CHAPTER 4

Data analysis and interpretation

4.1 INTRODUCTION

This chapter discusses the data analysis and findings. The study sought 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?

4.2 SAMPLING

Three different samples were used:

1 For the demographic and knowledge/practices questions, at least one PHC nurse per government fixed clinic, mobile clinic or CHC in the Gert Sibande district, Mpumalanga responded at 59 facilities. At three facilities a PHC nurse was not responsible for TB management in children. An enrolled nurse was responsible at two facilities and at one facility a DOTS supporter was responsible for TB management in children, and so they were included.
2 For the clinic audit, all government clinics, mobile clinics and CHCs were included, thus 62 facilities.

3 For the clinic record review for TB contacts, the researcher planned to include 10 records per facility (i.e. 620 records). However, 491 records were reviewed, as some facilities did not have any records and others did not have 10 TB patients on the electronic TB register. Of these 491 records, only 95 had the last page regarding contacts completed.

4.3 DATA INTERPRETATION

4.3.1 Characteristics of study population

Item 1*: *Gender (N=62)

Of the 62 respondents there were 51 female and 11 male.

Item 2*: *Age of the respondents (N=62)

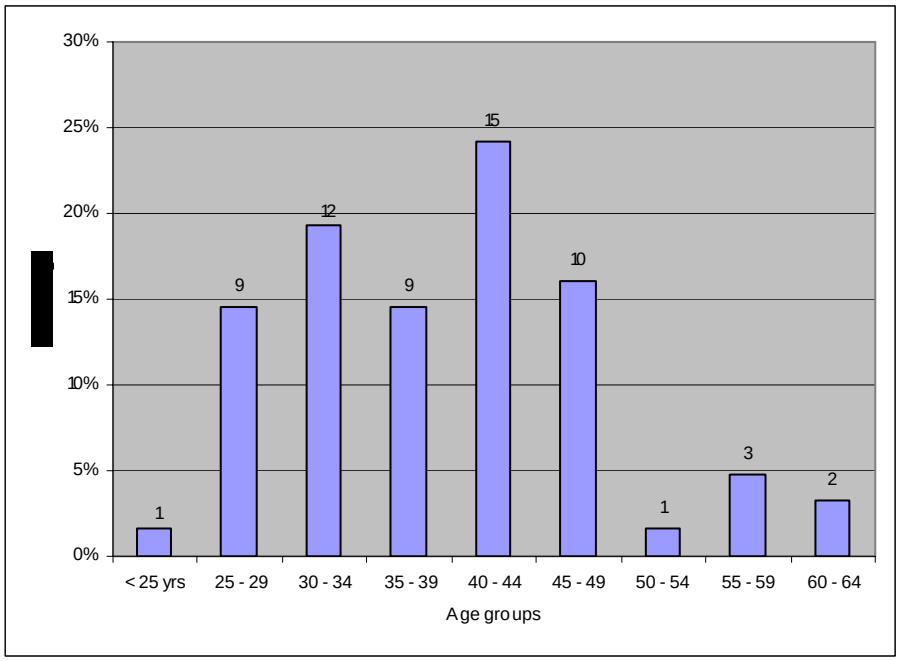

Figure 4.1

Age of respondents (N=62)

The median age of respondents was 39 years (range 24 to 61 years). Two-thirds of respondents were older than 34 years.

Item 3: Qualifications of respondents (N=62)

Table 4.1 indicates the respondents' qualifications.

Table 4.1 Respondents' qualifications (N=62)

Qualification	N	Percent
General nursing	59	95,1
Midwifery	50	80,6
Psychiatric nursing	22	35,4
Community health nursing	32	51,6
Nursing administration	11	17,7
Nursing education	4	6,4
Primary health care	13	20,9
Enrolled nurse	2	3,2
Santa DOTS volunteer	1	1,6

Of the respondents, 95,1% (N=59) had a general nursing qualification, while 3,2% (N=2) were enrolled nurses and one a community volunteer. The latter 3 were primarily responsible for TB management at their facilities. Of the general nurses, 80,6% (N=50) had additional qualifications in midwifery.

Item 4: Rural/urban government health facilities (N=62)

Of the respondents, 85,4% (N=53) were situated in rural areas. The payment of rural allowances was used to identify rural versus urban status of respondents.

Item 5: Type of health facility (N=62)

Figure 4.2 depicts the various types of health facilities where the respondents worked.

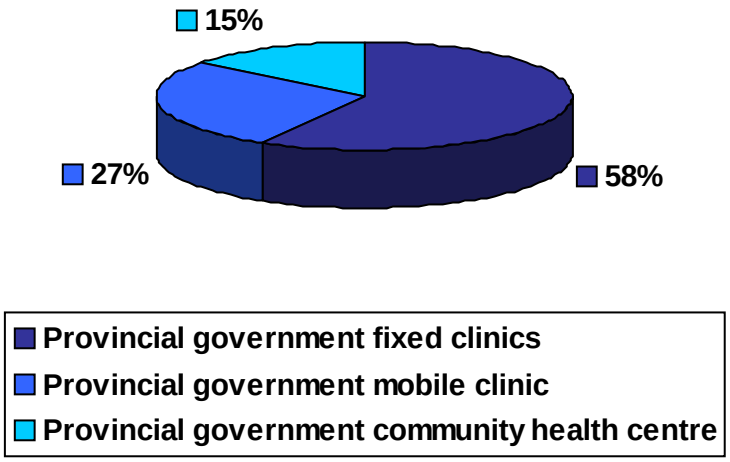

Figure 4.2

Types of participating health facilities (N=62)

Of the respondents, 58,0% (N=36) were from fixed provincial clinics, 27,4% (N= 17) from government mobile clinics and 14,5% (N=9) from provincial government CHCs (see figure 4.2).

Item 6: Previous TB training (N=62)

Of the respondents, 53,2% (N=33) had received TB training since qualifying. This appears inadequate as PHC nurses are required to serve as the first line to suspect, diagnose, treat and confirm the diagnosis of TB in children (Baez 2000:10).

