infection, prevention and control measures in public health care facilities, which includes hospitals as well as primary health care facilities, to prevent TB transmission of nosocomial infection. They further state that several recent studies which reviewed non-biological factors in TB control found that nurses play an important role in the detection, prevention and control of TB, including provision and coordination of appropriate TB treatment. This study recommended urgent training interventions in TB infection, prevention and control in the form of a policy to be offered to these nurses and other health care workers to improve the overall quality of care provided to patients.

2.6 Conclusion

This literature review highlighted the global problem of childhood TB, revealing different diagnostic methods used in the diagnosis and management of childhood TB to date. Infection control measures and nurses' role in the management of childhood TB were also highlighted. Although literature reviewed have identified that nurses have an important role related to TB management it was never explicitly stated what

those roles were. A gap identified in the literature reviewed was the absence of studies concerning exploration and description of registered nurses with regard to their role in carrying out sputum induction procedures. The lack of knowledge surrounding the skill in performing induced sputum procedure in diagnosing childhood TB was also lacking in the literature reviewed. This further supported the need to conduct the current study to address this identified gap.

University of Cape Town

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methods and processes used to conduct the study on the nurses' experiences of their role regarding induced sputum in diagnosing childhood TB. These include the methodology, research design, setting, population, inclusion and exclusion criteria, sampling, gaining access, recruitment of participants, and ethical considerations adhered to during the study.

3.2 Methodology

An exploratory, descriptive, qualitative research design was used to achieve the purpose of the study, which was to explore and describe registered nurses' experiences of their role regarding the induced sputum procedure to diagnose childhood TB. This methodology was found to be appropriate because according to Katzenellenbogen, Joubert and Abdool Karim (1997: 176-177), qualitative research methods allow researchers to contextualise how participants of a research study perceive their situation and their role within the context. The context of this study is the way in which registered nurses perceive their role of carrying out the induced sputum procedure to diagnose childhood TB.

3.2.1 Research design

A qualitative research design is an approach that nurse researchers use to gain rich knowledge and insight about human beings, be they patients, colleagues or other professionals (Holloway and Wheeler, 2010: 2-3).

3.2.2 Exploratory, descriptive design

According to Polit and Hungler (1997: 457), an exploratory study is designed to explore the dimensions of a phenomenon or to develop or refine a hypothesis about

the associations it. As there is so little knowledge surrounding this research topic, the study aimed to explore knowledge through semi-structured interviews with registered nurses of their experiences of their role regarding the induced sputum procedure to replace gastric lavage in diagnosing childhood TB in a secondary paediatric hospital as a research setting. The purpose of descriptive research is to provide a picture of what naturally occurs (Burns and Grove, 2011: 200). This research design promised to provide a useful starting point on which to base other qualitative research with the aim of providing nursing management at this hospital with descriptive views of the registered nurses' experiences regarding their role of carrying out induced sputum procedures in diagnosing childhood TB.

3.3 Study setting

The setting of this study was a secondary hospital which operates in the Central Health District of the Cape Town Metro Region. The hospital consists of four general paediatric units with 72 paediatric beds. At least 30 new admissions to these paediatric units daily are transfers from other paediatric institutions locally. Children with respiratory-related illnesses admitted to these paediatric units daily account for 78% of the total number of admissions. Due to available evidence suggesting that children contribute 15-20% of the total TB burden in South Africa, a unanimous decision was taken by the hospital management that all children admitted to these paediatric units be investigated for TB (Moore, Schaaf, Nuttall and Marais, 2009: 57).

3.3.1 Background

Previously the registered nurses on night duty were responsible for conducting two gastric lavages during the early morning hours to diagnose TB in children. Gastric lavage, a procedure used to aspirate gastric secretions from children's stomachs, poses limitations in making a diagnosis of TB in children; limitations include the need for an overnight fast, repeated specimens and hospital admission (Zar et al., 2005: 130-133). At the beginning of January 2009 the induced sputum procedure was introduced by the research team as part of a main project (REC: Ref. No. 045/2008, "Diagnosis of Tuberculosis in HIV-infected children – development of microbiological

and immunological strategies”, being conducted on children from birth to 13 years), at the hospital, where the researcher is employed as a research nurse. Registered night and day duty nurses were then approached by the hospital’s management to introduce a single induced sputum procedure to replace the two early-morning gastric lavage procedures. It is against this background that the current study was conducted.

3.4 Study population

According to Polit and Beck (2006: 56), a population is defined as the entire group of individuals that meet a designated set of criteria. The difference between a target population and an accessible population to alert readers to the eligibility criteria of the study. Eligibility criteria are the characteristics that delimit who need to be excluded from the study since they do not possess the elements in which the researcher is interested. The target population is the “entire population in which the researcher is interested. The accessible population is the cases that conform to the eligibility criteria and that are accessible to the researcher as a pool of subjects for the study” (Polit and Hungler, 1997: 223).

The population for this study was all registered nurses who were permanently employed at the secondary hospital and had been working in the paediatric units since February 2009, when the induced sputum procedure was introduced to replace gastric lavage in diagnosing childhood TB in the secondary hospital as a research setting.

3.5 Sampling

Sampling is said to be a process of selecting a portion of a population to represent the entire population (Polit and Hungler, 1997: 224). Munhall (2007: 530-531) advises that in qualitative research the sampling approach demands different techniques than the randomly selected and probability sampling which quantitative researchers often use. He further states that the sample must be both appropriate and adequate. To be appropriate, the method should fit in with the aim of the study.

A sampling strategy is adequate if it generates enough quality data which are also relevant for the purpose of the study.

In this study purposive sampling was used to select registered nurses who were considered as knowledgeable by virtue of their experiences in their role carrying out the induced sputum procedure in diagnosing childhood TB. Certain criteria (i.e. registered nurses who possessed special knowledge of the topic) were applied and therefore the sample was chosen according to a specified purpose. Polit and Hungler (1997: 229) state that purposive sampling is based on the researcher's prior knowledge about the population and can be used to hand-pick the cases to be included in the sample.

Qualitative researchers using purposive sampling deliberately select their sample using the following two criteria below, which were used in this study:

Experiential fit. Participants are deliberately selected according to their knowledge regarding the topic under discussion (See demographic questionnaire, Appendix E) (Munhall, 2007: 530-531). The researcher selected only those registered nurses working in the paediatric wards that had been involved with the gastric lavage procedure previously and had been introduced to the induced sputum procedure in diagnosing childhood TB.

Since the researcher was the person conducting the induced sputum training prior to introduction of the procedure, as well as the research nurse in the main study, she established good relationships with the registered nurses.

Qualities of a good informant. According to Polit and Hungler (1997: 459), the term informant is frequently used in qualitative research to recognise persons providing information to the researcher about the phenomena under study. The second set of characteristics involves the personal qualities of the participant. For obvious reasons researchers would not waste time interviewing a participant who is unwilling to talk or who doesn't have sufficient time to participate (Munhall, 2007: 530-531).

Good informants are those people who possess special knowledge, status or communication skills and are willing to share those skills and knowledge with the researcher. The informants are capable of providing access to information, either by providing the information themselves or linking the researcher to a person who may provide information about the specific phenomena of interest (Crabtree and Miller, 1992: 35).

Holloway and Wheeler (2010: 79) suggest that in qualitative research the term 'informant' refers to a member of a culture or a group who voluntarily informs the researcher about their world and plays an active role in the research. Morse (1991: 406) suggests that researchers may call those participating in a study "subjects, respondents, informants or participants", but concludes that "although researchers choose their own term it should fit" the study.

The abovementioned registered nurses were identified from the researcher's list of trained registered nurses as good informants. Strict criteria were used to determine the eligibility of participants as good informants.

3.5.1 Inclusion criteria

Criteria for inclusion in the study were as follows: registered nurses who were permanently employed at the secondary hospital and currently working in the paediatric units; registered nurses who had received training and been found to be competent in conducting the sputum induction procedure, and who were currently involved in using the procedure; and registered nurses who were able to communicate in English. English is the preferred language of choice due to it being the medium of instruction used in most health care facilities in the Western Cape, and especially in the research setting where the study was conducted (Stein, Lewin and Fairall, 2007: 954-964). It was felt that the registered nurses would best be able to express themselves professionally in this language.

3.5.2 Exclusion criteria

Potential participants who met the following criteria were excluded from the study: community service nurses – these are registered community health, student nurses who serve only a six-week paediatric in-service training period. Management of the paediatric ward was not keen for these nurses to be trained as they would not form part of the long term work force; registered nurses who had not been trained in the induced sputum procedure; and registered nurses who had received training but were found not yet competent in conducting the procedure.

3.6 Access to the research setting

Access to the research site for research purposes was sought (See Appendix A) and obtained from the Medical Superintendent and Nursing Services Manager of the hospital after receiving ethical clearance from the University of Cape Town's Faculty of Health Sciences Ethics Committee (See Appendix B). The principal investigator and research team of the main study had by then already been informed about the proposed study. They all supported the researcher in gaining access to the research site.

