The implementation of the National Tuberculosis Control Programme (NTCP) at a regional/district hospital and three of its feeder clinics: a case study

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Health Systems Trust
National Department of Health

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LIST OF ABBREVIATIONS

AFB	Acid fast bacilli
ANOVA	Analysis of variance
ART	Anti-retroviral therapy
CBHWs	Community based health workers
CCM	Cryptococcal meningitis
CMO	Chief medical officer
CSF	Cerebrospinal fluid
CSO	Community service officer
CXR	Chest x-rays
DoH	Department of Health
DOT	Directly observed therapy
DOTS	Directly observed therapy strategy
DST	Drug sensitivity testing
ETB	Extra-pulmonary tuberculosis
ETR.net	Electronic TB register
FGD	Focus group discussion
FNA	Fine needle aspirate
GP	General Practitioner
HBC	Home Based Carers
HIV/AIDS	Human immunodeficiency virus/Acquired immune deficiency syndrome
HST	Health Systems Trust
IALH	Inkhosi Albert Luthuli Hospital
IUCD	Intra-uterine contraceptive device
LDH	Lactate dehydrogenase
MDR TB	Multi-drug resistant tuberculosis
MOPD	Medical Outpatients Department
NDoH	National Department of Health
NCSS	Number Cruncher Statistical System
NTBCP	National Tuberculosis Control Programmes (globally)
NTCP	South African National Tuberculosis Control Programme
PHC	Primary Health Care
PLWA	People living with AIDS
PTB	Pulmonary tuberculosis
SANTA	South African National Tuberculosis Association
SCR	Smear conversion rate
STATA	The name of a statistical analysis programme
TAT	Turn around time
TB	Tuberculosis
TBM	Tubercular meningitis
VCT	Voluntary counselling and testing
WHO	World Health Organisation
XDR-TB	Extreme or extensive drug resistant tuberculosis

EXECUTIVE SUMMARY

The purpose of this study was to identify and understand the health system constraints to providing effective care to patients with tuberculosis (TB) in a combined regional/district hospital and three of its feeder clinics in an area with a high incidence of TB and high prevalence of HIV. The study was funded by the National Department of Health.

AIM

The aim of the study was fourfold:

1. To determine the gap between the care recommended by the national TB guidelines for patients with TB and the care received by patients at a combined regional/district hospital and clinic level.
2. To explore reasons for this gap and to identify factors which facilitate and/or constrain the ability of the hospital and clinics to provide the care outlined in the national guidelines.
3. To identify factors which will need to be overcome for the national TB guidelines to be effectively implemented.
4. To determine the potential for leakages of patients from the system at various points and to quantify these leakages where possible.

STUDY DESIGN

A multi-faceted retrospective descriptive case study design was used to provide information about the management of patients with TB at a regional/district hospital and three of its feeder clinics.

STUDY OBJECTIVES AND METHODS

To achieve the objectives of the study, the following methods were used:

- Participant observation and key informant interviews were used to review the implementation of the NTCP at a regional/district hospital and to identify the potential for leakages of patients from the system.
- A retrospective record review of TB and laboratory registers was conducted to examine the process of laboratory diagnosis of pulmonary TB (PTB) and extra-pulmonary TB (ETB) to identify the potential for leakages of patients from the system and quantify these where possible.
- Self-administered, structured questionnaires were completed by clinicians (n = 65) to assess doctors' knowledge of the NTCP and consider how this might lead to leakages of patients from the system.

- A retrospective medical record review of a sample of hospital patients was undertaken (n = 77) to assess the implementation of the NTCP,
- A retrospective record review of hospital and clinic TB registers was conducted to review the implementation of the NTCP at clinic level and determine leakages from the system when receiving and holding patients.
- A self-administered structured/semi-structured questionnaire was administered to nurses (n = 41) to assess the nurses' knowledge of the NTCP and consider how this might lead to leakages from the system.
- A focus group discussion was held with Community Based Health Workers (CBHWs). Patient and key informant interviews were conducted to explore experiences of community support for patients with TB.
- Semi-structured interviews were conducted with patients (n = 92) to explore their experiences with TB treatment.
- Semi-structured interviews were conducted with patients who interrupted their treatment (n =27) to explore the experience of these patients.

STRENGTHS AND LIMITATIONS OF THE STUDY

Three strengths emerge from the different methodologies chosen for the study:

- The use of a variety of methods to investigate the components of a complex system provided considerable detail and a depth of understanding of the issues involved.
- The research was done in collaboration with the staff involved in the institution.
- A TB Task Team was formed at the hospital after the results and recommendations were fed back to the institution. This team is implementing the recommendations of the research. The provincial TB directorate intends to roll out the recommendations to all regional and district hospitals within KwaZulu-Natal.

There were a number of limitations of the study:

- It was a case study conducted in one hospital only and the results, therefore, are not representative of all hospitals.
- As many different components of the NTCP were investigated, it was not possible to investigate the components with extreme rigor.
- Names, age and gender of patients were used in the record review of TB and laboratory registers to trace the patients as there was no common patient identifier. This may have resulted in some inaccuracies.
- The context of TB within the sub-district or district was not known because the TB data for the study facilities and many other facilities in the sub-district had not been captured at the district level,

KEY FINDINGS

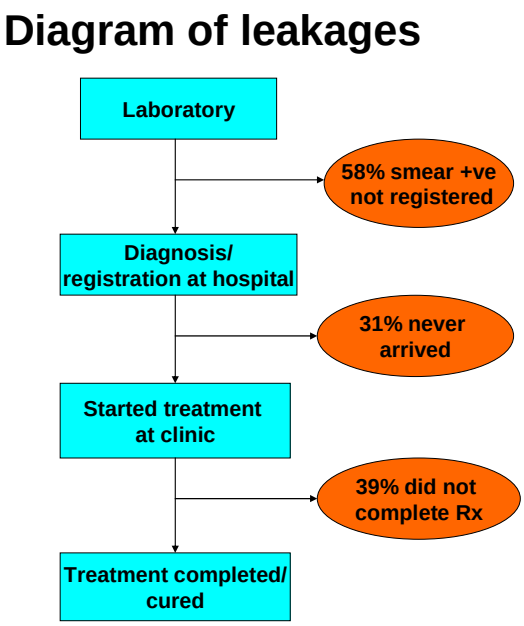
1. Leakages

Three major leakages were identified during the patients' journey from diagnosis to completing treatment.

1. Between the laboratory support services, clinicians in the wards and Medical Outpatients Department (MOPD) at the study hospital,
2. The referral system between the hospital and the clinic,
3. The case holding system at the clinic.

These are quantified in Figure 1

Figure 1: Major leakages identified during patient's journey from diagnosis to completing treatment



2. *Health Seeking Behaviour*

2.1. Patient Knowledge

All patients who had been diagnosed with TB knew they had TB or TB and HIV co-infection. Over 90% of the patients knew that TB was curable and should be managed at a clinic, that taking medication was important and treatment must be finished. However, patients did not know how long TB treatment had to be taken for and although most of the patients were aware of the contagious nature of TB, there appeared to be little awareness or knowledge of contact tracing. Patient knowledge impacted on health seeking behaviour in the following way:

- Home remedies: Eight percent of the patients used home remedies after they knew they had TB.
- Traditional healers: A quarter of the patients went to a traditional healer sometime during their illness and 15% after they knew they had TB. Sixteen percent of the patients went to a traditional healer as their first choice of care. Of those who went to a traditional healer, 72% were male.
- Where patients sought help: Ninety two percent of the TB patients went first to the clinic.

2.2. Association with HIV

As there has been a simultaneous increase in the prevalence of HIV and incidence of TB, patients have come to associate TB and HIV infections. This study showed that this has had three consequences:

- Stigma: Levels of stigma were high. Very few patients (9%) had told their spouse or anyone outside their family (4%) that they had TB and were fearful of doing so. A number of patients were concerned that different levels of health care workers did not respect confidentiality. This lack of respect for confidentiality led to treatment interruption.

- Delay in accessing services: Although patient delay was shorter than that recorded in other studies, patient responses suggests that patients waited until they were very ill before accessing treatment.

- Access to health services: A third of the patients were too sick to access services and were either too weak to get to the clinic or too weak to sit waiting for attention in the clinic.

- Increased morbidity due to HIV: A number of female TB patients had difficulty attending the clinic regularly due to overwhelming extended family responsibilities. This may be as a consequence of increased mortality of women infected with HIV.

2.3. Sources of information on TB

The local clinic was the first choice of care for most patients. For 80% of the TB patients interviewed, female relatives had assisted in helping patients decide to go to a health facility. Although three quarters of the patients got their information from the radio, two thirds of the patients felt that health workers were the most useful source of information as they know the most about TB.

The role of nurses as knowledge providers and female relatives as advisors of where to get help need to be optimised by health service providers.

3. Investigation and Diagnosis of TB

Four factors impacting on the diagnosis of TB were identified during the study:

3.1. Impact of the HIV epidemic

The HIV epidemic impacts on the diagnosis of TB as it is more difficult to diagnose TB in a patient co-infected with HIV. In addition an increasing number of TB patients present with ETB or smear negative PTB.

Patients often delay seeking help because of the greater stigma associated with TB as a result of HIV. When they do seek help, they are very ill and many require immediate hospitalisation. On discharge they are not physically strong enough to get to the clinic or sit at the clinic waiting for attention. This may impact on patient adherence to treatment.

3.2. The role of doctors

A third of the doctors said they spent all their time working with TB and a further third said they often worked with TB. Many doctors appear to be trained in the clinical aspects of TB. They, however, have limited knowledge of the epidemiology and principles of infectious disease control and how the NTCP works. Consequently they do not adhere to the NTCP guidelines and protocols, nor do they understand the role of monitoring and evaluation in achieving the NTCP targets and the role each individual plays in the process. These may impact negatively on the diagnosis of PTB and ETB in the following ways:

In the case of PTB:

- PTB was often diagnosed in the absence of positive smear microscopy. In only 22% of the record reviews of TB patients, was TB diagnosed on the basis of positive smear microscopy;
- There was a reliance on chest x-rays for diagnosis. In 45% of the record reviews, TB was diagnosed on the basis of a chest x-ray;
- TB diagnosed in the absence of a documented clinical history suggestive of TB. In 79% of the records reviewed there was no mention of chest pain, although between 50% and 70% of records did mention cough, night sweats and/or loss of weight.

- Sputum culture was not used. In only one of the record reviews (n = 77) was a specimen sent for culture.

In the case of ETB:

- A third of the ETB was diagnosed in the absence of appropriate investigations;
- Sputum microscopy was done simultaneously in only 7% of ETB patients to exclude PTB;
- ETB was diagnosed in the absence of a documented clinical history suggestive of TB.

3.3. Ward systems for sputum investigation not functioning optimally

In a third of the records reviewed sputum microscopy was ordered, but no results were documented. There are two possible reasons for this. Firstly, sputum specimens were not taken from patients as ordered by doctors and secondly, there was no system to link returning results to patient records.

3.4. Interface between laboratory and wards/MOPD:

"Transport system" between wards/MOPD and laboratory was not functioning optimally. The turn around time (TAT) for receiving results was up to seven days. Monitoring of this component of TB services was not possible as there was no specimen or suspect registers in either the wards or MOPD. It, therefore, was not possible to determine whether specimens were lost and in which part of the system they were lost.

4. Case Management

Four factors impacted on case management at a clinic level. These were the impact of HIV/AIDS, the functioning of the clinics, individual nurses and community level support.

4.1. Impact of HIV/AIDs

HIV/AIDS has impacted significantly on case management at a clinic level. There are increasing numbers of TB/HIV co-infected patients who have higher mortality and morbidity and are more difficult to diagnose and treat at a PHC level, due to smear-negative PTB, ETB or MDR TB. Co-infected patients, because of their physical weakness, expressed difficulties in accessing clinics and then waiting for attention.

4.2. Functioning of the clinics

The basic components of the NTCP was implemented at the three study clinics in that drug supplies were continuous and uninterrupted, laboratory support services ensured a turn around time of less than 72 hours and specimens/results were not lost. TB Registers and other registers were completed.

Two problems, however, were identified. Firstly, some patients defaulted because of the long queues of patients waiting for attention. Secondly, assistance and support was needed from the district level with the clinical management of patients, establishing a routine monitoring and evaluation system for case management and ensuring provincial/district level plans were disaggregated into clinic specific targets and tasks.

Although quarterly reports were completed no-one at a local level was tasked with monitoring the information to review the functioning of the NTCP. TB data for the study hospital had not been captured at the district office for almost two years. Data, therefore, could not be obtained from the electronic TB register.

4.3. Individual nurses

The relationship between nurses and TB patients is of the utmost importance for promoting adherence to treatment. Some patients had positive experiences of nurses. Others, however, experienced the nurses as having no time for them, disrespecting confidentiality, uncaring and insensitive. These experiences were often exacerbated by long waiting times for attention at the clinic which led to some patients defaulting from treatment.

Many nurses had little concept of how a disease control programme operates and did not have the necessary in depth knowledge of the NTCP guidelines for effectively managing patients with TB. For example:

- No nurses were able to define the DOTS strategy,
- Only 40% of the nurses knew the targets of the NTCP,
- Only one third of the nurses could define smear conversion rate,
- Less than a fifth of the nurses knew the target turn around time.

However, three quarters of the patients rated the information given to them by nurses about TB as the most valuable as nurses were considered their most knowledgeable source of information.

4.4. The role of community support

In this study a number of patients, who experienced difficulty in accessing TB services, highlighted the need for effective community level support. The NTCP promotes community-based DOT. In the Msunduzi sub-district, however, a number of problems with community level support were noted:

- There were different cadres of community based health workers (CBHWs).
- Selection and recruitment processes were inconsistent and did not comply with basic human resource practises.
- Remuneration was inconsistent between the different cadres of workers.
- There were no systems for support, monitoring and evaluation of the treatment supporters and other cadres of workers.
- There was no uniform system of training.
- There was no integration of TB and HIV services at a community level.
- Patients generally did not trust CBHWs as it was alleged that CBHWs spread confidential information that they had learnt at the clinic to people in the community.

The problems listed above need to be addressed so that CBHWs can assist in improving treatment adherence and tracing treatment interrupters. This role will continue to grow as people co-infected with TB and HIV are often too ill to attend a clinic for treatment. Treatment provided in their homes will not only save their lives, but limit the spread of TB to those around them.

RECOMMENDATIONS

To promote adherence

1. Knowledge about the length of treatment is a key message to be passed to all TB patients.
2. All levels of health workers to respect the confidentiality of patients. This is extremely important given the stigmatisation associated with TB and HIV infections.
3. Supportive family and community members need to be co-opted to assist in promoting adherence.

Within the hospital

4. Appoint a TB medical team to oversee TB services at the hospital;
5. Standardise investigations for PTB and ETB, based on the NTCP guidelines;
6. Ensure laboratory results are entered into all medical records;
7. Standardise management of TB patients according to NTCP guidelines;
8. Details of the implementation of TB and TB/HIV guidelines and the procedures to be followed for patients to be documented and made available to all medical personnel;
9. New doctors rotating through the medical wards to be made aware of the NTCP guidelines and the need to adhere to these.
10. Transfer letters to must be written out in triplicate, as recommended by the NTCP, and one copy, with the patient's contact details (preferably a cell phone number), to must be sent directly to the clinic. The clinic to take responsibility for contacting the patient if he/she does not arrive within a week. The tracing team to follow-up on referred patients if necessary.

Within the hospital and clinics

11. Integration of TB/HIV services:
    - All TB patients to be encouraged to have an HIV test.
    - All HIV patients to be taught the signs and symptoms of TB and be encouraged to report these to a clinician if they develop
    - TB and HIV status to be documented on referral letters and patients note.
12. Suspect registers to be used in the hospital (wards and MOPD) and clinics to monitor so that the interface between the laboratory and TB services is functioning optimally and the TAT is within the set target.
13. The NTCP guidelines and the DoH guidelines for TB/HIV management to be available in the hospital (in all wards and the MOPD) and in the clinics;

Within the district and clinics

14. Dedicated district TB co-ordinators to be appointed.
15. Sub-district TB co-ordinators to conduct regular supervisory visits to:
    - Provide training combined with supervisory visits. This may partially be a solution to the rapid turnover of staff in PHC facilities. On site training during supervisory visits ensures that all staff in the facility benefit.

- Ensure all staff are aware of the NTCP targets and the importance of achieving these in order to control the TB epidemic;
- Assist clinic level staff in breaking down provincial/district level tasks into clinic specific activities which are regularly monitored;

16. A uniform, consistent system of case holding for the co-infected TB/HIV patient to be developed to assist in the management of both diseases.
17. In clinics where there are sufficient personnel, fast queues to be established for patients who are on "clinic DOT" or who are collecting monthly TB medication.

Within the community

18. Standardised conditions of service, training, and protocols for the different cadres of CBHWs, including community health workers, treatment supporters and HBCs, is required.
19. Regular meetings between clinic staff and CBHWs to be held to discuss problems, to report on progress and to provide ongoing training.
20. Integration of TB and HIV services at a community level to be addressed by the National and Provincial TB and HIV directorates.

At an undergraduate level

21. Doctors and nurses need to be trained on the principles of infectious disease control and control programmes. This will ensure their understanding of the principles and targets of the NTCP, the importance of adhering to the guidelines and protocols, the role of monitoring and evaluation in achieving these targets and the role each individual plays in the process.

CONCLUSION

The NTCP has effectively decentralised TB services to a clinic level where the basics are now in place. Focus now needs to be on the implementation of the NTCP at all regional, district and regional/district hospitals, particularly in view of the growing epidemic of HIV and TB co-infection and the emergence of XDR-TB, These recommendations do not require huge input of financial or human resources, but more effective management, planning and support of health workers at all levels of the system. Particular attention to the interface of the different components of the NTCP is required as it is at these points that patients tend to leak from the system.

This study has highlighted the complexity of the components of the health system that have to function together for an effective TB service. Certain components may need more in-depth research to isolate specific problems. The situation in other provinces may be different and a similar study to identify problems and solutions in other contexts may be necessary.

REPORT

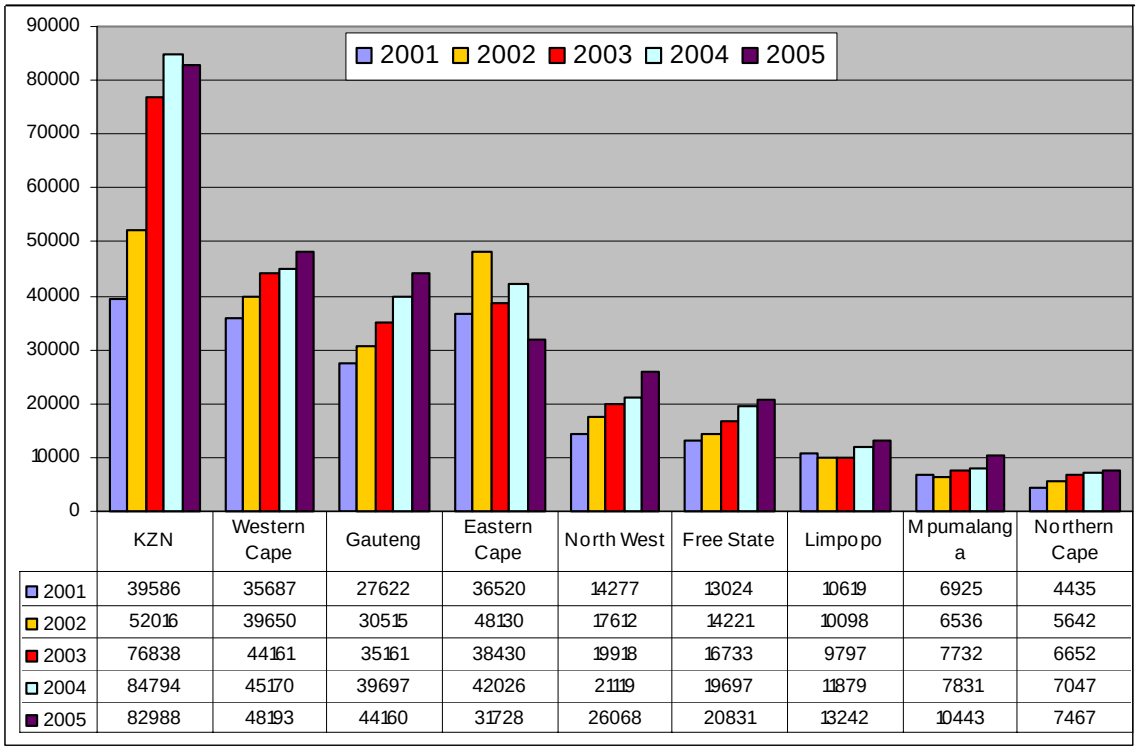
INTRODUCTION

The purpose of this study was to identify and understand the health system constraints to providing effective care of patients with tuberculosis (TB) in KwaZulu-Natal at a regional/district hospital and three of its feeder clinics.

BACKGROUND: TB CRISIS IN SOUTH AFRICA

The TB epidemic in South Africa continues to grow unabated. According to the 2006 WHO TB Report, South Africa has the fifth highest number of TB cases in the world.[1] The number of TB cases per province, illustrated in Figure 2, has increased in all provinces, and more than doubled in KwaZulu-Natal during the last four years.

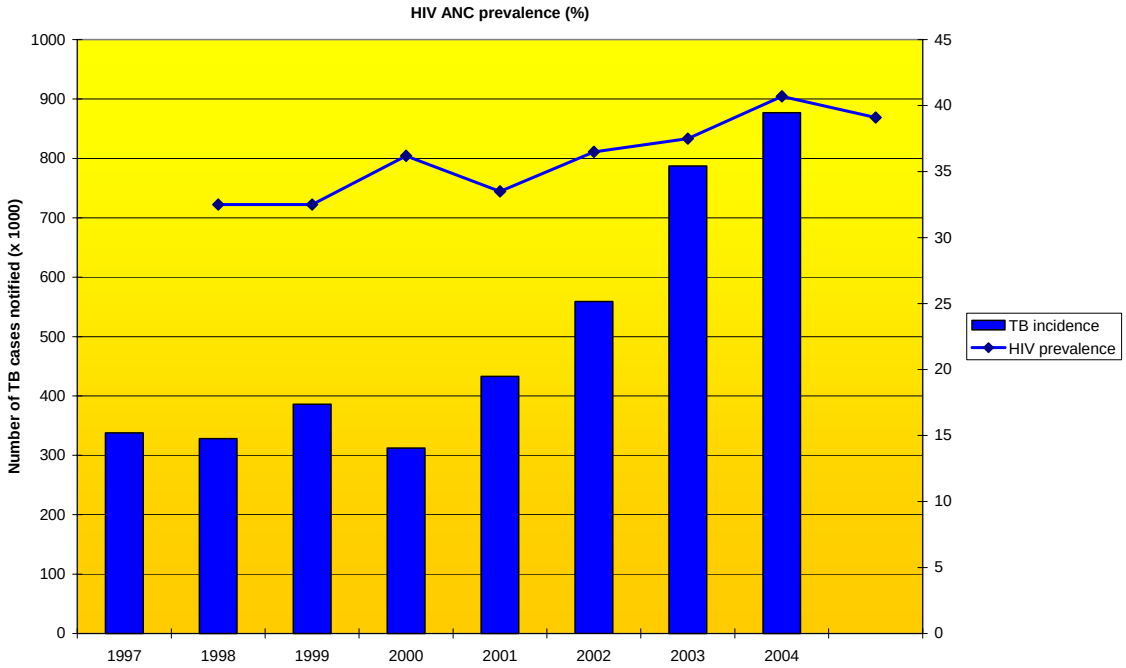
Figure 2: Number of TB cases in South Africa per province from 2001 – 2005
(Idema C, National TB Directorate, Department of Health, 2006)



	KZN	Western Cape	Gauteng	Eastern Cape	North West	Free State	Limpopo	Mpumalanga	Northern Cape
2001	39586	35687	27622	36520	14277	13024	10619	6925	4435
2002	52016	39650	30515	48130	17612	14221	10098	6536	5642
2003	76838	44161	35161	38430	19918	16733	9797	7732	6652
2004	84794	45170	39697	42026	21119	19697	11879	7831	7047
2005	82988	48193	44160	31728	26068	20831	13242	10443	7467

The HIV epidemic has played a key role in fuelling the TB epidemic. KwaZulu-Natal has been particularly badly affected by both the TB and HIV epidemics. In 2004, the TB incidence rate for the province was 723 per 100 000 for all TB and 582 for pulmonary TB.[2] The prevalence of HIV/AIDS in KwaZulu-Natal in the 2004 national antenatal seroprevalence survey was estimated at 40.7%.[3] Figure 3 illustrates the relationship between TB and HIV infections in KwaZulu-Natal.

Figure 3: A comparison of TB incidence and HIV prevalence in KwaZulu-Natal 1997 to 2005



Wilkinson (1997, 1999) described the parallel rise in TB incidence and HIV seroprevalence in Hlabisa.[4] [5] Thirty-three percent of HIV positive people are co-infected with TB, and 70% of TB cases are HIV positive.[6] [7] TB is the leading cause of death among people with HIV infection, accounting for a third of AIDS deaths world wide.[8] Sonnenberg et. al. (2005) showed that the risk of TB disease doubled within the first year of HIV infection and that the risk rose for up to seven years of HIV infection.[9]

Other factors in South Africa which provide an environment in which the TB epidemic thrives are poverty with its related factors of overcrowding, poor nutrition and substance abuse.[10]

The performance of the health services in identifying TB patients early and treating them effectively to interrupt the transmission of TB has been a cornerstone of National TB Control Programmes (NTCP) since the 1990s.[22] However, in many instances health services fail to detect patients early, and are unable to achieve the targets set by WHO and NTCP for curing TB patients. Poorly performing TB treatment programmes have not only resulted in a failure to stem the epidemic but also in the growth of multiple drug resistant TB (MDR-TB).[11] This has been particularly evident in KwaZulu-Natal over the past year with the emergence of Extreme Drug Resistant TB (XDR-TB) in several sites in the province, including the hospital involved in this study.[11] [12]

Patient factors which contribute to the epidemic include delayed health seeking behaviour because of the associated stigma, inability to access health services, and treatment interruption for a variety of reasons.

The implementation of the South African National Tuberculosis Control Programme (NTCP) in KwaZulu-Natal has been problematic. KwaZulu-Natal is the province with the largest population, 54% of which is in rural areas.[13] Socio-economic indicators suggest that after the Eastern Cape and Limpopo, KwaZulu-Natal is the poorest province.[14] KwaZulu-Natal has the highest HIV prevalence.[3] The NTCP was adopted much later in KwaZulu-Natal than in the other provinces. Clinicians and researchers in KwaZulu-Natal previously used different programmes and regimens to those recommended in the NTCP.[a] Delays in the decentralisation of TB services to a clinic level and the implementation of a number of the guidelines have also contributed to the problems.