Item 6.1: Duration of TB training (N=33)

Table 4.2 depicts the duration of the TB training the respondents had received.

Table 4.2 Duration of training (N=33)

Duration of training	N	Percent
1 day	1	3,0
2 days	1	3,0
3 days	19	57,5
4 days	5	15,1
5 days	6	18,1
10 days	1	3,0

Of the respondents, 57,5% (N=19) who had received TB training had participated in a three-day TB training course specifically offered in Mpumalanga.

Item 6.2: Time since receiving training (N=33)

Table 4.3 illustrates the different years in which the respondents received training.

Table 4.3 Year of TB training (N=33)

Year	N	Percent
1995	1	3,0
1996	1	3,0
1997	1	3,0
1999	3	9,0
2000	6	18,1
2001	6	18,1
2002	2	3,2
2003	8	24,2
2004	5	15,1

In the preceding 5 years, 45,5% (N=27) of all health workers surveyed (N=62) had been trained.

Item 7: Expressed need for additional training (N=62)

All respondents, except the nurse who had received 10 days' training indicated that they would benefit from extra training on TB.

Item 8: Respondents' roles in managing TB in children (N=62)

The approach to managing TB varied between facilities (see table 4.4).

Table 4.4 Respondents' responsibilities for TB management in children (N=62)

Role in TB management	N	Percent
I am the person mostly responsible for childhood TB management in the facility	17	27,4
Childhood TB is everybody's responsibility in the facility	22	35,4
All children with suspected TB are referred to the general hospital for diagnosis	23	37,1

Only 37,1% (N=23) referred all their patients to general hospitals for diagnosis. Beyers et al (1994:261) state that the mortality and morbidity from childhood TB may be adversely influenced by any delay in diagnosis or between diagnosis and commencement of treatment hence this raises concern regarding optimal patient management.

Items 9-17: TB patient totals in facilities, 2001-2003 (N=62)

Table 4.5 represents the total number of TB patients in facilities from 2001 to 2003.

Table 4.5 Gert Sibande TB statistics, 2001 – 2003 (N=62)

Year	All TB patients	TB 0-<5 year	TB 5-<15 year
2001	2 162	79	19
2002	2 665	71	72
2003	3 078	125	90

Table 4.5 is a summary of the responses to questions 9 to17. It should be noted that the number of patients at individual facilities varied between 0 and 127.

Items 18.1 and 18.2: TB child contacts on prophylactic treatment (N=62)

Only 20,9% (N=13) of the facilities were found to record contacts. The researcher found 16,1% (N=10) facilities who recorded child contacts. A total of 95 contacts were recorded, of which 22 were child contacts on prophylactic treatment.

Item 19: Record-keeping of TB child contacts (N=62)

This question was also asked under the *clinic record review* (Item 9). It is more applicable there and will thus be discussed under that item.

4.3.2 Respondents' knowledge of TB management in children

Item 1: Strategies mentioned for preventing TB in children (N=62)

Table 4.6 lists various strategies that respondents indicated can prevent TB in children.

Table 4.6 Strategies mentioned for preventing TB in children (N=62)

Strategy	N	Percent
BCG vaccination	57	91,4
Chemoprophylaxis of child contacts of infectious adults	34	54,8
Diphtheria-tetanus-pertussis (DPT) vaccination	3	4,8
A functional national TB control programme	27	43,5
Treating smear positive adults	36	58,0
Integrated management of childhood Illness	18	29,0
Anti-retroviral therapy (ARV)	3	4,8

When asked what strategies were effective in preventing TB in children, the majority of respondents, namely 91,4% (N=57) indicated BCG vaccination; 54,8% (N=34) mentioned administering chemoprophylaxis to child contacts of infectious adults; 58,0% (N=36) indicated that the treatment of smear positive adults was a strategy for preventing TB in children. Diagnosing and treating adults with sputum positive PTB can actually be a way of reducing the infectious pool (Schaaf et al 1991:223). This represents a missed opportunity for preventing TB in children.

Item 2: The risk of TB infection in children (N=62)

Table 4.7 indicates the determinants of the risk of childhood TB infection in a

given population as identified by respondents.

Table 4.7 Determinants of the risk of childhood TB infection in a given population (N=62)

Determinant	N	Percent
The number of infectious TB cases in the population	44	71,0
The degree of overcrowding in a community	37	59,7
The extent of exposure to infectious droplet nuclei	22	35,5
The population of children under 5 years of age in the population	13	21,0

Of the respondents, 71,0% (N=44) indicated TB infection risk was the number of infectious TB cases in the populations, and 21,0% (N=13) indicated that the population of children under 5 years of age in the population is a risk. This appears to be an important deficit in knowledge.

1 BCG

Item 2.1: BCG (N=62)

Only 29,0% (N=18) of the respondents knew that GCG was Bacillus Calmette Guerin.

Item 2.2: Age for administering BCG to a child (N=62)

Of the respondents, 93,5% (N=58) correctly indicated that BCG should be administered at birth; 3,2% (N=2) indicated an incorrect age and 3,2% (N=2) were unsure.

Item 2.3: Upper age for administering BCG (N=62)

There appeared to be confusion regarding the upper age recommended for administering BCG in children (see table 4.8).

Table 4.8 Recommended upper age for administering BCG to a child (N= 62)

Recommended upper age	N	Percent
Not answered	3	4,8
Unsure	14	22,5
Birth	18	29,0
1 year	3	4,8
18 months	1	1,6
2 years	1	1,6
5 years	1	1,6
Any age	21	33,8

This confusion may have resulted from differences between official guidelines and advice from the previous provincial TB manager who said it should only be given at birth. The correct answer is up to 2 years of age.

Item 2.4: Mode of BCG administration (N=62)

All the respondents accurately identified the mode of administration to be by intradermal injection.

Item 2.5: Anatomical location of BCG administration (N=62)

All the respondents identified the correct anatomical location for administering BCG, namely the upper arm.

