

CHAPTER 3

Research design

3.1 INTRODUCTION

This chapter describes the research design chosen to ensure the identification of possible reasons for the low reported childhood TB notification rate in the Gert Sibande district, Mpumalanga by exploring the factors that influence the ability of PHC nurses to diagnose TB in children.

3.2 DELIMITATION OF THE STUDY

The researcher focused on health facilities in the Gert Sibande district, Mpumalanga. The facilities included 62 government health facilities: community health centres, mobile clinics and fixed (permanent) clinics.

3.3 GEOGRAPHICAL AREA

Mpumalanga is one of the nine provinces of South Africa and covers a geographical area of 79 490 square kilometres. It is the seventh most populous province, is inhabited by approximately 7,0% of the country's people and occupies 6,6% of the surface area. Mpumalanga has three districts: Nkangala, Ehlanzeni and Gert Sibande (see figure 3.1).

The researcher conducted the present study in the Gert Sibande district. This district consists of seven municipal areas: Dipaleseng, Lekwa, Govan Mbeki, Msukaligwa, Albert Luthuli, Mkondo and Pixley Ka Seme (see figure 3.2).

See figure 3.3 for the estimated 2004 mid-year population pyramid for Gert

Sibande district.

MAP. MPUMALANGA

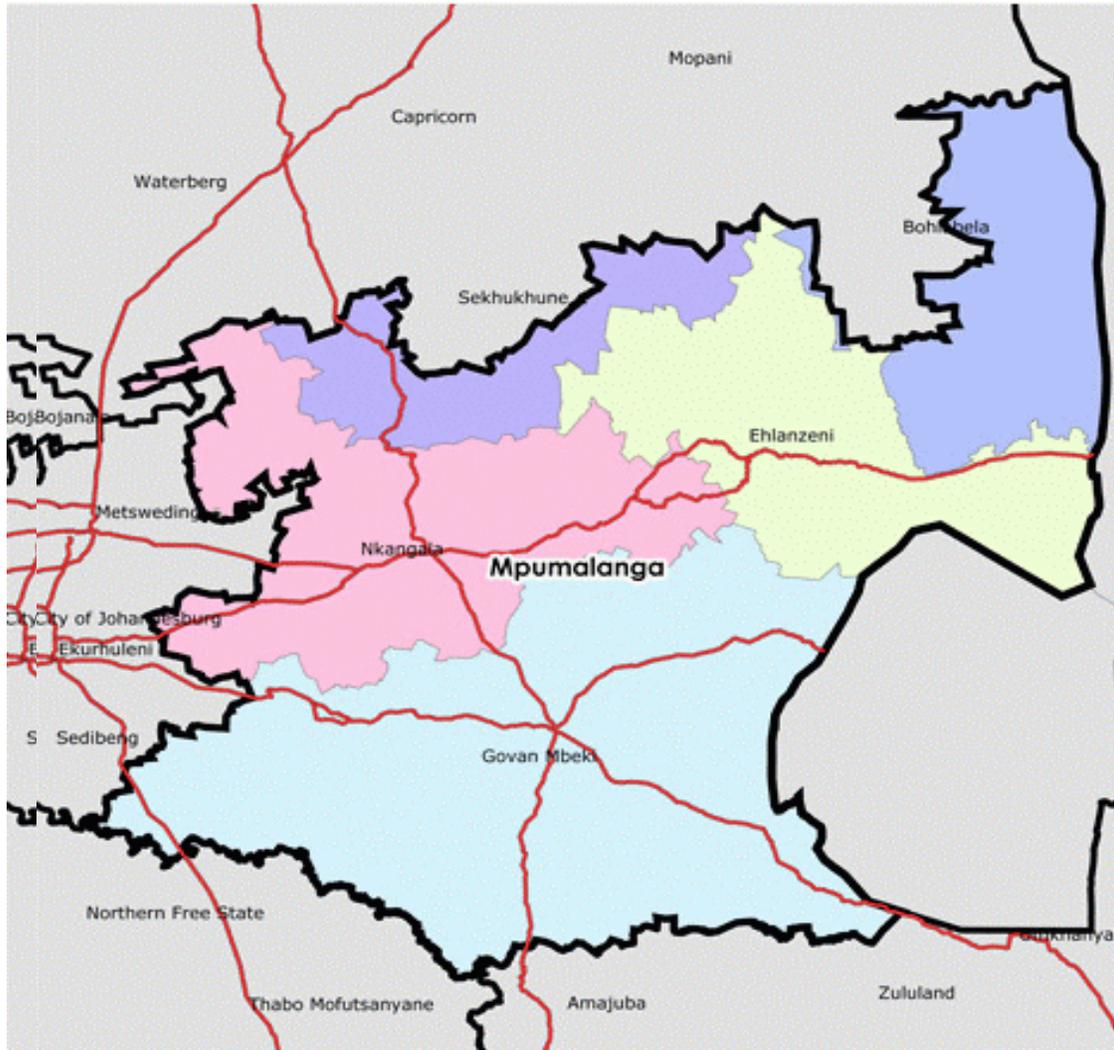


Figure 3.1

Mpumalanga

(Municipal Demarcation Board 2003)