3.7 Recruitment

The willingness of potential participants to express their experiences regarding their role of carrying out the induced sputum procedure in diagnosing childhood TB was of great importance to the researcher when selection was made. The night and day duty registered nurses involved in the induced sputum procedure were approached and informed about the study. The researcher approached those registered nurses from the list via telephonic means, introduced herself again [she had been involved in training them], gave a brief description of the study, and asked them to consider participating in it. Individual meetings to discuss the study were scheduled with those who agreed telephonically to participate in the research. This was in order to build rapport and get to know the potential participant better.

Streubert Speziale and Carpenter (2007: 94) state that “researchers must make contact with participants, once they have agreed to participate, before the interview to prepare them for the actual meeting and to answer any preliminary questions”. During the scheduled meetings with individual participants the researcher explained the study verbally to all. An information letter and consent forms were given to willing potential participants (Appendix C). Only once the potential participant agreed to take part was the informed consent document signed and a suitable time for interview arranged. The recruitment phase lasted four weeks.

3.8 Sample size

The sample for this study comprised eight registered nurses (two from the pilot and six from the main current study). Small sample sizes are used in qualitative studies because the in-depth nature of the interviews yields rich data in relation to the relatively small number of research participants. The rich data were gathered from respondents’ elaborations of what was of importance to them. The researcher has used probing to allow respondents to expand on what has already been said in order to gain rich data (Burns and Grove, 2011: 317). According to Sandelowski (1995: 179), a frequent misconception in qualitative research is that numbers are not important to ensure the adequacy of the sampling strategy. Patton (1990: 169) argues that the “logic and power” of the various kinds of purposive sampling used in qualitative research lie primarily in the quality each person holds, as opposed to their number per se. The author further explains that the number of respondents interviewed is not as important as is the rich information obtained from each person’s interview.

Although the proposed sample was 10 registered nurses, by the end of data collection and preliminary data analysis from the eighth participant the researcher had reached saturation of data, with no new information coming forth. According to Munhall and Boyd (1993: 256-257), data saturation occurs when no new data add to the emergent themes or patterns and no new insights are discovered that can shed light on the research question. That then calls for the active fieldwork phase to end. On consultation with the research supervisor who together with the researcher has

gone through the analysed data to ensure that nothing 'new' emerged, which may add different meaning to the data. It was confirmed that the researcher had reached the data saturation point. Further data collection was then no longer necessary.

3.9 Interview setting

Holloway and Wheeler (2010: 31) suggest that researchers search for a setting that is suitable and appropriate for meeting with participants to discuss the study information form and consent document and for conducting interviews. A quiet room and researcher's office was used for the interviews to ensure the privacy of all participants. The registered nurses had all agreed that this setting was most convenient and private. A 'Do not disturb' sign was placed outside the door to ensure no disturbances during the interviews. The seating arrangement was conducive to proper, direct eye contact and to encourage involvement and interaction with the participant.

3.10 Pilot study

Although the researcher has undergone qualitative research training, she regarded herself as a novice researcher. It was therefore important for her to conduct a trial run of draft interview questions was carried out in order to familiarise herself with conducting interviews using the semi-structured interview guide. This was also done to uncover procedural difficulties with the semi-structured interview guide. These practice interviews were recorded with permission from respondents and reviewed with the supervisor. Key revisions to the interview guide were to highlight deficits in questions during interviews and interview techniques and provided guidance as to the appropriateness of the length of interview. The interview technique was revised in the following ways:

- The audio-tapes from practice interviews were listened to with the assistance of the supervisor, who then advised on the technique of asking questions during interviews.
- Some of the questions were vague and did not focus on the research question and objectives, and therefore could not elicit much response from the pilot participants.

- Those questions were then deleted or revised with guidance from the research supervisor.
- The researcher's state of stress was detected from listening to her voice.
- She was advised to be calmer and to relax during the next interviews as this affected the participants' responses.
- Another lesson was that the researcher seemed to rush through the interview guide, without further probing, thus losing the opportunity to discover rich data through probing questions.
- Despite all this, the research supervisor found most of the participants' responses accurate and appropriate for inclusion in the main study.

3.11 Data collection instruments

Data collection instruments used in this study included a semi-structured interview guide (see Appendix D) and demographic questionnaire (see Appendix E). The demographic questionnaire was completed by each participant prior to the interview. This included demographic data such as type of employment institution, age, gender, education, months of experience post-induced sputum training and area of work.

A semi-structured interview is a flexible method of data collection used in qualitative research which allows new questions to come to the fore as a result of what the interviewee says (Taylor & Lindlof, 2002: 195). The semi-structured interview guide was developed by the researcher according to the objectives of the study (see Appendix D).

3.12 Data collection

The semi-structured, interviews were conducted using the interview guide that was developed according to the research objectives (Appendix D). Further probing was used when a respondent was having difficulty answering a question in the first reply. "Probing is the technique used by interviewers to elicit more useful, detailed information from respondents than was volunteered in the initial reply" (Polit & Hungler, 1997: 259). This included statements and questions such as: "Ok, so tell

me what you mean?”, “Would you like to tell me more?”, and “Is there anything else...?”.

Each interview lasted for approximately 45 minutes to one hour. This was in line with Holloway and Wheeler’s (1996: 56-57) recommendation that interviews should not be longer than one hour, although the actual length of time is dependent on the participant.

At the end of the interview each participant was told that she or he would be contacted again to see if there was something more that they would like to say and to share with the researcher with regard to data analysis. This was in order to prepare the participant for member checking, which is discussed in Chapter 4. The interview was concluded with the researcher asking each participant whether they had anything further to add, restating the level of confidentiality in this study and thanking them for their availability to participate in the study.

3.13 Ethical considerations

- The protection of human subjects as outlined in the *Guidelines on Ethics for Medical Research* (Benatar, 2002: 17-23) was adhered to during the study. This included the issues outlined below.

3.13.1 Informed consent

Informed consent means that participants have enough information regarding the study, are capable of forming an understanding, and have the right to make choices regarding whether to consent voluntarily and to participate in the research or not (Polit and Hungler, 1997: 134). Written informed consent (which included an explanation of the study, its aim and expectations) was obtained from each participant after they had read the information sheet and consent form (Appendix C).

- Written consent was signed by each participant and the researcher in duplicate before interviews commenced. Each participant who agreed to

participate in the study was informed that she/ he had the right to withdraw at any stage before, during or after the interview.

- A further explanation to participants was that their decision to refuse to participate would not be held against them.
- Consent for audio-taping the interviews were also sought from each participant before commencement of the interview. Participants were told that they had the right to refuse audio-taping of their interviews. Participants were also told the approximate duration of interviews.

3.13.2 Autonomy

Autonomy is derived from a Greek word meaning self-ruling, having the right to say no (Munhall, 2007: 40).

- It was explained to participants that participation was voluntary.
- The participants were given the right to say no or to refuse to participate in the research study without any coercion.
- Participants were given the right to withdraw at any time before, during or after signing informed consent.
- The informed consent document had three elements: information, comprehension and voluntariness. The autonomy of the participants was thus maintained, since the researcher treated all with human dignity by ensuring the above-mentioned, as per the *Guidelines on Ethics for Medical Research* (Benatar, 2002: 17-23).

3.13.3 Confidentiality and anonymity

Confidentiality in qualitative research is the protection of research participants in such a way that their identities are not linked to any information they provide. The information provided is further protected by the researcher to never reveal their identities publicly (Polit and Beck, 2006: 497).

- An explanation was given that all information obtained, such as the list of names and corresponding telephone numbers, demographic questionnaires, audio-tapes, written informed consents, and all transcripts from interviews, were kept in a lockable cabinet. The researcher was responsible for the key and other authorised persons such as the supervisor had access to such information upon request.

Anonymity is a term used when a researcher is not allowed to link a participant to her/his name or any form of identification of that person (Polit and Hungler, 1997: 136).

- This was ensured by the use of numbers instead of name identification to label each tape.

Qualitative health services research aims for anonymity and confidentiality, and the researcher ensured safe storage of tapes and transcripts to maintain the principle of anonymity and confidentiality was adhered to (Richards & Schwartz, 2002: 135-137). Any information that might allow participants to be identified was deleted from computer files and stored under pseudonyms to further protect participants' anonymity. These files were stored in a Microsoft Word file under participant 1 and date, participant 2 and date, etc. Further information on data storage is available in Chapter 4.

3.13.4 Possible benefit from the study (justice)

It was explained to participants that there was no direct benefit because of their voluntary participation. Justice concerns the fair distribution of the benefits and burdens of research, and demands that individuals who are equal be treated equally when they participate in research (Ackerman, 1996: 83-104). Transport costs were covered up to a maximum of R50 for those nurses who were not able to schedule an appointment during their work time. This amount of R50 was sufficient to cover costs for a trip to the interview and back home. According to the *Guidelines on Ethics for*

Medical Research (Benatar, 2002: 51-52), all participants who have incurred personal expense as a consequence of participation in research must be compensated.

3.13.5 Beneficence

Beneficence means to “do good” for the benefit of others (Polit and Hungler, 1997: 130). Participants were assured that all information provided and that which is used in the research study will not be used negatively against them in any way. A further explanation was given that there are no direct benefits of the study to them, but that the outcome of the study may be useful for improving nursing practice in paediatric care. All objectives and purposes of the study were explained in full to participants prior to voluntary participation, to ensure that they all comprehended the information fully.