Item 2.6: Action if no scar follows BCG vaccination (N=62)

Only 9,6% (N=6) of the respondents correctly indicated that the intradermal injection of BCG does not leave a scar unlike the previous percutaneous method practised in South Africa. When asked what their action would be if no scar followed vaccination, 75,6% (N=47) correctly indicated that nothing should be done, 19,3% (N=12) incorrectly indicated that the vaccination should be repeated, 3,2% (N=2) were not sure what to do, and 1,6% (N=1) did not answer the question.

Item 2.7: Most common adverse event after BCG vaccination (N=62)

Although the most common adverse event with intradermal BCG is an infected wound, and not a scar as was the case with the previous BCG, 46,7% (N=29) of the respondents still mentioned a scar, while 38,7% (N=24) correctly indicated an infected wound, 9,6% (N=6) did not answer the question and 4,8% (N=3) were unsure.

Item 2.8: Number of BCG doses that should be given (N=62)

Of the respondents, 80,6% (N=50) knew that only one dose of BCG should be given.

2 PREGNANT WOMEN AND INFANTS

Item 3.1: Treatment for pregnant women (N=62)

When asked about the treatment of pregnant women with TB, only 35,4% (N=22) of the respondents indicated that Streptomycin should not be given to pregnant women because of the teratogenic effects on the fetus, 51,6% (N=32) indicated the wrong medicines and 16,1% (N=10) were unsure.

Item 3.2: Management of a baby born to a mother with active TB (N=62)

Only 32,2% (N=20) of the respondents answered this question correctly, indicating that treatment should be started immediately after birth and BCG only given once treatment of the baby was completed. Half of the respondents (N=31) incorrectly indicated that BCG should be given immediately after birth and 16,1% (N=10) were unsure.

Item 3.3: TB drugs excreted in breast milk (N=62)

Only 27,4% (N=22) of the respondents correctly indicated that TB drugs excreted in breast milk were ineffective treatment for active TB infection in a breastfeeding infant; 27,4% (N=17) were unsure and 35,4% (N=22) were wrong.

3 DIAGNOSTIC TOOLS

Item 4.1.1: Indication for tuberculin test (N=62)

Of the respondents, 83,8% (N=52) knew that a tuberculin test should be performed when TB was suspected in a child, 9,6% (N=6) answered incorrectly and 6,4% (N=4) were unsure.

Item 4.1.2: Interpreting a positive tuberculin test (N=62)

Of the respondents, 64,5% (N=40) answered correctly that a positive tuberculin test meant that the child was infected with TB, while 24,1% (N=15) answered incorrectly and 9,6% (N=6) were unsure. Beyers et al (1994:265) maintain that greater utilisation of the tuberculin test would shorten the delay between diagnosis and initiation of TB treatment.

Item 4.1.3: Suppressed tuberculin test (N=62)

When asked what conditions could suppress a tuberculin test, the respondents demonstrated considerable uncertainty.

Table 4.9 Conditions that may suppress tuberculin test reaction (N=62)

Condition	N	Percent
HIV infection	30	48,3
Malnutrition	13	20,9
Steroids	10	16,1
Cancer treatment	5	8,0

Severe disseminated TB	14	22,5
Unsure	14	22,5

The knowledge of respondents regarding conditions that can suppress a tuberculin test was limited. More than a fifth of the respondents were not able to identify one condition (see table 4.9).

Item 4.1.4: Site for administering tuberculin test (N=62)

Of the respondents, 70,9% (N=44) correctly indicated that tuberculin should be administered on the dorsal aspect of the forearm, while 12,9% (N=8) incorrectly indicated the upper arm, 4,8% (N=3) did not answer the question and 11,2% (N= 7) were unsure.

Item 4.1.5: Reading the Mantoux test (N=62)

Of the respondents, 56,4% (N=35) correctly indicated that the diameter of the swelling should be assessed while 20,9% (N=13) said that the height of the swelling should be monitored and 11,0% (N=4) were unsure.

4 X-RAYS AS A DIAGNOSTIC TOOL IN CHILDREN

Item 4.2.1: X-rays for diagnosis (N=62)

When asked whether x-rays were used in their clinic to diagnose TB in children, 20,9% (N=13) answered in the affirmative but 75,8% (N=47) said that x-rays were not used. There is a clear missed opportunity of using x-rays as an adjunct for diagnosing TB in children.

Item 4.2.2: X-rays status in diagnosing TB in children (N=62)

Of the respondents, 29% (N=18) correctly indicated that x-rays were not the gold standard for diagnosing TB in children, but 46,7% (N=29) thought that x-rays were the gold standard and 24,9% (N=15) were unsure. X-rays clearly have a role in diagnosing TB in children. The correct interpretation of chest radiographs will lead to earlier diagnosis of TB in infants and therefore can lead to earlier initiation of treatment and a lower mortality (Schaaf et al 1993:374).

1 HIGH INDEX OF SUSPICION/CLINICAL SIGNS AND SYMPTOMS OF TB IN CHILDREN

Item 4.3.1: Main focus of TB control (N=62)

Of the respondents, 77,4% (N=48) indicated that sputum positive adults should be the main focus of TB control, while 20,9% (N=13) listed other groups of patients and 1,6% (N=1) were unsure. South African guidelines indicate that with sputum positive adults should be the main focus for TB control.

Item 4.3.2: Groups at risk of developing serious forms of TB (N=62)

Only 38,7% (N=24) of the respondents answered correctly that children under 2 years of age are at risk of developing serious forms of TB, while 48,3% (N=30) answered incorrectly that it was adults and 11,2% (N=7) were unsure.

Item 4.3.3: Monitoring response to treatment (N=62)

Table 4.10 indicates different symptoms that are indicative of a child responding to TB treatment.

Table 4.10 Monitoring response to TB treatment in children (N=62)

Symptom	N	Percent
Gains weight	40	64,5
TB symptoms disappear	44	70,9
Fever subsides	15	24,1
X-ray improves	26	41,9
Unsure	2	3,2

When asked how they would know when a child was adequately responding to TB treatment, 70,9% (N=44) of the respondents indicated that this would be based on the resolution of TB symptoms. Fewer respondents mentioned other important signs.