MAP: GERT SIBANDE

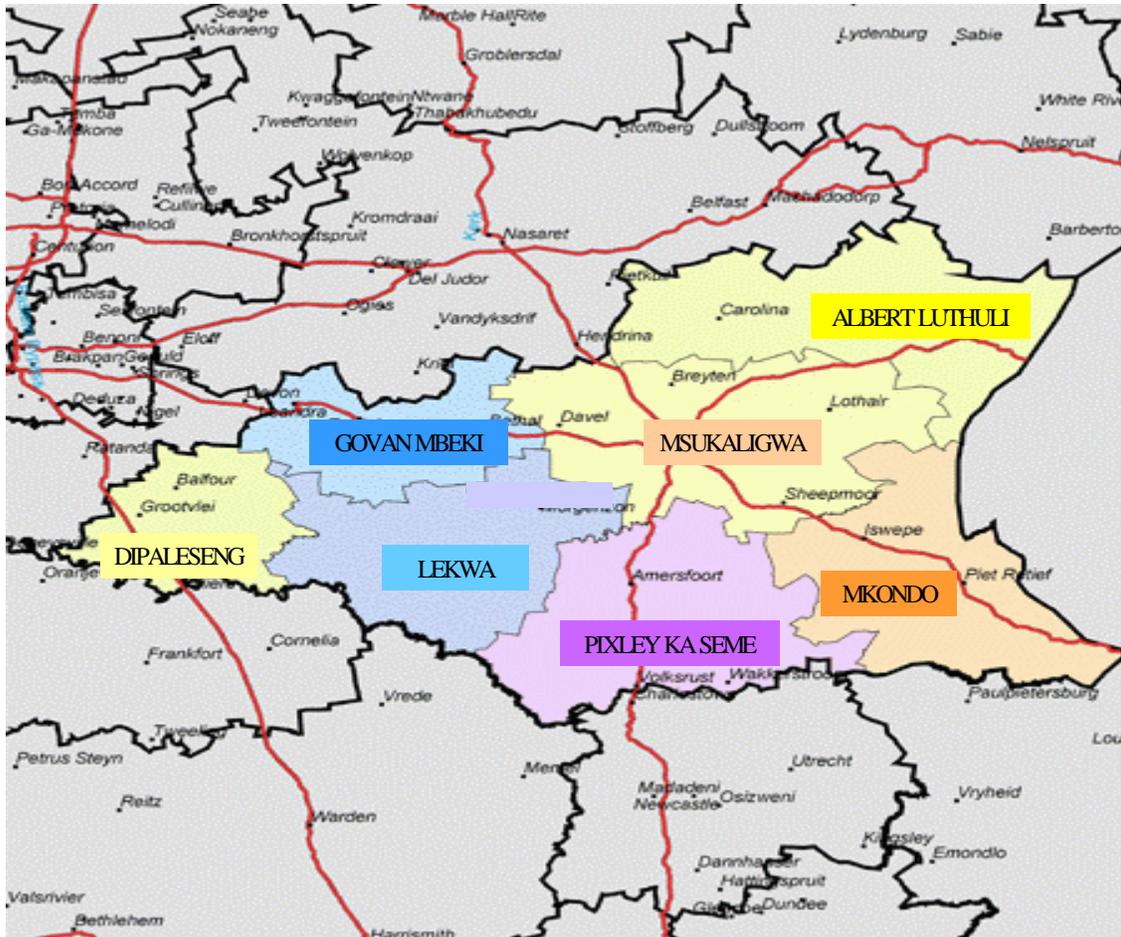


Figure 3.2

Gert Sibande district

(Municipal Demarcation Board 2003)

POPULATION PYRAMID

Population Pyramid for Gert Sibande Health District
2004 Mid-Year estimate
Census 2001