3.13.6 Non-maleficence

Non-maleficence is the principle that is important for nurses to “do no harm”. Researchers must ensure that the benefits outweigh the burden on the participant in participating in research (Sullivan and Decker, 1992: 103). The researcher explained to participants that there were no risks or direct benefits involved in their voluntary participation in the study. It was again explained that they may withdraw from the research study at any time.

3.14 Researcher-participant relationships

The researcher was a reflective listener who did not judge the interviewee during the interview process. Reassurance that there was no right or wrong answer ensured that participants felt guided on the topic being researched during the interview. Rapport does not mean that intimate relationships will form, but does mean that genuine interest will develop with growth of a trusting negotiation between the researcher and participants (Holloway and Wheeler, 1996: 8). Although close bonds

formed during the data collection process, the researcher was non-judgemental in her approach and was mindful that the main goal of their relationship (researcher and participant) was to gain knowledge which will improve clinical practice. The researcher guarded against potential for coercion by explaining that participation is voluntary. Throughout data collection the researcher acted professionally by explaining her role clearly.

3.15 Conclusion

The research design, including the data collection methods used for conducting the study, the pilot study and lessons learnt during the pilot study were discussed. In addition, the ethical considerations undertaken by the researcher were also outlined.

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CHAPTER 4: DATA ANALYSIS

4.1 Introduction

This chapter describes the data management procedures and data analysis methods used in the study. The measures taken to ensure the trustworthiness and academic rigour of the study are also discussed.

4.2 Data management

Data management is the process which the researcher follows to ensure that all data resources and documents (consent documents, list of names with corresponding telephone numbers, demographic questionnaires, audio-taped interviews and transcribed interviews) are handled properly for safekeeping and easy identification when retrieval thereof is needed (Streubert Speziale and Carpenter, 2007: 43). Consent documents were checked for correct signatures and date and filed together with the demographic questionnaires in a lockable cabinet. Audio-taped interviews from all participants, including the pilot study participants, were transcribed verbatim within the first 24 hours to ensure accuracy of recording of the participants' responses. The transcriptions were labelled with pseudonyms and filed in order of research participation and date, e.g. participant 1 and date. These were saved as Microsoft Word documents on both hard drive and flash disk for backup purposes.

4.3 Data analysis

Data analysis is said to be the reduction of an enormous amount of information from thematic summaries to categories and themes until the description thereof in the interpretation of the findings (Streubert Speziale and Carpenter, 2007: 112). Qualitative thematic analysis was the method chosen for this study to answer the research question: What are registered nurses' experiences regarding their role in sputum induction in diagnosing childhood TB in a secondary paediatric hospital

setting? This was based on the recommendations of Braun and Clarke (2006: 79-93) that thematic analysis is a search for themes that emerge as being important to the description by the research participant of the phenomenon under study. The researcher used an inductive approach (data driven) whereby the themes developed have a strong link with the data collected. The data was read and re-read and then searched for codes as it emerged direct from the data using inductive coding (Braun and Clarke (2006: 83).

The process of qualitative data analysis started from the moment the first set of data was collected and continued parallel to the process of data collection. This was preliminary data analysis to get an initial overview of each participant's experience and to acquire a feeling from the data. This was done by reading and re-reading the complete data set (each participant's transcript). This was followed by a more focused, formal data analysis, whereby the researcher was constantly moving back and forward through the data set searching for potential and important patterns which may form meaning from emergent themes (Braun and Clarke, 2006: 86). A detailed articulation of the phases which the researcher followed within this qualitative study, using thematic analysis as cited in Braun and Clarke (2006: 79-93), is given below:

4.3.1 Phases of thematic data analysis

Thematic analysis as cited in Braun and Clarke (2006: 79-93) was used for data analysis, which included six phases: Phase 1: Familiarising yourself with the data; Phase 2: Generating initial codes; Phase 3: Searching for themes; Phase 4: Reviewing themes; Phase 5: Defining and naming themes; and Phase 6: Producing the report.

4.3.1.1 Phase 1: Familiarising yourself with the data

This phase forms the foundation for the rest of qualitative data analysis, and is what the researcher does to familiarise herself with all aspects of the qualitative data before starting to formulate the initial coding process (Braun and Clarke, 2006: 87).

According to literature, the researcher may be the one who interactively collects and transcribes all the verbal data into written form in order to conduct a thematic analysis. However time-consuming this may be, the researcher who transcribes all their own data has a deeper understanding of the data (Reissman, 1993, as cited in Braun and Clarke, 2006: 87). Bird (2005: 227) emphasises what others are saying, that transcribing one's own data should be seen as a "key phase in qualitative data analysis within interpretive methodology". What is of importance at this stage is that the transcript retains all the information as it is in its natural form from the verbal account given by participants (Braun and Clarke, 2006: 87-88).

The researcher collected and transcribed all the data from interviews herself, and therefore arrived at the process in phase one with some kind of prior knowledge about the data. The transcript from each participant was read and reviewed several times to verify that it was representative of the experience. During this process meaningful statements, comments and words of interest were identified and highlighted as potential themes in the raw data using different colours (as explained in phase 3). The researcher then summarised the transcripts separately by noting the key points made by each participant in response to the questions asked by the researcher (as discussed in Chapter 3 on data collection). This led to initial codes being formed, which are discussed in the next phase.

4.3.1.2 Phase 2: Generating initial codes

This phase involves the production of initial codes across the entire set of raw data. Codes are tags or labels which are assigned to words, paragraphs or sentences from the verbatim transcriptions and help qualitative researchers formulate a formal system to organise their data. They identify a certain feature in the data that appears to be of interest to the researcher that can be assessed in a meaningful way regarding the phenomena under study (Boyatzis, 1998: 63). This identification of certain features or "codes" is the "salvaging of the meaning of the experience" (Braun and Clarke, 2006: 87). It is likened to being "reminiscent of searching for gemstones of a certain type; some gems are of the desired type, others are precious but they are not the type being sought, and some of the other stones are clearly pieces of gravel stones and grit" (Taylor, 1994: 187). At this point the researcher

reads through the data set line by line and familiarises herself with what is interesting in terms of the phenomena under study. Full attention is then given to each code and a list is drawn up of the identified aspects that may form the start of interesting patterns (themes) across the entire data set (Braun and Clarke, 2006: 89).

The initial coding was done manually by the researcher. Coloured marker pens were used to group the identified statements or phrases, whereby all information relating to a particular code was highlighted in the transcript in a particular colour as a means of organising the data. Each colour was given a label to ensure that a strategy existed for identifying which colour belonged to which statement or phrase within each participant's transcript. Then the different colours were used to identify and organise statements with similar meanings in order to group and later form themes from them. The search for themes started as described in phase 3 below.

4.3.1.3 Phase 3: Searching for themes

Phase three begins when all the data which have been initially coded are combined to give a set of the different codes that are identified across the data set (Braun and Clarke, 2006: 89).

Themes are described by Boyatzis (1998: 63) as recurring, unifying statements about the subject of enquiry. The researcher collated all the coded data from phase two and named the selected text within each data item according to colours and giving each meaning by describing. In essence, the researcher was at this point thinking hard about the relationships between codes, and making constant comparisons in search of meaning. The inferred themes were further analysed in order to explore the possibility of alternative meanings and to search for themes which overlapped (having similar meaning). Where overlapping of themes was identified, further grouping was done into subgroups but under the same heading.

The researcher once again met with her supervisor and together they reviewed the emerging themes for further refinement. This included highlighting the statements which were considered not as useful or outliers, i.e. those mentioned by only one participant or incomplete or not making sense in relation to the research objectives.

Although the researcher identified 'useless' extracts, at this stage they were not discarded altogether, since at the end of refinement (in the next phase) these could be combined, refined or finally discarded. The researcher ended this phase with a collection of the emerging themes and sub-themes, and all extracts of data coded in relation to emerging themes (Braun and Clarke, 2006: 87-93).

4.3.1.4 Phase 4: Reviewing themes

Patton (1990) in Braun and Clarke (2006: 91) asserts that phase four begins when a set of emerging themes has been identified, and involves the refinement of those themes.

This phase involved two levels. The first involved reading the coded data extracts for each theme and considering whether they formed a logical pattern. This was done by checking back and forth across the codes and categories in search of emerging themes. Once the researcher was sure that the emerging themes formed a clear pattern to fit the data, she moved onto the second level, which involved a similar process, except that this time the researcher applied it to the data set as a whole. The entire data set was again read and the researcher remained focused on the aim of the study while trying not to get overwhelmed by the volume of text. Some re-coding of data occurred at this stage which had been missed at the beginning of coding. At this juncture it became apparent which themes were the emerging ones, which moved the researcher on to the next phase of thematic analysis (Braun and Clarke, 2006: 87-93).

By the time this phase was completed it had become evident that some of the 'so called' themes were not really themes, since there was not enough supportive data, and these were discarded.