This study sought to identify some of the health service and patient factors which may be contributing to poor performance of the South African NTCP in a district/regional hospital in KwaZulu-Natal. A literature review of NTCPs was undertaken as a first step of the study.

LITERATURE REVIEW OF NATIONAL TB CONTROL PROGRAMMES

A Medline search was undertaken to review the available literature. The following phrases were used: "evaluation of TB programmes," "implementation of TB programmes," "TB protocols assessment," and "evaluation of implementation of TB programmes." The articles located fell into three categories, namely:

- Articles focused on one or two particular aspects of implementation in TB control programmes, such as *"Evaluation of community contribution to TB control in Cape Town, South Africa"*[15] and *"Randomised controlled trial of self-supervised and directly observed treatment of tuberculosis."*[16]
- Articles focused on the implementation of TB control programmes at a national level, such as "*Progress in global tuberculosis control with emphasis on 22 high-incidence countries."*[17]
- Articles focused on the implementation of TB and HIV, such as *"Will DOTS do it? A reappraisal of tuberculosis control in countries with high rates of HIV–infection"*[18].

Traditionally the success of a National Tuberculosis Control Programme (NTCP) is measured in terms of the proportion of patients with TB who are cured or who complete treatment. This ignores the fact that patients with TB have to overcome a series of obstacles before they can be considered cured. Not all people who contract TB and seek care at a health facility, are correctly diagnosed and treated according to the national guidelines. Many patients do not attend regularly for their treatment and therefore do not complete the full course. A more appropriate evaluation of the success of the NTCP would be to take into account the obstacles and decisions that need to be overcome for a patient with TB to access and complete treatment according to the NTCP guidelines.[19]

Piot (1967) has developed a model for assessing the different technical and operational aspects of a TB control programme.[20] The model describes the different steps an individual in the community goes through between becoming ill with active TB and being cured. The main steps are summarised in the Table 1 below:

[a] Personal communication Dr. R. Matji June 2006: National TB Director 1994 - 2002

Table 1: Piot's Model of the Different Steps of a TB Programme
(Piot MA. A simulation model for case finding and treatment in a tuberculosis control programme (1967) WHO/Technical Information, WHO, Geneva, 67-73)

Step 1	Awareness	Patients have to have an awareness of TB. Awareness is affected by the stigma around TB.
Step 2	Motivation	Patients suffering from symptoms related to TB contact a health care delivery point.
Step 3	Selection	The health professional suspects TB and requests a sputum examination (smear).
Step 4	Examination	The sputum test is correctly carried out on the patients thus selected.
Step 5	Sensitivity	The smear is positive if the patient has bacilli in the sputum.
Step 6	Prescription	The newly identified case of TB receives the correct treatment prescription.
Step 7	Treatment	The TB patient obtains the prescribed treatment.
Step 8	Regularity	The TB patient takes his treatment regularly as prescribed.
Step 9	Effectiveness	The patient is cured with a certain probability if treatment is taken as prescribed.

A number of health service related factors contribute to the poor implementation of the NTCP. These include a lack of management capacity at a district level, poor management systems and inadequately trained and supported staff. In reflecting critically on TB control programmes worldwide, Dr. Rango Rao (1997) identified 17 major weaknesses in TB control programmes.[21] Most of the weaknesses identified were related to operational failures, either human or organisational, which led to a dysfunction of the health systems. Foremost amongst the operational reasons given were the challenges arising from the integration of TB into general health services and the quality and overall functioning of the health services.[22] In 1999, the WHO estimated that only 23% of all infectious TB patients had access to adequate diagnosis and treatment.[23]

In 1986, Thomson and Myrdal investigated how TB policy was implemented in different areas in South Africa and found that certain aspects of the policy were not being correctly implemented.[24] These included bacteriological diagnosis, use of standardised treatment regimens, community-based supervision of all TB-therapy and contact tracing. Treatment compliance was also poor. Three studies conducted in the late 1980s and early 1990s in South Africa investigated the contribution of health system factors to the ineffective management of TB patients. They reported inadequate health service resources, untrained staff, poor referrals from hospitals and a lack of compliance of doctors with TB management policies.[25] [26] [27]

In reviewing published studies of NTCP evaluations in South Africa, Lee and Price (1995) were struck by how many studies were one-dimensional, focusing only on certain aspects of TB control and using mainly record reviews.[28] They argue that routine data collection systems should provide information, but often fail to do so, as the records are incomplete. They developed a rapid assessment tool to evaluate a regional TB programme. The indicators they chose to evaluate were:

- Direct TB programme activities including case finding and case holding
- Management processes in support of the direct TB programme activities
- Integration of TB into PHC

The methodology included policy analysis, interviews with health managers and workers, observation of patient management in wards, observation of supervised ambulatory care visits, patient interviews, record reviews and

a household survey. Lee and Price suggested that qualitative and quantitative information contributed to a more comprehensive evaluation. However, they did not evaluate how the different components of the TB programme related to one another and whether this was effective or not. In addition, no defaulters were interviewed.

Wilkinson, working in Hlabisa in the 1990s described community involvement in TB, and addressed issues such as the cost-effectiveness of community-based volunteers[29] and the use of traditional healers[30]. He went on to introduce and monitor an alternative approach to the DOTS-strategy.[31] [32] However, the deviation of this programme from the WHO model (the lack of confirmation of cure and twice weekly regimen) has been criticised by others, who challenge the fact that, despite being published in peer-reviewed journals, the programme has not been replicated in other rural area in South Africa.[33]

A number of other studies focusing on the importance of the community component in TB control have been conducted. Issues addressed include the recruitment and training of community volunteers to assist health personnel,[34] [35] support from Non-Governmental Organisations,[34] [35] and incentives for voluntary community based workers.[35] [36]

A further component of TB management in South Africa which has been documented extensively is patient-centred approaches. Dick et al (1997) describe methods in which the communication skills of health workers were improved;[37] an educational booklet was designed for patients[38] and a comprehensive intervention focusing on patient-centeredness, problem solving and critical reflection for PHC providers delivering care to TB patients.[39] The extensive interventions implemented and evaluated by Dick et al showed no significant improvement in TB treatment outcomes. This is attributed to the numerous health systems related issues which impact on TB service provision.[40]

A study was undertaken in 1999 investigating the knowledge of primary care clinicians in the public health service in Mpumalanga about tuberculosis management and control.[41] Results showed that nurse clinicians in Mpumalanga who had attended TB training programmes had superior knowledge on TB management and control compared to their colleagues who had received no training; primary care doctors appeared to be underutilised; and the knowledge of primary care clinicians on managing TB in children was inadequate. However, it appears that this study did not investigate in any detail the knowledge of primary care clinicians about HIV and its effect on TB.

Stigma leads to delays in health seeking behaviour by patients as well as impacting on adherence to treatment.[42] [43] [44] [45] The stigma attached to TB is well documented, especially in qualitative studies. As TB is associated with poverty, overcrowding and malnutrition, patients are often ashamed of having TB, and try to hide this from employers, friends and family members.[46] [47] A rural community in Pondoland in the Eastern Cape fears TB because so many people are dying of the disease.[47] The patients interviewed described that the stigma attached to TB is due mainly to the link of TB with HIV/AIDS. In Malawi TB patients complained of being stigmatised by their communities, as TB and HIV were seen as equivalent within the community.[48] In a South African study Rowe et al (2005) describes stigmatisation as one of the barriers to adherence of TB preventive therapy for HIV-positive patients.[49] Stigmatisation results in delays in health seeking behaviour, a lack of disclosure and non-adherence to treatment.

In 2005 Dr. Lindiwe Mvusi, the national director of TB, listed a number of key health systems issues which need to be addressed to improve treatment outcomes for TB in South Africa. These included the quality of the

relationship between providers and patients, turn around times for laboratory specimens, staff shortages and health education.[50]

Few studies have focused on all components of a TB programme together. All the different components have to function optimally and in relation to one another for a TB programme to be effective. In addition the system within which the programme is placed has to be functional. In this study a number of the different components involved in the implementation of a TB programme were assessed to determine firstly if they function effectively and secondly to determine if they function in relation to one another so that patients do not "leak" from the programme as they move from one component to another.

HYPOTHESIS

In order for patients to be provided with effective TB treatment and care, all aspects of the health system and the NTCP need to be functional. In many instances in South Africa this is not the case, particularly in KwaZulu-Natal, which has a high TB incidence and poor TB programme outcomes. This study therefore seeks to assess the extent to which the local health system in KwaZulu-Natal is complying with the standards and guidelines of the SA NTCP, in order to identify gaps and opportunities to improve tuberculosis control.

The care received by patients with TB at the study sites is not in line with the guidelines of the NTCP. As a result patients are not treated effectively. This leads to leakages from the TB programme.

AIMS OF THE STUDY

1. To assess the extent to which the health system in KwaZulu-Natal is complying with the standards and guidelines of the South African National Tuberculosis Control Programme (NTCP).
2. To determine the gap between the care recommended by the national TB guidelines for patients with TB and the care which is received by patients at a combined district and regional hospital and clinic level.
3. To explore reasons for this gap and to identify factors which facilitate and/or constrain the ability of the hospital and clinics to provide the care outlined in the national guidelines.
4. To identify factors which will need to be overcome for the national TB guidelines to be effectively implemented.
5. To determine the potential for leakages from the system at various points and to quantify these leakages where possible.

OBJECTIVES OF THE STUDY

1. To review how the NTCP is implemented at a regional/district hospital and to identify the potential for leakages from the system.
2. To review the laboratory diagnosis of pulmonary TB (PTB) and extra-pulmonary TB (ETB) and identify the potential for leakages and quantify them where possible.
3. To assess the doctors' knowledge of the NTCP and consider how this might lead to leakages from the system.
4. To review the hospital records of a sample of patients from the hospital TB register to assess the implementation of the NTCP.

5. To review the implementation of the NTCP at clinic level and determine leakages from the system when receiving and holding patients.
6. To assess the nurses knowledge of the NTCP and consider how this might lead to leakages from the system.
7. To explore the experiences of community support for patients with TB.
8. To explore the experience of patients on TB treatment.
9. To explore the experience of patients who interrupted their TB treatment.

METHOD

STUDY DESIGN

This was a descriptive retrospective study aimed to provide information about the management of patients with TB at a district/regional hospital in KwaZulu-Natal and three of its referral clinics. The following methodologies were used to investigate different components of the NTCP:

- Retrospective record and document reviews
- Semi-structured interviews
- Key informant semi-structured interviews
- Participant observation
- Self administered questionnaires
- Focus group discussion

As a number of components were investigated, the different methodologies used, results and discussion for each component are reported on together.

STUDY SITE

The study was based at a combined district and regional hospital and three of its referring clinics in uMgungundlovu District in KwaZulu-Natal. The three clinics were chosen to be representative of all the clinics referring to the hospital. They represented the variation in the clinics in respect of the distance from the hospital, the number of patients they attend to and the number of staff employed at each clinic. The three clinics, however, were in the same sub-district with the same management and support structures with access to the same training and other resources. The socio-economic status of people living around the three clinics was similar.

For one component of the study clinicians from two other hospitals in the same district were included. One of these hospitals was a district level hospital and the other a tertiary level hospital.

uMgungundlovu Health District where the study took place has a population of nearly a million people (980 654).[51] The normalised deprivation index[b] for the district was 2.98 and it is in the third socio-economic quintile.[52] The economic status of uMgungundlovu District is average for the country. Most (84%) of the population have access to piped water.

STUDY SAMPLE

This was a case study of a regional/district hospital. The sampling, therefore, is not representative of the district or sub-district as a whole.

The three study clinics chosen were purposively selected, in consultation with the acting district manager. All three clinics were in the same sub-district with the same management and support structures with access to the same training and other resources. The socio-economic status of people living around the three clinics was similar and all had a high caseload of TB patients. The clinics, however, were in different geographical locations and at variable distances from the hospital. One clinic was close to the hospital, the second was half way up the valley that refers patients to the hospital and the third was at the top of the valley.

The study population for the doctors was all doctors in the medical departments of three large public hospitals in uMgungundlovu District.

The study population for the nurses was all professional nurses within one sub-districts of uMgungundlovu which referred patients to the study hospital. Nurses based at a clinic which treated only TB patients were excluded from the study sample. Sampling of the clinics was purposive; in that only clinics at which a number of TB patients were attended to and which referred patients to the study hospital were considered. Within these clinics convenience sampling of the professional nurses was used and all professional nurses on duty completed the questionnaire. Forty one professional nurses based in nine different provincial and local authority PHC clinics completed the nurses' questionnaire.

The study population for the patients was all adult patients, over 12 years of age, diagnosed with TB during a six month period 1 April – 30 September 2005 at the hospital and the three study clinics. The NTCP guidelines define children as less than eight years of age. [53] In this study all children under 12 years of age were excluded as they are treated in the paediatric wards at the hospital, and the diagnosis and management of TB in children can be difficult.[c]

All adult patients diagnosed with TB during the study period were selected for following through the health system. The patients were identified in the relevant laboratory registers and the TB registers in the study hospital and three study clinics. Only patients treated in the medical wards were included in the sample for the record review.

Ninety two TB patients were interviewed. These patients were identified using the TB registers at the three study clinics. Equal numbers of TB patients were selected randomly from each clinic. No patients refused to be interviewed.

[b] The deprivation index is a measure of material and social deprivation across districts in South Africa. The index is constructed using variables that are indicators of social and material deprivation from the South African 2001 census data. Higher values of the deprivation index denote higher levels of social and material deprivation.
[c] Personal communication Dr. Lesley Bamford, January 2006: Clinical advisor for Child Health, NDoH.

Patients who had not taken their treatment for two months or more ('treatment interrupters') were identified by clinic staff at the three study clinics using the TB register. Only treatment interrupters who interrupted their treatment during the study period 1 April to 30 September 2005 were considered.

A convenience sample of community based health workers who were available and interested in coming to talk about their experiences was used for objective 7. The study sample for objectives 8 and 9, were subsets of patients on treatment and those who had interrupted treatment. Care was taken to ensure that the sample of patients and those who had interrupted treatment was representative of all three clinics.

DATA COLLECTION

1. To review how the NTCP was implemented at a regional/district hospital and to identify the potential for leakages of patients from the system.

Information on the implementation of the NTCP at the hospital and the three study clinics was collected through direct observation. Note was made of the flow of patients presenting with the signs and symptoms of TB at the Medical Outpatients Department, the hospital PHC (Gateway) clinic and the three study clinics. The processes followed at the TB laboratory and hospital TB office were observed. The relationship between the components was recorded.

To assess the effectiveness of the referral system between the hospital and the clinics details of patients in the TB registers at the hospital and three study clinics were entered onto an EXCEL spreadsheet.

Interviews with hospital and clinic staff were held to determine their understanding of how the TB programme at the hospital functioned, the flow of patients and their role in the programme. A semi-structured questionnaire was used to interview nurses from the three study clinics, PHC (Gateway) clinic at the hospital, clinicians, the person in charge of the TB office, laboratory technicians and managers.

2. To review the laboratory diagnosis of pulmonary TB (PTB) and extra-pulmonary TB (ETB) and identify the potential for leakages of patients and to quantify them where possible.

A retrospective review of laboratory registers was conducted to assess how PTB and ETB were diagnosed at the hospital. Patient details from the laboratory and TB registers at the hospital were collected and compared. This was to assess whether patients diagnosed as having TB in the laboratory were registered as TB patients and had commenced treatment. This quantified the leakage of patients between diagnoses as having smear-positive TB in the laboratory and entry into the TB register in the TB office. Uncollected results were reviewed to determine the number of positive results that were not connected to a patient. A cost analysis of the uncollected results was done. Positivity rates were calculated to determine the value of the different tests used in the diagnosis of TB. This information could be used by the Department of Medicine at the hospital to develop guidelines for tests to be used for the diagnosis of TB.

3. To assess the doctors' knowledge of the NTCP and practises

A self administered, structured questionnaire was used to assess clinicians' knowledge and compliance with the NTCP guidelines. The questionnaire was administered to all doctors in the medical departments at the three public hospitals in uMgungundlovu.

4. To review the hospital records of a sample of patients from the hospital TB register to assess the implementation of the NTCP.

The aim of this component of the study was to assess health system delays in the diagnosis of TB, clinicians' application of the NTCP guidelines and the care received by patients with TB. A retrospective record review of adult patients registered in the hospital TB register during the study period 1 April 2005 to 30 September 2005 was done. A structured data collection tool was used. The contribution of support systems such as the laboratory was also assessed. The following aspects of patient care were explored:

- Symptom recognition by health care practitioner and compliance with national TB or TB/HIV guidelines (gold standard): How many of the sample diagnosed with TB who presented in the previous three months with the signs and symptoms of TB were appropriately investigated according to the national TB and TB/HIV guidelines? How many of the sample were diagnosed and referred appropriately as new or retreatment cases?
- Collection of results: What proportion of patients received their results? What were the factors which prevented patients obtaining their results?
- Integration with HIV: Was the patient offered VCT? What proportion of patients agreed to have the test and how many were positive?

5. To review the implementation of the NTCP at clinic level and determine leakages from the system when receiving patients and holding patients.

A retrospective review of the hospital TB register and the TB registers at the three study clinics for the study period 1 April 2005 to 30 September 2005 was undertaken to determine how many patients registered in the hospital TB register actually arrived at the clinic to which they were referred.

6. To assess the nurses knowledge of the NTCP and consider how this might lead to leakages from the system.

A semi-structured self administered questionnaire was used to assess the knowledge of and compliance with NTCP guidelines by professional nurses. Knowledge of the TB guidelines and the operational aspects of the NTCP were tested using true-false questions. Multiple choice questions addressed training issues and semi-structured questions were used to determine in more depth the impact of TB and TB/HIV on health facilities. The questionnaire was administered to nurses at nine clinics in the same sub-district as that in which the study hospital and three study clinics were based.

At each clinic an appointment was made with the facility manager for distribution and administration of the questionnaire. All nurses on duty on the day the questionnaire was distributed were included in the study. The questionnaires were not completed at one clinic with only two professional nurses and a large number of patients waiting for attention.

7. To explore the experience of community support for patients with TB

A focus group discussion was held with community based health workers (CBHWs) to explore a number of factors relating to their role in TB care, their relationships with the patients and with health professionals. The CBHWs chosen represented the three study clinics and had recently worked at one of the three study clinics. Selection of the participants was based on their willingness to talk about their experiences as CBHWs. Four of the CBHWs had been trained as treatment supporters using Directly Observed Therapy (DOT). They had worked as volunteers and had been attached to one of the study clinics. Three of the CBHWs were Home Based Carers. After being trained they worked as volunteers attached to one of the study clinics. None of the CBHWs interviewed were employed or supported by any group or organisation.

A semi-structured questionnaire was used to interview two members of the local TB tracer team. The tracer team were employed by SANTA at an ex-SANTA Hospital (Doris Goodwin Hospital) close to the study hospital. With the take over of the SANTA hospitals by the KwaZulu-Natal Department of Health, the tracer team members became provincial employees, but still based at Doris Goodwin Hospital. Their responsibility is to find TB patients who interrupt or default from their treatment from any clinic which refers patients to the hospital.

Two community members were identified using the snowballing technique. They had experience of CBHWs and were prepared to share these experiences. A semi-structured questionnaire was used for these interviews.

8. To explore the experience of patients on TB treatment

A semi-structured approach was used to interview patients. Patients were interviewed in their mother tongue (isiZulu) by two local fieldworkers. The fieldworkers were trained in the use of the tool and to ensure consistency and the quality of data, the research assistant met with the fieldworkers every second day to check the completed questionnaires, give feedback, discuss problems and identify solutions. Data was collected on:

- Socio-economic characteristics
- Factors which facilitated or constrained access to health services
- Patients' knowledge and beliefs about TB and the association between TB and HIV
- Patients' attitude and feelings about TB
- Health seeking behaviour and the sources of health information
- How long it took health workers to diagnosis TB
- What education patients were given about TB
- Whether patients had been made aware of the link between TB and HIV and encouraged to be tested for HIV

9. To explore the experience of patients who interrupted their TB treatment.

A semi-structured questionnaire was used to interview treatment interrupters to determine health service factors and individual/community factors which assisted or hindered treatment adherence. Treatment interrupters were interviewed at home in their mother tongue (isiZulu) by two local fieldworkers. Data quality and consistency was monitored by the research assistant in a similar way as in the patient interviews.

ETHICAL AND OTHER APPROVALS

Ethics approval was granted by Stellenbosch University. Approval to conduct the study was obtained from the KwaZulu-Natal Provincial Department of Health, the Medical Manager of the Pietermaritzburg Hospital

Complex, the acting District Manager of the uMgungundlovu district and the Chief Executive Officer of the study hospital.

DATA ANALYSIS

Information was entered and analysed using STATA version 9.0[d]. Answers to open-ended questions were analysed using content analysis approaches and grouping responses into themes. Quantitative information was analysed using frequency tables, chi-square tests, fisher exact tests, t-tests and analysis of variance.

LIMITATIONS

1. The lack of a common patient identifier made it impossible to trace a cohort of patients through the health care system, including the laboratory support services. Names, gender and age of patients were used. This, however, may have resulted in some inaccuracies in tracing patients from one system to another as patients may change their names and the writing of health care workers is often illegible.

2. Accessing medical records retrospectively was problematic as some records could not be found. Notes in medical records were often scanty making it difficult to determine whether a clinician had followed the NTCP guidelines or had noted a number of facts.

3. It was not possible to contextualise TB in the whole sub-district as no data had been captured on the electronic TB register for this hospital or a number of clinics in the sub-district since 1 January 2005. The findings of this study, therefore, could not be compared to the district as a whole.

4. The value of the results from the interviews with TB treatment defaulters was limited. The treatment defaulters appeared guarded, possibly due to a lack of trust in the relationship between the interviewer and the defaulters. Their responses to questions were brief and they may not have disclosed their true opinions and feelings.

5. One of the criteria for selection of the study clinics was a high caseload of TB. This may have introduced negative bias in that a high workload may result in systems breakdown.

6. The community members who were interviewed about CBHWs and community support for patients with TB were identified by their willingness to talk about their experiences. This may have introduced a negative bias, as often people with a bad experience often want to talk about it.

[d] Personal communication with Rebecca Shanmugan, January 2007: Statistician Medical Research Council who assisted with this study.

FINDINGS

OBJECTIVE 1:
A REVIEW OF THE IMPLEMENTATION OF THE NTCP AT A REGIONAL/DISTRICT HOSPITAL IDENTIFYING THE POTENTIAL AND EXTENT OF LEAKAGES FROM THE SYSTEM

PURPOSE AND METHODOLOGY

To review the implementation of the NTCP at a regional/district hospital and identify the potential for leakages of patients, a retrospective review of records was conducted and hospital and clinic staff interviewed.

The TB register (paper version) was reviewed and data collected using a specially designed data collection tool. Data was then captured onto EXCEL spreadsheets. Interviews using a semi-structured questionnaire were conducted by the principal investigator.

A retrospective medical record review of adult patients diagnosed and registered with TB during the study period was undertaken to assess health system delays in the diagnosis of TB, clinicians' knowledge and awareness of TB and the care given to patients with TB. A medical officer employed at the hospital used a structured data extraction tool to collect the data for the records which were identified from the TB register. Only the 170 patients diagnosed as having TB in the medical wards during the study period were considered for the record review. Of these 170 patients, 138 folder numbers were identified in the ward register, ward discharge book or the discharge book in administration. One hundred and fourteen medical records were randomly sampled and of these 95 (81%) were found. Eighteen files were excluded as the medical records were incomplete. The final number of medical records reviewed was 77. Data was captured and analysed using STATA 9.0 for simple frequencies and Number Crunching Statistical System (NCSS) for one-way Analysis of Variance (ANOVA).

FINDINGS

The role of a regional/district level hospital in managing TB patients is primarily one of diagnosis, notification and registration of these patients. Treatment and follow-up is primarily the responsibility of PHC clinics within the sub-district. The findings in this section do not address treatment.

Presentation of TB patients

TB patients presenting at the hospital usually fell into one of the following four categories:

- Patients who had attended their local clinic where sputum samples had been sent for microscopy and found to be negative for AFBs. The patients were referred to the hospital because of persistent symptoms.
- Patients who were referred to the medical outpatients department at the hospital for investigation by general practitioners (GP) in the area. Sputum samples had not been taken or tested by the GP.

- Patients who were referred to the hospital for some other complaint and were found to have the signs and symptoms of TB.
- Seriously ill patients arriving directly at the hospital.

The manner of investigation of patients with suspected PTB varied depending on the condition of the patient. Patients not ill enough to be admitted and who had not had their sputum investigated were given two sputum bottles to collect sputum samples. These samples were to be taken to the patient's nearest clinic for sputum microscopy. Occasionally patients were asked to bring their sputum samples back to the medical outpatients department (MOPD). Patients whose sputum had been sent for microscopy were sent for chest X-rays. Very ill patients were admitted to hospital and investigations done in the ward.

Diagnosis of TB

The diagnosis of PTB was problematic. Few patients at the hospital had sputum microscopy done AND received their results. A rapid turn over of doctors, especially interns, was noted. Most doctors were unfamiliar with the NTCP and did not have the Department of Health TB or TB/HIV Guidelines. Doctors were also uncertain of how to diagnose ETB.

Table 1.1 shows the number of adult patients registered as having TB at the hospital during the study period. Children (under 12) were excluded from the study sample.[e] A total of 1104 patients were registered, of these 642 (58%) had PTB and 462 (42%) had ETB. Of the 642 PTB patients 611 (95%) were new cases and 31 (5%) retreatment cases. The commonest form of ETB recorded was TB of the pleura and other respiratory organs.

Table 1.1: Number of Patients Registered with TB at the Study Hospital: 1 April – 30 September 2005*

	Total	%
Total no. of patients	1104	
Total no. of PTB patients	642	58
Total ETB	462	42
TB miliary	61	5
TB meningitis	63	6
TB pleura and other respiratory organs	197	18
TB other organs	91	8
TB lymph nodes	45	4
TB bones	5	0
New PTBs	611	95
Retreatment PTB	31	5

*See appendix 1 for case definitions

Diagnostic Problems identified within the Study Hospital

Four problems concerning the diagnosis of TB were highlighted by this study (See Daigram1.1):

1. The impact of the HIV-epidemic,
2. Lack of awareness of national TB protocols and guidelines,
3. System for the investigation of sputum specimens dysfunctional,
4. Interface between laboratory and the wards is not functioning optimally

[e] Children under 12 were treated in the paediatric wards. Due to the complexity of diagnosing TB in children, all those in paediatric wards were excluded.

FIGURE 1.1: PROBLEMS RELATED TO THE DIAGNOSIS OF TB AT A COMBINED REGIONAL/DISTRICT HOSPITAL

TB: Diagnostic problems identified

Problem 1:
Impact of HIV-epidemic:

- Complicates the presentation of TB
- ETB more common
- Smear negative PTB

Problem 2:
Lack of awareness of national TB protocols and guidelines:

PTB diagnosis:

- PTB diagnosed in the absence of smear microscopy.
- PTB diagnosed in the absence of a suggestive clinical history
- PTB diagnosed on the basis of chest X-rays.
- Sputum specimens not sent for culture at appropriate times.