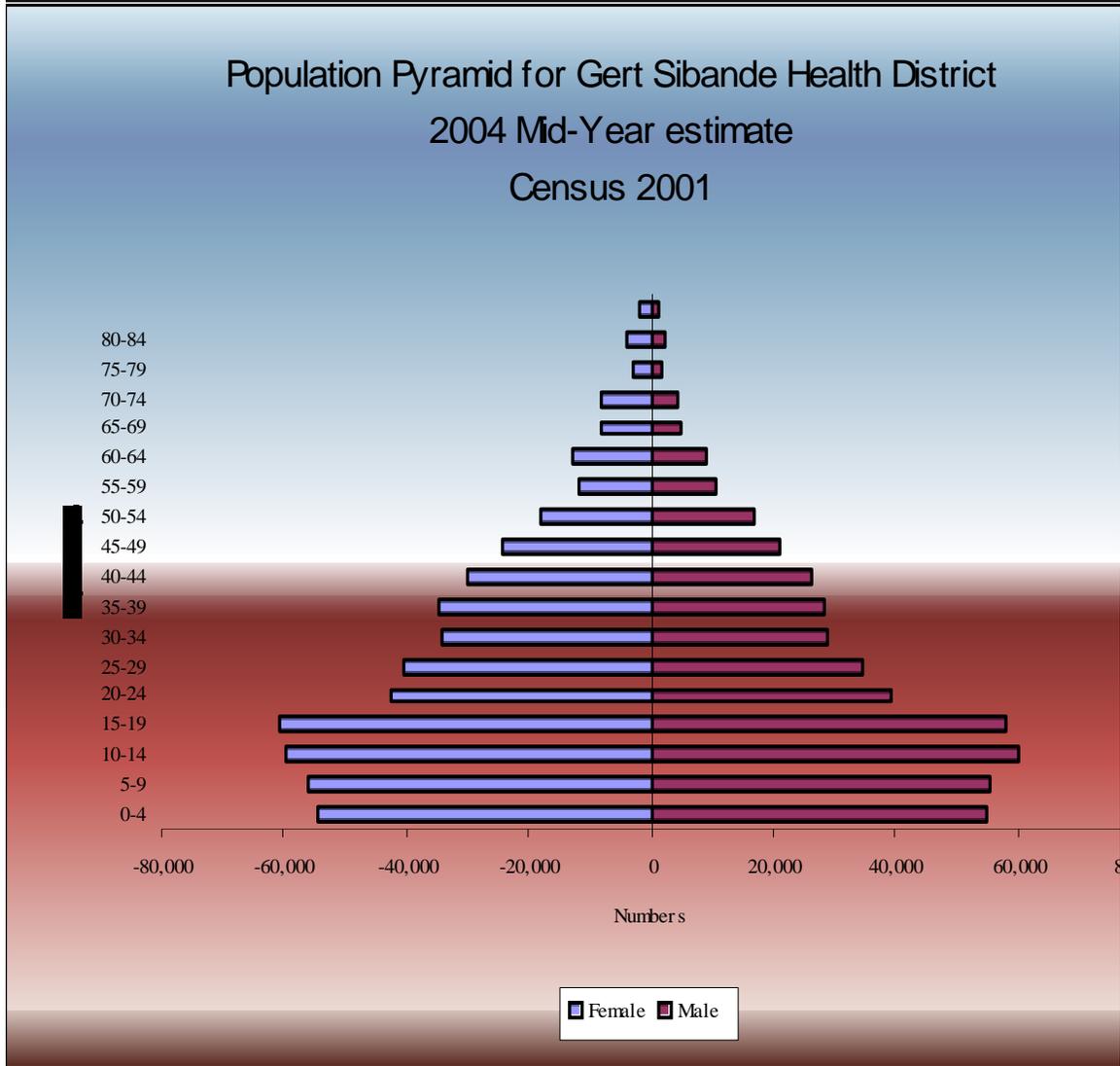


Figure 3.3
Population pyramid
(Statistics South Africa 2004)

The area is mostly rural and is bordered by Gauteng, the Free State, KwaZulu-Natal and Swaziland.

3.4 RESEARCH DESIGN AND METHODOLOGY

According to Burns and Grove (2003:195), a research design is “a blueprint for conducting a study that maximizes control over factors that could interfere with the validity of the findings”. It provides a set of guidelines and instructions to be followed in addressing the research problem. The main function of the research design is to enable the researcher to anticipate what the approximate research decisions should be so as to maximise the validity of the eventual results (Mouton 1996:107). A quantitative, descriptive research design was selected as most appropriate for this study.

1 Quantitative

“Quantitative research is a formal, objective, rigorous and systematic process for generating information about the world” (Burns & Grove 2003:27). It is useful for identifying problems in current practice (Burns & Grove 2003:200).

2 Descriptive

The purpose of descriptive research is to provide a picture of what naturally occurs (Burns & Grove 2003:200).

3.5 PHASES OF THE RESEARCH DESIGN

3.5.1 Phase 1: Research objectives and questions

The literature review formed the basis for the method and techniques of the study. The purpose of phase 1 was to identify deficiencies or problems that PHC nurses may encounter in diagnosing TB in children in government PHC facilities.