Item 4.3.4: Diagnosing TB in children (N=62)

Of the respondents, 59,5% (N=37) indicated that the diagnosis of TB in children revolved around clinical features, 67,4% (N=42) indicated the tuberculin test and 48,3% (N=30) indicated chest x-rays. They also knew that VCT and TB blood tests were not useful. The majority of the respondents, namely 72,5% (N=45), correctly indicated that a history of contact with sputum positive PTB patients is important. An acute awareness among health workers of symptoms and signs of primary TB is important because it can shorten the diagnostic delay (Beyers et al 2004:265).

Item 4.3.5: Symptoms suggestive of TB in children (N=62)

A number of different symptoms were commonly provided by the respondents to the question, “What symptoms are suggestive of TB in children?”

Table 4.11 Symptoms suggestive of TB in children (N=62)

Suggestive symptoms	N	Percent
Persistent cough	51	82,2
Persistent wheezing	12	19,3
Weight loss	49	79,0
Fever	26	41,9
Failure to recover from recent infectious diseases	36	58,0
Malnutrition despite an adequate diet	37	59,6
Unsure	0	0,0

The majority of the respondents indicated that a persistent cough (82,2%, N=51), weight loss (79,0%, N=49), failure to recover from infectious diseases (58,0%, N=36) and malnutrition despite an adequate diet (59,6%, N=37) are suggestive of TB but fewer recognised that fever (41,9%, N=26) is also suggestive. International and locally proposed clinical criteria for the diagnosis of TB in childhood still lack uniformity and this may be reflected in the inconsistent responses (Osborne 1995:370).

Item 4.3.6: Factors associated with an increased risk of TB in children (N= 62)

The respondents were asked to identify any factors that increased the risk of TB in children**.**

Table 4.12 Factors associated with an increased risk of TB in children (N= 62)

Factor	N	Percent
Overcrowded living conditions	54	87,1
Poor ventilation	42	67,7
Malnutrition	49	79,0
Poverty	48	77,4
Exposure to cigarette smoke	17	27,4
Smoke derived from household wood and coal fires	5	8,0

The majority of the respondents identified the key risk factors, although fewer recognised the importance of tobacco and environmental smoke. Crofton et al (1992:13) assert that reducing national tobacco consumption would assist in preventing TB.

Item 4.3.7: Children most susceptible to TB (N=62)

Of the respondents, 82,2% (N=51) correctly indicated that the chronically underweight child was more susceptible to TB.

5 SCORE SYSTEM FOR THE DIAGNOSIS OF TB IN CHILDREN

Item 4.4.1: Use of the score system for assisting with the diagnosis of TB in children (N=62)

Although 25,8% (N=16) of the respondents indicated that they used the score system during completion of the self-administered questionnaire, when asked directly by the interviewer, only 16,1% (N=10) indicated that they actually used it. Van Beekhuizen (1998:155) found that the TB score chart is a useful, easy,

cheap and quick method for diagnosing TB in children at primary health care facilities, and Harries et al (1996:63) advocate its use.

Item 4.4.2: Availability of a standardised score chart (N=62)

Although 19,3% (N=12) of the respondents said that they used a standardised score chart, no standardised TB score chart was found in use at facilities. In the clinic audit when the researcher verified the responses, 16,1% (N=10) indicated that they actually used it. The researcher asked them to show her which score chart they used and 19,3% (N=12) could locate the TB score chart in the guidelines (8 of these 12 were also among the 10 who indicated that they actually used it).

Item 4.4.3: Usefulness of the TB score chart (N=62)

When asked to rate the potential usefulness of the TB score chart, 27,4% (N=17) of the respondents did not answer the question, 17,7% (N=11) found it very useful, 8% (N=5) found it useful, 1,6% (N=1) found it not useful and 45,1% (N= 28) were unsure of the usefulness of the score chart. Of the 16,1% (N=10) who indicated using the TB score chart, 5 found it very useful, 2 found it useful, 1 found it not useful, 1 was unsure and 1 did not answer the question.

Item 4.4.4: Comments provided on the TB score chart (N=62)

The respondents replied as follows:

1 Nothing in clinic
2 I need to have one in future
3 The child might not be positive
4 We have not used it
5 I need help on how to score it

6 I have yet to see the score chart for children
7 I do not know how to score
8 We do not use it in our clinic, we do not have it
9 Use it from the TB manual
10 Not aware of it
11 Lesson was not given on it

Item 4.4.5: Score chart displayed on the walls of the consulting rooms (N= 62)

Only 9,6% (N=6) of the respondents said the score chart was displayed in their clinics, 69,3% (N=43) said no, and 9,6% (N=6) were not sure. No score chart was actually on display during the researcher's personal visits. No question was asked about why the score chart was not displayed.

Items 4.4.5 and 4.4.7: Paediatric TB flow chart use and display (N=62)

Only 16,1% (N=10) of the respondents said that they used the paediatric flow chart, while 61,3% (N=38) indicated that they were not using it, 12,9% (N=8) were unsure and 9,6% (N=6) did not answer the question. When asked whether they displayed the flow chart, 69,3% (N=43) indicated that they did not, while 9,6% (N=6) said they did, 11,2% (N=7) did not answer the question and 9,6% (N=6) were not sure. The TSC can be used to help with the diagnosis of TB in children if it is used together with a paediatric tuberculosis flow chart (Crofton et al 1992:49).

1 GASTRIC WASHING/GASTRIC SUCTION

Item 4.5.1: Gastric washing/suction as a diagnostic tool in children (N=62)

Of the respondents, 72,5% (N=45) knew that gastric suction could be used as a diagnostic tool and 72,5% (N=45) knew that sputum cannot easily be produced

by children. The question on whether the sputum of children is always negative was not answered by 95,1% (N=59) and 43,5% (N=27) indicated that children under the age of 10 years swallow their sputum.