4.3.1.5 Phase 5: Defining and naming themes

Phase five is the ongoing analysis or further reduction of the themes into final emerging themes to capture the phenomena one is trying to understand for presentation of data analysis (Braun & Clarke, 2006: 87-93). Each theme was then

further refined by the researcher under guidance of the supervisor to search for any sub-themes which were also useful in illustrating complex themes. At this stage the researcher had to decide why the theme was chosen and its relevance to the research question. The researcher had to decide whether each identified theme indeed contributed to the broader story of interest that is being told by the data in relation to the research question. The themes were then finalised if they could give the reader a clear understanding of what it is about (Braun and Clarke, 2006: 92). Six themes were identified, as discussed in phase six below.

4.3.1.6 Phase 6: Producing the report

Phase six begins when you have a set of fully worked out themes, and involves the final analysis and writing up of the report (Braun and Wilkinson, 2003, as cited in Braun and Clarke, 2006: 92). In the final analysis phase the following six final themes emerged from the participants' central statements in response to the semi-structured interviews on the registered nurses' experiences of their role regarding the use of the induced sputum procedure for diagnosing childhood TB:

- The role of involving the mother or caregiver;
- The role of assessment and monitoring;
- The role of controlling spread of infection
- Active participation role in diagnosis of TB;
- Teaching and training role; and
- Cost-saving role

Detailed descriptions of these themes and related extracts from the data are further discussed in chapter 5.

4.4 Scientific rigour of the study

Qualitative research needs to be both reliable and valid in order to be trustworthy. This needs to be clearly demonstrated throughout the study (Holloway and Wheeler, 1996: 163). Guba and Lincoln (1989: 315) suggest that the concept of trustworthiness be utilised in qualitative research to guide the aim for quality.

Sandelowski (1986) and Koch (1994), cited in Holloway and Wheeler (1996: 163), say “The researcher must prove that the study is rigorous by maintaining trustworthiness throughout.” Trustworthiness in qualitative research is the methodological soundness of the findings of the study, which should give an account of the exact experiences of the research participants to truly reflect the phenomenon as experienced by the participants. Guba and Lincoln (1989), cited by Polit and Hungler (1997: 305), describe the criteria for trustworthiness to be credibility, transferability, dependability and confirmability. A detailed description of how these four criteria were met in this study is given below.

4.4.1 Credibility

Credibility or degree of confidence in the truth of the findings of the inquiry is achieved by ensuring that a rich, thick description of the phenomena under study is provided. The researcher has to convince the reader that there is enough evidence to support the claims made from the findings and thus allow the reader to form their own assessment (Munhall, 2007: 564).

To ensure credibility, the researcher engaged the research supervisor who went through the emerging themes and the entire set of raw data together with the researcher throughout the process of data analysis and peer debriefing. Peer debriefing concerns the presentation of analysed data and conclusions drawn for peer evaluation by an experienced designated qualitative researcher. In this case, the research supervisor, who is an experienced qualitative researcher, was the designated person for peer evaluation (Holloway and Wheeler, 1996: 165).

In this study peer debriefing was ensured by the researcher having kept constant engagement with the research supervisor during all stages of the study, from the proposal writing, data collection and data analysis (using emailing and scheduled face-to-face meetings for guidance in interpretation of data and refinement of themes), since the supervisor is an experienced qualitative researcher. Only once

both were satisfied with the themes was data analysis considered to be in the completion phase.

4.4.2 Transferability

Transferability is the next criterion for ascertaining rigour within a qualitative study. It indicates whether particular findings from a qualitative study can be transferred to a similar setting and still maintain the particularised meanings, interpretations and inferences from the completed study. Due to the fact that qualitative research is not meant to produce generalisations, but rather thick descriptions about a particular phenomenon, the transferability criterion emphasises general similarities of findings under similar contexts or situations. “Thick description” is a concept widely used among qualitative researchers to refer to the rich and thorough descriptions of the research setting and processes observed by the researcher during the inquiry. To ensure transferability, a detailed description of all the steps taken during the research process (sampling process and data collection and analysis) is provided in this report. This is to allow anyone repeating the study in a similar context to come up with similar findings or to transfer such findings to a similar situation (Polit and Hungler, 1997: 307-308).

Chapter 3 of this research report provides a detailed description of the original study sample and the study setting for transferability to another context with a similar research problem.

4.4.3 Dependability

Dependability is the third alternative for maintaining the trustworthiness of qualitative research, and is reliant on credibility. A dependable study is said to have reached credibility once an expert qualitative researcher has examined the verbatim transcripts and fieldnotes (Holloway and Wheeler, 1996: 168). Transcripts and

emerging themes were shared with the researcher's supervisor and her opinion was sought throughout the data analysis process to ensure that the findings of this research were accurate and consistent.

4.4.4 Confirmability

Guba and Lincoln (1989) refer to confirmability as meaning that the data are related to their sources, for the reader to establish that the conclusions and interpretations emerged directly from them (Holloway and Wheeler, 1996: 168). The objectivity or neutrality of the data is also explained as confirmability, and that there should be agreement between two or more independent people about the data's relevance and meaning (Polit and Hungler, 1997: 307).

For confirmability in this study, an audit trail (collection of materials, descriptions of raw data before and after analysis) was shared with the researcher's supervisor throughout the research process. Data analysis processes conducted by the researcher were also shared and confirmed by the supervisor (Holloway and Wheeler, 1996: 168). This was to determine how well the findings of the research supported the data collected by the researcher.

Each participant was contacted again about the themes that emerged, to ensure member checking. Member checks, according to Polit and Hungler 1997: 306), refer to provision of feedback to study participants regarding the data and the researcher's emerging findings and interpretations, and securing the participants' reactions. The authors further elaborate that member checking can be done in one or two ways: it may be carried out informally in an ongoing way at the end of each data collection session to verify if data collected is accurate or, more formally, it is out carried after complete data analysis to confirm the researcher's interpretation of data.

In the current study the researcher contacted each participant after complete data analysis as formal member checking. All eight participants were contactable, and all agreed and confirmed that the researcher's interpretation of the data as described in her report were in line with their descriptions of their experiences in carrying out

sputum induction. The purpose of the member checking was to validate their views on findings (Caeli, 2001: 274).

4.5 Conclusion

In keeping with the thematic data analysis process as described by Braun and Wilkinson (2003), as cited in Braun and Clarke (2006: 79-93), six emergent themes were identified from the researcher's interpretations of data from the participants' exploration of their experiences regarding their role in carrying out the induced sputum procedure in diagnosing childhood TB. A description of how academic rigour and trustworthiness were maintained throughout the study was also provided. The next chapter describes the six emergent themes.

CHAPTER FIVE: FINDINGS

5.1 Introduction

This chapter discusses the findings revealed by the analysed data using the thematic analysis. The discussion covers the demographic data of the participants and the emergent themes in relation to the objectives of the study. The objectives were to explore and describe the registered nurses' experiences of their role in carrying out sputum induction as a procedure in diagnosing childhood TB at this paediatric hospital in Cape Town.

The findings are structured according to the six themes that emerged from thematic analysis of the responses of the participants in relation to the semi-structured interview questions. Some verbatim quotes or excerpts from participants' responses are used to illustrate examples of the data used to develop the themes.

5.2 Demographic data

These data were obtained from the demographic questionnaire completed by each participant at the beginning of the interviews. The sample consisted of eight registered nurses who were all working in paediatric units at the secondary hospital which was the research site. Six participants were female and two were male - a common scenario in nursing as men comprise a minority in the profession. Men are often discouraged to enter nursing because it is viewed as a "women's profession" (Mkhize and Nzimande, 2007: 8).

The age of the participants ranged from 30 to 59 years. The average number of months of working experience following the training in using the induced sputum procedure for diagnosing childhood TB was 13. This period of work experience allowed sufficient time for these nurses to develop necessary experiences to be able to provide rich data for the study.

5.3 Themes and sub-themes

Six themes emerged from the data using content analysis, as follows:

- The role of involving the mother or caregiver;
- The role of assessment and monitoring;
- The role of controlling spread of infection;
- Active participation role in diagnosis of TB;
- Teaching and training role; and
- Cost-saving role

For technical purposes each theme is described with a few examples of extracts from the participants to demonstrate how each theme and sub-theme emerged or were developed.

5.3.1 The role of involving the mother or caregiver

This theme was derived from clusters of data in relation to the experiences of registered nurses regarding their role in carrying out induced sputum procedures and involving the mother or caregivers in the care given to their children.

One participant described her role of involving the mother or caregiver as helping nurses with the day-to-day care of the child:

“We also involve the mothers and, during the day the mothers are here to help us...”

Another participant expressed the role of involving the mother or caregiver during the procedure as follows:

“Mothers want to participate ... they have the right to participate in the care of their children and they are happy if they can ... therefore, I allow the mother or caregiver to be involved in the induced sputum procedure”

Another participant’s response indicating involvement of the mother or caregiver was as follows:

“As the nurse ..., I prepare and explain everything that is going to happen to the mother... so that she doesn’t feel scared, I show the mother how to hold the child, as this is a totally new environment in which we do the induced sputum...”

5.3.2 Assessment and monitoring role

This theme was derived from clusters of data in relation to the nurses’ role in the assessment and monitoring of the patient during the induced sputum procedure.