This required determining the research questions and study objectives and deciding on the most appropriate data-gathering methods. During this phase the researcher elaborated on what would be researched, objectives, questions and assumptions, and identified factors influencing the ability of PHC nurses to diagnose TB in children. The context of the study was determined as all government PHC facilities: community health centres (CHCs), mobile clinics and fixed (permanent) clinics in Gert Sibande district, Mpumalanga as the principal providers of TB care to the population of the area.

The research objectives and questions guided the planning of the data collection.

3.5.1.1 Research questions

The researcher wished to answer the following questions:

- 1 Do PHC nurses have adequate knowledge to effectively diagnose TB in children in the Gert Sibande district, Mpumalanga?
- 2 Is the PHC setting in the Gert Sibande district, Mpumalanga equipped for diagnosing TB in children?
- 3 How complete is screening for TB child contacts of confirmed smear positive adult TB cases?
- 4 Is a specific plan of action for diagnosing TB in children by PHC nurses in Mpumalanga necessary?

3.5.1.2 Research objectives

The objectives of the study were to

- 1 determine the knowledge of the PHC nurses in the Gert Sibande district, Mpumalanga regarding TB diagnosis in children
- 2 establish whether the PHC setting is equipped to diagnose TB in children
- 3 evaluate the completeness of TB child contact screening of confirmed TB

smear positive adult cases

- 4 determine the need for a plan of action for PHC nurses in Mpumalanga for improved diagnosis of TB in children

3.5.1.3 Data collection

“Data collection is the process of acquiring subjects and collecting the data for the study” (Burns & Grove 2003:298). A structured quantitative process of data collection, consisting of three complementary methods was selected.