2 “ROAD TO HEALTH” CARD

Item 4.6.1: Use of the “Road to Health” card (N=62)

Only 61,2% (N=38) of the respondents said they used the “Road to Health” card as a TB diagnostic tool. Failure to thrive is detected by use of the “Road to Health” card hence it can serve as a diagnostic tool for TB in children (Donald et al 1985:117).

Item 4.6.2: TB suspicion when losing weight or not gaining weight (N=62)

Only 64,5% (N=40) of the respondents indicated that they routinely evaluate a child for possible TB when he/she is losing weight. A weight card can be most useful in the diagnosis of TB in the young child. It is useful in the case of TB meningitis and a sensitive and simple aid to early diagnosis (Donald et al 1985:117).

3 CLASSIFYING CHILDREN AS HAVING SUSPECT, PROBABLE OR CONFIRMED RESPIRATORY TB

Item 4.7.1: WHO guidelines for diagnosing TB in children (N=62)

Also asked in clinic audit Item 3.7; will be addressed under that section.

Item 4.7.2: Diagnostic pathways for children with possible PTB (N=62)

Also asked in clinic audit Item 3.6; will be answered there.

4 DIAGNOSTIC TESTS

Item 4.10.1: The use of newer diagnostic tests (N=62)

No other diagnostic tools were used in the Gert Sibande district.

4.3.3 Clinic record review for TB patient contacts

Item 1: Record review for TB (child) contacts (N=62)

At each facility, the researcher verified how many of the last 10 admissions had the contact section of their official TB record completed. Information was only available on childhood contacts at 20,9% (N=13) of the facilities. Not all the facilities had 10 GW20/12 forms; some did not use the record at all, and others did not have 10 patients on their TB electronic register. Only 491 records were thus scanned and only 22,6% (N=111) had the section on (child) contacts completed.

Item 2: Non-screening for contacts (N=62)

The following reasons were provided when the contact section was not completed:

1 Forget sometimes
2 No time
3 No reason

4 Forget to fill it in
5 Use a new GW20/12 record for contacts that are on prophylactic treatment (this was at a clinic where they do contact tracing – 10 records were found that were completed)
6 No transport to do it
7 Did it some time ago but stopped - shortage of staff
8 Not told to do it
9 Do not use GW20/12 at all (22,5 %, N=14)
10 Write name in TB register (researcher could not find proof of it)
11 Only write contacts if they have signs and symptoms (researcher could not find proof of it)
12 Not done, refer all children to hospital (27,1%, N=23)

Although the main focus of TB control is the detection and treatment of culture positive adults who spread the disease, the early detection of children with TB will prevent progression of the disease in these children and will also help with the tracing of infectious adult contacts (Gie et al 1993:263).

Item 3: Responsibility for contact tracing (N=62)

A variety of approaches to contact tracing were described.

Table 4.13 Responsibility for contact tracing (N=62)

Category	N	Percent
Nobody	10	16,1
Professional nurses	9	14,5
Other categories of nurses	1	1,6
Health promotion practitioners	3	4,8
Volunteers	33	53,2
Traditional healers	3	4,8

A number of remarks were received regarding volunteers. At most facilities it appeared that they only provided home based care for HIV/AIDS patients. Some volunteers only come to the clinics daily but do not do any contact tracing

because no transport is available. Contact tracing activities are important in the control of TB in developing countries, and associated with early case detection and treatment (Lienhardt et al 2003:610).

Item 4: Prophylactic treatment and Item 6: Period of treatment (N=62)

Many different kinds of prophylactic medicines were in use in Gert Sibande district (see table 4.15). The majority of facilities, namely 91,9% (N=57) indicated that they have prophylactic treatment in stock for children. Only 6,4% (N=4) of the facilities indicated stock-outs of prophylactic treatment over the past 6 months.

Table 4.14 Prophylactic TB treatment provided to child contacts and period of treatment (N=62)

Kind of Prophylactic treatment	N	Percent	Provided for correct time period	Provided for incorrect time period
Rimactized	25	40,3	15 (60,0%)	10 (40,0%)
Isoniazid (INH)	20	32,2	2 (10,0%)	18 (90,0%)
Rimcure	3	4,8	2 (66,6%)	1 (33,3%)
Rifinah Junior	7	11,2	5 (71,4%)	2 (28,5%)

The majority of the facilities, namely 91,9% (N=55) indicated that they have prophylactic treatment in stock for children. Only 6,4% (N=4) of the facilities indicated stock-outs of prophylactic treatment over the past 6 months. It is thus regrettable that so few clinics appeared to be putting an effort into asking about child contacts and initiating prophylactic therapy.

Item 5: DOTS system (N=62)

Half of the facilities (N=31) indicated that they had a DOTS system in place, 38,7% (N=24) said they had no system and 11,2% (N=7) did not answer the question. This was quite disturbing, as all facilities are required to have a DOTS system in place according to national guidelines.

Item 7*: *Use of TB trial of treatment (N=62)

One professional nurse indicated that she puts children on TB trials – she had no TB register, and did not use the GW20/12, while 11,2% (N=7) of the professional nurses indicated that children are sent home from hospital on a TB trial of treatment. Only 6,4% (N=4) of the professional nurses indicated that children are referred to clinics by general practitioners to get TB medicines to initiate a TB trial of treatment. When the researcher asked them if they provided the medicines to the children they all indicated that they did as was prescribed.

Item 8: Follow-up of children on prophylactic treatment (N=62)

The following table indicates the process of follow-up of children on prophylactic treatment.

Table 4.15 Follow-up of children on prophylactic treatment (N=62)

Follow-up of children on Prophylactic treatment	N	Percentage
Not answered	3	4,8
Daily	1	1,6
Weekly	15	24,1
Monthly	30	48,3
Never	7	11,2
Unsure	6	9,6

The majority of the respondents, namely 80,6% (N= 50) indicated that they did not have a different follow-up system for patients who were on treatment and children who were on prophylactic treatment (see table 4.16).

Item 9: Record-keeping of children receiving prophylactic treatment (N=62)

This question was also asked under characteristics of study population – Item 19.