ETB diagnosis:

- ETB diagnosed in the absence of appropriate investigations.
- Sputum microscopy not done simultaneously to exclude PTB
- ETB diagnosed in the absence of a suggestive clinical history

Problem 3:
Ward systems for specimen investigation not working:

- Sputum not collected from patients as ordered by the doctor.
- Patients unable to produce sputum
- Results not documented.
- Results not entered onto green TB card.
- TB cultures not ordered at appropriate times

Problem 4:
Interface between laboratory and the wards is not functioning optimally:

- No suspect registers
- Long turn around time
- Transport system for specimens and results between the laboratory and wards dysfunctional.

Problem 1: Impact of the HIV-epidemic

The impacts of the HIV-epidemic on TB are referred to in other sections of this report. With regard to the diagnosis of TB, the HIV-epidemic has the following impact:

- It complicates the presentation of TB[54];
- ETB is more common[54];
- There are an increasing number of patients with smear-negative PTB[54].

Problem 2: Lack of awareness of national TB protocols and guidelines

2.1. Diagnosis of PTB

PTB diagnosed in the absence of positive smear microscopy

In the record review sputum microscopy was not ordered in half of the 77 records of TB patients. (See Table 1.2). In a further 30% of the TB cases diagnosed, sputum microscopy was ordered, but no results had been filed. Consequently, in less than a quarter of the records reviewed (17) the results of the sputum microscopy were available. Table 1.2 also shows that of the 36 patients diagnosed as having PTB, only 8 (10%) had positive smear microscopy results.

Table 1.2: Record Reviews: Details of sputum specimen requests

Results for sputum specimens	Number	Percentage
Positive	8	10
Negative	9	12
Not found (system failure)	23	30
Not ordered by clinician	37	48
Total	77	100

TB diagnosed in the absence of clinical history suggestive of TB

The medical record review showed that the signs and symptoms suggestive of TB were not comprehensively documented. From the information gathered it is not clear whether an adequate history was taken and not documented, or if an adequate history was not taken. Table 1.3 shows the percentage of records in which the classic signs and symptoms of TB were documented.

Table 1.3: Percentage of TB signs and symptoms recorded in the medical records

Signs and Symptoms of TB	Percentage recorded in medical records
History of coughing	70%
Known/suspected HIV infection	70%
Respiratory distress	69%
Loss of appetite and weight	57%
Night sweats and night fever	49%
Tiredness and weakness	16%
Exposure to PTB	38%
Haemoptysis	28%
Chest pain	21%

PTB diagnosed on the basis of chest X-rays

In the record review two thirds of the patients had chest x-rays ordered and 45% of the patients were diagnosed with PTB on the basis of the chest x-ray. The use of chest x-rays in diagnosing TB has been discounted for a number of years and is not part of the NTCP. This confirms doctors' lack of awareness of the national protocols.

Sputum culture not used

Sputum specimens were not sent for culture at appropriate times as stipulated in the national guidelines. In the 77 records reviewed a culture was requested on only one occasion. The failure of doctors to order sputum cultures is of concern in a hospital where MDR-TB was diagnosed in 11% of the sputum samples sent from the hospital to IALH over an eight month period in 2006[f] and 14 cases of XDR-TB were diagnosed in the second half of 2006.[g]

2.2. Diagnosis of ETB

TB diagnosed in the absence of clinical history suggestive of TB

Similarly to PTB, in the medical records of patients diagnosed with ETB, a clinical history suggestive of TB was often not documented.

ETB diagnosed without excluding PTB

From the sample of 77 record reviewed, 41 patients were diagnosed as having ETB. Of these 41 patients only three patients had their sputum tested. According to the national guidelines all patients suspected of having ETB should have their sputum tested, as they may also have PTB.

ETB diagnosed in the absence of appropriate investigations

Table 1.4 illustrates that the appropriate investigation was ordered in less than half (36) of the cases diagnosed with ETB. Doctors often started patients on TB treatment prior to the sputum results being available because of the long TAT and the perceived short length of stay of patients on the ward. A number of issues concerning the use of appropriate investigations to diagnosis of ETB were identified:

- The TAT for investigations done at the hospital laboratory was between five and seven days.
- Poor filing systems made it difficult to retrieve results.
- Although ultrasounds for suspected pericardial effusions were done on the day of presentation, other ultrasounds could take up to three weeks.
- Pleural effusions and ascitic effusions are easily tapped but were often not done due to the uncertainty of what laboratory investigations should be requested.
- Fine needle aspirates (FNAs) for TB lymphadonitis were sent, but microscopy results were difficult to find.
- Cytology results were usually returned as unsuitable for processing.

[f] Culture and drug sensitivity report from IALH Nov 2006

[g] Personal communication Dr. G. Alverez, January 2007: Medical officer KZN DoH, Regional/district hospital uMgungundlovu district,

Table 1.4: Type of TB diagnosed compared with appropriate laboratory investigation which was positive

Type of TB	No. diagnosed as positive	Appropriate test	Test positive
Pulmonary TB	36	Sputum microscopy	8
Pericardial effusion	10	Ultrasound	7
Pleural effusion	11	Ultrasound/pleural tap	6
TB lymphadonitis	3	Lymph node FNA	0
TB meningitis	8	Lumbar puncture	6
TB abdomen	3	Ultrasound/ascitic fluid	0
Miliary TB	6	Chest x-ray	4
Total	77		36

Problem 3. Ward systems for specimen investigation not working

Sputum collection

Table 1.2 shows that in the record review sputum microscopy were ordered for almost a third of the patients (23) but no results were documented in the patient's notes. One reason identified for this was nurses did not obtain sputum specimens as ordered by the clinician.

Patients unable to produce sputum

Most patients admitted to hospital are desperately ill and many are co-infected with HIV. These patients may be too weak to cough to produce sputum, or have an unproductive cough or have smear-negative TB. The national TB/HIV guidelines suggest the use of nebulisers to assist patients to cough productively. This had not been implemented at the study hospital.

The documenting of results in the patients records

Sputum results were not documented in the patients' record due to the inefficient and ineffective filing system in the ward. Doctors, who may be unaware of the importance of smear microscopy results for both diagnostic and management purposes of the TB patient, often discharged patients without documenting results in the patient's green TB card. This impacts on the management of the individual TB patient as well as the management of TB epidemic.

Sputum culture not used

Specimens needing cultures were sent to the laboratory at Inkhosi Albert Luthuli Hospital (IALH) in Durban. Initial culture results from IALH were returned to the hospital after three weeks. Final results were sent after six weeks.

Doctors in the MOPD ordered cultures more frequently than doctors in the wards. However, results of sputum culture were at times not placed in the patient's file. Due to the lack of suspect registers/laboratory registers in the wards and MOPD it was not possible to quantify how many culture results were not linked to patients. However, in the MOPD a box of uncollected results was identified and the number of uncollected results over the study period was counted.

Forty seven results from the study period had not been collected, of which half (23) were positive. Of the 37 specimens sent for drug sensitivity testing (DST) that were not collected, 10 were positive and were resistant to one or more drugs. Table 1.5 lists the number of each type of specimen sent for drug sensitivity testing and the drugs they were resistant to.

Table 1.5: Uncollected results: Results for drug sensitivity testing (DST)

Type of specimen	No. of specimens	No. of drugs resistant to	Type of drugs resistant to
Sputum	2	1	Isoniazid
	3	3	Isoniazid, rifampicin, streptomycin
	1	4	Isoniazid, rifampicin, streptomycin, ethambutol
CSF	1	3	Isoniazid, rifampicin, streptomycin
Pus	1	1	Isoniazid
	1	3	Isoniazid, rifampicin, ethambutol
Fluid	2	1	Isoniazid
	10		

Problem 4: Interface between laboratory and wards not functioning optimally

No suspect registers in the wards or MOPD

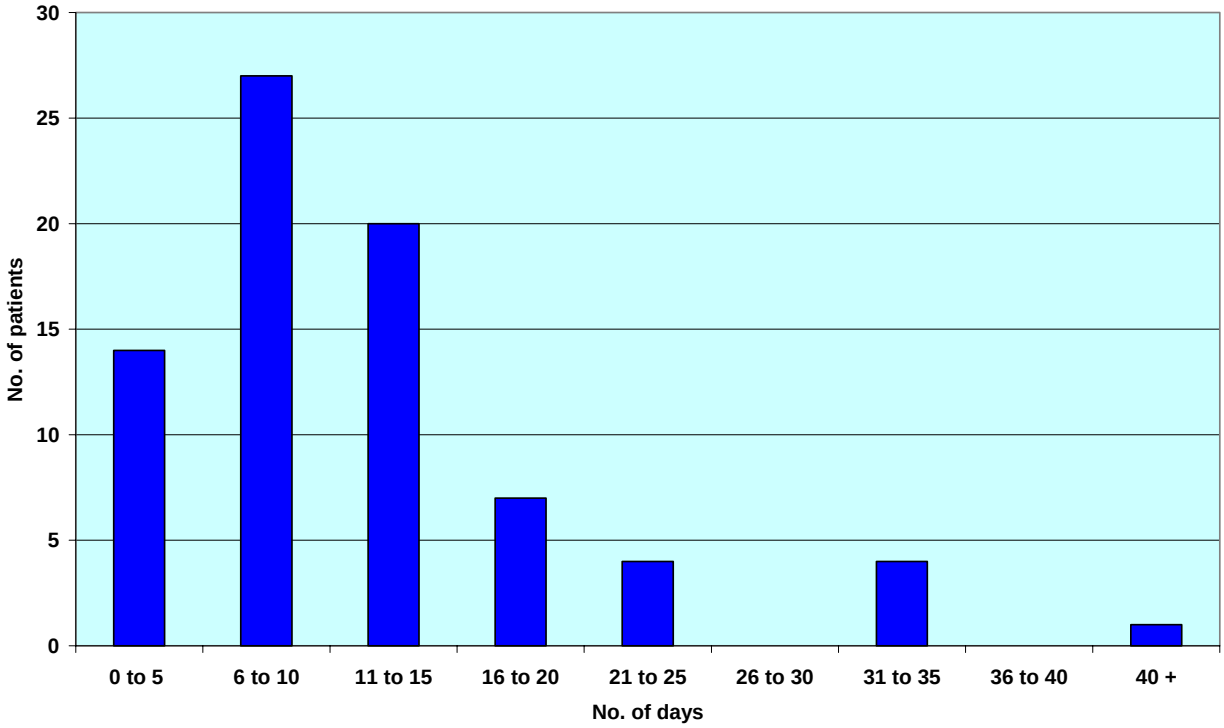
Suspect registers detailing the patient's name and contact details, the date and time of sputum was taken, the result and the date and time the results were returned were not kept in the MOPD or any of the hospital wards. As a result it was not possible:

- To determine the turn around time (TAT) for sputum results
- To contact patients diagnosed as smear-positive TB if they did not return to collect their results in the MOPD.
- To trace a specimen if results were not returned.
- To monitor the TAT and the number of specimens for which results were never returned.

Long Turn Around Times (TAT)

Clinicians interviewed in the MOPD and wards said the TAT was at least a week and many results were lost. A number of clinicians justified diagnosing TB in the absence of laboratory confirmation as patients were only hospitalised for a couple of days at the most and the TAT of laboratory investigations was long. However, the record review showed that the average length of stay was 12 days (range 1 – 57). This suggests that there was adequate time to conduct laboratory investigations to confirm the diagnosis of TB. Figure 3 illustrates the length of stay in five day intervals.

Figure 1.2: 1 April – 30 September 2005: Length of stay of patients in hospital for investigation and treatment of TB measured in 5 day intervals taken from the record reviews



The transporting of specimens and results between the wards and the laboratory

The system for transporting specimens from the wards to the laboratory and results from the laboratory to the wards did not function well. Two staff members were expected to collect specimens hourly from the wards and take them to the laboratory, delivering results at the same time. The staff interviewed said this occurred periodically, perhaps once a day, and as the staff members concerned could never be found, they had become known as "the ghosts." Line management of these staff members exacerbated the problem as they were not answerable to the laboratory, ward or medical management.

Notification and registration of TB patients

There was no written hospital protocol of how to manage patients diagnosed with TB. The process below was described by a number of clinicians and the person in charge of the TB office during their interviews.

All patients diagnosed with TB in the hospital were supposed to be issued with a green patient carrier card (issued by the NTCP) and referred to the "TB team" which operated from a prefabricated building within the hospital premises. The "TB team" were required to notify the patient according to regulations and enter them in to the hospital TB register. They were further required to educate the patient on TB, the use of the green card, supply them with a few days of anti-TB medication and refer them, with transfer a form, to their nearest clinic for further management. The TB team was also responsible for submitting quarterly reports of the patients registered in the hospital to the district office.

There was no case holding at the hospital. Patients living close to the hospital were referred to the Gateway Clinic within the hospital grounds for case management. Patients requiring daily streptomycin injections as part

of a retreatment regime and were unable to access a clinic daily for were admitted to the ex-SANTA hospital less than a kilometre from the hospital.
However, a number of variations of the above procedure took place due to the lack of a written protocol,. A number of problems with the notification and registration system were identified:

- The TB team only operated during normal working hours. Patients diagnosed after hours and on weekends were expected to return to the hospital for TB education and then referral to a clinic. Many patients did would not do this[h];
- Patients admitted to the wards and diagnosed with TB were only referred to the TB team on discharge. The discharge procedures, including collecting medication, is long and may have resulted in some patients not visiting the TB team [h];
- Books of TB transfer forms were frequently out of stock. Patients, therefore, were given one photocopy of the transfer form, and no forms were sent to the clinic. Clinics were not always informed of the transfer, and, therefore, would not follow up patients if they did not attend the clinic;
- Doctors, because of patient load pressure, at times circumvented the full registration and transfer process which involves a lot of paper work and takes time. They sent patients directly to their nearest clinic with only a transfer form;
- Doctors failed to understand the importance of identifying and managing infectious PTB. The results of sputum microscopy were not filled in on the notification form and green card, complicating the management and recording and reporting of the patient for the duration of their treatment;
- Quarterly reports were completed but no-one was tasked with monitoring the information at a local level so as to review the functioning of the TB programme e.g. the sputum coverage rate and positivity rate for PTB. This data was also not available form the district office as the TB data for the hospital had not been captured at the district office for almost two years.

The referral of patients from the hospital to the clinics is documented under the implementation of the NTCP at a clinic level.

[h] Personal communication Dr. Khan Principal MO , April 2006: KZN DoH, Regional/District Hospital Umgungundlovu District KZN

OBJECTIVE 2:
A REVIEW OF THE PROCESS OF THE LABORATORY DIAGNOSIS OF PTB AND ETB IDENTIFYING THE POTENTIAL FOR AND EXTENT OF LEAKAGES

PURPOSE AND METHODOLOGY

To review the laboratory diagnosis of PTB and ETB and identify the potential for leakages and quantify them where possible a retrospective review of laboratory registers for the study period was conducted.

FINDINGS

2.1. Pulmonary TB

Figure 2.1 illustrates that 1984 sputum samples were taken from 992 patients during the study period (1 April – 30 Sept 2005). Of these 225 (23%) were diagnosed as smear positive PTB. Over this time 95 patients were entered into the hospital TB register as having smear-positive TB. Eighteen patients did not collect their results and 112 patients were not accounted for. Total leakage of smear-positive PTB patients from the laboratory to the TB register was 58% (130/225). (Appendix 2: Table 1)

Figure 2.1: Diagrammatic Representation of the Leakage of Patients between diagnosis in the laboratory and being recorded in the TB Register

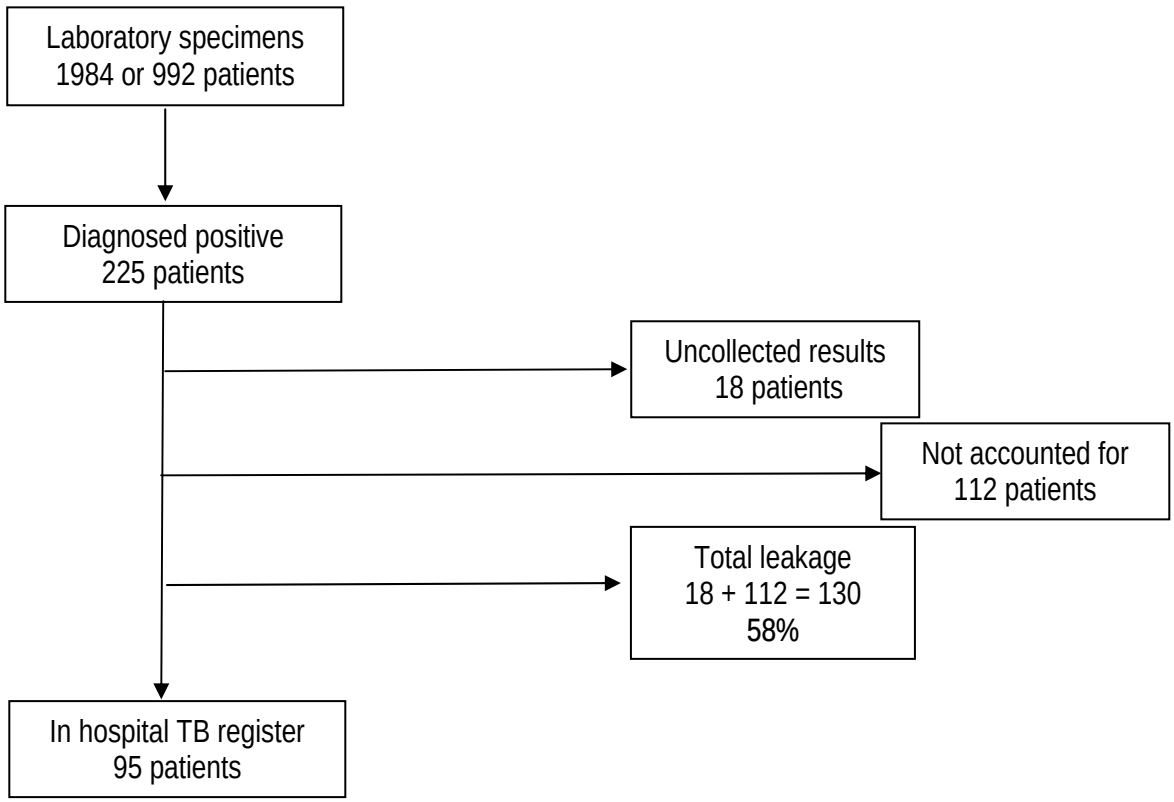
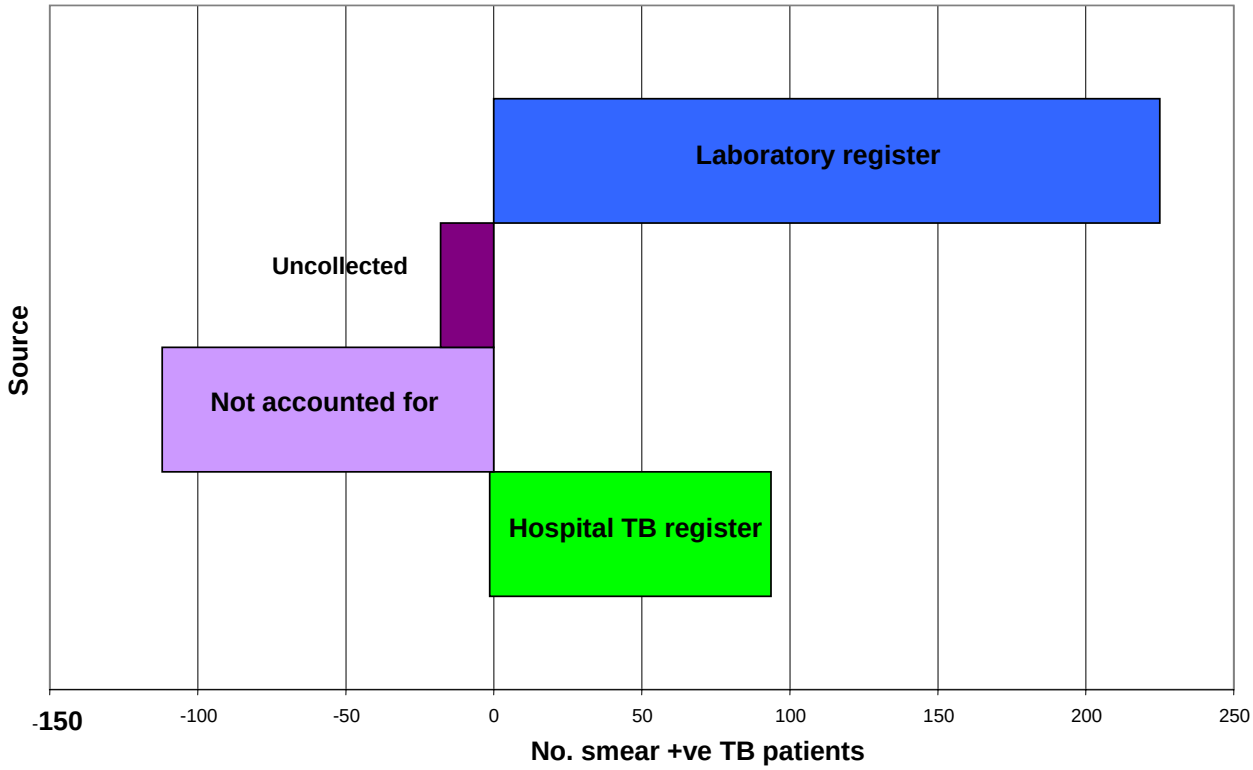


Figure 2.2 illustrates the leakage of patients at the interface of the laboratory and health services on a histogram. This shows that of the more than 200 positive smears recorded in the laboratory less than 100 were entered into the hospital TB register.

Figure 2.2: Histogram illustrating leakage of smear positive TB patients at the interface of the laboratory and health services



Health service factors which contributed to the discrepancy between the number of patients diagnosed as smear-positive in the laboratory register and the number registered as smear-positive in the TB register are documented above, "Diagnostic problems identified within a combined regional/district hospital." (See page 25)

In MOPD the problem was further exacerbated by patients who failed to return for their results. During the study period 1 April 2005 – 30 September 2006, 505 sputum specimens from MOPD were investigated by the laboratory. Twenty seven percent (137) were either not collected by patients or not connected with the patients for some reason. Of the uncollected results a quarter (36) were positive.

The TB register does not include the patient's hospital number so it was not possible to trace individual patients from the laboratory registers to the TB register. It, therefore, was not possible to determine from the register how many of the 112 patients referred to as "not accounted for" actually leaked from the system and were really lost to TB treatment.

Bacteriological Coverage

Table 2.1 shows the bacteriological coverage and percentage of pulmonary TB cases recorded as smear-positive in the hospital TB register between 1 April and 30 September 2005. The bacteriological coverage of all 642 PTB patients was 17% (108 out of 642 patients) and the percentage of pulmonary cases that were smear-

positive was 15% (95 of the 642 patients). Only patients diagnosed as having TB within the hospital were registered in the hospital TB register. Of the 611 new PTB patients, 97 had pre-treatment sputum taken giving a bacteriological coverage of 16%. Of these 90 (15%) were new smear-positive PTB patients

Table 2.1: Laboratory Diagnosis of all PTB patients at the Study Hospital

	All PTB	New PTBs
Total number of patients registered with TB	1109	
Number of patients registered as PTB	642 (58%)	611 (55%)
Bacteriological Coverage	108 (17%)	97 (16%)
Smear Positive TB	95 (15%)	90 (15%)

It was unclear as to the status of patients who were not diagnosed as smear positive. Five possible reasons were identified for smear-positive TB not being diagnosed:

- Sputum not obtained (cough unproductive)
- Sputum not done
- Results not retrieved
- Results not entered on relevant form
- Smear negative TB

2.2. TB of the Pleura, Other Respiratory Organs and Other Organs

During the study period 197 patients were registered in the hospital TB register as having TB pleura and other respiratory organs; 91 patients were registered as TB of other organs, most commonly with TB of the abdomen.

There was no clear hospital protocol for diagnoses of TB pleura in the presence of a pleural effusion. Variations included:

- Pleural tap done and left to see if it clotted (as recommended in the NTCP)
- Diagnosis on chest x-ray alone especially in younger people i.e. < 40 years
- Pleural tap done to show the presence of a clear straw coloured fluid to exclude an empyema
- Pleural fluid sent for chemistry. A total protein of greater than 30 mg/litre and a raised LDH indicate an effusion, the commonest cause of which is TB.
- The chemistry of the pleural effusion was linked to blood chemistry so as to calculate serum/ blood protein or albumin ratios.
- Pleural fluid was sent for microscopy. A lymphocytosis was taken as indicative of TB infection.
- Pleural fluid was sent for cytology. A lymphocytosis indicated TB and malignancy could be excluded.
- Pleural fluid was sent for microscopy for acid fast bacilli. If requested, the specimen was sent to Inkhosi Albert Luthuli Hospital TB laboratory in Durban for microscopy and culture and sensitivity.

Table 2.2 shows the number of chemistry and cytology tests conducted on pleural and ascitic fluid during the study period and the number of these tests that were positive for TB. The criteria used to diagnosis TB was a protein level of >30g/l with a lymphocytosis. As no serum values were available for comparison, it was not possible to confirm if the specimen was an exudate or a transudate. A lymphocytosis was the main parameter used, unless the total protein or LDH was very high.

Two hundred and ninety four chemistry tests were carried out on pleural fluid. Of these 233 (79%) were considered to be positive for TB. Cytology tests were carried out on 115 of these. For 22 specimens (19%) cytology would have contributed to the diagnosis of TB. Five of the specimens sent for cytology showed malignant cells.

One hundred and ten chemistry tests were carried out on ascitic fluid. Of these 74 (64%) were considered to be positive for TB. Cytology tests were carried out on 52 specimens; 15 of these specimens (29%) gave supportive evidence for the diagnosis of TB. Three of the specimens sent for cytology showed malignant cells.

Although 233 pleural fluid specimens showed TB pleura and other respiratory organs, only 197 patients were recorded in the TB register. This suggests 36 (15%) of the patients diagnosed as having TB pleura and other respiratory organs leaked from the system. The leakage may have been greater as only results for pleural fluid were quantified. It is not possible from the data available to determine how many patients with "TB other organs" leaked from the system as only the tests for TB in ascitic fluid were evaluated.

Table 2.2: Chemistry and Cytology Tests conducted on Pleural Fluid

	Pleural Fluid	Ascitic Fluid
Chemistry tests done	294	110
Chemistry tests positive for TB	233 (79%)	74 (67%)
Cytology tests done	115	52
Cytology tests contributed to diagnosis	22 (19%)	15 (29%)
Malignancy diagnosed on cytology	5	3

2.3. TB Lymph Nodes

At the study hospital patients presenting with suspected TB lymphadenitis were investigated by fine needle aspiration biopsy (FNAs). These are routinely sent to the laboratory for AFB and/or cytology screening. In the six month period under review:

FNAs for AFBs: Fifty nine specimens were sent for AFBs. Of these 17 (28%) were positive for TB.