The following quote from one participant depicts the role of assessment and monitoring:

“We first see how the saturation oxygen of the child is ..., how all observations are before we do the induced sputum and only when we know how the observations are will we proceed ...”

Another participant’s response indicated the role as follows:

“During the procedure we make sure that the observations are stable...”

The following quote by another participant emphasised the assessment and monitoring role further:

“We ensure the safety of the child in that ... we do the observations and if the observations are stable then we know it is OK to do the induced sputum”

5.3.3 The role of controlling the spread of infection

This role was derived from the nurses' experiences of their role in following infection control policies to curb the spread of infection from TB to personnel, patients and their families.

The following quote from this participant highlights the role of controlling infection:

"We follow infection control policies ... therefore it is more sterile and the infection rate is less to staff, patients and mothers ..."

Another participant described how nurses control infection in the induced sputum room:

"We control infection ... by waiting 10 minutes for the extractor fan to clean the room in between patients"

5.3.4 Active participation role in diagnosis of TB

This theme emerged from clusters of data in relation to the participants' role in making a diagnosis of TB in children at this secondary paediatric hospital.

One participant expressed her views regarding her active role in diagnosis of TB as follows:

"We feel that we have a very important role than what we had before with gastric lavage ... as now we can manage to do so many more induced sputum and diagnose so many more babies with TB than before"

This viewpoint is eloquently expressed by another participant:

“... the whole process of making a diagnosis of TB is nurse-based and you prepare the patient by doing induced sputum...”

Another participant illustrated this as follows:

“... now it is us as nurses who are having a part in the diagnosis of TB for children ... in doing induced sputum”

Another participant described her active role in making a diagnosis of TB as follows:

“... but now our role has changed ... we are more involved in diagnosing TB”

Yet another participant said:

“... now you feel part of the investigation for TB”

5.3.5 Teaching and training role

This theme was developed from clusters of data in relation to nurses' time spent in teaching mothers and caregivers about the spread and containment of TB infection, and training of other categories of nurses regarding the induced sputum procedure.

As a result, this theme has two sub-themes, the first referring to the nurses' role in teaching mothers or caregivers and the second relating to the role of training other categories of nurses regarding the induced sputum procedure.

5.3.5.1 Teaching of mother or caregiver role

This sub-theme is derived from clusters of data in relation to the participants' description of teaching mothers and caregivers regarding the spread and containment of TB infection at the hospital.

One participant expressed her view by saying:

“We have a teaching role ... also for mothers about the spread and containment of TB ...”

Another expressed her teaching of mothers and caregivers by saying:

“When the child is diagnosed with TB by induced sputum ... mothers are also educated as they may spread the TB germs ...”

Yet another participant expressed her teaching of mother or caregiver role as follows:

“We protect the other children from getting TB by teaching mothers and caregivers about the spread of TB germs by asking them to wear masks ...”

Yet another said:

“We also teach the mothers and caregivers about the spread of TB when we ask them to wear masks while they are helping us with induced sputum ... even if they just hold the baby ...”

5.3.5.2 Teaching and training of other nurses role

This sub-theme is revealed in statements made by the study participants.

One participant said:

“The new nursing staff that come into the ward ... I also teach them the induced sputum because it is an easy procedure ...”

Another participant had this to say about training of new nursing personnel:

“I showed one other new staff member how to do induced sputum by training her ...”

Another added:

“Now we feel that we are also helping the enrolled nurses ... as we teach the procedure to them as well”

Yet another participant said:

“I can teach other nurses induced sputum it is easy like one, two, three ...”

5.3.6 Cost-saving role

This theme was derived from clusters of data in relation to the participants' cost-saving role at this paediatric hospital in Cape Town. These registered nurses experienced their role regarding the induced sputum procedure to be a cost-saving role since the procedure was quick to perform, which ultimately reduced overall hospital costs. Furthermore, participants explained that costs are saved by doing more induced sputum procedures in a day. Also, with the results of induced sputum procedures being available sooner, the children are able to start TB treatment sooner.

One participant said this regarding their cost-saving role:

“Yes, we can do it quicker and many in one day so we save time and cost”

Another expressed his view by saying the following:

“... in management side of things are better in dealing with ... the budget as the children stay shorter with this new procedure.....”

Yet another participant said:

“We get the results and if the baby is positive he can quickly start the TB treatment and if he is negative for TB he can go home ... so it is also cost-effective...”

Another said:

“It has changed our role of diagnosing TB in children ... as now it is quick and effective”

5.4 Conclusion

In conclusion, the findings of the study as depicted in the themes that emerged from content analysis revealed that the nurses have positive experiences of their role carrying out the induced sputum procedure in diagnosing childhood TB. Conducting the sputum induction procedure for diagnosing childhood TB has given the registered nurses new meaning in the way they manage diagnosing children with TB at this secondary paediatric hospital.

CHAPTER 6: DISCUSSION AND RECOMMENDATIONS

6.1 Introduction

This chapter focuses on the discussion of the findings of the study, as well as the limitations, recommendations and conclusions of the study. For technical purposes the discussions are presented according to the six identified themes and related literature.

6.2.1 Involving the mother or caregiver

The findings of the study with regard to the role of nurses in involving the mother or caregiver are in line with a family-centred approach in nursing practice. In a family-centred nursing approach, families and significant others such as mothers, fathers and other caregivers are involved in the care of the hospitalised child (Paliadelis, Cruickshank, Wainohu, Winskill and Stevens, 2005: 31). In developed countries most paediatric wards claim to involve parents with the care of the child, which means that these wards adopt a “philosophy where parents are acknowledged as being central to their child’s existence”, and they are seen as fundamental in the decision-making process regarding the care of their child (Paliadelis et al., 2005: 32-33).

It is encouraging that even though the current study was conducted in a developing country, the findings revealed that the nurses perceived their role as involving the mother or caregiver, which is in line with the family-centred approach. This could mean that the nursing practice of nurses involved with sputum induction is at the same level as that in developed countries. This could also indirectly mean that the patients under the direct care of these nurses receive nursing care of a similar standard.

The role of involving the mother or caregiver has been found by other researchers to be useful to alleviate fear and anxiety in the mothers and caregivers. For instance, Paliadelis et al. (2005: 36) in their study involving nurses and mothers or caregivers of hospitalised children revealed that explaining procedures to the mother not only provided nursing care but also protected the mother from a painful or stressful experience. The same study also reported that nurses not only cared for the children but gave support and comfort to the mother or caregiver. These findings are similar to those of the current study, where participants regarded their role as including alleviation of the fear and anxieties of the mothers or caregivers during the sputum induction procedure.

Another study in support of the role of involving the mothers was conducted by Shields, Kristensson-Hallstrom and O'Callaghan (2003: 180). In that study it was found that those nurses who did not spend time communicating, motivating and building a relationship with the mother or caregiver in the care of the ill child did not experience cooperation from such mothers or caregivers. The findings of the current study revealed how the nurses empowered mothers and caregivers before and during the induced sputum procedure by communicating and explaining everything about the procedure to them, and how this encouraged cooperation of the mothers in assisting with the care of the child during the sputum induction procedure.

There is always a danger that health professionals, including nurses, may unintentionally exercise what Hewitt (2002: 440) describes as "benevolent paternalism" through their forceful behaviours in trying to involve mothers. The health professionals' "benevolent paternalism" behaviours restrict parents from acting autonomously in the care of their child, and often lead to lack of cooperation of parents or caregivers. It can be concluded that this was not the case in this study. The nurses reported positive experiences with the cooperation of the mothers or caregivers in the care of their children before and during the sputum induction procedure.

However, the findings of the current study also differed from those of Paliadelis et al. (2005: 35), who reported that the nurses who participated in their study excluded

mothers or caregivers from involvement in the care of the child, in order to spare them (mothers or caregivers) from fear when witnessing procedures done to the child. One would need to understand the cultural context and philosophical underpinnings that guided the nurses who participated in the study by Paliadelis et al. (2005) to fully understand why they reported that exclusion of mothers or caregivers was for the protection of the mothers.

Another study which differed from the findings of the current study is that reported by Galvin, Boyers, Schwartz and Jones (2000: 626). That study discovered that nurses reported that working collaboratively with mothers (or caregivers) threatened the nurses with the loss of professional identity. It further reported that nurses feared that collaboration with mothers could take away from the nursing role. In response to such fears, Shields, Kristensson-Hallstrom and O'Callaghan (2003: 180) highlighted that parents are willing to participate in the care of their hospitalised children, but need guidance in the role and involvement in the decisions nurses make about the care given to their children. If nurses are secure in their professions and the clinical decisions they make and guidance they give to parents, they should not be threatened by cooperation of mothers in the care. The cooperation of parents should be viewed positively, as was reported in the current study. However, if nurses are insecure - for whatever reason - they may feel threatened with the loss of their professional identity, as reported by Galvin, Boyers, Schwartz and Jones (2000: 62).

6.2.2 Assessment and monitoring role

The current study findings revealed that assessment and monitoring of the patients' condition before, during and after performing the induced sputum procedure was seen as a key nursing role. This included monitoring of saturation oxygen levels and ensuring that these were above 95%, and that all other vital signs were within normal limits before proceeding with the induced sputum procedure.