Table 4.16 Record keeping of children on prophylactic treatment (N=62)

Kind of record-keeping	N	Percentage
None	25	40,3
Extra TB register	8	12,9
Book	2	3,2
Extra form	0	0,0
GW10/12 of positive patients	20	32,2
GW10/12 for child contact	6	9,6
Baby card/Road to health card	6	9,6
Other	2	3,2

Table 4.16 provides respondents' answers to the question – on verification the 12,9% (N=8) facilities who kept record of children on prophylactic treatment recorded it on the GW10/12 for the actual child contact and on the GW10/12 of positive adult patients. Recording of medicines distributed is a legal issue and thus demands a uniform system of recording, but this was not in place.

Table 4.17 Record-keeping of child contacts (N=62)

Type of record-keeping	N	Percent
None	25	40,3
Extra TB register	8	12,9
Extra book	2	3,2
Extra form	0	0,0
Blue card of positive TB patient	20	32,2
New blue card for TB child contact	6	9,6
Baby card/Road to Health card	8	9,6

This is how the respondents said they (would) record child contacts. On verification the recording of child contacts was only found at 12,9% (N=8) facilities. Tracing of children who are in contact with individuals with infectious TB has been relatively neglected within TB control programmes in developing countries, mainly because of managerial difficulties. This can clearly be seen in this local study as well.

Item 10: Review of records for contacts (N=95)

Only 17,9% (N=95) of 491 patients had information completed on contacts on the GW20/12 TB document.

Table 4.18 Record review of GW20/12 (N=95) (with information completed)

Record review as found on GW20/12	N	Percent
Name	96	86,4
Relationship	97	87,3
Age	97	87,3
Sputum done	19	17,1
Date sputum done	19	17,1
Result of sputum done	22	19,8
X-ray done	3	2,7
Date x-ray done	3	2,7
Result of x-ray done	3	2,7
Tuberculin test done	41	36,9
Date tuberculin test done	41	36,9
Result of tuberculin test done	41	36,9

The record review of child contacts clearly shows major deficiencies in recording that deserve urgent attention if TB management is to be assured.

4.3.4 Clinic audit of management of children with suspected TB

Item 1: Fast lane for TB DOTS patients (N=62)

Only 22,6% (N=14) of the clinics had a fast lane for TB patients who had been diagnosed and were on DOTS. This is important as it may facilitate patients of carers bringing their children to the clinics for follow-up.

Item 2: Fast lane for coughing patients (N=62)

During the clinic audit conducted at each facility (N=62), it was found that 51,6% (N=32) had a fast lane for coughing patients. Schaaf et al (1991:223) express concern about the crowded nature of paediatric out-patient facilities in developing countries with infants and mothers in close proximity to one another. Just as the health facilities may serve as a reservoir for measles in the community, they may also aid in the spread of TB if the possibility of TB in the mother as well as the child is not considered.

Items 3.1 and 3.2: Availability of supportive material/guidelines (N=62)

Of the clinics, 88,7% (N=55) had a copy of the *South African TB control programme practical guidelines* and 88,7% (N=55) had a copy of *TB: a training manual for health workers*.

Item 3.3: TB score system (N=62)

Although both the guidelines recommend using the TB score chart as a diagnostic tool in children, only 16,1% (N=10) of the respondents used it.

Item 3.4: TB flow chart (N=62)

None of the respondents indicated that they were using a paediatric flow chart.

Item 3.5: Flow diagram to help identify and manage child contacts of infectious adults (N=62)

None of the respondents indicated that they were using the flow diagram provided in the manual to help identify and manage child contacts of infectious adults. Crofton et al (1992:49) recommend using the flow chart when the child has signs of a pneumonia that has lasted more than 2 weeks.

Items 3.6 and 3.7: Diagnostic pathways and WHO guidelines that classify children as having suspect, probable or confirmed TB (N=62)

Only one respondent indicated that she would use the suggested diagnostic pathways.

Item 4.1: Cough register (N=62)

During clinic visits it was found that 77,4% (N=48) of facilities used a cough register. Various documents were found that were used as cough registers. During the researcher's clinic visits, the official cough register was not yet introduced at facilities.

Items 4.2 and 4.3: Sputum bottles – availability and stock-outs (N=62)

Of the clinics, 93,5% (N=58) indicated that they had sputum bottles in stock; they also indicated that they had experienced no stock-outs. Only 6,4% (N=4) indicated that they did not have sputum bottles.

Items 5.1 and 5.2: Tuberculin test – availability and stock-outs (N=62)

Only 46,7% (N=29) of the facilities had tuberculin tests in stock; out of the 29 who indicated that they had tuberculin test in stock, 6,4% (N=4) indicated that they had stock outs; 46,7% (N=29) indicated that they did not have tuberculin

tests in stock.

Items 6.1 and 6.2: X-ray facilities – x-rays used as a diagnostic tool (N=62)

None of the 62 facilities had x-ray facilities on site for TB patients.

Items 7.1 and 7.2: TB medicines (stock and stock-outs) (N=62)

Of the facilities, 91,4% (N=57) indicated that they had all the TB medicine for children in stock. Only 8,0% (N=5) indicated that they had stock-outs of TB medicines for children. Various kinds of paediatric TB medicines were used by the different facilities.

Items 7.3 and 7.4: TB prophylactic medicines (stock and stock-outs) (N=62)

Of the facilities, 91,9% (N=57) indicated that they had prophylactic treatment in stock for children. Only 6,4% (N=4) indicated stock-outs of prophylactic treatment over the last 6 months. Various TB medicines were used for TB prophylactic treatment in children.

Items 8.1 and 8.2: Gastric washing (N=62)

None of the facilities performed gastric washings and none had the necessary equipment, but the respondents indicated that they would refer children to hospital for testing.

4.4 THE IMPACT OF TRAINING

Only 53,2% (N=33) of the respondents had received 10 days of TB training, and the period of training varied between 1 and 10 days. All the respondents, except the PHC nurse who had received 10 days' training, indicated that they would benefit from additional training. As this may be an important determinant of

knowledge and practice, the responses were compared on the basis of the previous training. Only items that reflect and influence the training of TB management in children will be discussed under this section.