FNAs for cytology: Ninety four specimens were sent for cytology. Of these, 40 were reported as unsatisfactory for evaluation, seven as malignant including two lymphomas and 11 as pus. Thirty one specimens showed a lymphocytosis, suggesting a probable diagnosis of TB and in the remaining five specimens the results were inconclusive as they showed normal lymph node tissue or equivalent numbers of neutrophils and lymphocytes.

Over half (50) of the slides for cytology were reported as being unsuitable for diagnostic purposes. This is possibly due to delays in the specimens reaching the laboratory. the delay can be three to five days.

More cytology investigations were requested than AFB investigations and cytology was often done without an AFB investigation. A number of doctors suggested that the transport of specimens from the wards to the laboratory and the return of the results were problematic as many specimens and results went missing.. This could not be investigated as the wards do not keep a specimen register.

2.4. TB Meningitis

During the study period 42% (462) of the patients registered with TB at the hospital had extra-pulmonary TB. Of these 14% (63) had TB meningitis (TBM). Due to the high prevalence of HIV, doctors have a high level of suspicion of chronic meningitis, including TBM and cryptococcal meningitis (CCM). Consequently,

- Lumbar punctures are done frequently. During the study period 1499 spinal fluid specimens were sent to the laboratory for investigation.
- In three quarters (58) of the records reviewed patients were screened clinically for meningitis.
- At the study hospital all CSF specimens have AFB microscopy done as well as culture and sensitivity and other routine investigations.

This study showed that routine AFB microscopy on CSF was not cost effective as only four (0,3%) of the 1499 of tests were positive.

Of the lumbar punctures done during the study period 279 were positive for CCM. A senior infectious diseases specialist reviewed the remaining 1220 CSF results using the following criteria to diagnose TBM; a glucose of ≤ 2,43 mmol/l, protein >0.8gms/l and lymphocyte count higher than normal. The following information was not available to the reviewing specialist:

- Clinical history, in particular durations of symptoms
- Blood glucose levels
- Serial lumbar puncture results
- HIV infection which is associated with increased total protein in CSF
- Traumatic CSF tap (> 10,000 red blood cells) associated with raised white cell count

He found that, based on laboratory results, 108 patients probably had TBM. As only 63 patients with TBM were registered in the TB register, 45 (42%) of the patients with TBM leaked out the system. The main reason why patients diagnosed with TBM would not have been registered in the TB register is the high mortality rate for TBM at the hospital. (According to the death certificates from September 2006 to January 2007 an average of nine patients a month died at the hospital of TBM.[i]) There, however, are a number of other possible explanations for this leakage:

- As described previously it was not possible to link TB laboratory results directly with patients appearing in the TB register due to the lack of a common patient identifier
- Patients were transferred directly to the clinics on discharge, without being entered in the hospital TB register. There was no way of confirming whether the patients had attended the clinic for treatment.
- Patients were discharged with no follow up arrangements being made. At this hospital, patients diagnosed with TBM are never followed up by a doctor, in spite of the complications that may arise as a result of TBM.[j]

2.5. TB culture and Drug Sensitivity Testing (DST)

During eight months of 2005, of which six were included in the study period, 491 samples were sent to IALH for culture. Of these 20% showed some form of drug resistance, of which 11% were MDR-TB.[k]

[i] Personal communication Dr. G. Alverez, January 2007: Medical officer KZN DoH, Regional/district hospital uMgungundlovu district.
[j] Personal experience of author (L. Thomson) October 2006. Chief Medical Officer KZN DoH. Regional/district hospital uMgungundlovu district.
[k] Personal communication Dr. G. Alverez, January 2007: Medical officer KZN DoH, Regional/district hospital uMgungundlovu district.

2.6. Total Leakage

Table 2.3 tabulates the total leakage for PTB and ETB. Over a third (214) of the patients diagnosed as positive TB in the laboratory were not recorded in the TB register. The magnitude of this leakage is not accurate for reasons discussed previously. There, however, is a leakage of patients at the interface between the laboratory services and TB services. This leakage is highest amongst infectious TB patients, i.e. those with smear-positive PTB.

Table 2.3: Total leakage of patients diagnosed with TB between the laboratory and TB services

Type of TB	No. of patients diagnosed as having TB in the laboratory	No. of patients in the TB register	Leakage
PTB	225	95	130 (58%)
TB pleura	233	197	36 (15%)
TBM	108	63	45 (42%)
Lymph nodes	48	45	3 (6%)
TB other organs: Unable to determine as only ascitic fluid counted			
Total	614	400	214 (35%)

DISCUSSION

Key objectives in any TB control programme are to reduce tuberculosis transmission through early detection of smear-positive PTB, and to commence treatment as soon as possible. Delays in diagnosis and starting effective treatment result in prolonged transmission, increased infectiousness of the patient and increased morbidity and mortality. In the presence of HIV infection, the cost of delayed diagnosis is even higher due to the increased mortality and morbidity as a result of TB in the immuno-compromised patient.[55] It has been suggested that in an area where TB is endemic, each infectious case will result in between 20 and 28 secondary infections.[56] Recently Sonnenberg et al showed that within the first year of HIV infection the incidence of TB doubled with a further slight increase for up to 7 years.[57]

The failure of the hospital to diagnosis smear-positive TB quickly and efficiently increases the mortality and morbidity of patients with TB and places staff and other patients at risk of contracting TB through nosocomal transmission within the hospital. The NTCP includes clear guidelines for diagnosis of TB disease. The use of non-contributory tests results in poor diagnostic accuracy, potentially unnecessary treatment, and poor monitoring of treatment outcomes. The cost and increased workload for staff of these additional tests need to be considered and addressed.

The following reasons were identified as contributing to the low bacteriological coverage rate at the hospital:

Sputum not done: Although many doctors appear to be trained in clinical aspects of TB they have limited knowledge of epidemiology and the principles of the NTCP. They frequently diagnose TB on the basis of a chest x-ray, although this practice has been discouraged for many years by the NTCP.[58]

Sputum not obtained: Sputum was not obtained for several reasons. Sputum collection was seldom given the importance it deserves. The NTCP guidelines include a point-by-point procedure for sputum collection. This stresses the importance of supervising sputum collection, deep breathing before a deep cough and conducting

the procedure in a well ventilated area.[59] The TB and HIV Guidelines[60] suggests that each hospital appoint a "cough officer" to ensure sputum collection is done correctly according to the guidelines. None of the facilities involved in this study conducted sputum collection in line with the NTCP guidelines and the hospital had no appointed "cough officer". The failure to adhere to the guidelines for sputum collection places patients and staff (particularly those who were immuno-compromised) at greater risk to be infected with TB while in the health facility. Patients who are unable to produce sputum can be assisted by using ultrasonic or saline nebulisation.

Results not entered on relevant form: Non recording of results on the transfer form means that it was not known if the patient was smear-positive TB, smear-negative TB or not tested. Incomplete and inaccurate recording and reporting of patient information and data appeared to be a problem with the implementation of the NTCP at many levels of the programme.

Smear-negative TB: Guidelines have been formulated for the diagnosis of sputum negative TB. This includes taking a third sputum specimen and re-evaluating the patient clinically with these results after a course of a broad spectrum antibiotic. These guidelines were seldom followed. The record review showed that patients admitted to the wards, usually by interns, were regularly started on TB treatment without any investigation except possibly a chest x-ray.

The laboratory services at the hospital appear to undertake the technical aspects of conducting bacteriological investigations for TB adequately, despite the considerable workload experienced by the technicians. However, this is undermined by the failure of clinicians to collect specimens timeously from patients, a system to ensure that specimens reach the laboratory, and that the results are returned to the clinician or patient within a reasonable period of time. The hospital and laboratory services need to review the gaps identified in the system, many of which can be closed. For example, the laboratory needs to take some responsibility for ensuring that results are linked back to patients. For example, the laboratory forms could be changed to include the patient hospital number and contact details and regular collections of sputum from and delivery of results to all wards and MOPD organised. This study shows that a considerable proportion of the work done by the technicians in the laboratory is of no value as the results are not used to assist in the diagnosis and management of the patient. Poor systems between the laboratory, the wards and MOPD appear to be the main problem.

TB contributed significantly to the burden of disease and the workload of staff at the hospital. The high numbers of patients with extrapulmonary TB (42%) suggests that a large proportion of TB patients at the hospital are co-infected with HIV.[61] These results are similar to those in a study undertaken in Gauteng by Edginton et al between 2003 and 2005.[62]

This component of the study aimed to identify if there were leakages in the laboratory diagnosis of PTB and ETB and to determine the magnitude of these leakages. There were four major findings:

- Several leakage points in the system were identified. Fifty-eight percent of patients' with smear-positive TB and at least 15% of patients with TB pleura and other respiratory organs diagnosed in the laboratory were neither registered nor commenced on treatment.

- Clinicians at the hospital were not diagnosing PTB according to the NTCP guidelines. This gave bacterial coverage of only 17% of the patients registered as PTB.

- ETB was not diagnosed according to the NTCP guidelines. Only one of the 462 patients (0.2%) diagnosed with ETB was tested for PTB. In addition patients were diagnosed as having ETB and started on TB treatment without confirmatory laboratory tests.

- Inaccurate recording and reporting resulted in incomplete and inaccurate registration of TB patients at the hospital level. This had negative consequences on the implementation of the NTCP at a PHC level and impacted on the management of individual TB patients.

GENERAL RECOMMENDATIONS

Patients with TB or TB/HIV co-infection form a considerable part of the patient load at all combined regional/district hospitals in KwaZulu-Natal [1]. The following general recommendations are made to effectively manage and treat these patients:

1. Appoint a TB medical team to coordinate the TB services at the hospital;
2. Standardise investigations for PTB and ETB, based on the NTCP guidelines;
3. Use suspect registers in the wards and MOPD to ensure that the interface between the laboratory and TB services is functioning optimally so that the TAT is reduced to less than 48 hours;
4. Ensure laboratory results are entered into all medical records;
5. Standardise management of TB patients according to national guidelines;
6. TB/HIV integration:
    - All TB patients to be encouraged to have an HIV test.
    - All HIV patients to be taught the signs and symptoms of TB and be encouraged to report these to a clinician if they develop in the patient.
    - TB and HIV status to be documented on referral letters and patients notes

SPECIFIC RECOMMENDATIONS FOR THE STUDY HOSPITAL

The results of this study were discussed with medical staff at the study hospital. A TB crisis plan for the hospital which included many of the recommendations listed below was developed. The implementation of these plans began in October 2006 and is being monitored by a clinician assigned responsibility for the implementation of the plan.

1. Appointment of a TB medical team

- Appoint a TB medical team at the hospital to improve the delivery of TB services. The TB medical team to include a senior medical doctor with TB experience so that the team has the authority and standing to make changes and monitor the implementation.
- TB medical team to monitor the implementation of the plan through weekly rounds in all wards.
- Hospital management to support and assist the TB team to address issues that are outside their sphere of influence.

[1] Personal communication Mr. B. Margot. January 2007. Provincial TB Co-ordinator: KZN DoH.

2. Standardise investigations for PTB and ETB based on NTCP

- National TB guidelines to be accepted by the hospital as the guidelines for investigating all suspect TB patients.
- National TB guidelines to be available in all wards and MOPD.
- Quarterly updates on the NTCP guidelines for clinicians to educate rotating staff.
- Senior clinicians to ensure that the TB national guidelines are adhered to on all wards..

3. Shorten delay in TB diagnosis

- Cough officers
  - Identify three cough officers per ward and one cough officer in the TB office. The cough officers to be a clinical orderly, enrolled nurse or enrolled nursing assistant.
  - Job descriptions for cough officers, including key result areas, to be drawn up.
  - Cough officers to receive training on their role in supervising sputum collection and TB management, including the use of a nebuliser to assist patients who have minimal sputum.
- TB suspects registers to be kept in medical wards, clinics and TB office.
- Use suspect registers to monitor weekly the TAT for smear microscopy and cultures and the number of specimens for which results are not returned.
- Improve the system of transporting specimens and results between the wards and the laboratory. Two staff responsible for transporting of specimens to be attached, managed and answerable to the laboratory management.
- All staff to be encouraged to write contact numbers (ideally cell phone numbers) of the referring clinician and the patient, on the laboratory form accompanying the specimen.
- Laboratory staff to phone referring clinician informing them that the patient is diagnosed as smear-positive TB and giving them the patients' contact phone number.
- Clinician to phone patient informing them about their results and encouraging them to return as soon as possible for treatment.
- Laboratory forms to be adjusted to using a common patient identifier.
- The TAT for sputum microscopy results should be reduced through adherence to the NTCP guidelines.

4. Ward system for returning laboratory investigation results

- All results from the laboratory to be signed for and filed.
- One person in each ward to be assigned the responsibility of filing all results in patients folders.
- If patient has been discharged and records sent to record department, records to be requested and results filed.
- A result indicating a patient has MDR-TB or XDR-TB to be given to the head of the TB Medical Team.

5. Standardise management of TB patients according to national guidelines

- National TB guidelines for the management of TB patients to be accepted by the hospital as the guidelines for management of confirmed cases of TB.
- National TB guidelines to be available in all wards and MOPD.
- NTCP stationary to be available in all wards and the MOPD. This to include:
  - Notification forms
  - Transfer forms
  - Patient held green TB cards
  - Laboratory request forms
- Quarterly updates on management of TB patients to be held for clinicians in order to educate rotating medical staff on the national guidelines.

- Senior clinicians to ensure that patients with TB are being managed in accordance with the national guidelines.

6. TB/HIV Integration
   - All TB patients to be encouraged to have an HIV test.
   - All HIV patients to be taught the signs and symptoms of TB and be encouraged to report these to a clinician if they develop them.
   - TB and HIV status to be documented on referral letters and in patients notes

7. Referral system to be improved

   Improve referral system to:
   - TB office at hospital for TB patients who are being discharged to be treated at their local clinic or the Gateway clinic.
   - Anti-retroviral therapy (ART) clinic for patients diagnosed as HIV positive
   - Clinics, including Gateway clinic at the hospital, for all TB patients who will be treated at these clinics
   - Ex-SANTA TB Hospital for patients with MDR-TB and patients co-infected with TB and HIV.
   - King George V Hospital for patients with XDR and MDR-TB.

8. Co-operation with Gateway Clinic
   - Representation from Gateway Clinic to be included in TB team
   - Defaulter tracing team to be used to trace patients from Gateway Clinic who interrupt treatment, and including patients diagnosed with MDR-TB or XDR-TB after they have been discharged.
   - Gateway Clinic to be monitored and evaluated by the hospital TB team

9. Revised responsibilities for TB office
   - System to be devised to extend the working hours of the TB office to after hours, weekends and public holidays. This to include notification and registration of TB patients, education on TB and providing patients with medication for a few days until they reach the clinic.
   - Develop clear job descriptions for TB office staff
   - TB office staff to collaborate closely with wards and visit patients in the wards if necessary.

10. Patient education
    - Train Siyaphila (HIV positive support group) members as treatment supporters
    - Develop comprehensive patient education material
    - Patient education material to be available in the wards
    - Give patient education by using cough officers, TB office members and Siyaphila treatment supporters

11. Monitoring and evaluation

a. Targets to be set for the following indicators at the study hospital:
   - Positivity rate
   - Proportion of PTB suspects with positive smear
   - Turn around time of smear results
   - Proportion of PTB patients diagnosed by AFB
   - Number of TB patients reported
   - Proportion of new PTB
   - Proportion of PTB vs. ETB
   - Proportion of MDR TB cases

- Number of smears examined in the lab
- Proportion of samples sent to IALH for culture

b. Additional indicators to be set at the Gateway Clinic:

- Smear conversion rate
- Cure rate
- Successful treatment completion rate
- Default rate

c. Evaluation of targets monthly or quarterly

- Evaluation to be done by TB office and members of TB working group
- TB medical team to assist in monitoring quality of TB investigations and treatment as well as implementation of the revised operations plan

OBJECTIVE 3:
AN ASSESSMENT OF DOCTORS' KNOWLEDGE OF THE NTCP AND HOW THIS MIGHT CONTRIBUTE TO LEAKAGES FROM THE SYSTEM.

PURPOSE AND METHODOLOGY

Objective 3 was to assess the doctors' knowledge and compliance with the SA NTCP in providing care to people with TB or people co-infected with TB and HIV and consider how this might lead to leakages from the system. The self administered questionnaire was piloted before being completed by 65 doctors from the three public hospitals in Pietermaritzburg.

FINDINGS

Almost half (28/65) of the doctors were from the study hospital, a regional/district level hospital. Thirty one percent (20/65) were from a district hospital and 15% (23/65) were a tertiary hospital. (Appendix 3: Table 14)

Table 3.1 shows that 25 (38%) of the doctors were medical officers, 24 (37%) were interns, nine (14%) were chief medical officers/specialists, five (8%) were community service officers and two (3%) were registrars. The mean length of medical practice post internship was nine years and the range of years worked from 0 to 46.

Table 3.1: Rank of doctors who completed the questionnaire

	No. of responses	Percent
Medical Officer	25	38
Intern	24	37
Chief Medical Officer/Specialist	9	14
Community Service Officer	5	8
Registrar	2	3
Total	65	100

3.1 Doctors' involvement in the TB Programme

Table 3.2 shows the extent of doctors' involvement in the TB programme at their facility. Sixty-seven percent (42) of the doctors were involved with TB all the time or often.

Table3. 2: Extent of the involvement of doctors in the TB programme at their facility

	No. of responses*	Percent
All the time	18	29
Often	24	38
Occasionally	20	32
Never	1	1
Total	63	100

***** 2 GPs excluded as they were not employed at any of the three public hospitals

Table 3.3 shows that of the 63 doctors included in the analysis 43% (28) were involved in all aspects of the TB programme, 72% (47) in the diagnosis of TB and 62% (40) in the treatment of patients with TB (Table 3.3). Forty-two percent (27) of the doctors were involved in referring patients for treatment to PHC clinics and 26%

(17) were involved in recording and reporting. Most doctors were involved in more than one aspect of the TB programme.

Table 3.3: Aspect of the TB programme doctors were involved in

Part of TB programme	No. of responses*	Percent
Diagnosis	47	72
Treatment	40	62
Referral	27	42
All of the above	28	43
Recording and reporting	17	26

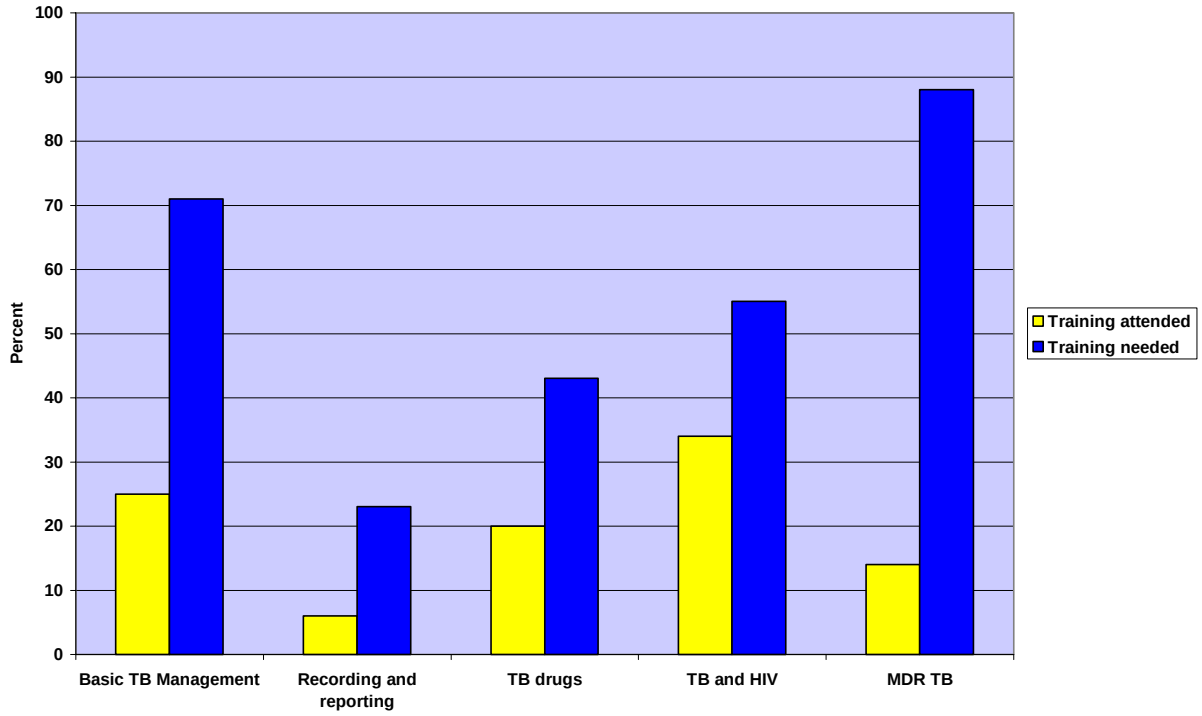
*Each doctor recorded whether they were involved in each of the five aspects of the TB programme listed above

Training of doctors in relation to the TB programme

Graph 3.1 shows that only 25% (16) of the doctors had received post graduate training in basic TB management, 20% of the doctors had received training in TB drugs and only 14% in MDR TB. Thirty four percent of the doctors had received training in TB and HIV.

Eighty-eight percent of the doctors said they needed training in MDR TB, 71% in basic TB management and 43% in TB drugs. few doctors expressed a need for further training in the recording and reporting procedures Only four percent had attended training on recording and reporting procedures, (Appendix 3: Table 15)

Graph 3.1: Comparison of percentage doctors who had attended trained and percentage of doctors requesting training in aspects of the TB programme



Doctor's Knowledge of TB

Most doctors (>80%) had a high level of knowledge of the appropriate investigations for TB in patients presenting with a chronic productive cough. However, less than half knew the correct national protocols for the investigation of contacts of a known AFB positive TB patient (45%), or in HIV positive people (49%). (See Appendix 3: Table 16)

Doctors' knowledge about the diagnosis of TB suggested that most (91%) knew the basic protocols for sputum investigation of AFB's in patients presenting with symptoms of pulmonary TB. There, however, was confusion about the total number of sputum specimens to be taken, and the timing of taking the sputum specimens. In AFB negative patients, more than half the doctors (52%) relied exclusively on chest x-rays to 'confirm' a diagnosis, which is contrary to national protocols. (Appendix 3: Table 17)

Most (> 80%) doctors knew that HIV infected patients were more likely to have smear negative TB, often have atypical chest x-rays (CXRs), and half knew that a third sputum specimen should be sent if a patient had two negative sputum. (Appendix 3: Table18)

When making treatment commencement decisions, three quarters of the respondents indicated that they would commence the patient on a "trial of treatment", which is contrary to national and international guidelines. Thirty nine percent of the doctors indicated that if both sputums were negative they would, based on the chest x-ray, start the patient on TB treatment. These treatment decisions were reported being made, despite half of the doctors knowing that culture results were needed before starting an AFB negative patient on TB treatment. (Appendix 3: Table 18)

Many (69%) respondents knew that TB treatment should be started if a patient had 3 negative smears, the signs and symptoms of TB, a chest x-ray suggestive of TB and did not respond to a broad spectrum antibiotic.

Respondents knowledge of the diagnosis of extrapulmonary TB varied, with between half and three quarters being familiar with the national protocols. (Appendix 3: Table 19) More correct responses were recorded for the diagnosis of TB in the presence of cervical lymphadenopathy (83%), abdominal TB (79%) and pericardial effusion (93%), and fewer for the diagnosis of a TB pleural effusion (66%), and testing of ascites for TB (55%).

Doctors' knowledge of the correct treatment regimens for TB varied. Most (88%) were familiar with the treatment of an uncomplicated PTB patient, with fewer being familiar with protocols for treatment failure (23%), retreatment of patients (49%) and extrapulmonary TB (29%). (Appendix 3: Table 20)

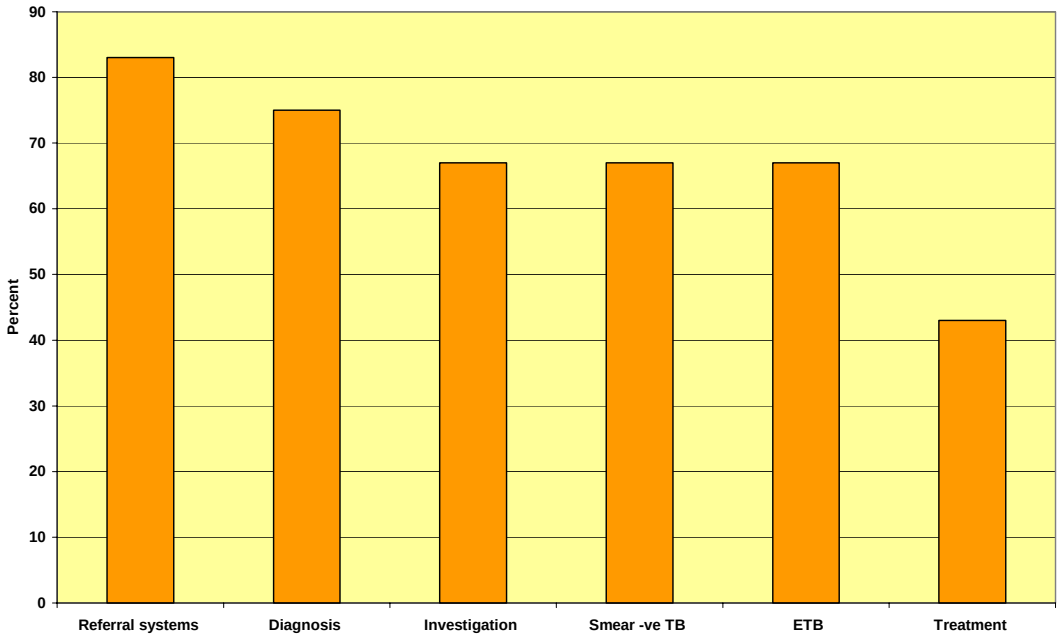
Most clinicians (>80%) were familiar with the notification of and referral protocols for patients with TB from the study hospital to the clinics. Fewer (65%) were familiar with requirements to complete the hospital TB register. (Appendix 3: Table 21)

Comparing scores for the different sections of knowledge tested.

The respondents were most knowledgeable about the referral systems and least knowledgeable about the correct treatment protocols for patients with TB. The lack of knowledge of treatment protocols is of concern, particularly with the increasing prevalence of TB drug resistance in KwaZulu-Natal and nationally.