The importance of the assessment and monitoring role, such as monitoring of arterial oxygenation saturation prior to the induced sputum procedure, was also highlighted in a previous study of asthmatic adult patients where no patient was reported to have

developed bronchoconstriction during the sputum induction procedure (Chanez, Holz, Ind, Djukanovic, Maestrealli and Sterk, 2002: 4). The authors reported that in a previous study they found a significant drop in arterial saturation oxygen in their adult patients with chronic airway disease during sputum induction, but to date this has been the only study to report a reduction in arterial saturation oxygen during this procedure. The authors further reported that those patients who developed a low arterial saturation oxygenation had self-reversed their low arterial oxygen saturation levels after cessation of the induced sputum procedure (Chanez, Holz, Ind, Djukanovic, Maestrealli and Sterk, 2002: 4; Castagnaro, Cheta, Foresi, D'Ippolito, Malargio and Olivieri, 1999: 943-944).

In another study in the United Kingdom, the researchers performing sputum induction on hospitalised adults reported excluding all patients with an oxygen saturation level below 94% from their study because of the risk of exacerbation of pulmonary disease by sputum induction (Brown, Varia, Basset, Davidson, Wall and Pasvol, 2007: 1418). This supports the importance of the assessment and monitoring role of nurses in carrying out the induced sputum procedure. It also demonstrates the importance of the nurses' understanding of this role in assessment and monitoring in the current study.

Nurses' assessment and monitoring role was also reported as providing important indicators to proceed with the procedure of induced sputum by other researchers in a study of induced sputum for assessment of airway inflammation (Rytala, 2002: 32). This study reported that nurses monitored lung functions of patients before and after sputum induction, and if troublesome symptoms like a drop in lung function were observed and reported by them, the procedure of induced sputum was stopped (Rytala, 2002: 32).

Although the induced sputum procedure is well tolerated and described as safe and non-invasive, its safety is dependent on the nurses realising the importance of assessment and monitoring and ensuring that adequate precautions are taken in cases of respiratory distress (Pizzichini, Leigh, Djukanovich and Sterk, 2002: 15).

This supports the researcher's conclusion in her interpretation of the findings of the current study, that the nurses' role of assessment and monitoring before, during and after the induction procedure is key among all the other roles. All of the above-mentioned studies highlighting the importance of the assessing and monitoring role supported the current researcher's interpretation and conclusions.

6.2.3 The role of controlling spread of infection

TB is a communicable disease which poses a risk to health care workers, patients and their families. A communicable disease is one that can be transmitted to others by direct or indirect contact with that person's discharges (Oxford Concise Medical Dictionary, 1998: 141). It is therefore encouraging that the findings of the current study revealed that the nurses perceived controlling the spread of infection as their role. This role included controlling nosocomial transmission of TB to themselves, their patients and the patients' families.

Nosocomial infection is an institutionally acquired infection (Reese & Betts, 1991: 712). Nosocomial infection of TB has been reported as an occupational risk to health workers working with TB patients. In one study in Cape Town, 16 health workers involved in a TB study were found to be infected with TB during the study period (Sissolack, Bamford and Mehtar, 2011: 427). As a result, the researchers demanded development and implementation of infection control policies in all health care settings where there is a high risk of nosocomial infection with TB in order to lower this occupational risk (Sissolack, Bamford and Mehtar, 2011: 427).

Another study carried out in Blantyre, Malawi, reported that at least 4% of the nurses working in the TB wards were infected with TB over a two-year period (Harries, Maher and Nunn, 1997: 480). The authors concluded that the risk of nosocomial infection with TB among health care workers was higher in those working in medical wards where patients are treated for TB than those working in general wards (Harries, Maher and Nunn, 1997: 480).

In support of the need to control the spread of TB infection, Harries, Maher and Nunn (1997: 478-479) state that although research shows that health care workers are at greater risk of acquiring TB infection when working with TB-infected patients, the TB control guidelines developed and used in the USA were successful in curbing nosocomial spread of MDR-TB there. This finding supports those of the current study regarding the nurses' role in controlling infection by adhering to the TB guidelines.

Several surveys conducted in India advise that nurses should fight against TB by following infection control measures, which include the wearing of masks (N95 respirator) when performing cough-induced sputum induction procedures, as part of infection control policy (Puri and John, 1997: 272). These measures were also reported by the participants in the current study.

Moore, Schaaf, Nuttall and Marais (2009: 62) recommend that sputum collection for TB diagnostics should be obtained in a well-ventilated part of a hospital. Furthermore, epidemiologists in a Canadian hospital have identified ultraviolet light installations in induced sputum rooms as part of their infection policy to curb nosocomial transmission of TB infection (Schwartzman and Menzies, 1999: 1272). This was also reported by the participants in the current study in their experience of their role in controlling the infection of TB.

In the current study the findings revealed that the role of controlling TB infection included nurses ensuring adherence to all of the infection control policies to protect staff, patients and their families from becoming infected with TB. This is in line with the *Childhood TB guidelines of the Southern African Society for Paediatric Infectious Diseases*, which promotes use of infection control policies to curb spread of TB among nurses who perform hazardous procedures like induced sputum (Moore, Schaaf, Nuttall & Marais, 2009: 62). The findings of the current study are also supported by those of Harries, Maher and Nunn (1997: 478-479), Puri and John (1997: 272) and Schwartzman and Menzies (1999: 1272).

6.2.4 Active participant role in diagnosis of TB

The role of active participant in making the diagnosis of TB by nurses is another important finding of the current study. This role was constantly compared with the role previously held by the nurses prior to the introduction of the sputum induction procedure, when nurses conducted gastric lavage. It was reported that previously, nurses were not always successful in obtaining sputum. The research nurses who were involved with induced sputum as a diagnostic method in childhood TB diagnosis in Cape Town found induced sputum microbiological test results to be superior to the results from gastric lavage as a TB diagnostic test for children (Zar et al., 2000: 306). This supports the findings of the current study, where research nurses involved with induced sputum as a diagnostic method in diagnosing childhood TB reported their role as active participants in the diagnosis of TB. They reported that induced sputum microbiological test results were superior to those of gastric lavage as a TB diagnostic test for children, since they were able to obtain the sputum more easily than during gastric lavage.

The finding of the role of nurses as active participants in TB diagnosis is supported by findings by nurse researchers from San Francisco General Hospital in the USA (Hopewell, Pai, Maher, Uplekar and Raglivione, 2006: 713-722). These researchers concluded by suggesting that a diagnosis of TB should be established promptly and accurately for good patient care and response to TB treatment. The authors further stated that evidence from their review suggested that children are at a higher risk of becoming infected with TB, and with delays in diagnosis may develop serious forms of TB (Hopewell et al., 2006: 713-722).

In another study conducted in London, a nurse-led rapid TB clinic showed that through nurse-led interventions, TB was rapidly diagnosed in patients suspected of TB infection (Cootauco, 2008: 28). The patients were also commenced on TB treatment regimens within a week of nurses making the accurate TB diagnosis (Cootauco, 2008: 28). In another study, Pratt and van Wijgerden (2009: 715)

concluded by stating that the role of the nurse is an evolutionary one which cannot go without a framework of nursing diagnosis in the care and management of people with TB. Both of these studies supported the findings of the current study.

6.2.5 The role of teaching and training of others

Teaching is the process of transmission of knowledge and skills to those who as yet do not possess them. It is an active event that is not neutral and produces a positive influence on the recipient if done correctly. In order for teaching to be successful, the material taught has to be prepared and organised in advance (Mellish, 1987: 3). Training is in order to bring staff members to a certain standard of competency through a developed programme of learning. The training and development are thus aimed at improving knowledge about a job as well as the skills and attitudes the staff member has about that job (Booyens, 1993: 366).

In the current study nurses were not necessarily involved in the formal teaching and training as defined above. However, because they shared their knowledge and skills with others, including the mothers or caregivers, it was interpreted and concluded that they had a role in teaching and training during the induced sputum procedure.

The findings of the current study revealed that the skills taught to the mothers included asking them to wear masks as a means of controlling the spread of TB to other children. This was because mothers (or adults) infected with TB are often viewed as a potential primary sources of the spread of TB infection to children. According to Schaaf, Shean and Donald (2003: 1110-1117), prevention of TB in children depends upon the early diagnosis and treatment of TB in the child's mother, who may be the culture-positive contact and source of TB infection to the child.

It is good that the nurses in the current study reported asking mothers or caregivers to wear masks as part of their role. Although this role can be seen as part of control of spreading infection, the researcher concluded that it was also a teaching role in line with the definition of transmission of knowledge. Nurses also explained to

mothers and caregivers how TB could be transmitted from adults as a primary source of infection to children.

The findings of the study on the nurses' teaching role was supported by similar findings in a survey conducted in India, where it was recommended that nurses should teach patients suspected of having TB the infection control measures to diminish spread of TB infection to themselves, their patients and their families (Puri and John, 1997: 271).

The findings of the current study on the nurses' role in teaching mothers are in contrast with the findings of another study conducted at a teaching hospital in the Western Cape, which explored nurses' experiences regarding their role in the prevention and control of TB infection (Sissolak, Marais and Mehtar, 2011: 262). That study reported that TB training for patients was below the current infection control policy guideline standards, and it was concluded that this could increase risk of nosocomial transmission of TB at that large teaching hospital (Sissolak, Marais and Mehtar, 2011: 262).