The respondents were presented with a set of questions to test their knowledge of TB management in children. The group was then divided into two independent subgroups, namely, those who had received training in TB management and those with no training in TB management. Selvanathan, Selvanathan, Keller, Brain and Bartel's (1994) statistical technique (in O'Leary & Cotter 2000:111) was applied to determine whether the correct responses/answers of the two groups differed significantly. This technique compares proportions under the null hypothesis of equal proportions:

H_0: $p_1 = p_2$ or $p_1 - p_2 = 0$.

By calculating the estimate of the combined proportion and comparing the separate group proportions to one another and to the combined proportion, a *z* score was calculated:

$$z = \frac{(p'_1 - p'_2) - (p_1 - p_2)}{\sqrt{p'(1 - p')(1/n_1 + 1/n_2)}},$$

where
p'_1 is the proportion of respondents in group 1 choosing the correct option,
p'_2 is the proportion of respondents in group 2 choosing the correct option,
p' is the proportion of respondents in both groups choosing the correct option,
n_1 is the number of respondents in group 1 choosing the correct option, and
n_2 is the number of respondents in group 2 choosing the correct option.

To reject the null hypothesis in each case, the calculated z scores were compared to statistical tables. Usually the 5,0% and 1,0% levels of significance are used:

Rejection region at the 5,0% level: $z \geq 1,96$ and
rejection region at the 1,0% level: $z \geq 2,58$.

4.4.1 Knowledge of TB management in children

Item 1: Strategies for preventing TB in children

More trained respondents knew that BCG was an effective strategy for preventing TB in children but although they mentioned other effective strategies more often, the difference with untrained respondents was not so obvious (see table 4.20). No significant difference was registered between the two groups at the 5,0% level.

Table 4.19 Strategies mentioned for preventing TB in children (N=62)

	l.Table 4.19 Stra tegies me ntioned	for preventing TB i n children (N=62)		el.	
	e 4.19 Strategie s mention	ed for preventin g TB in c			
	(N= 62)	. Tab			
Strategies mentio d for preventing T B in children (N=6	2)	l.T abl e 4.1 9 Str tegies ment one			
r preventing TB in	ch ildre n (N=6	2) l.T able 4.19 S rat			
s mentioned for preventing TB i	n c hildr en (N=	62) • Resp ndents with TB			

a
ining (N=33)• Respondents with no TB training (N=29)• ‡
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•
Respondents with
no TB training (N=2
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o
TB training (N=29)• ‡•

The majority of both groups knew that a tuberculin test should be done when TB is suspected in children (see table 4.21). No significant difference was registered between the two groups at the 5,0% level.

Table 4.20 Indication for tuberculin test (N=62)

	Respondents with TB training (N=33)			• Respondents with no TB training (N=29)			•	•	•
				o TB training (N=29)• •					
	Cor	re	ct o	pti	on	sel			
orrect option select ed• • •	▯	• N	1• %p'	1N	2• %p	'2	'2	2	

• • ▯ ▯ For s

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ected TB in children• 27• 81,82• 0,818• 25• 86,1• 0,62• 0,469• 0,6

3

8• NS▯ NS: Not significant ***Item 4.2: Interpreting a positive tuberculin test (N=62)*** A similar proportion of both groups knew that a tuberculin test indicates t at a child is infected with TB (see table

4

.22). No significant difference was registered between the

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g	roups at the 5,0% le vel.**Tab le 4.21**			**Interpreting a posi tive tuberculin te**			st	(	N=
	▯ Respondent s with TB			training (N=33) • Responde					
	no	T	B tr	ain	in	g(N=			
• ▯ ▯	ent	s with	no TB	tr	aining	(N=29)	• • •	▯ ▯	(N

3
)• Respondents with n
o

TB training(N=29)• • • ▯ ▯

r
aining(N=29)• • • ▯ ▯

▯ • Correct options sele

cted• Correct options selected• • • ▯ ▯ • N1• %p'1N2• %p'2• • ▯ ▯ C

hild infecte

Table 4.22 Conditions that may suppress tuberculin test reaction (N=62)

	.Table 4.22 Condi tions that may s			uppress tuberculin t est reaction (N=62)					
	Table 4.22 Condi tions tha			t may suppress t uberculin					
	act	io	n (N	=62	)				
dent	s w	ith TB	train	ing	(N=33	)• Resp	ondent	s with	no
training (N=2	9)	•• •		(N	=33)• R	espon	dents w	ith no	TB
ining (N=	29	)••			(N=33	)• Resp	ondent	s with	no
training (N=29)•	•	•		3)	• Res	ondent	s with	no TB	tr
ng (N=29)•• •	=33	)• Resp	ondent	s	with n	o TB t	rainin	g (N=2	9)

•• 3)

Respondents with no TB training (N=29)•• • s

pondents with no TB training (N=29)•• •

ng (N=29)•• • • Cor rect options selected• Correct optio n

s selected•• • • N₁• %p'₁N₂• %p'₂•• HIV• 19• 57

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• 0	,576• 11• 37,93• 0,379 1,544• 0,1 24• NS	Malnutrition• 7• 21 ,21• 0,212• 6• 20,69• 0	,2	07	• 0
	0,960• NS Ste roids• 8• 2	4,24• 0,242• 2• 6,9 0• 0,069• 1			
	64 NS	Ca nc er t			
t• 4• 12,12• 0,121• 1• 3 5• 0,034	1,2 51• 0,2 11• NS	Sever e diss	eminat	ed TB	10

0
,30• 0,303• 4• 1
3
,
79• 0,138• 1,551• 0,121• NS NS: Not significant

Item 4.1.4 Site for administering tuberculin test (N=62) The trained group res ponded better to the question on the site for administering a tuberculin tes t (see table 4.24). A significant difference was regi

	ps at the 5,0% level . **Table 4.24 Co**			**rrect reading of the Mantoux test (N=6**			**)**		
	t the 5,0% level . **Table**			**4.24 Correct rea ding of t**					
	ux	**te**	**st (**	**N=6**	**2)**				
dents with TB trainin	**g (**	**N=33)**	**Respo**	**den**	**ts wit**	**h no T**	**B trai**	**ning (**	**N=2**