The average total score over all the sections was 67%. (Appendix 3: Table 22)

Graph 3.2: Comparison of the scores for different sections of knowledge tested, expressed as percentage of respondents



Comparing the average scores over the different categories of doctors

An analysis of variance was done to compare the scores across the sections for the three categories of doctors. The more senior doctors, medical officers and chief medical officer (CMO)/specialists, generally had a greater knowledge than interns and community service officers (CSOs) of the correct protocols for all aspects of TB diagnosis and management., Their knowledge was significantly greater in the area of appropriate investigations ($p < 0.01$). However, medical officers had a slightly better knowledge of the correct protocols for smear-negative TB, extra-pulmonary TB, and referrals than their seniors. This was not significant. (Appendix 3: Table 23)

Comparing the average scores over the different hospitals

A comparison of the average scores between the different hospitals was undertaken. The knowledge at the tertiary level hospital was not significantly better than at the other hospitals although the tertiary hospital had consultants and registrars and a greater average years of experience (12.2 years in the tertiary hospital compared with 1.4 years in the district hospital).

Relationship between length of medical practice and knowledge in each section

Comparing the length of medical practice and knowledge in each section was undertaken using linear regression and analysis of variance. The numbers in each category were too small to show any significant differences.

Relationship between post-graduate training and knowledge

Table 15 in Appendix 3 shows the relationship between post-graduate training and knowledge. The question was TB-specific and stipulated that post-graduate training was within the last five years. Doctors were asked if they had received training in a number of components in the TB programme, such as basic TB management, TB drugs, TB and HIV and MDR TB. Post-graduate training was categorized into None or Some, and a t-test performed to determine any difference in the knowledge score between the two groups.

The t-test p-values showed no significant difference between the average score of the two groups in respect of knowledge on appropriate investigations for TB, diagnosis of smear-positive and smear-negative PTB and the referral of patients from hospital to clinic. No significant difference was also found for diagnosis and management of ETB, although post graduate training did improve the average score. There, however, was a significant difference in the mean scores in respect of treatment of patients between those who had had post graduate training and those who had not. Those who had training had a higher knowledge score. (See Appendix 3: Table 24)

DISCUSSION

As most of the doctors were involved in the management of TB on a regular basis, their knowledge of the national protocols for the investigation and diagnosis of TB was lower than expected. This low knowledge was supported by the results of the record reviews. Four reasons for this lack of knowledge on the NTCP and its implementation at the study hospital were identified.

- Many doctors appear to be trained in clinical aspects of TB but have limited knowledge of epidemiology and the principles of the NTCP. They, therefore, do not adhere to NTCP guidelines and protocols.
- New doctors who rotate through the medical wards are not trained on NTCP and the requirement to adhere to the guidelines.
- National guidelines are not available in the wards and the use of these guidelines is not emphasised by senior clinicians.
- The details of the implementation of the guidelines are not documented for use by all medical staff.

The leakage of TB patients resulting from doctors' lack of knowledge about the NTCP was not quantified. The factors below, however, could have resulted in TB patients being incorrectly diagnosed and treated:

- The lack of sputum investigation and the use of chest X-rays to diagnose TB could result in some patients being incorrectly diagnosed as smear-positive and possibly unnecessarily started on TB treatment. In a population with a high incidence of TB the use of chest x-rays alone to diagnose TB could lead to many patients with latent TB being diagnosed as having active TB disease and being started on treatment. In addition there could be misdiagnosis of other chest infections, such as bacterial or pneumocystis carinii pneumonia, as PTB.
- Patients may be placed on TB treatment inappropriately, while others are being missed that are AFB or culture positive are not being detected because of a failure to adhere to the national protocols.
- Patients who are diagnosed on chest x-rays cannot be monitored bacteriologically for sputum conversion and cure. Patients who are sputum positive at the end of the standard treatment may not be detected.

These findings are of concern in an area with a high TB prevalence and incidence and with high TB/HIV co-infection. The diagnosis and management of PTB should be a priority. Other studies of doctors' knowledge of the investigation and diagnosis of TB have shown similar results. In Korea, Hong et al (1998) found that 50% of the general practitioners in Korea did not consider sputum examination essential for diagnosis and 75% did not perform sputum examinations to monitor treatment response.[63] Similarly, a study in Delhi, India found that only 12% of general practitioners interviewed relied on sputum microscopy for diagnosis.[64]

Doctors' relatively poor knowledge of appropriate treatment regimens does not ensure cure or the prevention of drug resistant TB. It was reassuring that most of the doctors would not have chosen a "trial of treatment", but the practise appears to be more prevalent than it should be.

Although not significant, intern and community service officer with fewer years experience and less seniority had less knowledge. This suggests medical students may not receive adequate training in the epidemiology of TB or how TB should be managed according to the NTCP guidelines. Similar results were obtained in studies in China and Germany. They found that knowledge and practice competency regarding tuberculosis amongst final-year medical students was generally inadequate. This would suggest a lack of emphasis on training in the epidemiology and management tuberculosis.[65] [66]

Doctors have an extremely important role in making decisions regarding investigation, diagnosis and treatment of patients with TB. Clinicians at all levels of the health system should be adequately trained on the SA NTCP guidelines. Further discussion on this section of the study is not possible due to insufficient data being collected. No studies in South Africa which measured the effect of TB training programmes for doctors were found. A number of doctors, however, at the study hospital found the TB course run by the National Department of Health together with the Foundation for Professional Development in November 2006 to be extremely useful.[m]

RECOMMENDATIONS

1. Undergraduate training on the principles of infectious disease control and the NTCP guidelines and protocols should be strengthened.
2. New doctors rotating through the medical wards to be made aware of the national TB guidelines and the need to adhere to these.
3. The NTCP guidelines and the DoH guidelines for TB/HIV management to be available in all wards and the MOPD.
4. The details of how the TB and TB/HIV guidelines are implemented at the hospital and the procedures which must be followed for patients to be documented and made available to all medical personnel.

[m] Personal experience of author (L. Thomson): October 2006: Chief medical officer MOPD Study Hospital

OBJECTIVE 4:
A REVIEW OF HOSPITAL RECORDS ASSESSING THE IMPLEMENTATION OF THE NTCP

As the findings of the record review have been incorporated into other sections, they will not be reported on further.

OBJECTIVE 5
A REVIEW OF THE IMPLEMENTATION OF THE NTCP AT A CLINIC LEVEL AND THE EXTENT OF LEAKAGES FROM THE SYSTEM

PURPOSE AND METHODOLOGY

Objective 5 was to review the implementation of the SA NTCP at clinic level and determine leakages from the system when receiving patients and holding patients.

A retrospective review of the hospital TB register and the TB registers at the three study clinics for the study period 1 April 2005 to 30 September 2005 was undertaken to determine how many patients registered in the hospital TB register arrived at the clinic to which they were referred.

FINDINGS

Referrals from the hospital to the three study clinics

A major problem encountered in tracing patients between the hospital and the three study clinics was the absence of data on the electronic register at the district level. No data was captured during 2005. The data capturer responsible for this task acknowledged she was not up to date, but appeared unaware and unconcerned of the implications of this. The sub-district and district case finding and treatment outcomes, therefore, are incomplete and do not provide an accurate reflection of the TB case load nor their management.

In KwaZulu-Natal patients are registered at the institution where they are diagnosed (often a hospital) and then referred to their nearest clinic for treatment. At the study hospital a patient diagnosed with TB is referred to the TB office for notification and referral to their nearest clinic for treatment. The patient is provided with treatment for two or more days and a transfer form. The hospital TB office submits the notification form to the district office. .

Number of Patients Registered at Three Study Clinics

Table 5.1 shows that during the study period 451 adult TB patients were registered at the three study clinics; 278 at Clinic 1, 89 at Clinic 2 and 84 at Clinic 3. Of these patients 303 (67%) had PTB and 148 (33%) ETB. Clinic 1 had a higher percentage of ETB patients than the other two clinics with 101 (36%) of the patients having ETB and 177 (64%) PTB. Of the 303 PTB patients, 72% (217) were new PTBs and 28% (86) were retreatment patients. Clinics 2 and 3 had a similar percentage of new PTBs with 84% and 85% respectively. Clinic 1 had a higher percentage of retreatment cases. Sixty two percent of the patients were new PTBs and 24% retreatment cases.

Table 5.1: Number of Adult TB Patients Registered at the Three Study Clinics: 1 April – 30 September 2005*

	Clinic 1	Clinic 2	Clinic 3	Clinic Total
Total no. of patients	278	89	84	451
Total no. of PTB	177 (64%)	64 (72%)	62 (74%)	303 (67%)
ETB: TB miliary	12	2	0	14
ETB: TB meningitis	12	1	2	15
ETB:TB pleura and other respiratory organs	35	20	8	63
ETB: TB other organs	15	1	7	23
ETB: TB lymph nodes	8	0	1	9
ETB: TB bones	1	0	0	1
ETB: Primary TB	18	1	4	23
Total ETB	101 (36%)	25 (28%)	22 (26%)	148 (33%)
New PTBs	110(62%)	54(84%)	53(85%)	217(72%)
No. of retreatment patients: RC	26	5	8	39
No. of retreatment patients: RI	23	1	1	25
No. of retreatment patients: RAC	18	4	0	22
Total no. of retreatment patients	67 (24%)	10 (16%)	9 (15%)	86(28%)

*for case definitions see appendix 1

Diagnosis of TB at a clinic level

At each of the three study clinics patients suspected of having TB were entered into the suspect register and their sputum specimens sent to the hospital laboratory (clinics 2 and 3) or the closest microscopy centre (clinic 1). The hospital laboratory used auramine stains whereas the microscopy centre used Ziehl- Neelsen stains. The turn around time for the laboratory and the microscopy centre was between four and six days.

Table 5.2: Laboratory Diagnosis of all and new adult PTB patients at a clinic level

All PTB patients	Clinic 1	Clinic 2	Clinic 3	Clinic Total
Total no. of patients	278	89	84	451
Total no. of PTB	177 (64%)	64 (72%)	62 (74%)	303
Bacteriological Coverage	175 (99%)	39 (61%)	35 (56%)	249 (82%)
Smear Positive	116 (66%)	31 (48%)	30 (48%)	177 (58%)
New PTB patients	Clinic 1	Clinic 2	Clinic 3	
No. of new PTBs	129	57	52	238
Bacteriological Coverage of new PTBs	114 (88%)	33 (58%)	28 (54%)	175 (74%)
Smear Positive new PTBs	85 (66%)	29 (51%)	26 (50%)	140 (59%)
New PTBS Not Smear Positive	44 (34%)	28 (49%)	26 (50%)	98 (41%)

Movement of Patients from the Study Hospital to the Three Study Clinics

Of the 451 patients registered in the study clinics over the six month study period, 123 (27%) were diagnosed in one of the three clinics (Table 5.3). Of the 328 patients who transferred in, 176 were referred from the hospital TB register. Of these 176 patients, 69% did report to the clinic for treatment, but 31% are counted as having leaked from the system between the hospital and the clinic. A higher percentage of patients arrived at Clinic 1 (71%) than at Clinics 2 and 3 (65% each).

The remaining 152 patients who transferred in to the clinics came from other hospitals and clinics in the district. (The percentage of patients who were referred and who arrived from other hospitals and clinics was not investigated).

The time taken by patients to report at all three clinics ranged from 0 to 23 days with a mean arrival time of 3.4 days. At clinic 1 the range was 0 to 19 days, at clinic 2 it was 0 to 23 days and at clinic 3 it was 0 to 12 days. There was no significant difference in mean arrival between males and females or between patients with PTB and ETB. Patients were usually given two days treatment on discharge from the hospital. However 52% of the patients took longer than two days to access a clinic.

Table 5.3: Movement of Patients from the Study Hospital to the Three Study Clinics

	Clinic 1	Clinic 2	Clinic 3	Clinic Total
Total no. of patients	278	89	84	451
Patients referred to this facility from study hospital	110	40	26	176
Patients who arrived from study hospital	78 (71%)	27 (65%)	17 (65%)	122 (69%)
Patients who did not arrive from study hospital	32 (29%)	13 (34%)	9 (35%)	54 (31%)
No. of days taken to present at clinic after referral from study hospital	0 - 19	0 - 23	0 - 12	0 - 23
Mean number of days taken to present at the clinic after referral from the study hospital	3	4.1	3.5	3.4

Treatment outcomes of patients referred to three study clinics

Of the new PTBs a quarter of the patients had no smear done, and the bacteriological coverage of all the PTB patients was 82%. The smear conversion rate for new smear-positive PTB patients was 72% and for the retreatment patients it was 50%..

Table 5.4 shows the treatment outcomes for all patients referred from the hospital and attended the clinics for treatment. Only 19% (13 out of 67) of all the PTB patients were cured. Thirty nine percent (26 out of 67) of the PTB patients interrupted their treatment and 36% (24 out of 67) completed their treatment, but had no bacteriological proof of cure. A further 3% of the patients either died or transferred out. The low bacteriological coverage rates, and high treatment interruption rates contribute significantly to the low cure rate for all PTB patients.

The cure rate for new smear positive PTBs was 44% (11 out of 25), the treatment completion rate 16% and the interruption rate 36%. Of the six PTB patients on retreatment half interrupted their treatment and third were cured. Of the ETBs 58% (32 out of 55) completed their treatment, 4% were transferred out and 11% died. Almost a third interrupted their treatment.

Patients who arrived at the clinic, started their treatment and then interrupted their treatment are considered to have leaked from the system. One third (41 out of 122) of all the TB patients who arrived at the clinic leaked from the system. Almost a quarter (26 out of 122) of these was PTBs, nine smear-positive PTBs and seven had no smears done.

Table 5.4 refers only to patients referred from the hospital and actually presented themselves at the clinic; it does not include the 54 patients who did not report to the clinics.

Table 5.4: Treatment outcomes for patients referred by study hospital to the three study clinics

	Clinic 1	Clinic 2	Clinic 3	**Total**
Number of patients who arrived	78	27	17	122
Patients with PTB	41	16	10	67
Patients with ETB	37	11	7	55
Bacteriological coverage (PTB)	36 (88%)	3 (19%)	7 (70%)	46 (69%)
Smear Positive TB	21	2	7	30
Cured (all PTBs)	10	0	3	13 (19%)
Treatment Completed (all PTBs)	11	8	5	24 (36%)
Interrupted (all PTBs)	16	8	2	26 (39%)
Transferred Out (all PTBs)	2	0	0	2 (3%)
Died (all PTBs)	2	0	0	2 (3%)
New PTBs	38	14	9	61
New Smear Positive PTB	18	1	6	25
Smear Conversion Rate (SCR)	12 (67%)	1 (7%)	5 (83%)	18 (72%)
Cured	9	0	2	11 (44%)
Treatment Completed	0	1	3	4 (16%)
Interrupted	8	0	1	9 (36%)
Died	1	0	0	1
New Smear Negative PTB	15	1	0	16
Treatment Completed	9	1	0	10
Interrupted	4	0	0	4
Transferred Out	2	0	0	2
Smear Not Done	5	12	3	20
Treatment Completed	2	6	2	10
Interrupted	3	6	1	10
Retreatment PTBs	3	2	1	6
Smear Conversion Rate (SCR)	1	1	1	3 (50%)
Cured	1	0	1	2 (33%)
Interrupted	1	2	0	3 (50%)
Died	1	0	0	1 (17%)
ETB	37	11	7	55
Treatment Completed (all ETBs)	21	7	4	32 (58%)
Interrupted (all ETBs)	9	3	3	15 (27%)
Transferred Out (all ETBs)	1	1	0	2 (4%)
Died (all ETBs)	6	0	0	6 (11%)
New ETBs	31	9	7	47
Treatment Completed	19	5	4	28
Interrupted	6	3	3	12
Transferred Out	1	1	0	2
Died	5	0	0	5
Retreatment ETBs	6	2	0	8
Treatment Completed	2	2	0	4
Interrupted	3	0	0	3
Died	1	0	0	1

DISCUSSION

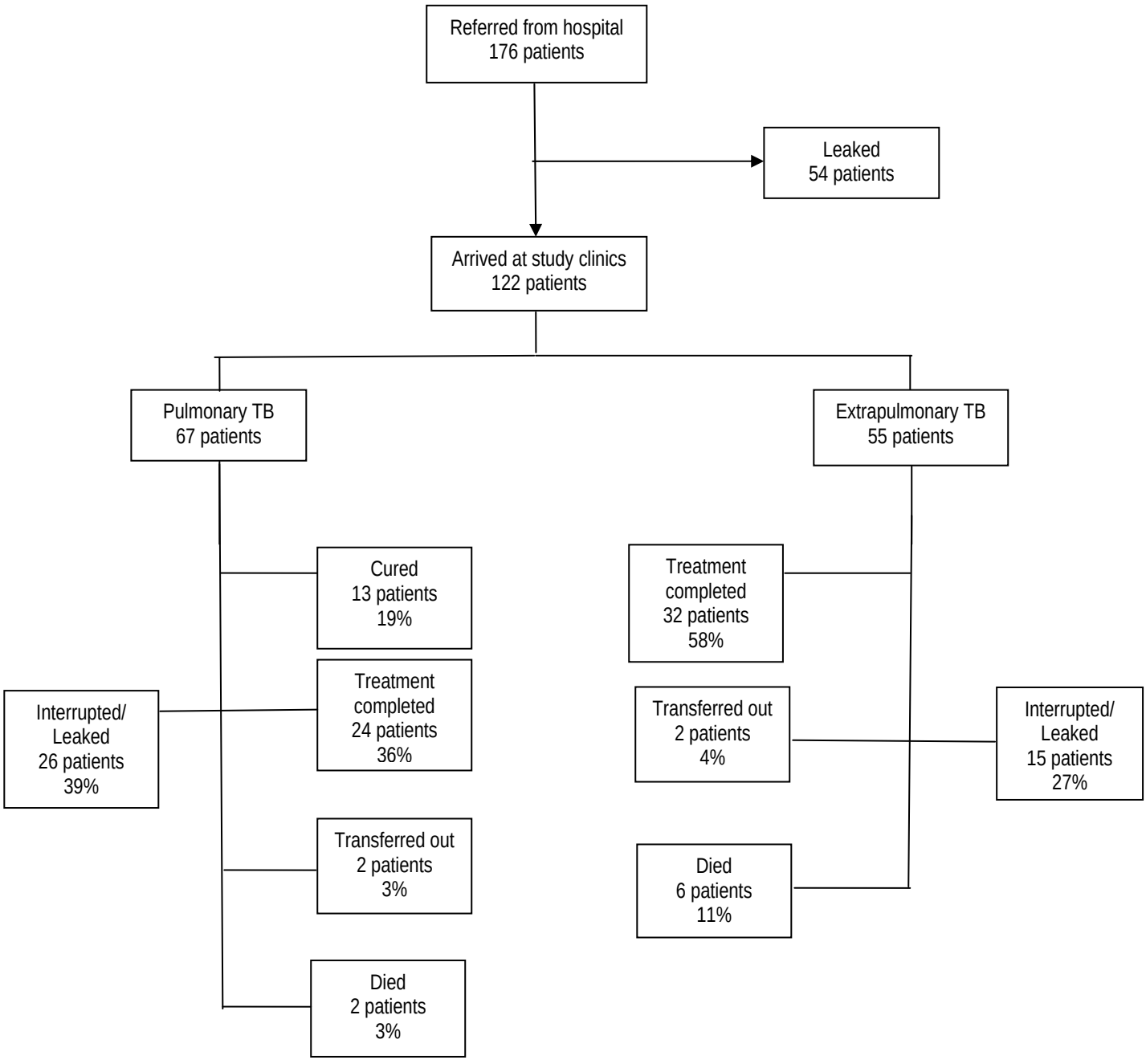
Figure 5.1 below shows the three major leakages identified in this study during the patients' journey from diagnosis to completing TB treatment. Of all the patients who presented themselves to the health facilities in this study,

- 58% diagnosed as having smear-positive TB were never entered in the hospital TB register.
- 31% referred to one of the three study clinics never arrived at these clinics.
- 39% with PTB started treatment but failed to complete it.

Almost half the patients registered in the hospital TB register never completed their treatment. The number of patients lost on referral from the hospital to the clinic was considerably higher than the 21% reported by Edginton et. al.[67] A study in Uganda highlighted the problems with referrals between different facilities where it was shown that moving from one health facility to another negatively affected treatment completion.[68] A number of studies have documented the importance of a caring relationship between the health care provider and patient in ensuring patient adherence.[69]

On discharge from the hospital patients were usually given two days treatment. More than half of the patients arrived after two days. In Edginton's study where patients were given two weeks supply of medication, half of the patients arrived before the medicine was finished.[67] The hospital policy for dispensing TB medication on discharge is required to ensure non interruption of treatment before the patient reports to the clinic.

Figure 5.1: Diagrammatic representation to show leakage of patients on referral to clinics and during treatment at clinics



The focus of the NTCP at PHC level is on smear-positive PTB. The diagnosis of PTB without sputum results and the incomplete record keeping at the hospital can lead to confusion at a PHC level.. A number of patients, who on discharge from the hospital had no sputum results, were recorded in the clinic registers as being smear positive. Reasons for this is not known, but could be due to pressure from supervisors to fill in all pre-treatment results or sputum specimens were taken at the clinic level and sent for microscopy. The latter, however, is unlikely as sputum can be negative after the two days treatment given on discharge[70]

The presentation and management of patients co-infected with TB and HIV is complicated.[71] In one clinic there appeared to be some confusion about the management of patients with ETB. All patients referred to the clinic from the hospital with PTB and ETB were expected to produce sputum specimens at the time of registering at the clinic, after two months treatment and after five months irrespective of whether they were able to produce sputum or were smear-negative at diagnosis. This led one of the patients who interrupted treatment to remark:

> *"……my cough is dry, always dry…..the clinic says cough, cough, cough, every time I go…..it was sore and I got tired, so I stopped going……"*

Clinic staff need support as they struggle to implement a complex programme with many aspects need to be considered.

RECOMMENDATIONS

1. There was no dedicated district TB co-ordinators in KwaZulu-Natal during the period of this study. Cluster managers were responsible for all communicable diseases, geriatrics, psychiatry and rehabilitation. District TB co-ordinator posts have now been created and advertised to be filled.

   The appointment of a dedicated district TB co-ordinator in uMgungundlovu district will assist in addressing many problems highlighted in this study. A clear job description with key performance areas and close supervision and monitoring of the district TB co-ordinator is necessary.

   The key function of the TB co-ordinator is to supervise and monitor the implementation of the NTCP at a district level. Regular effective supervisory visits are essential to ensure that:

   - All components of the NTCP are being correctly understood and implemented,
   - Recording and reporting is accurate and up to date,
   - Clinic staff are assisted in solving the myriad of problems which arise in treating TB patients,
   - Ongoing in-service education and training on TB is provided to all staff.

2 To reduce leakage between the hospital and clinics transfer letters should be written in triplicate, as recommended by the NTCP. One copy with the patient's contact details (preferably a cell phone number) to be sent directly to the clinic. If the patient does not arrive within a week the clinic staff can follow-up with the patient to remind him/her to visit the clinic as a matter of urgency. If the patient still fails to report for follow-up, the tracing team can be mobilised to trace the patient.

3 Increased bacteriological coverage is required. This has been addressed in the previous section for patients referred from the hospital. At a clinic level the bacteriological coverage can be improved through regular education, training and supervision of all clinic staff on the NTCP. This is particularly required

where there is a high turn over and rotation of staff. The use of the suspect register will assist in this process.

4 A uniform, consistent system of case holding with the necessary checks and balances should be designed and implemented in the district. Case holding of the co-infected TB and HIV patient to monitor and manage both diseases is very important, especially where there is high prevalence of both diseases.

5 Routine screening and testing for co-infection of all TB and HIV patients should be done so as to reduce the burden on the hospitals of desperately ill co-infected patients.

OBJECTIVE 6
AN ASSESSMENT OF NURSES' KNOWLEDGE OF THE NTCP AND HOW THIS MIGHT CONTRIBUTE TO LEAKAGES FROM THE SYSTEM.

PURPOSE AND METHODOLOGY

A semi-structured self administered questionnaire was used to assess the knowledge of and compliance with NTCP guidelines by professional nurses. True-false questions were used to test knowledge of the operational aspects of the NTCP; multiple choice questions addressed training issues; and semi-structured questions looked in more depth at the impact of TB and TB/HIV on health facilities.

Professional nurses from nine clinics within the same sub district as the study hospital completed the questionnaire. An appointment was made with the person in charge of the clinic and all professional nurses on duty at the clinic on that day completed the questionnaire, irrespective of whether they were working exclusively with TB or not.

FINDINGS

The findings are discussed in three main sections:

- Time spent on TB and training
- General knowledge of TB
- The impact of TB/HIV on health facilities in South Africa

1. Time spent on TB and training

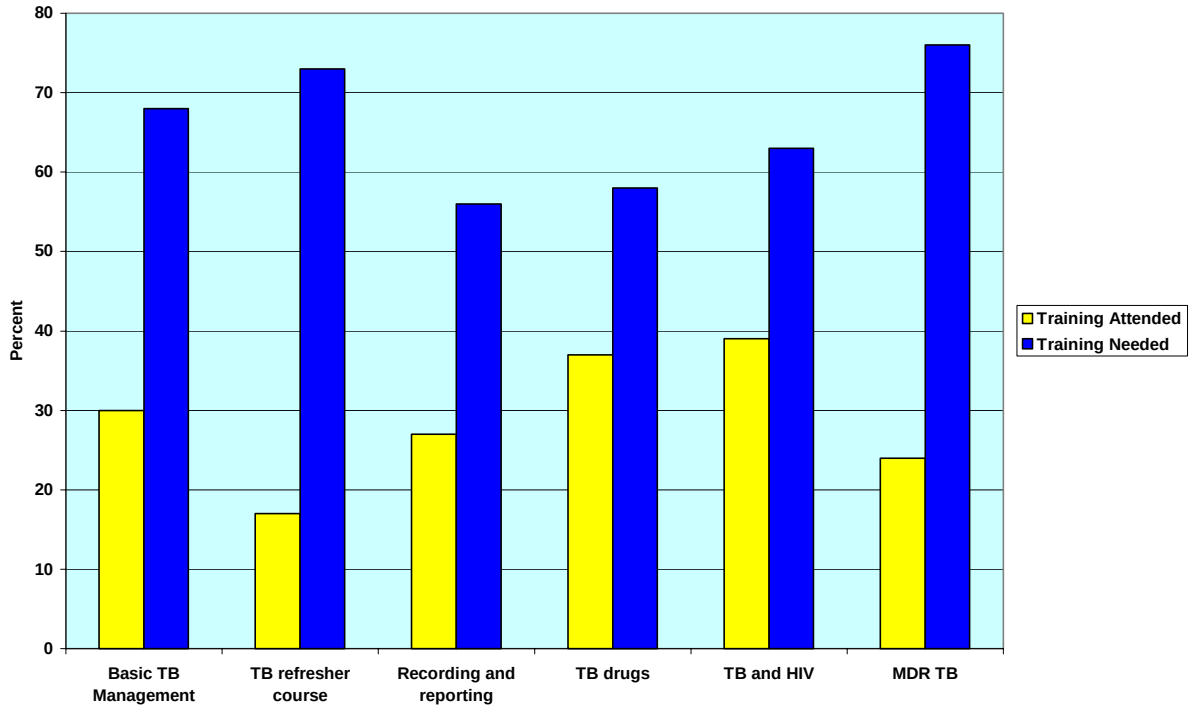
Forty one professional nurses from nine clinics completed the questionnaire. One professional nurse refused to complete the questionnaire as she was too busy. Thirty six (88%) of these professional nurses were employed by the provincial government and five (22%) were employed by local government. Forty-four percent of the nurses worked with TB patients all the time or often, 41% occasionally and 15% never worked with TB patients (Table 6.1).