The role of teaching and training others was revealed to be that of sharing the knowledge about the new diagnostic method for childhood TB with other registered nurses, including enrolled nurses. This was to ensure that more nurses were experienced to carry out the induced sputum procedure, and was seen as a help to the registered nurses.

These findings are supported by Pizzichini, Leigh, Djukanovic and Sterk (2002: 16), who emphasised that the procedure of induced sputum should be performed by adequately trained nurses, who have sufficient experience in this regard. They further recommend that such training should ideally be undertaken at an institution where the induced sputum procedure has already been well established. This is further supported by the international Council of Nurses in Geneva, Switzerland, which reported that although nurses are the frontline health care workers in TB care and management, the lack of well trained personnel is seen as a limitation in the care and management of TB (Gebrehiwet, 2007: 41-42).

6.2.6 Cost-saving role

The cost-saving role of the nurses in the current study entailed assisting hospital management through ensuring a reduced hospital stay for children than that previously experienced with gastric lavage. According to Booyens (1993: 148-149), the cost-effective role of nurses in health care facilities is seen as a key management skill that determines the success of the organisation.

In support of the findings of the current study, Harries, Maher and Nunn (1997: 481) in a study focusing on TB control measures in sub-Saharan Africa, reported that the most cost-effective way of interrupting the infection chain was the rapid diagnosis and treatment of smear-positive TB patients. The current study supports this finding, where nurses experienced their cost-saving role in doing the induced sputum procedure because it was an easy, quick procedure and laboratory results were available earlier, which ultimately resulted in initiating TB treatment early, and reduction of the patients' hospital stay and interrupting the infection chain of TB.

Another study finding in support of the current study on the nurses' cost-saving role was an economic cost analysis study regarding improvement of TB management strategies in Hlabisa health district in Kwazulu-Natal (Wilkinson, Floyd and Gilks, 1997: 455). These authors reported that costs were saved when the emphasis of care was shifted from the hospital to the community through nurses (Wilkinson, Floyd and Gilks, 1997: 455).

Studies in Zambia and Brazil indirectly support the nurses' role in cost saving through the sputum induction procedure. According to Osborne (1995: 371), diagnosing TB in children in Zambian health care facilities was seen as a costly endeavour. This was directly attributable to health care workers having to rely on multiple diagnostic criteria, which included three gastric lavages, since there is a lack of a definitive diagnostic tool for childhood TB. Another report, from the Brazilian Ministry of Health systematic review of gastric lavage, found the procedure to be

expensive to the overall hospital budget as children have to remain hospitalised for an average of three days (Maciel et al., 2010: 2).

These two countries may benefit hugely from the findings of the current study where the nurses reported their role in sputum induction as cost saving, thus highlighting that the sputum induction was a cheaper and costing-saving procedure.

6.3 Limitations

Data collection required direct contact with participants, as is common in qualitative studies, and this required prior appointments. Cancellations of appointments occurred in some cases due to unforeseen circumstances, and these caused delays for the researcher. However, these delays ensured that there was enough time for the researcher to conduct preliminary data analysis of the data so far obtained. This is highlighted as a limitation only to encourage those wishing to embark on qualitative studies to know what to do when appointments are cancelled by potential participants. Rescheduling of appointments was done at times most suitable for participants. However, it did mean that data collection took longer than was anticipated. This could have had negative implications for both the researcher and the supervisors, had they not thought of utilising the delays in data collection positively.

There was perceived potential of coercion of participants, since the researcher was viewed as an authoritative figure because of her known role as a trainer of the induced sputum procedure and a member of the main research study at the research site. The researcher's role was incorrectly perceived as that of an evaluator of the induced sputum training programme. This was recognised when some potential participants who were identified as key informants showed reluctance to participate. However, after explaining the purpose of the current study within the main study, as well as the researcher's role and her status as a Master's student from a local university, this perceived threat was no longer a problem. The lesson from this experience was that the researchers have to be sensitive to different situations that expose potential participants as vulnerable. Thorough communication and the use of

information sheets were found to be useful in explaining the role of the researcher and allaying anxiety associated with assessment of learning among participants.

Juggling different roles as a full-time research nurse in a research team and being a student was a challenge more than a pure limitation. However, the support of other research team members from the main study and the supervisor made this an opportunity for learning more research skills. Novice researchers are encouraged to seek opportunities to work with experienced research teams in order to learn research skills (Duma, 2011 – personal conversation). Being a student in research teams has many benefits and should be viewed positively.

The few limitations of the study were all turned into opportunities. They are only highlighted as limitations in order for others to learn from them.

6.4 Recommendations

Based on the findings of the current study, the following recommendations are made for different stakeholders.

Research

Further research on the role of professional nurses in both diagnosis and management of childhood TB at primary, secondary and tertiary levels should be carried out to enlarge the scope of nurses at all levels of health care and thus improve health outcomes for children affected by TB. Short courses for in-service training of nurses in sputum induction should be developed as part of continuous professional development. This will ensure both cost savings and improve health outcomes for patients with TB.

Policy-makers

Policy-makers should consider recognition and protection of nurses who work with patients infected with TB, by improving the strategies for implementation of policies with regard to prevention of TB as an occupational health hazard in terms of the Occupational Health and Safety Act 85 of 1993.

Education

Childhood TB should be included in the curriculum of nursing programmes at both undergraduate and postgraduate levels, to ensure that nurses have all required knowledge and skills with regard to diagnosis and management of TB patients, including all necessary precautions to be taken before, during and after the sputum induction procedure.

6.5 Conclusion

The findings of this study revealed the important role of the nursing profession in the diagnosis and management of childhood TB. The study also highlighted that the nurses have positive experiences regarding their role in conducting the induced sputum procedure in the diagnosis of childhood TB. These roles are well supported by both national and international researchers, as evidenced by the literature reviewed.

Although there were a few limitations to the study, there are quite a number of useful recommendations to different stakeholders concerned with TB, including researchers, policy-makers, hospital managers and nurse educators, as well as other nurses.

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APPENDICES

Appendix A: Letter of seeking permission from NSH; Permission letter

Appendix B: Ethical approval letter to Faculty of Health Sciences Ethics Committee;
Permission from Faculty of Health Sciences Ethics Committee letter

Appendix C: Information letter and consent form

Appendix D: Semi-structured interview guide

Appendix E: Demographic questionnaire

University of Cape Town

Appendix A: Letter of seeking permission from NSH

29 November 2010

Ms Washiefa Isaacs

S4 Investigational Unit

Red Cross Children's Hospital

The Medical Superintendent

Head of Paediatric Units

New Somerset Hospital

Green point

8001

MSc Nursing Proposal

Candidate: Isaacs, W (Ms) (ISCWHA001)

Title: "EXPERIENCES OF REGISTERED NURSES OF THEIR ROLE IN CARRYING OUT THE INDUCED SPUTUM PROCEDURE IN DIAGNOSING CHILDHOOD TUBERCULOSIS"

Supervisor: Associate Professor Sinegugu Duma

Re: Application to conduct a study on the "Experiences of registered nurses of their role in carrying out the induced sputum procedure in diagnosing childhood tuberculosis"

I Washiefa Isaacs am a part-time Master of Nursing student at the Health and Rehabilitation Sciences Department at University of Cape Town. Ethics approval has been obtained from the Research Ethics Committee (Rec Ref No. 310/ 210). I would like to seek permission to conduct a qualitative study and also, be able to contact the registered nurses about a study to describe the registered nurses' experiences of their role in the introduction of induced sputum procedure in diagnosing childhood TB. The registered nurses will be given the opportunity to have the interviews conducted on their off duty day or night and also to have a venue of their choice. This study will also have great relevance to the diagnosis of childhood tuberculosis in a secondary hospital setting. Although sputum induction is the preferred method to diagnose TB in young children, there is no documented literature, which indicates that nurses' experiences about their role in the introduction of such a procedure have been explored.

If there are any further concerns please feel free to contact me.

Kind regards
Sincerely,
Ms Washiefa Isaacs
Telephone: 021-6585515



**DEPARTMENT
of HEALTH**
Provincial Government of the Western Cape

COMPONENT:
Director General Specialist & Emergency Services

ihemg@pswv.gov.za
Tel: +27 21 918 1699; +27 21 918 1463
Private Bag X15 Parow 7500
www.capegateway.gov.za

REFERENCE:
ENQUIRIES:

28 February 2011

To whom it may concern: .

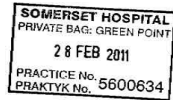
Re: Miss Whasiefa Isaacs
Student number: ISCNRA001

Permission to conduct study entitled: The experiences of registered nurses regarding their role of doing induced sputum in diagnosing childhood TB

I hereby write to inform you that permission has been granted to conduct your study at our paediatric units, at New Somerset hospital.

Wishing you all the best during your study.