Methodological triangulation was used to provide the researcher with a holistic understanding of the phenomenon being researched (Allan & Somervell 2001:18). The researcher selected a questionnaire, observation and secondary data as data collection methods. Data collection on site, namely fieldwork, was used for the clinic audit and clinic record review (Allan & Somervell 2001:19).

3.5.1.3.1 Sections A and B: Personal questionnaires

The researcher chose to use a personal questionnaire handed to the respondents during personal facility visits. It was self-completed, but the researcher was available for clarification, if necessary. The researcher remained in the background and generally only encouraged respondents to complete the questionnaire (De Vos 1998:154).

Section A of the questionnaire collected demographic information (see annexure C1):

- 1 Type of health facility in which the PHC nurse worked.
- 2 Previous training in TB management and whether respondents felt that they would benefit from additional training.
- 3 The degree to which the respondent was involved in the management of TB

in children.

- 4 Whether children were treated in the specific health facility.

Section B determined the relevant knowledge of PHC nurses involved in diagnosing TB in children. The questions were generated from information obtained during the literature review (see annexure C1).

The following areas were explored:

- 1 Strategies needed to prevent TB in children
- 2 Use of BCG in children
- 3 Approaches to pregnant women and infants
- 4 Diagnostic tools available for the PHC nurse to diagnose TB in children:
 - Tuberculin skin test
 - X-rays as a diagnostic tool in children
 - High index of suspicion/clinical signs and symptoms
 - Score system for the diagnosis of TB in children/paediatric flow chart
 - Gastric washing/gastric suction
 - “Road to health” card
 - Classification of children as having suspect, probable or confirmed respiratory TB
 - Other tests available to diagnose TB in children

3.5.1.3.2 Section C: Clinic record review for patient contacts (GW 20/12)

Official TB records, GW20/12, were examined for completeness of follow-up of patient contacts (see annexure C2). The last 10 cases (or as many cases as available, where less than 10) admitted in the electronic register at each site were used for this purpose. The important aspect of providing TB prophylactic

treatment to contacts under 5 years of age was also investigated.

3.5.1.3.3 Section D: Clinic audit

To establish whether PHC nurses have everything they need to diagnose TB in children and whether the organisation of the facility facilitates the diagnosis of TB in children, the researcher performed an on-site audit of all government clinics, mobile clinics and CHCs in the Gert Sibande district, Mpumalanga (see annexure C3). All facilities were included and no attempt was made during the study to manipulate, change or control the settings during the fieldwork (Allan & Somervell 2001:19).

A checklist was used to collect the data consisting of a series of statements with *yes* or *no* options for each item and the researcher completed this personally.

3.5.2 Phase 2: Population and sampling

During this phase the target population was determined, sampling strategies were considered, ethical issues were identified and addressed, instruments were pre-tested, and consideration was given to the validity and reliability of the research design.

3.5.2.1 Sampling

Three different sampling methods were selected:

- 1 For the knowledge/practices questions, purposive sampling was chosen. According to De Vos (1998:153-154), purposive sampling is based on the judgement of the researcher, and the sample is composed of elements most representative of typical attributes of the population. At least one PHC nurse per government fixed clinic, mobile clinic or CHC in the Gert Sibande district, Mpumalanga, preferable the person working with TB mostly was included. There were 67 PHC facilities in the Gert Sibande district. However, not all of

them were operational at the time of data collection or had professional nurses. Therefore 62 PHC facilities were used for the study. The sample thus consisted of 62 PHC workers. In this case, this also represents the full population of PHC facilities in the area.