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s with no TB training (N=29)

ning

(N=29) **Corre**

ct options selected **Correct options selected** **N_1** **$\%p'_1$**

N

$_2$ **$\%p'_2$**

8,	28 0,483 1,217 0,222 NS NS : Not s			ignificant **X-ra ys*Item 4.2.2: X-***			***ra***	***ys***	***a***
	gold standard f or diagno			***sing TB in child ren (N=62***					
	gro	up	s di	d e	qu	ally			
on this question (se	ta	ble 4.	26). N	o	signif	icant	differ	ence w	as

g
istered between the
t

wo groups at the 5,0% level. **Table 4.25 X-ray status in diagnosing TB**

in children (N=62)

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iagnosing TB in children (N=62)

diagnosing TB in children (N=62)

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Table 4.26 Group at risk of developing serious forms of TB (N=62)

	0% level. **Table 4.26 Group at risk**			**of developing serious forms of TB (N=62)**			)		
	evel. **Table 4.26 Group at**			**t risk of developing seri**					
	s of		**TB (**	**N=62)**					
dents with TB training (N=33)	**Respondents with**			**h no TB training**			**g (N=29)**		

w

i

th no TB training (N=29)

(N=29) Correct options selected Correct options selected N_1 **%** p'_1 N_2 **%** p'_2

Children under 2 years of age 14 42,42 0,424 10 34,48 0,345 0,641 0,522 NS NS: Not significant

Item 4.3.3: Symptoms indicative of a child responding to treatment (N=62) The trained group did better than the untrained group in indicating that a child gains weight and that TB symptoms disappear when response to treatment.

on	ding to treatment (see table 4.28).			Both groups seldom mentioned the impact			o	f	su
	ful treatment on fever and			d x-rays. A significant d					
	e was	as	regist	er	ed a				
,0% level between the two groups on weight gain as a symp									
indicative of a child	responding to treatment.								
esponse to TB t	**reatmen**	**in ch**	**il**	**dren (**	**N=62)**		eatme	t.	
le 4.27 Monitor	**ing respo**	**nse to**	**TB**	**treat**	**ment**	**n chil**	**dren (**	**N=6**	

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4.27 Monito

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ing response to TB treatment in children (N=62)

Monitoring response to TB treatment in children (N=62)

le 4.27 Monitoring respon

(see table 4.29). There was a significant difference between the two groups at the 1,0% level regarding knowledge of the history of a contact with a sputum positive PTB as a diagnostic option.

Table 4.28 Diagnosing of TB in children (N=62)

	a diagnostic option .			**4.28 Diagnosing of**			)		
	iagnostic option .			**Table 4.28 Diag nosing of**					
	hil	**dr**	**en (**	**N=6**	**2)**				
dents with TB trai	**nin**	**g (N=3**	**3)• Res**	**por**	**dents**	**with n**	**o TB t**	**rainin**	**g (**
)•• • ▯ ▯	**33)**	**• Resp**	**ndents**	**wi**	**th no**	**TB tra**	**ining**	**(N=29)**	**•**
▯ ▯	**esp**	**ondent**	**s with**	**no**	**TB tr**	**aining**	**(N=29**	**)••**	
no TB training (N=2	**9)**		**••**	**▯**	**▯**	**)• Resp**	**ondent**	**s with**	**no**

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training (N=29)••

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Respondents with no TB training (N=29)•• • ▯ ▯

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ndents with no TB training (N=29)•• • ▯ ▯

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=3	**3)• Respondents with no TB tra ining (**			**N=29)•• • ▯ ▯ 33)• Respondents wit**			**h**	**no**	**T**
	ining (N=29)•• • ▯ ▯			**N=33)• Respondent s with no**					
	nin	**g**	**(N=2**	**9)**		**9)•**			

4 Score system

Item 4.4.1: Score system for assisting with diagnosing TB in children (N= 62)

Only 10 facilities were found to use the score chart system and all were trained respondents.

5 Gastric washing

Item 4.5.1: Gastric washing as a useful tool in diagnosing TB in children (N=62)

Although both groups indicated that gastric washing is a useful tool to diagnose TB in children, no one was using it (see table 4.31). Both groups did equally well. There was a significant difference at the 1,0% level between the two groups regarding children under 10 years of age swallowing their sputum.

Table 4.30 Gastric washing as a useful tool in diagnosing TB in children (N=62)

	le 4.30 Gastric wash ing as a useful			tool in diagnosing T B in children (N=62			)		
	.30 Gastric wash ing as a			useful tool in d iagnosing					
	hil	dr	en (	N=6	2)				
dents with TB tra ining (N=33)• Respon dents wit	h n	o TB t	rainin	g (	N=29)		• •	]	=33
spondents with no T B training (N=29) • •		(N=33)	• Resp	nd	ents w	ith no	TB tr	aining	(N

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espondents wi
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no TB training (N=29)

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Just over half of both groups indicated that they use the “Road to Health” card to diagnose TB in children (see table 4.32). No significant difference was registered between the two groups at the 5,0% level.

Table 4.31 “Road to health” card (N=62)

	(see table 4.32). No significant dif			ference was register ed between the two			gr	ou	ps
	he 5,0% level. **Table**			**4.31 “Road to h ealth” ca**					
	)	▯		ee	ta	ble			
No significant differ ence	was	regis	tered	bet	ween	he two	group	s at t	he

0
% level. **Table**
4
.31 “Road to he
a
lth” card (N=62) ▯
d between the two groups at the 5,0% level. **Table 4.31 “Road to health”**
rd (N=62) ▯
the two groups at the 5,0% level. **Table 4.31 “Road to health” card (N=6**
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nificant difference was registered between the two groups at the 5,0% level.
Table 4.31 “Road to health” card (N=62) ▯
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