Table 6.1: Involvement of Professional Nurses in the Diagnosis and Management of TB Patients

Aspect	No. of responses	Percent
All the time	10	24
Often	8	20
Occasionally	17	41
Never	6	15
Total	41	100

Figure 6.1 shows training attended and identified training needs of the 41 professional nurses. Thirty percent (12) of the nurses had received training in basic TB management, 27% (11) in recording and reporting and 24% (10) in multi-drug resistant TB. When asked what training they needed, 73% (30) said they needed a refresher course in TB and 76% (31) training in MDR TB. Sixty-eight percent (28) identified training in basic TB management, 63% (26) TB/HIV, 58% (24) in TB drugs and 56% (23) in recording and reporting were also identified as important areas for additional training. (Appendix 3: Table 1)

Figure 6.1: Training attended and identified training needs as percentage of professional nurses completing the questionnaire



2. General knowledge of TB

The questionnaire included 38 questions to assess the general knowledge of the professional nurses. The following themes were used:

- The epidemiology of TB
- PTB a priority
- The National Targets of the NTCP
- Diagnostic issues related to TB
- The treatment of TB patients
- TB and HIV

2.1. The Epidemiology of TB

Nurses' knowledge of TB epidemiology was generally very good. Most nurses (90% and 88% respectively) knew that TB can affect organs other than the lungs and is spread by patients with active PTB. Sixty two percent (24) of the nurses knew that ETB cases of TB were not infectious. Fifty two percent (21) of the nurses

knew that a BCG gives children protection mainly against disseminated forms of TB such as miliary TB and TB meningitis. (Appendix 3: Table 2)

2.2. PTB a priority

Twenty four nurses (53%) said PTB was a priority as it is infectious, six (13%) because TB can kill, five (11%) because TB is both infectious and curable and two (4%) said that it is because TB can be cured. Six (13%) of the nurses gave incorrect answers and two (4%) of the nurses did not respond. (Appendix 3: Table 2)

Knowledge of the DOTS strategy: Nurses at a clinic level in the sub-district were not aware that directly observed treatment (DOT) is one aspect of directly observed treatment strategy (DOTS). In response to the question "What is the DOTS strategy?" 88% of the nurses responded as if the question were "What is DOT?" Twelve percent (5) of the professional nurses did not know what the DOTS strategy was.

2.3. National Targets of the NTCP

This questionnaire was administered before the launch of the TB Crisis Plan in KwaZulu-Natal. Targets used in this survey, therefore, are those set prior to the TB Crisis Plan.

The nurses had poor knowledge of NTCP targets. Only 16 (39%) of the nurses could define smear conversion rate, although many more (71%) knew the national target for the cure rate of new smear-positive PTB cases. Sixteen (39%) knew the national target for treatment interruption and 15 (37%) the national target for the smear conversion rate of new smear-positive PTB patients. Only seven (17%) of the nurses knew that the national target for turn around times for sputum specimens was less than 48 hours. (Appendix 3: Table 3)

2.4. Diagnostic issues related to TB

The collection of sputum: Ninety five percent (39) of the nurses knew that two as opposed to three sputum samples should be collected from a patient who was suspected of having TB. Eighty five percent (34) of the nurses knew that the purpose of the suspect register was to increase the level of case detection by increasing awareness of TB. Fifty eight percent (24) of the nurses knew that sputum had to be kept in a refrigerator. The mean score for the questions concerning sputum investigation was 78% (32). (Appendix 3: Table 4)

Discordant sputum results: Ninety five percent (39) knew that a patient who has the clinical signs and symptoms of TB and discordant sputum results is classified as having smear-positive TB. Only half of the nurses (21) knew that a patient with discordant results should have a chest x-ray. Three quarters of the nurses knew that a retreatment patient with discordant results required a chest x-ray and a third sputum specimen be sent if the chest x-ray was clear. The mean score for the questions concerning discordant results was 73% (30). (Appendix 3: Table 4)

Smear negative TB: Only 7% (3) of the nurses knew that a patient with signs and symptoms of TB and two negative sputum results should be given an antibiotic for 10 days and then reassessed. Whereas 54% (22) of the nurses knew that a retreatment patient with the signs and symptoms of TB and two negative sputum should have a 10 day course of antibiotics and then reassessed. (Appendix 3: Table 4)

2.5. Treatment of TB

Twenty questions referred to the treatment of adult patients with TB. (Appendix 3: Table 5). Most nurses had good knowledge of the side effects of treatment. Less than 30% of the nurses had adequate knowledge of investigations required for changing patients from the intensive to continuation phase of treatment. Very few nurses (22 %) knew how to manage a retreatment patient who had two positive sputum after 3 months of treatment.

2.6. Nurses knowledge of TB and HIV

The nurses (> 85%) had a sound knowledge of risks of HIV positive individuals being infected with TB. They knew that the signs and symptoms and treatment of TB are the same for a patient infected with HIV. Just over half of the nurses 23 (56%) knew that all patients co-infected with HIV and TB should be offered co-trimoxazole prophylaxis after completing one month of TB treatment. (Appendix 3: Table 6)

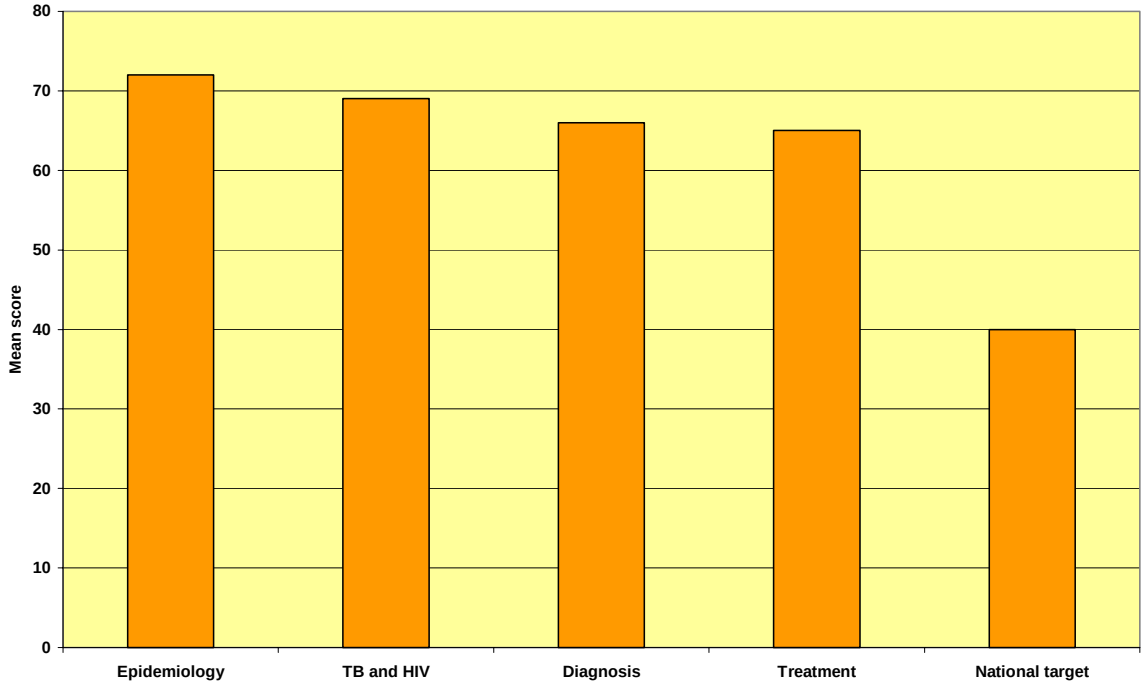
Almost two thirds (26) of the nurses knew that most HIV-positive TB patients also had signs and symptoms of HIV disease.[n] A similar number of nurses knew that an intra-uterine contraceptive device (IUCD) is the contraceptive of choice in women co-infected with TB and HIV who are on rifampicin for their TB. Only 19 (46%) of the nurses knew that HIV infection in a child will modify a tuberculin skin test. (Appendix 3: Table 6)

2.7. Comparing knowledge scores per section

Figure 6.2 compares the knowledge scores per section. The mean scores varied from 72 to 40. The highest score was for epidemiology and the lowest score was for national targets. The scores for epidemiology, TB and HIV, diagnosis and treatment were very similar, whereas that for national targets was much lower. The sample size was too small to determine if there was a difference in the knowledge scores of those who worked in the TB programme compared to those who did not. As a result a t-test was not reliable. (Appendix 3: Table 7)

[n] In a patient with HIV infection, if the patient has PTB the patient has stage 1 HIV-infection. If the patient has ETB, the patient had stage IV HIV-infection. Consequently, most HIV patients who present with TB usually have a number of other HIV related symptoms, such as oral thrush, dermatitis, shingles, HIV wasting with diarrhoea, other opportunistic infections and Kaposis.
Personal communication with Dr. Sabine Verkjuil: February 2007: Medical officer for ICAP Eastern Cape.

Figure 6.2: Comparison of professional nurses' knowledge scores per section of the questionnaire



2.8. Bivariate Analyses

The relationship between training in basic TB management and knowledge scores

The relationship between training in basic TB management and the average knowledge score for each of the five components identified in the questionnaire were compared using bivariate analyses. There was a significantly higher average knowledge score for the national targets ($p = 0.0271$) and average knowledge score for treatment of TB ($p = 0.0018$) for those who had received training. For the other components, training had little influence on the average scores achieved. (Appendix 3: Table 8)

The relationship between a need for training and knowledge scores

For each component, except the national targets, those that said they needed training had consistently lower knowledge scores. These differences were not statistically significant. For national targets, the knowledge score was very low for those needing training and for those that did not need training. (Appendix 3: Table 9)

3. The impact of TB/HIV on health facilities in South Africa

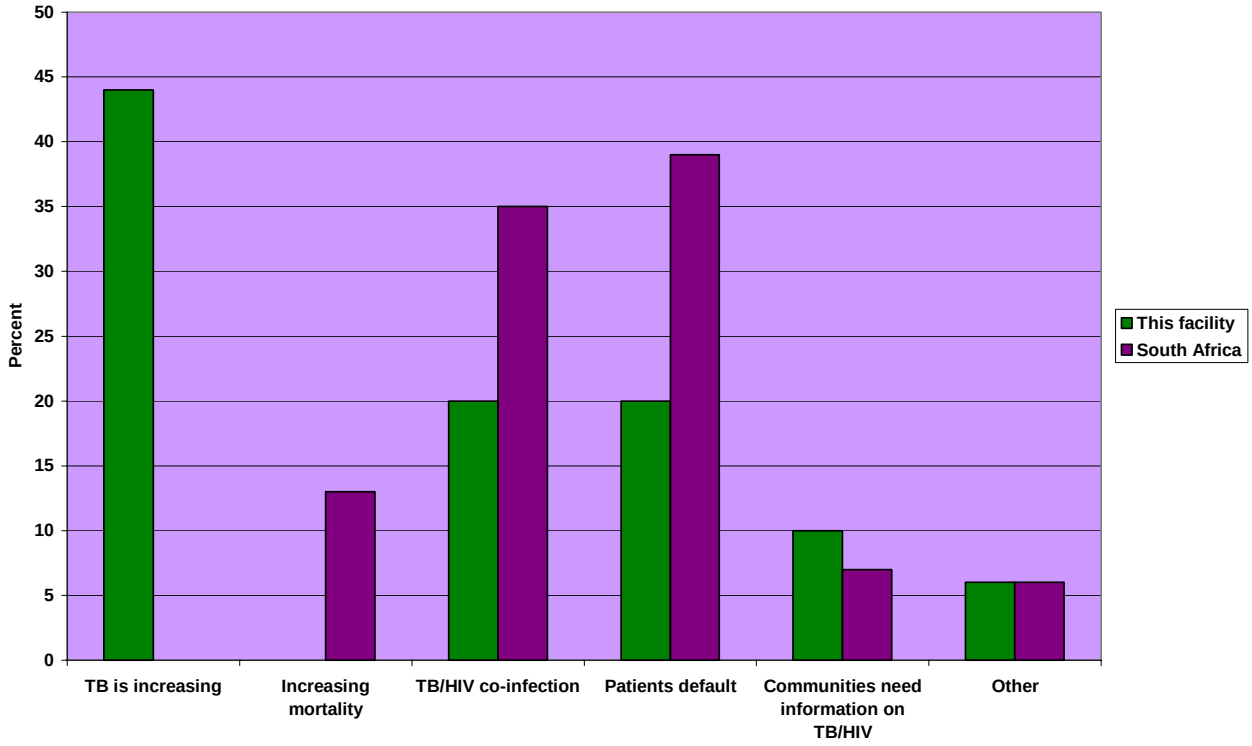
All the nurses felt that TB was a problem in South Africa and that HIV had had an impact on TB. Surprisingly, two of the nurses said that TB was not a problem in their facility.

3.1. TB a problem at this facility and in South Africa

Figure 6.3 shows the reasons given by nurses as to why they thought TB was a problem in their facility and in South Africa. Regarding their facility, 44% (18) said that the number of patients with TB was increasing. Twenty percent (8) said that TB/HIV co-infection and patients defaulting from treatment were problems. Only four nurses (10%) felt that the community needed more information about TB and TB/HIV.

Four reasons were given as to why TB was a problem in South Africa. Thirty nine percent (21) of the nurses said it was as a result of patients defaulting from TB treatment. Thirty five percent (19) said it was due to TB/HIV co-infection, 13% (7) said because of increasing mortality as a result of TB and 7% (4) said the community needed more information about TB and TB/HIV. (Appendix 3: Table 10)

Figure 6.3: Comparison between views of professional nurses as why TB is a problem in this facility and why TB is a problem in South Africa



3.2. The impact of HIV on TB in South Africa

The main reasons given for the impact of HIV on TB was that since TB was an opportunistic infection, HIV had increased prevalence of TB, and had resulted in high rates of co-infection. A number of other responses were given by smaller numbers of nurses. These are documented in Table 6.2.

Table 6.2: Reasons given by professional nurses as to why HIV has had an impact on TB in South Africa

	Frequency*	Percent
TB an opportunistic infection	23	51
High rates of co-infection	10	22
Increased complexity of TB with co-infection	2	4.5
Increased mortality	2	4.5
Health system failing to control TB because of HIV	2	4.5
Stigma	1	2
Socio-economic implications	3	7
No response	2	4.5
Total	45	100

* Some respondents gave more than one response

3.3. Integration of HIV/TB services: The main challenges and suggestions for improvement

More than a third (19) of the nurses mentioned nursing issues as the major obstacle to integration of HIV/TB services (Figure 6.4). These included knowledge, rotation, attitude and shortage of nursing staff. Thirty percent (17) of the nurses mentioned TB/HIV co-infection as a major obstacle, in particular the increased stigma around TB due to its association with HIV, and patients refusing to be tested for co-infection. Smaller numbers mentioned the increased number of co-infected patients, increased mortality due to TB, the late presentation of patients and the severity of the condition of patients on presentation to a health facility. Poor TB treatment outcomes were identified by 14% (8) of the nurses (Appendix 3: Table 11).

Figure 6.4: The main challenges facing integration of HIV/TB services according to professional nurses interviewed

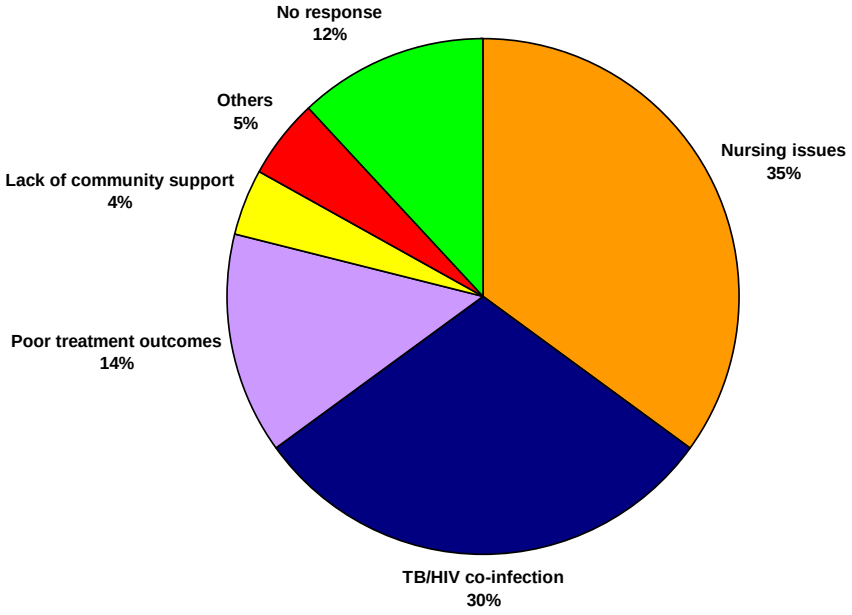


Table 6.3 shows suggestions to improve the integration of TB/HIV services. These included improving staff knowledge of TB and HIV, addressing human resource issues, such as the poor attitude of nurses, the rotation system, the lack of supervision, monitoring and evaluation and the shortage of staff. Increased case finding and more information for patients on TB and HIV were mentioned by 9 (15%) nurses. Four (7%) of the nurses mentioned an improved treatment supporter programme.

Table 6.3: Suggestions for improvement of integration of TB/HIV services

	Frequency*	Percent
Staff lack knowledge about TB & HIV	16	28
Human resource issues	13	22
Patients lack information on TB & HIV	9	15
Increase case finding	9	15
Improved treatment supporter programme	4	7
Other	1	2
No response	8	13
Total	56	100

*Some respondents gave more than one response

3.4. The strengths and weaknesses of the TB programme in their facility

More than a third of the nurses (21) indicated that the strengths of the TB programme at their facility were the effective implementation of some aspects of the TB programme (Appendix 3: Table 12). A quarter of the nurses (15) said that having the resources/infrastructure available was a strength, and twelve (21%) said that the community based workers at their facility were a strength.

Human resource issues were said to be a weakness of the TB programme by 40% (22) of the nurses (Appendix 3: Table 13). Human resource issues included a high workload due to staff shortages, problems caused by rotation of staff and staff attitudes. Half of the nurses mentioned lack of knowledge about TB as a weakness at their facility. A quarter (13) of the nurses said that the lack of an effective treatment supporter system, including a system for following up defaulters, was a weakness. Patients' problems, including poor adherence to treatment, not returning to get results, giving the wrong address so that they cannot be traced and not being willing to have an HIV test, were said to be a weakness by 11 (20%) of the nurses.

LIMITATIONS

The questionnaire used to determine nurses' knowledge of TB included true or false statements. This format proved to be a limitation of the study as respondents had a 50% chance of getting the correct answer if they guessed. This may have contributed to the lack of coherence in the results in which for example, two questions relating to the treatment of smear-negative TB were answered very differently. This issue was addressed with the doctors' questionnaire and a third option "unsure" was added.

DISCUSSION

This component of the study did not quantify leakages of patients as a result of a lack of knowledge on the part of professional nurses. It, however, is apparent from the results that patients with suspected or confirmed TB would not have received optimal treatment from nurses due to their lack of knowledge of the NTCP.

The results indicated that nurses in clinics referring to the study hospital have little concept of how a disease control programme operates and are not familiar with the principles and basics of the NTCP.

Undergraduate training of nurses does not provide nurses with any concept of or exposure to how disease control programmes operate.[72] Consequently, more effort is required in workplace training conducted by programmes such as the NTCP. Improved undergraduate training would provide nurses with the background necessary to understand the guiding principles and targets of the NTCP, the importance of monitoring and evaluation in achieving these targets and the role each individual nurse plays in the process.

Decentralisation of TB to a clinic level in KwaZulu-Natal started in 2001.[o] Consequently, nurses at clinics have been involved in the diagnosis of patients and been responsible for the treatment of the majority of TB patients for five years. It was therefore somewhat surprising that nurses took a long time to answer the questions on treatment, and a number of very simple straightforward questions were not answered well. For example, just over half of the nurses knew that sputum samples had to be kept in a refrigerator and that all patients co-infected with HIV and TB should be offered co-trimoxazole prophylaxis. There was no obvious pattern to the responses to indicate any one area of nurses' knowledge on treatment was much weaker than others. These

[o] Personal communication: Mrs. Jackie Smith: June 2006: Acting District Manager Umgungundlovu District 2005 - 2006

results suggest nurses do not know the detailed information needed to diagnose and treat patients with TB effectively. It appears they do not use the guidelines on a regular basis and are not as familiar with the guidelines as they should be.

A number of South African[73] [74] [75]and international studies[76] [77] [78] showed similar results. Health care worker knowledge about key aspects of the TB control programme is limited and could severely compromise the treatment of patients with TB.

The NTCP has over the past decade embarked on extensive training throughout the country on the different components of the TB programme. Residential training workshops of up to five days at a time are facilitated by the different provincial TB programmes. Districts send the relevant staff to be trained who, on their return, are expected to cascade their recently acquired knowledge to other staff in the district.

In spite of the training efforts of the NTCP this study suggested that the coverage and effectiveness of the training was limited. Less than a third of the nurses had received training in basic TB management, recording and reporting and MDR TB. In addition many nurses felt they needed further training to manage TB patients more effectively. The lack of knowledge that nurses from different clinics had about TB may also suggest that the cascading of knowledge within the district after residential training is limited.

A recently conducted study in South Africa suggested that off site training not only interrupted clinical services, but was of doubtful effectiveness and had limited sustainability and coverage.[79] In comparison, between two and six educational outreach sessions conducted by the supervisor of a clinic focussing on key messages were shown to improve quality of care. This study suggested that not only can educational outreach training achieve large improvements in the quality of care, but it can be done without interrupting services and within existing staff constraints.

Educational outreach training combined with supervisory visits should be ongoing and can address the local training needs as they arise at each clinic. This ongoing training may also be a more effective training strategy for public health services in South Africa struggling to cope with high staff turn over. A further advantage of this training strategy is that all staff at the facility can be given information at the same time. In this study almost half of the nurses worked with TB all the time or often and a further 40% occasionally. Given the size of the TB epidemic in South Africa, this is to be expected and suggests a training strategy which can train all staff at a facility is appropriate.

Setting targets and motivating staff to achieve these targets is an essential part of achieving quality health care services. Provincial, district and sub-district managers of the TB programme have failed in ensuring that their staff members know these targets and their role in achieving these targets. Motivating staff to achieve targets is an essential part of good management practice. The key to success in a tuberculosis treatment programme has repeatedly been said to be good motivation of patients, which is achieved through the good performance of the programme staff.[80] It was shown in a study in Korea that effective supervisory visits which included checking the tasks performed by nurses, times for discussion and checking knowledge improved treatment results.[81] Recent work in South Africa has achieved a similar success.[82]

Proper implementation of any programme or quality service is dependent on effective management at all levels of the health system. Supervision of front line staff workers needs to be regular. Key components of the TB programme need to be systematically checked and rechecked and in-service education provided. In-service education should focus on encouraging nurses to use the guidelines to resolve clinical problems as well as

informing them about the TB programme as a whole, the DOTS strategy, priorities, indicators and targets. To facilitate integration of TB and HIV services supervisors need to spend time discussing the short comings of the TB programme at present, the contributory role of the HIV epidemic and the role each individual can play in the situation.

Working conditions were identified by nurses as the primary challenge facing improvement of TB services and integration of TB and HIV services. The issues identified included a high workload due to staff shortages, problems caused by rotation of staff and staff attitudes. In a controlled randomised intervention trial in the Western Cape Dick et al[83] introduced a multi-faceted intervention into a number of clinics in an attempt to improve treatment outcomes. Initial improvements to treatment outcomes were not sustainable. The lack of success was attributed to nurses being preoccupied with their working conditions: namely heavy workloads, poor remuneration and a lack of support. This resulted in poor quality of care, low morale, dissatisfaction with work and a high turnover of staff. The nurses had little time or energy to reflect on their communication with TB patients. In another article the same researchers included a lack of management commitment to organisational and practice change, a lack of teamwork and conflicts amongst staff as reasons the improvements not being sustainable.[84]

Effective management and leadership of PHC services at the district level is essential in assisting services to transform to meet the growing number of chronic patients infected with HIV and/or TB and in stemming the exodus of skilled health workers.

RECOMMENDATIONS

1. At an undergraduate level, training in disease control programmes, such as the NTCP, should be considered. This would assist nurses' understanding of the principles and targets of,these programmes, the importance of monitoring and evaluation in achieving these targets and the role each individual plays in the process.
2. Educational outreach training, combined with supervisory visits, may be a solution to the rapid turnover of staff in PHC facilities as all staff in the facility can benefit from the training.
3. Sub-district level TB co-ordinators need to regularly visit PHC facilities to ensure all staff members are aware of the targets of the NTCP and the importance of achieving these in order to control the TB epidemic. Support, monitoring and evaluation for PHC health workers as they implement the NTCP are very important.

OBJECTIVE 7:
AN EXPLORATION OF COMMUNITY SUPPORT FOR PATIENTS WITH TB

PURPOSE AND METHODOLOGY

A focus group discussion was held with seven community based health workers (CBHWs) to explore issues relating to the role of the CBHWs in TB care, and their relationships with patients and health professionals. The CBHWs chosen represented the three study clinics and had recently worked at one of the three study clinics. They were selected for their willingness to talk about their experiences as CBHWs. Four of the CBHWs had been trained as treatment supporters and were trained to support TB patients using Directly Observed Therapy (DOT). They had worked as volunteers attached to one of the study clinics. Three of the CBHWs were Home Based Carers. After being trained they worked as volunteers attached to one of the study clinics. None of the CBHWs interviewed were employed or supported by any group or organisation.

A semi-structured questionnaire was used to interview two members of the local tracer team. The tracer team were responsible for finding TB patients who interrupted treatment in the Umzinduzi area. They were based at the ex-SANTA hospital close to the study hospital.

Two community members were identified using the snowballing technique. They had experiences of CBHWs and were prepared to share these experiences. A semi-structured questionnaire was used to conduct these interviews.

FINDINGS

1. Focus group discussion (FGD) with community based health workers

The main themes that arose in the FGD were the selection/remuneration process, the training, ongoing work and support.

Recruitment/remuneration process: In the FGD the participants spoke with frustration and bitterness about the selection and remuneration process. There were a number of different cadres of CBHWs present, all chosen and trained differently, with only one group (the community health workers (CHWs)) being paid. One CBHW described how the CHW where she lives was chosen as she is part of the family of the ward councillor. The issue of payment was a source of bitterness and pain for the CBHWs who described that the paid CHWs often did no work.