Yours faithfully
Nursing services manager



**Appendix B: Ethical approval letter to Faculty of
Health Sciences Ethics Committee**

29 November 2010

Ms Washiefa Isaacs

70 Sandown Drive Turfhall Park

Ottery

7780

Faculty of Health Sciences

Shehaam Emjedi

Old Main Building

Groote Schuur Hospital,

Observatory, 7925

Telephone: 021-4066338

Email: Lamees.Emjedi@uct.ac.za

Dear Miss Emjedi

M Sc Nursing Proposal

Candidate: Isaacs, W (Ms) (ISCWHA001)

**Title: "EXPERIENCES OF REGISTERED NURSES OF THEIR ROLE IN CARRYING OUT THE
INDUCED SPUTUM PROCEDURE IN DIAGNOSING CHILDHOOD TUBERCULOSIS"**

Supervisor: Associate Professor Sinegugu Duma

I Washiefa Isaacs am a part-time Master of Nursing student at the Health and Rehabilitation Sciences Department at University of Cape Town. I am hereby requesting an expedited review and permission from the Research Ethics Committee to conduct the above mentioned study as stipulated in the attached research proposal. If there are any further concerns please feel free to contact me.

Sincerely

Ms Washiefa Isaacs

Telephone: 021-6585515

UNIVERSITY OF CAPE TOWN



Faculty of Health Sciences
Human Research Ethics Committee
Room E52-24 Groote Schuur Hospital Old Main Building
Observatory 7925
Telephone [021] 406 6626 • Facsimile [021] 406 6411
e-mail: s.thomas@uct.ac.za

18 January 2011

HREC REF: 310/2010

Mrs W Isaacs
c/o Ms S Duma
S4 Investigational Unit
Red Cross Children's Hospital

Dear Mrs Isaacs

PROJECT TITLE: THE EXPERIENCES OF REGISTERED NURSES OF THEIR ROLE IN THE INTRODUCTION OF INDUCED SPUTUM IN DIAGNOSING CHILDHOOD TUBERCULOSIS.

Thank you for responding to the issues raised by the Faculty of Health Sciences Human Research Ethics Committee

It is a pleasure to inform you that the Ethics Committee has **formally approved** the above mentioned study.

Approval is granted for one year till the 30 January 2012.

Please submit an annual progress report if the research continues beyond the expiry date. Please submit a brief summary of findings if you complete the study within the approval period so that we can close our file.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please quote the HREC REF in all your correspondence.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN ETHICS
Federal Wide Assurance Number: FWA00001637.

S Thomas

Appendix C: Information letter and consent form

**PARTICIPANT INFORMATION LETTER AND INFORMED CONSENT FORM
FOR STUDY:
EXPERIENCES OF REGISTERED NURSES OF THEIR ROLE IN CARRYING
OUT THE INDUCED SPUTUM PROCEDURE IN DIAGNOSING CHILDHOOD
TUBERCULOSIS**

Organisation/Department:

**School of Health and Rehabilitation Sciences at the University of Cape
Town**

Researcher's Name: Washiefa Isaacs

Contact details: 021-6585515

Researcher's position: MSc Nursing student

I am Washiefa Isaacs, a student at University of Cape Town, School of Health and Rehabilitation Sciences. I am enrolled for a Masters Degree in Nursing Science. You are requested to participate in a qualitative research study that is conducted by the researcher as an MSc student in the Division of Nursing and Midwifery, UCT. This study forms part of a larger paediatric TB diagnostic study funded by National Institutes of Health in America. It has been approved by the Research Ethics Committee of the Health Sciences Faculty of the University of Cape Town and will be conducted according to strict ethical guidelines and principles (Rec: Ref no: 310/2010). Please read this carefully and feel free to ask any questions.

The reason for this study

I am proposing to describe nurses' experiences of their role regarding the introduction of induced sputum procedure to diagnose childhood TB. This study is in partial fulfilment of university requirement for Masters Degree in Nursing Science. Previously, the registered nurses were responsible for diagnosis of childhood TB in the research site using the two gastric lavages, in which two consecutive gastric lavage procedures were conducted from children, during the early morning hours. Recent researches provided substantiate findings regarding the need for a change from two early morning gastric lavages to a single induced sputum, to diagnose childhood TB. The induced sputum procedure has been going on for 16 months in this hospital. As a nurse who is

involved with this procedure, you are asked to share your experiences of the nurses' role with regards to the induced sputum procedure.

Who will be asked to participate?

The study will comprise of registered nurses who are permanently employed at the secondary hospital, have been working in the paediatric units since February 2009, and have been trained to do sputum induction procedure to diagnose childhood TB. In addition, these nurses have also been doing Induced sputum procedure for at least 6 months post their induced sputum training.

What to expect as a participant

Interviews will be conducted in an unused office within the hospital setting to ensure the privacy of participants. All interviews and audiotapes are voluntary and you may refuse or withdraw at any time, before, during or after interviews. The interview questions will focus on your role with the introduction of induced sputum procedure to diagnose TB from children. These interviews will last for approximately 45 minutes to an hour. The interview will be audio-recorded to record the discussion, but your name will not be recorded anywhere, instead it will be replaced by a specific number. Audio-tapes will not be shared by anybody other than the supervisor of the study and you may refuse to be audio-taped. Participation in this study is voluntary and you may withdraw at any time. This will not in any way affect your professional position. If you are uncomfortable about answering a certain question, you will inform the researcher who will then skip the question or end the interview depending on what you chose. There will be 2 interviews per participant, 1 at the beginning and then a subsequent interview after the researcher has immersed through the data. All information that you provide (interview data, transcripts and analysed data) will be considered confidential and will be stored in a lockable cupboard for at least 5 years after the study. Your right to participate in this study will be respected. Your name will not appear anywhere in the study or published articles after the research is completed. You have the right to withdraw at any time before, during or after informed consent has been granted.

Risks, benefits and significance of the study

There are no risks involved by voluntarily participating in this study. There are also no direct benefits by participating in this study. This study may provide hospital management with nurses' views on their experiences of their role in sputum induction as a new procedure in the hospital. If the sputum induction technique proves to be feasible and registered nurses can perform it safely it could result in an ultimate nursing caseload relief.

If you are happy with this information and you agree to participate, please read and sign the attached informed consent. The results of this study will be made available to all participants in the form of a report and you will be contacted via telephone as soon as this is available.

You will be reimbursed a minimum amount of R50-00 for each interview appointment you have to travel to in order to participate in the study. Please feel free to ask any questions and the researcher will try as best to answer these. For more information about the study, you can contact the researcher at 021 6585515. Alternatively you can contact the research supervisor, Associate Professor Sinegugu Duma on the following telephone number (021) 4066321) during office hours.

For questions about your rights as a study participant call the Research Ethics Committee, Faculty of Health Sciences, University of Cape Town, Tel: 021-4066492.

Thank you

Voluntary participation agreement:

This is to show that I (Name)

have read and understood this form and I consent to participate in this study. I understand that I can withdraw from the study at any time and that I will not be identified in the research report.

Signature of the participant:

Signature of the researcher:

Date: _____

Appendix D: Semi-structured interview guide

Questionnaire aimed at participants during interview schedule for the study entitled “EXPERIENCES OF REGISTERED NURSES OF THEIR ROLE IN CARRYING OUT THE INDUCED SPUTUM PROCEDURE IN DIAGNOSING CHILDHOOD TUBERCULOSIS”

Explanation given by the Interviewer

The aim of this study is to describe the experiences of registered nurses' of their role in the introduction of induced sputum in diagnosing childhood TB. Kindly be advised that all interviews will be conducted by the researcher who is also a registered nurse and has undergone training in qualitative interviewing skills. A quiet, private room will be available, at a venue which you, the interviewee will be most comfortable with (preferably away from your place of work). All information provided is strictly confidential. It will not be given to any of your colleagues or health care managers unless otherwise advised by you. Please feel free to stop this discussion at any time and you do not have to answer a particular question if you do not feel comfortable to do so. Each interview will be audio-taped and thereafter the tape will be dated and labelled with a pseudonym. After analysis of data, the findings of the study will be distributed to management of the hospital and possibly a nursing journal.

Risks/Benefits: Your participation is completely voluntary and there are no risks in participating in the study, also, there are no direct benefits but could help nursing management at large.

Do you have any questions before we start?

Open ended, in-depth interview guide to be used throughout phenomenological interview.

The induced sputum procedure has been going on for more than 18 months in this hospital. Please tell me about your experiences with regards to your role in the induced sputum procedure.

How was this role introduced to you?

What was your role previously in diagnosing TB from children in this hospital?

What are the changes that you experience in your role with the introduction of induced sputum procedure to diagnose TB from children?

Is there anything else you would like to tell me about your current role in TB diagnosis in children?

Please note that I will contact you again to see if there is something more that you would like to say and to share my analysis with you.

DEMOGRAPHIC QUESTIONNAIRE (Appendix E)

Please complete by marking X next to the corresponding answer

Type of institution where you are currently employed		x
	Hospital	
	University	
Age		
	32-40	
	41-59	
Gender		
	Female	
	Male	
Education		
	Diploma	
	Baccalaureate	
Months experience post induced sputum procedure training		

	1-12	
	13-24	
Area of work		
	Paediatric Nursing Department	
	Paediatric Research Nursing Department	

University of Cape Town