- For the clinic audit, all government clinics, mobile clinics and CHCs were used; in other words, the whole population was used.
- For the clinic record review, the last ten records or if there were less than ten available, as many as possible, in the facilities' electronic register were used as these were considered to best represent current practice. Purposive sampling was thus used. The sample was planned to include up to 62x10 records per facility. A total of 491 records were reviewed as some of the facilities did not have any records and others did not have ten TB patients on the electronic TB register (4 facilities indicated that they do not use the GW20/12 TB document, 5 facilities had not had any TB patients in the past year, 5 facilities did not have 10 records and one facility could not find their GW20/12 records; 491 records were reviewed but only 95 had the last page on contacts completed).

The researcher used the following sampling criteria:

- 1 The person mostly responsible for TB management in the facility was given a questionnaire.
- 2 Only government PHC facilities were included in the study.

3.5.2.2 Sampling and target population

Monama (2003:1) describes a population as “the totality of persons, events, organisations, units, case records or other sampling units with which the research problem is concerned”. Burns and Grove (1997:235) define sampling as

“the process of selecting a group of people, events, behaviours or other elements for studying a subset of the population”.

3.5.2.3 Target population

The target population comprised all PHC nurses working in government facilities, namely CHCs, fixed clinics and mobile clinics, in the Gert Sibande district, Mpumalanga and responsible for managing children with suspected TB. PHC nurses are usually responsible for diagnosing TB in children in the primary care setting, while nurses in TB hospitals and general hospitals do not diagnose TB in children; they only nurse them. The PHC nurse is thus expected to be competent in diagnosing TB in children.

3.5.2.4 Pre-testing

Pre-testing of the research instrument was conducted to ensure that the questions were clearly worded, free from major biases and solicited the kind of information that the researcher envisioned (Polit & Hungler 1995:650). For pre-testing, one professional nurse from each of the seven health facilities in the Dipaleseng municipal area Gert Sibande district, Mpumalanga participated.

The researcher pre-tested the instrument in order to

- 1 check the content validity and reliability of the instrument
- 2 identify any latent problem
- 3 assess whether the study was feasible
- 4 assess whether the objectives of the study would be met

Phase 2 was organised in such a way that validity, reliability, and ethical considerations would be given full weight and consideration.

3.5.2.5 Validity and reliability

The researcher had to ensure the validity and reliability of the instruments before data collection. Validity is “the extent to which an instrument measures what it purports to measure and delivers what it indicates it will deliver” (Allan & Somervell 2001:17). The research instrument was checked for face and content validity by the supervisors and colleagues with research expertise. These people were asked to identify any ambiguities in the wording of items and any unintentional repetition of items. The researcher then consulted a statistician to determine whether the instrument was comprehensive, allowed meaningful conclusions about the ability of the nurses to diagnose TB in children, and was appropriate in structure and length. After feedback, some items were reworded while others were discarded to give the instrument greater clarity. During pre-testing content validity was confirmed by a professional statistician, who specifically assessed the relevance and adequacy of the instrument.

Validity was strengthened by using multiple data sources to corroborate data (McMillan & Schumacher 2001:409).

External validity was achieved through the following:

- 1 Similar conditions for data collection for each participant made possible by the researcher conducting data collection when visiting all the facilities.
- 2 The clinic audit of patient records was done by the researcher using the same research instrument at all times.
- 3 Triangulation ensured content validity (Sim & Sharp 1998:23).
- 4 The sample for the questionnaire included at least one PHC per government health facility (62).
- 5 All 62 government health facilities were included.
- 6 The sample size for patient record review was 62 facilities x 10 patient records per facility (491 records were reviewed but only 95 had the last page

on contacts completed).

Internal validity was achieved through:

- 1 piloting the research instrument
- 2 using methodological triangulation

Reliability of the instrument was achieved through the following:

- 1 The research instrument giving the same information every time it was used (Allan & Somervell 2001:17).
- 2 The evidence obtained through the instruments being trustworthy (Allan & Somervell 2001:7).
- 3 Exposing everybody in the study to the same instrument (De Villiers 2003:1).
- 4 Piloting the research instrument (Allan & Somervell 2001:17).
- 5 Using triangulation (Allan & Somervell 2001:17).
- 6 The data collected ensured that evidence was relevant (Allan & Somervell 2001:17).