> "*I feel awful as the CHWs get paid, but I get nothing. I don't follow up defaulters anymore. This is the job of the community worker. But it seems she does not do her job.*"

According to one person interviewed the treatment supporter programme was working quite well. However, when one of the non-governmental TB organisations started to work in the area, they promised that treatment supporters would be paid. As this payment was never forthcoming, treatment supporters became disillusioned and stopped working. During the study, at the biggest and busiest study clinic, there were no treatment supporters.

Training: From the perspective of the CBHWs the training appeared to have no system. Only people chosen specifically as treatment supporters were trained in the support of TB patients. Those chosen as home based carers (HBC) to work with people living with AIDS (PLWA) were not trained. This was a major source of frustration as most of their patients had TB and needed a person to supervise the taking of their medication on a regular basis. Not knowing about TB led to patients in the community losing faith in their ability. Sometimes they had to pretend to know for credibility, *"…..I saw someone once, they tick a card, so now I tick…."* CHWs were also not trained as treatment supporters.

Co-ordination/support/monitoring: According to the treatment supporters there was no coordination, support or monitoring of the work they did. Nurses in the clinic played none of these roles, and in fact many nurses were not supportive of the treatment supporters.

> *"Some clinic staff treats us with respect; they listen if we say that a patient is not taking their pills. Others seem quite threatened and do not listen if we say a person is not taking pills."*

As a result, many treatment supporters had stopped working. Others, drained by their experiences in the community and unsure of the role they were expected to play in the community, had started assisting with odd bits of work around the clinic.

2. Interviews with community members

The quote below sums up the feelings of many interviewed about the work of treatment supporters and other CBHWs:

> *"…..they don't do their work. They meet weekly at the clinic. But never go to people, don't know where they live, promise to help find people, but always postpone and don't actually know where people live although they say they do."*

Treatment supporters and other CBHWs were accused of gossiping by a number of those interviewed:

> *"They go through patient's files, find confidential information and distribute this amongst themselves by gossiping."*

One person described seeing a clinic nurse chasing a treatment supporter out of the clinic as they were gossiping and disseminating confidential information. In frustration the nurse had told them their job was *"in the field."*

The fieldworkers for this study had to find defaulters to interview. One of the clinic sisters said she had a number of treatment interrupters at her clinic as well as a number of treatment supporters who could assist with the tracing of the treatment interrupters. The treatment supporters initially said there was no defaulters and complained about walking around, instead of taking a taxi. They then became evasive, not turning up at prearranged times and saying they did not know the defaulters or where they lived.

A number of treatment supporters were founc to have very little about TB and had not made any effort to educate themselves. Pamphlets about TB are readily available in the clinic. In addition some did not even know where to tick the cards *"….ticking all over in the wrong places…"*

Clinic DOT was not optimally implemented at the clinics. At one of the clinics TB patients, even if they were working, had to sit in the long daily queue waiting for their treatment. There was no fast queue where they could be observed taking their pills and leave. This could lead to patient's interrupting their TB treatment.

3. Interviews with tracing team based at ex-SANTA hospital close to the study hospital

An ex-SANTA TB hospital close to the study hospital had recently been taken over by the Department of Health. Two members of the tracing team are based at this hospital and are responsible for tracing treatment defaulters in the catchment area of the study hospital. The tracing team members felt that there were problems with the take over of the ex-SANTA hospital by the Department of Health (DoH), and that their work as tracers had been negatively affected.

They were not sure where they fitted in as new members of the DoH. There had been no discussion about their jobs, and whether their job description remained the same. They felt unimportant, unsupported and forgotten as on a number of occasions they had not been invited to meetings or training sessions with the other tracing teams. In addition no meeting had been held to discuss their geographical area of work with other tracer teams in the district.

Under SANTA each tracer team member had a car. One car had been taken away which adversely affected their ability to work and reduced their effectiveness. They were feeling very demotivated as if their hard work of the last few years was coming undone in front of their eyes. There was no documented evidence to substantiate this claim.

DISCUSSION

Directly observed therapy (DOT) has been a central component of TB treatment for at least 30 years.[85] DOT was devised to ensure treatment adherence by providing TB patients with support and motivation as close to their home as possible. Widespread implementation of DOT in resource poor settings has been shown to be cost-effective in improving patient outcomes.[86] [87] Although there has been increasing scepticism and doubt expressed about the effectiveness of DOT[88], the WHO and the South African NTCP continue to promote the DOTS strategy and more recently the DOTS-plus strategy for multi-drug resistant TB.[89] [90] [91]

The NTCP guidelines state that:

> *"Directly observed treatment is an important element in the WHO recommended policy package for TB control. Directly observed treatment means that an observer watches the patient swallowing the tablets, in a way that is sensitive and supportive to the patient needs. This ensures that a TB patient takes the right drugs, in the right doses, at the right intervals. In practice, it means providing a treatment supporter acceptable to the patients, to enable them to complete treatment."*[90]

The guidelines go on to say that the involvement of the community in the selection process is essential, that training must be co-ordinated, that there must be clearly defined lines of accountability and performance must be monitored.

In this study it was apparent that the number of different cadres of CBHWs operating in a community was problematic. Differences in remuneration were the biggest problem as this level of health worker had no other

income. However, differences in training, expectations and conditions of service were also problematic, resulting in both a loss of motivation and some volunteers stopping work altogether.

The lack of supervision and support by the clinic is a concern. The clinic is responsible for ensuring that patients complete their treatment, and with the high levels of treatment interruption experienced, community based workers have an important role to play in complementing the case holding strategies of the clinics.

Effective and affordable care at a community level for chronic illness is essential in Sub-Saharan Africa where hospitals are overloaded with patients with HIV/AIDs. South Africa is no exception. It has been argued that integration of community level services for both HIV/AIDs and TB is an important factor affecting the effectiveness of community care services.[92] Effective home based care can also have major health benefits for patients and their families as the chances of nosocomal transmission of tuberculosis are reduced and it can be a potentially effective entry point for strengthening HIV prevention and TB control.[93]

The need for integration of community level services for both HIV/AIDs and TB was borne out in this study. HBCs trained to look after PLWA had patients they were caring for at home with TB and HIV co-infection. Their lack of knowledge about TB decreased their credibility in the community and at times they would pretend to know the role of treatment supporters to enhance their credibility.

Interviews with treatment supporters described a dysfunctional treatment supporter programme where treatment supporters were not supported, communication with clinic staff was dependent on the attitude and perception of these facility based staff and there was no system for monitoring, evaluation or providing ongoing training. In Peru patients with multi-drug resistant TB were effectively treated by community based workers. However, those involved in the project considered close co-ordination of the team with lots of communication and interactive participation across professional and geographic boundaries necessary prerequisites for the success of the project.[93]

In 2003 cure rate for TB in KwaZulu-Natal was 35%.[94] Good adherence rates cannot be achieved without effective case holding. An effective treatment supporter programme could substantially contribution to this. Poor implementation of the NTCP guidelines, and particularly poor treatment adherence, are contributory factors to the outbreak of XDR-TB in the province, a strain of TB which is resistant to all the first line TB drugs. The poorly functioning treatment supporter programme in the sub-district in which the study hospital is based, needs to be addressed.

RECOMMENDATIONS

1. Standardised conditions of service, training, and protocols for community based TB care to be introduced to provide adequate community support for patients with TB and implement DOT effectively.
2. Treatment supporters to be incorporated into the team caring for patients with TB. Regular meetings with clinic staff to be held to discuss problems, report on progress and provide ongoing training for treatment supporters.
3. Integration of TB and HIV services at a community level to be addressed by the National TB and HIV directorates.
4. A fast queue or track for patients who are attending the clinic daily to receive TB treatment via clinic DOT to be introduced to help reduce treatment interruption rates.

OBJECTIVE 8
THE PERSPECTIVE AND EXPERIENCE OF PATIENTS WITH TB

PURPOSE AND METHODOLOGY

Objective 8 was to document the experiences and opinions of TB patients and defaulters about the treatment they received for their TB. From this factors which might lead to leakages from the system were considered.

A sample of 92 patients was interviewed. The study sample comprised adult patients who had TB and were registered in the TB register at one of the three study clinics.[p] Equal numbers of patients were randomly selected from the three study clinics. Patients were interviewed by field workers who had been trained in the use of the data collection tool. As the first language of all patients was Zulu, the data collection tool was in Zulu and the interviews were conducted in Zulu. Interviews took place at the three different clinics.

The fieldworkers were trained to explain the study and follow the correct consent procedure. As a number of the questions regarding the patients' diagnosis and treatment were of a sensitive nature the following precautions were taken. Firstly, in explaining the study, the fieldworkers alerted the patients to the sensitive nature of some of the questions and recommended that no-one else be present during the interview. Secondly, the fieldworkers were informed of the need for confidentiality regarding the patients' diagnosis and treatment. Thirdly, the patients' name was not documented; a study code was used as the patient identifier.

The semi-structured data collection tool collected information on:

- Socio-economic characteristics
- Factors which had facilitated or constrained access to health services
- Patient's knowledge and beliefs about TB and the association of TB and HIV, as well as patients attitude and feelings about TB
- TB treatment practices at a household level including health seeking behaviour and sources of health information
- How long it took for health workers to diagnose TB, what education patients were given about TB and whether they were made aware of the link of TB and HIV and encouraged to be tested for HIV

Data collected was checked and coded before being captured. STATA version 9.0[d] was used to analyze simple frequencies and NCSS for one-way ANOVA.

[p] Department of Health South Africa: South African National Tuberculosis Control Programme: Practical Guidelines draft. 2004: p 30 Children defined as less than 8 years old.

FINDINGS

Socio-economic characteristics

The mean age of the 92 respondents interviewed was 35 and the age range was 16 to 64. Forty six (51%) of the respondents were male and 44 (49%) were female. An average of 6.5 people lived in each house with a range from 2 to 22. The average number of children living in each house was 1 with a range from one to six. (Appendix 2: Tables 1 and 2) Respondents were not asked their HIV status.

Seventy (76%) of the respondents said that someone in the household was employed. A quarter of respondents did not know their total monthly household income. Of those that did know their monthly household income, the mean was R1254 and the median was R780. Monthly income varied from R180 to R9000.

Access to health services

Table 8.1 shows that 60 (65%) of the respondents walked to their nearest clinic whilst 29 (32%) took either the taxi or bus. The remaining 3 (3%) used their own vehicle. The average time taken for the respondents to access their nearest clinic was 45 minutes (range 3 – 180 minutes, median 30 minutes). For those who took public transport to access the clinic the mean cost to access the clinic was R8 (range R3 to R80, median R5). (Appendix 2: Table 3)

Table 8.1: Patients usual means of accessing the clinic for treatment

Responses	No. of respondents	Percentage (%)
Walk	60	65
Taxi/Bus	29	32
Own vehicle	3	3
Total	92	100

Thirty nine (42%) of the respondents had no difficulties in attending the clinic regularly. (Appendix 2: Table 4) For those who had problems, Figure 8.1 shows that for 40% the problem was a lack of money. Thirty six percent were too sick to walk/go to the clinic and 11% said the clinic was too far. Four percent had each of the following problems: a failure to get a baby sitter, too weak due to hunger and getting off work. Two percent had a problem with transport.

Figure 8.1: Problems experienced by patients attending the clinic regularly as a percentage of respondents

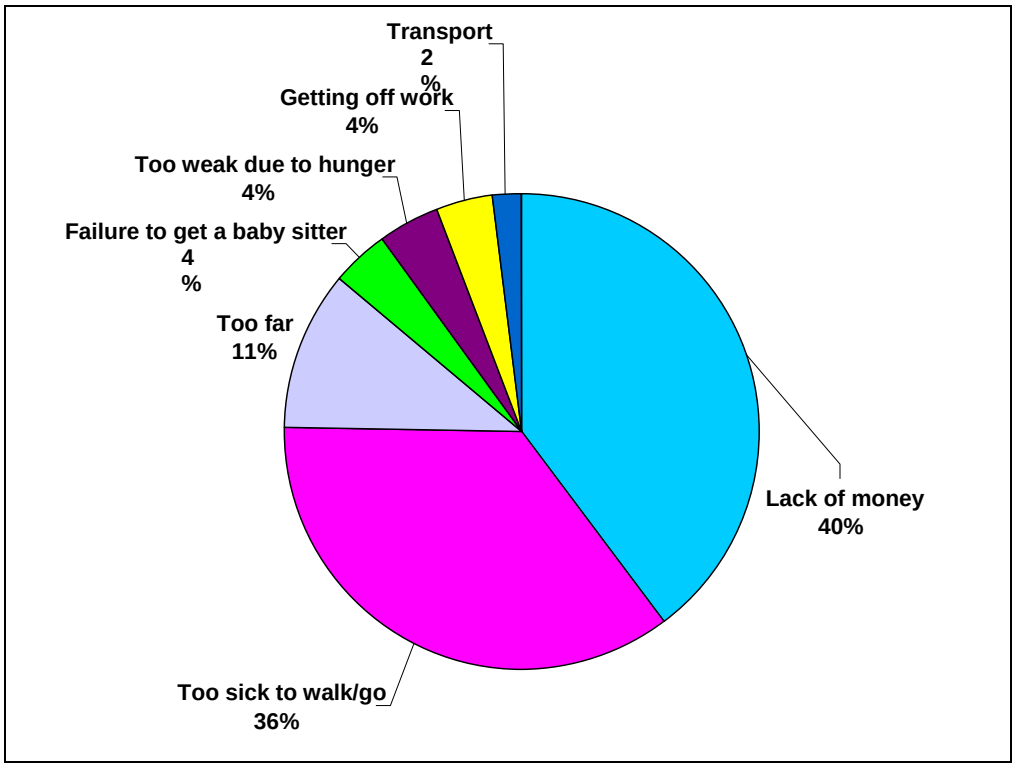


Table 8.2 shows the implications of taking time off work to attend the clinic. For 77 (84%) of the respondents this was not applicable, as they were not working. Of the 15 who responded, six responded positively saying they only had to ask for permission (2), no pay was deducted (3) and there were no problems (1). However, the remaining nine respondents were not as positive. Five said they would lose some income, two said they may get fired and two said they did not know what would happen.

Table 8.2: The implications of taking time off from work to attend the clinic

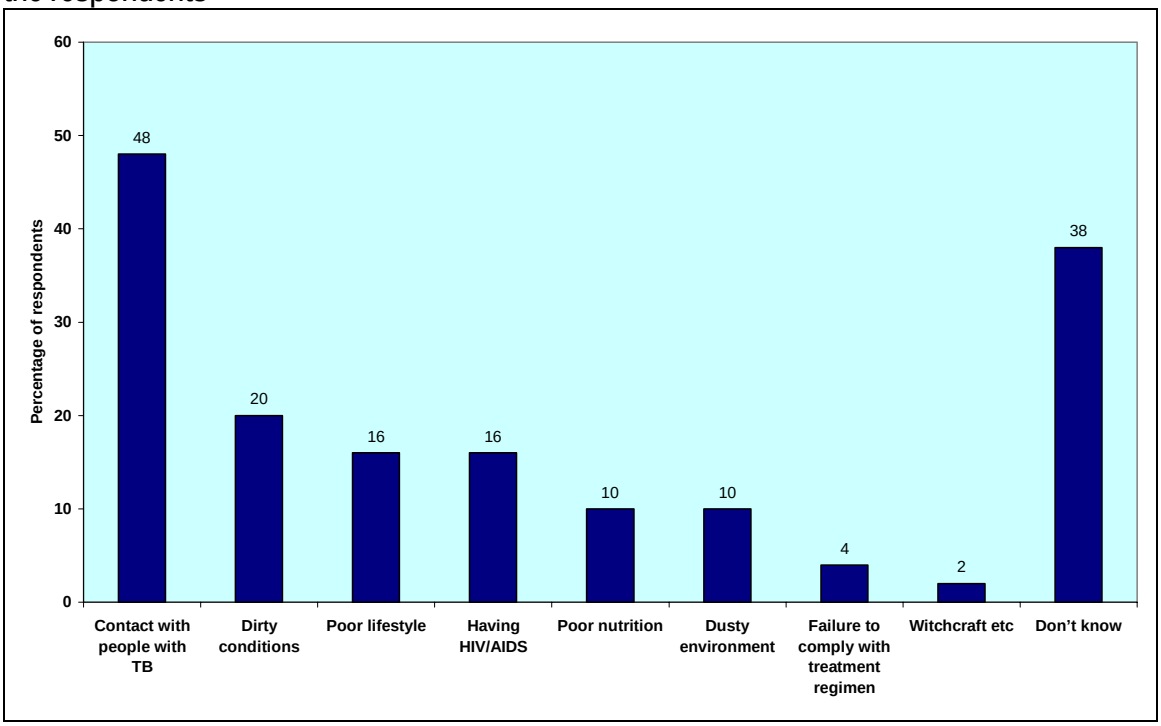
Responses	No. of respondents	Percentage (%)
Not applicable/not working	77	84
Loss of income	5	6
They don't deduct anything	3	3
May get fired	2	2
I can ask for permission	2	2
Don't know	2	2
No problems	1	1
Total	92	100

Knowledge and beliefs about TB and HIV

Seventy six (83%) of the respondents said they had TB. 15 (16%) said they had TB and HIV. One respondent did not know what they had. (Appendix 2: Table 5)

Figure 8.2 shows respondents' answers as to what increases the chances of getting TB, expressed as a percentage of the respondents. Although almost half of the respondents said that contact with people with TB increased the chances of getting TB, 38% of the respondents said that they did not know. A further 16% said that having HIV/AIDs increased the chances of getting TB. (Appendix 2: Table 6)

Figure 8.2: Respondents' views of the factors that increase the risk of contracting TB as percentage of the respondents



* Some respondents gave more than one response. Percentage for each response expressed out of 92, the number of respondents.

In response to the more direct question about the cause of their TB, Table 8.3 shows that two thirds of the respondents said they did not know.

Table 8.3: Respondents' knowledge of the cause of TB

Responses	No. of respondents	Percentage (%)
Don't know	60	65
Being near people with TB	8	9
Drugs	7	8
Having HIV/AIDs	4	4
Dusty environment	4	4
Dirty environment	2	2
Other	7	8
Total	92	100

When asked if TB could be cured 85 (93%) of the respondents said it could, three (3%) said it could not and four (4%) said they did not know. Ninety percent (83) of the respondents went on to say that TB could be cured by taking TB treatment. Nine percent (9) of the respondents did not know how it could be cured. (Appendix 2: Table 7)

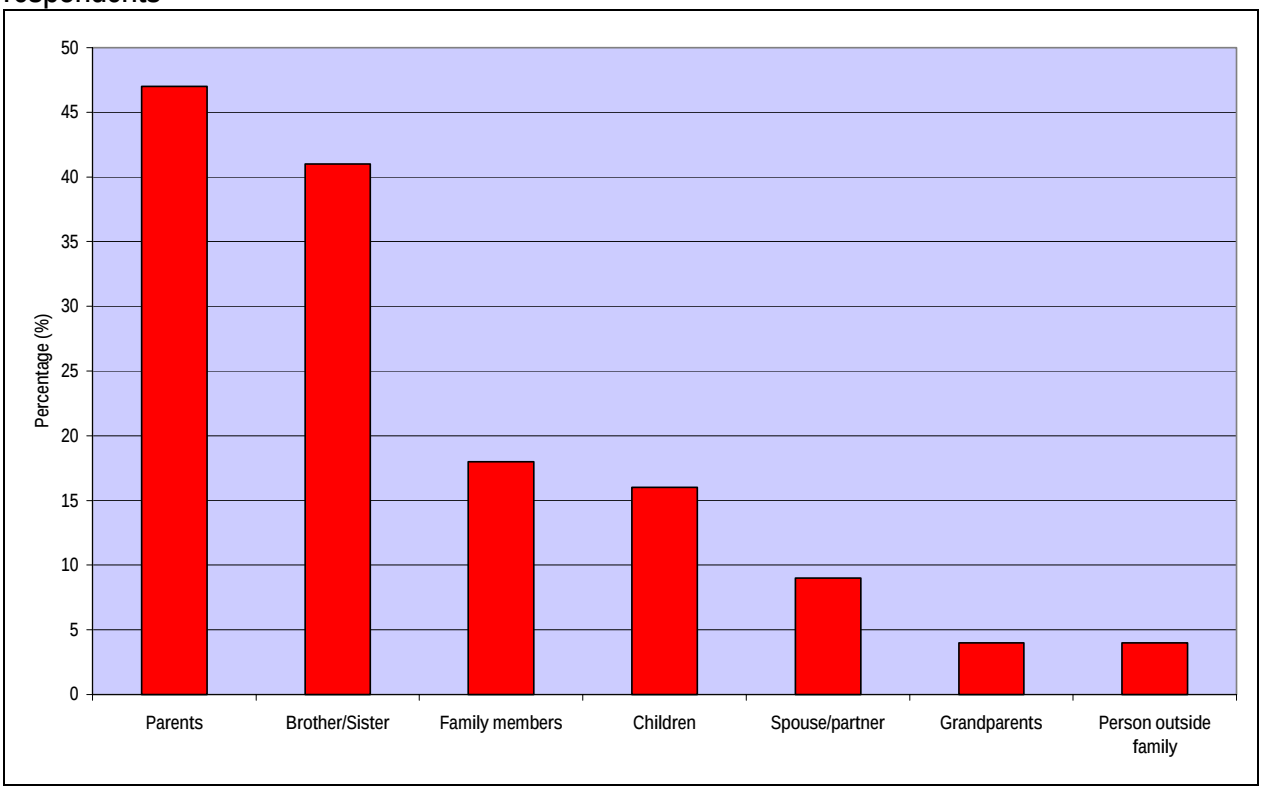
Two thirds (57) of the respondents knew that TB was spread by coughing or being close to someone with TB (11%). Twenty percent (18) of the respondents said that TB was spread through blood and a further 2% (2) that TB was spread through sexual intercourse. Three percent (3) of the respondents said the disease was spread by people with TB not taking their treatment and a further 13% (12) were not sure what causes the spread of TB. (Appendix 2: Table 8)

To prevent people getting TB a third of the respondents (29) said that contact with people with TB should be avoided. About a quarter of the respondents said that healthy habits (25), a clean environment (21) and a healthy diet (20) would prevent people from getting TB. Nine percent (8) of the respondents said that taking treatment properly prevented others from getting TB and two percent (2) said that not getting HIV would prevent TB. Forty one percent (38) of the respondents did not know. (Appendix 2: Table 9)

When asked how they felt about TB as a disease 95% (87) of the respondents said they accepted it and 3% (3) said they still felt negative and upset. (Appendix 2: Table 10)

Only one respondent said they had not told anyone that they had TB. Fear was the reason given for this. Figure 8.3 illustrates the responses to the question "Who did you tell you had TB?". Almost half of the respondents said they had told their parents and 41% said they had told one of their siblings. Sixteen percent said they had told their children, 9% their spouse or partner and 4% their grandparents. Eighteen percent stated they had told someone in the family, but were not explicit about whom. (Appendix 2: Table 11).

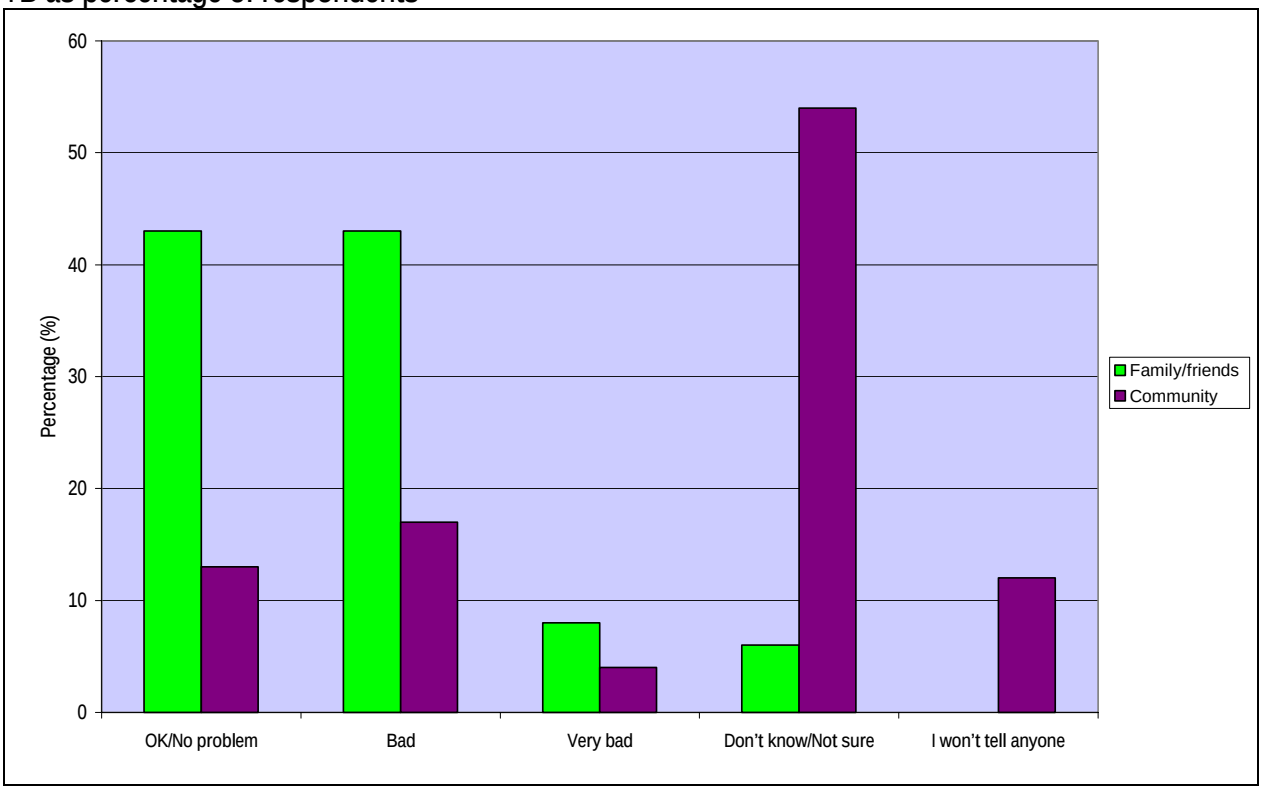
Figure 8.3: People to whom respondents disclosed that they had TB disease as percentage of respondents *



* Some respondents gave more than one response. Percentage for each response expressed out of 91, the number of respondents. One response was missing.

Figure 8.4 compares respondents' expectations of how family and friends would feel on hearing they had TB with how the community would feel. Respondents were less fearful of the response of their family and friends, although they knew that informing them caused their family and friends anxiety. The high levels of stigma to TB in the community were illustrated by the number of respondents who were unsure and even fearful of how their community would respond to the news of their TB infection. (Appendix 2: Table 12)

Figure 8.4: Respondents perception of how family and friends* and community members** feel about TB as percentage of respondents



* Three respondents missing and * two respondents missing

Health seeking behaviour

Home remedies: Half of the respondents said they had used a home remedy for their TB. Table 8.4 shows that of these a third obtained their home remedy from the chemist or supermarket and a quarter from a traditional healer.