3.5.2.6 Ethical considerations

The following ethical considerations were taken into account:

1 Human rights of the respondents were protected

- 1 The University of South Africa (Unisa), Department of Health Studies' Research Ethics Committee and the Mpumalanga Health Research Ethics Committee reviewed the proposal (see annexures B1 and B2).
- 2 Voluntary informed consent was obtained from all the respondents (see annexure D1).
- 3 The purpose of the study and its general value were discussed with all the respondents.

- 4 The respondents were informed of all instruments used in the research.
- 5 Raw hard copy data were stored and locked in a safety cabinet in a secure, locked office and destroyed once the data had been entered into a database and analysed.
- 6 The computer database was stored on a password-protected computer and completed hard copy questionnaires were locked in a safety cabinet.

1 The rights of the institution were protected

- 1 The research report presented collated data and averages, and avoided providing information about individual facilities that might allow identification (De Vos 1998:28).
- 2 Data collected by the facilities were used to establish whether TB contacts were traced and whether children received correct prophylactic or curative treatment and did not permit identification of source (De Vos 1998:29).
- 3 Consent was obtained from the Gert Sibande District Director to conduct the study in all government fixed clinics, mobile clinics and CHCs (see annexure B3).

2 Scientific honesty of the researcher was assured

- 1 Data were not fabricated or manipulated during analysis (De Villiers 2003:3).
- 2 The researcher did not commit plagiarism (De Villiers 2003:7).
- 3 The contributions of others were acknowledged (De Villiers 2003:7).

3.5.3 Phase 3: Data collection

In phase 3 the actual process of data collection was conducted at 62 government facilities in the Gert Sibande district, Mpumalanga. Chapter 4 discusses the data analysis and findings.

3.5.3.1 Data collection process

Only the mobile clinics were warned before the researcher visited them. Since they go out early in the morning and some only return late in the afternoon, the researcher had to arrange a specific time with them so that they would wait for her.

The researcher organised to visit the 62 facilities within 13 working days. At each facility she asked the PHC nurse generally responsible for TB management of children to complete Sections A and B of the questionnaire, after carefully describing the purpose, approval and confidentiality guarantees of the study. Before the respondent completed the questionnaire, the researcher requested access to the electronic TB register and the patient clinic cards GW20/12. The researcher selected the last available 10 admissions in the electronic register or as many as were available in less busy clinics.

While respondents completed the questionnaire on their own, the researcher was available to assist with clarification, if required. While the respondents completed Sections A and B, the researcher completed part of Section C. The researcher and respondent then completed the rest of Section C together. After completion of Section C the researcher conducted the structured clinic audit with the respondent accompanying the researcher through the clinic.

3.5.3.2 Data analysis

Data analysis is “the systematic organisation and synthesis of research data” (Polit & Hungler 1995:639). The data collected were used to evaluate PHC nurses’ knowledge of the management of TB in children, determine whether contact tracing was performed for TB sputum positive patients, PHC facilities

were equipped to facilitate PHC nurses' diagnosis of TB in children, and to establish the need for a plan of action for the PHC nurses to help them to diagnose TB in children.

Data were electronically captured in an Excel for Windows Spreadsheet and analysed using the statistical program SAS (Statistical Analysis System) for Windows version 9.1. Analysis was descriptive, reporting frequencies of discrete variables as proportions, with arithmetic mean and standard deviation used for continuous variables where appropriate. Descriptive statistics are useful in arranging numerical data in an orderly and readable manner and allowed the researcher to make decisions about the nature of reality (Terre Blanche & Durrheim 1999:121).

3.6 CONCLUSION

This chapter covered the research design and methodology. Questionnaires, checklists and a clinic audit were used for data collection. Permission to conduct the research was sought and obtained from the Research and Ethics Committee of Mpumalanga province and Unisa (see annexure B1 and B2).

Chapter 4 discusses the data analysis.