Almost half of the respondents took their home remedy before they knew they had TB. Twenty eight percent (14) took them after getting sick and 12% (6) after they started coughing. Only 8% (4) took their home remedy after they knew they had TB.

A quarter of the patients (24) had visited a traditional healer. Fifteen went before they knew they had TB and very few (3) after they knew they had TB. (Appendix 2: Table 13)

Table 8.4: Sources of home remedies and time of taking the remedy

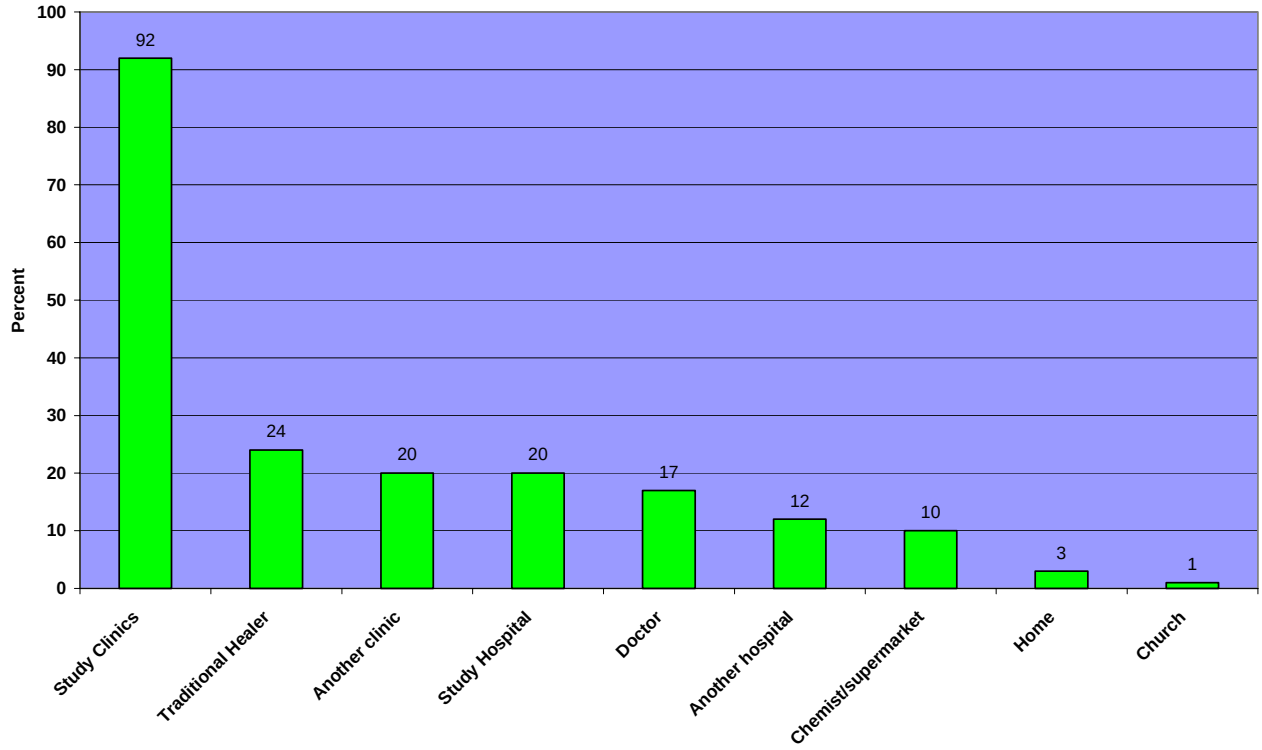
Responses	No. of respondents*	Percentage (%)
Where did you get your home remedy from?		
Chemist/supermarket	18	36
Traditional healer	13	26
Home/my yard	7	14
Church	4	8
Herbalist/traditional chemist	4	8
Other	4	8
Total	50	100
When did you take your home remedy?		
Before I knew I had TB	23	46
After getting sick	14	28
After coughing	6	12
After I had TB	4	8
Blank	3	6
Total	50	100

* 50 respondents used home remedies

Where people sought help: Figure 8.5 illustrates where people sought help. Respondents gave more than one answer, indicating they sought help in more than one place. Ninety-two percent (83) of the respondents went first to their local clinic for help. Twenty-four percent (22) went to a traditional healer/spiritual healer/herbalist and a further 20% (18) went to a clinic other than their local clinic or the study hospital. Sixteen percent (15) went to a doctor, 12% (11) to a hospital other than the study hospital and 10% (9) to a chemist/supermarket. (Appendix 2: Table 14)

Age, the number of TB symptoms a person had tested, the number of people living in a house and whether they thought they were HIV positive did not affect where the respondents sought help. Of those who went to a traditional healer 72% were male and 28% female. There was no difference between men and women seeking help from other places. Almost all of those who went to a traditional healer (94%) did not think they had TB. (Appendix 2: Tables 25 and 26)

Figure 8.5: Place of attendance for health care by percentage of respondents.



Of the 92 respondents less than half (43) went to a second place to get help, a third (31) went to a three places and a sixth (15) went to four places. A few went to more than four places. (Appendix 2: Table 15)

Figure 8.6 shows that almost half (47%) of the respondents went to the local clinic in the first place. Fourteen percent (13) went to a traditional healer and 11% (10) to a private doctor. Of those who went to a second facility over half (22) went to their local clinic and seven (17%) to a hospital (five to the study hospital) and five to a private doctor. Of those who went to a third facility a third attend their local clinic.

Figure 8.6: Order of places attended by respondents for health care as percentage of respondents

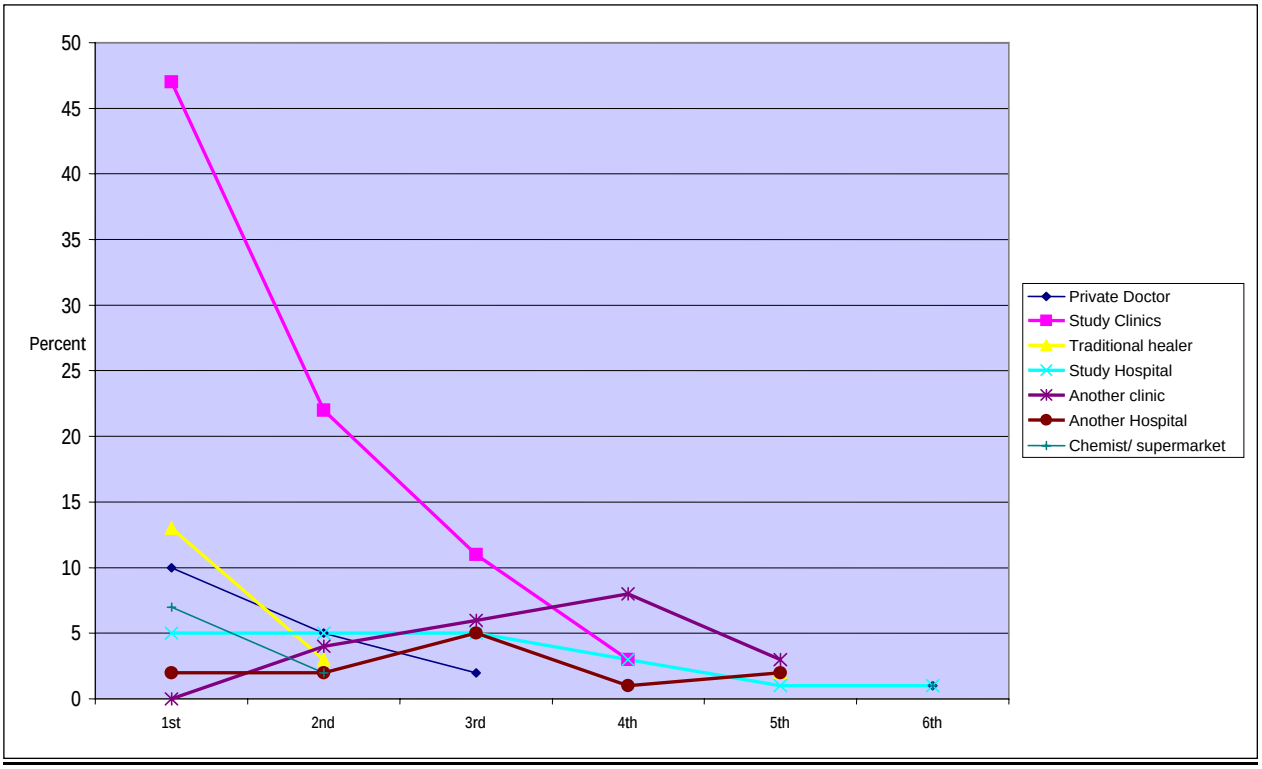


Figure 8.7 shows the reasons for respondents, expressed as a percentage of the total respondents', first choice to go to a hospital or clinic. Twenty three percent (21) said it was helpful and cheaper, 17% (16) said because they were so sick and weak, 11% (10) because they suspected they had TB and 10% (9) because of their beliefs. (Appendix 2: Table 16)

Figure 8.7: Reasons for attending a hospital or clinic as percentage of total respondents

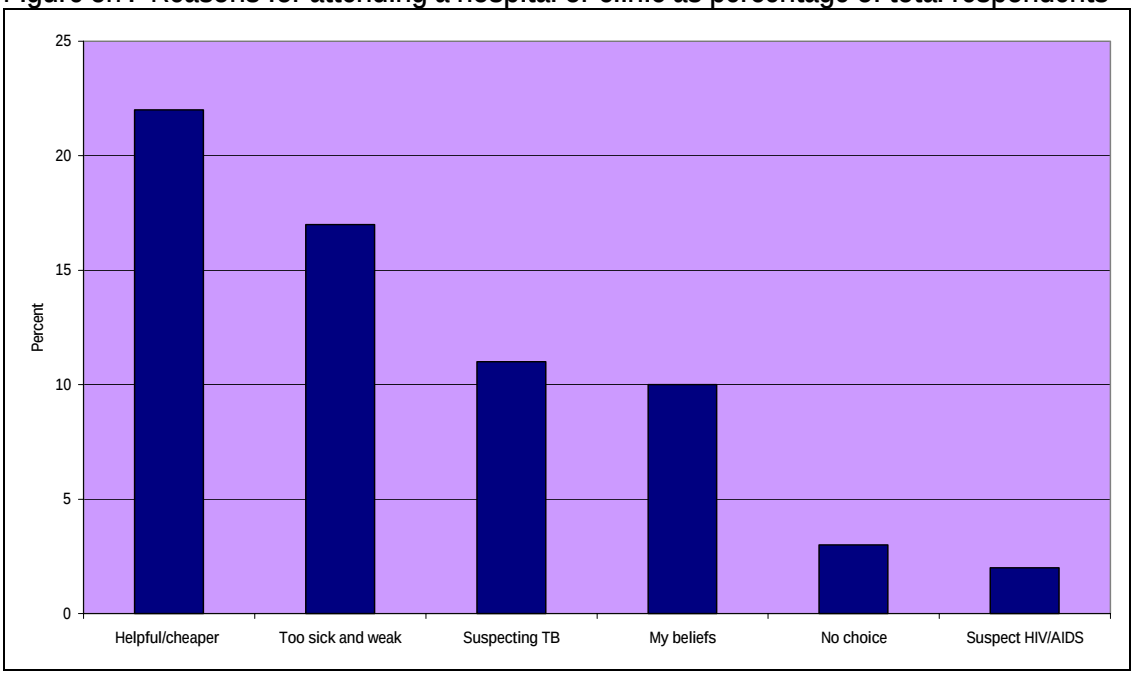


Table 8.5 shows that 69% (61) of the respondents said they had decided to go to the clinic or hospital themselves and 22% (20) said they had decided to go with someone else. When asked who had helped them make the decision 80% (44) of the respondents said a female relative had helped them and 13% (7) their spouse.

Table 8.5: Decision made by or in support of the respondents

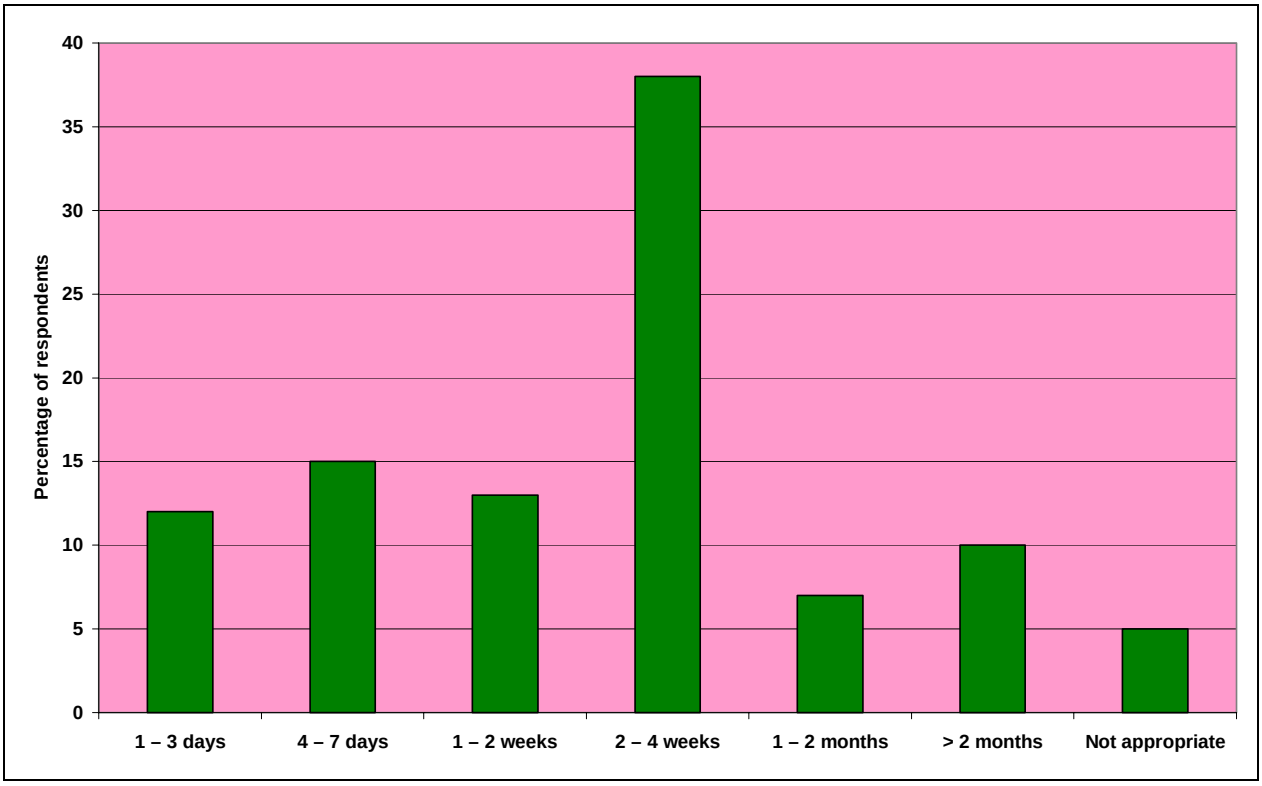
Responses	No. of respondents	Percentage (%)
Whose decision was it to go to the clinic/hospital?		
Decided myself	61	69
With someone else	20	22
Some one else decided	8	9
Total	89*	100
* 3 respondents missing		
If you decided to go, who helped you make the decision?		
Female relative	44	80
Husband/wife/partner	7	13
Other male relative	4	7
Total	55*	100
* 37 respondents missing		

Patient delays in accessing a recognised health service provider

The time taken from when respondents became ill to when they accessed a recognised health service provider ranged from 1 to 180 days. The median was 21 days. Figure 8.8 shows that 37% (38) of the respondents were sick for two to four weeks before they went to a clinic, 12% (11) between one and three days (11), 15% (14) for four to seven days and 13% (12) for one to two weeks. Seven percent (6) respondents waited for one to two months before going to the clinic and 10% (9) respondents for longer than two months. (Appendix 2: Table 17)

The length of time taken by respondents to seek help was not associated with age, sex, number of TB symptoms, number of people living in a house or whether the respondent thought they may have TB or HIV (generalised linear regression model used).

Figure 8.8: Length of time ill before attending a clinic as percentage of respondents



Source of Health Information

Most (75%) of the respondents got their information about TB from the radio, a third (31) from the health care professional at the clinic or hospital, less than a third (27) from the television and 21% (19) got their information from the newspaper. (Appendix 2: Table 18)

Almost two thirds (58) (Table 6) of the respondents felt that the health care professional (HCP) at the clinic/hospital had provided the most important information and a quarter that the radio had provided useful information. When asked why they thought this information was useful 40% of the respondents said the nurse was a knowledgeable person and a third that it had been given in an accessible manner.

Table 8.6: Sources and usefulness of information on TB

	No. of respondents*	Percentage (%)
Who provided the most important information?		
HCP at clinic/hospital	58	63
Radio	23	25
Newspaper/magazines	8	9
TV	6	7
Community health worker	5	5
Other	5	5
No response/not appropriate	4	4
Family member	3	3
Why did you think this information was useful?		
Info from knowledgeable people	37	40
Given in accessible manner	29	32
I need their help	14	15
No response	11	12
Their advice worked	5	5

* Some respondents gave more than one response. Percentage for each response expressed out of 92, the number of respondents.

Table 8.7 shows that Ukhosi, a Zulu national radio station, was considered the most informative radio station and SABC1 the most informative TV station. A quarter (20%) considered the KwaZulu-Natal isiZulu papers informative. These included Isolezwe, Ilanga and UmAfrica. Very few (2%) found the hospital/clinic cassette programme informative.

Table 8.7: Sources of media information

Type of Media	Details of media	No. of respondents*	Percentage (%)
Radio	Ukhosi	68	74
	P4KZN	3	3
TV	SABC1	26	28
	ETV	1	1
Newspapers	KZN isiZulu	18	20
	KZN English	4	4
	National English	1	1
Hospital/Clinic cassette programme		2	2

* Some respondents gave more than one response. Percentage for each response expressed out of 92, the number of respondents.

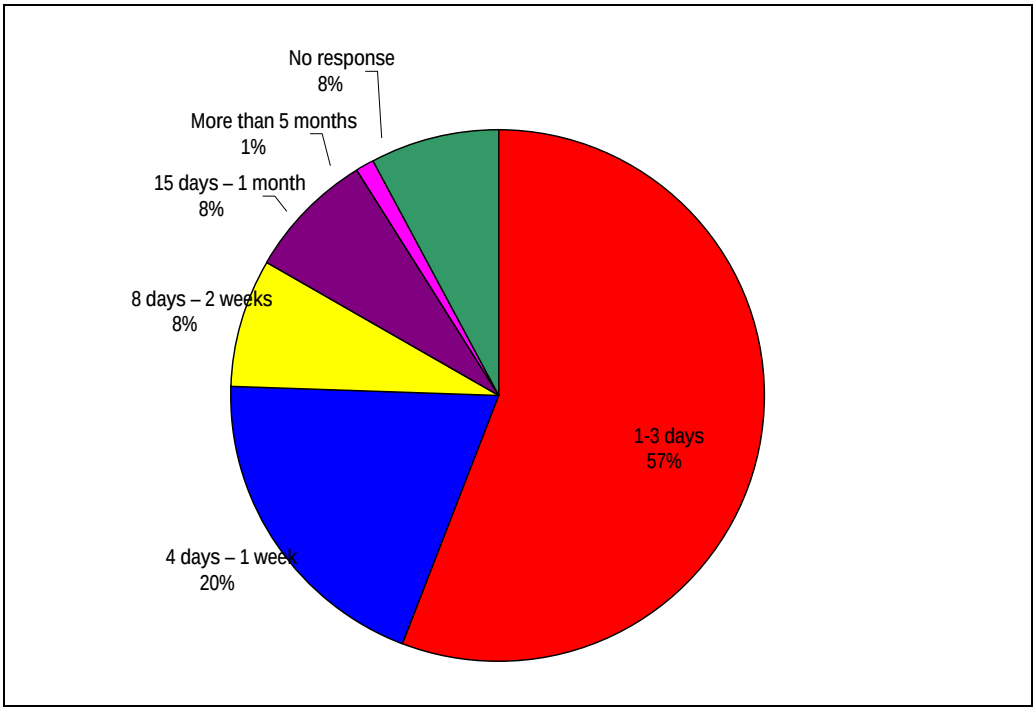
Experiences of health services

Almost all (91%) of the respondents were told that TB was curable and the dangers of not finishing treatment. Although 39 (46%) of the other respondents knew they should take their treatment daily and 24 (29%) knew that they must finish their full course of treatment only a quarter (20) knew they would not be cured if they did not complete their treatment. (Appendix 2: Table 19).

Sixty percent (55) of the respondents said they had been told to inform close family members of their disease whilst 40% (36) said they had not. Three quarters (67) of the respondents were told that children under five living with them should be brought to the clinic. (Appendix 2: Table 20)

The time it took from respondents first presenting at the clinic to when they were put on treatment ranged from 1 to 240 days. The median was 2 days. Figure 8.9 shows that more than half (57%) of the respondents started treatment for TB within one to three days of reporting to the clinic, 20% (18) within four days to a week. Eight percent (7) said it took eight days to two weeks and a similar number said it took 15 days to a month to start treatment. For one respondent (1%) it took more than five months. (Appendix 2: Table 21)

Figure 8.9: Length of time from reporting to a clinic and commencing TB treatment as a percentage of respondents



Thirty-nine percent (24) of the respondents said they attended the clinic once before being told they had TB, 24% (15) had been twice and 19% (12) said three times. (Appendix 2: Table 22)

Of the 92 respondents almost three quarters were tested for HIV. (Appendix 2: Table 23). Table 8.8 illustrates the impact of providing information/education on TB/HIV on the HIV test rate. Of the 55 respondents who were given information about TB/HIV 44 went on to have an HIV test, an HIV test uptake rate of 80%. Of the 33 respondents who were not given information or education about TB/HIV 20 did have an HIV test, a test uptake of 60%. This difference, however, was not significant (t-test: p-value=0.1266).

Table 8.8: Impact of providing information/education about TB/HIV on the HIV testing rate

Responses	Given information/education		Had HIV test	
	No. of respondents	Percentage (%)	No. of respondents	Percentage (%)
Yes	55	60	44	80
No	33	35	20	60
Not sure	4	4	0	0
Total	92	100	64	73

When asked for any comments or questions related to this assessment or TB in general, over 90% of the respondents said they needed more information about TB. A third of the respondents (13) had questions relating to the treatment of TB, 21% (8) the infectious nature of TB, 18% (7) the relationship between TB and HIV, 8% (3) the cause of TB and 11% (4) wanted more information about TB in general. (Appendix 2: Table 24)

DISCUSSION

Health seeking behaviour is the first step described in Piot's model.[95] The following topics are discussed:

- factors facilitating or constraining access to health services
- health seeking behaviour and delays in accessing treatment
- patients' knowledge of TB and the relationship between TB and HIV infection.

1. Factors which facilitated or constrained access to health services

Beliefs about the causes of TB: From the responses to the question what causes the spread of TB over half of the patients interviewed appeared to know that TB is infectious. This possibly contributes to the stigma attached to the disease. A third of the patients did not know what caused TB and a further third attributed the cause of TB to a personal habit (smoking or drinking) or environmental pollution. Sixteen percent considered HIV/AIDs to be a cause of TB and only two percent believed witchcraft caused TB.

A study in rural Limpopo Province in 1996[96] had similar findings, with two exceptions. In the Limpopo study there was no reference to HIV. This may reflect the impact and increasing awareness of HIV and its association with TB over the last 10 years. In the Limpopo study, as in a number of other studies in Africa, sexual misbehaviours and witchcraft were more commonly believed to be a cause of TB.[96 97 98]

Association of TB with HIV: With the rising prevalence of TB and HIV, patients now associate TB and HIV infections. This was shown in their responses to a number of questions, such as access to health services, beliefs about the causes and prevention of TB and their perception of their illness. Patients see a strong association between TB and HIV as a quarter of the respondents believes the two infections have similar mode of spread, i.e. blood and sexual intercourse. The increasing stigma of TB due to its association with HIV may contribute to patient delays in accessing services. This has been documented in other studies.[99]

Stigma: Evidence of the stigma associated with TB was demonstrated in that only four percent of the patients interviewed had told anyone outside their family about having TB. In addition, over half of the patients interviewed did not know, or were not sure, how people in the community would react they were infected with TB.

Access to health services: Access to health services was a problem for just over half of the TB patients interviewed. The impact of the HIV epidemic with associated co-infection with HIV and the increased morbidity and mortality was evident in that over a third of the patients were too sick to access health services.

2. Health seeking behaviour

TB treatment practises at home

Almost half of the respondents used a home remedy. Of these half did so before their TB was diagnosed. Two thirds of the home remedies used came from a chemist or supermarket and one third from a traditional

healer/herbalist or traditional chemist. These results suggest there is easy access to across the counter medication in urban areas and may reflect an increase in self-medicate. Deregulation of the pharmacy industry has made access to across the counter medication easier, without first attending a health care professional.

Where patients sought help

In this study patients first accessed help for their illness from the PHC clinics with 53% of the respondents first attending their local clinic and 8% a public hospital. This indicates some success of the NTCP in decentralising TB to a clinic level and differed from the findings of Edginton et al at Baragwanath Hospital in Gauteng in 2001[100] that showed that almost half of the TB patients went directly to the hospital. Pronyk et al in a rural area of Limpopo in 2005 found that 41% of the TB patients went first to a public hospital and 31% to the clinic.

In this study 16% of the patient's interviewed went to a traditional/spiritual healer and 11% to a General Practitioner as their first choice of care. In Pronyk's study 15% of the TB patients went to a spiritual/traditional healer and 13% to a private general practitioner (GP) as their first choice of care.Error! Bookmark not defined. These similar results would suggest that rural and urban populations make similar choices about where to access health care and are aware that clinics provide services for the diagnosis and management of TB. Health care workers often assume that patients in rural settings are more likely to go to traditional healers than their urban counterparts and that due to the stigma associated with TB a large number of patients go initially to a general practitioner to ensure confidentiality. Results from this and Pronyk's study do not support these assumptions as only 11% and 13% of patients respectively went first to a GP.

Patients' health seeking behaviour is not influenced by age, number of TB symptoms, and number of people living in a house and whether they thought they were HIV positive. However, sex significantly affected who visited a traditional healer. Seventy two percent of those who went to a traditional healer were male. Sex, however, did not affect seeking help at other places. It was also significant that 94% of those who went to a traditional healer thought they did not have TB. These results are consistent with other South African studies where the majority of people chose a conventional medical provider as they believed TB should be treated with medical therapy.[101] Error! Bookmark not defined.[102]

A quarter of the respondents visited a traditional healer/spiritual healer/ herbalist at some stage during their illness (either before or during). A similar result was reported by Pronyk.Error! Bookmark not defined.

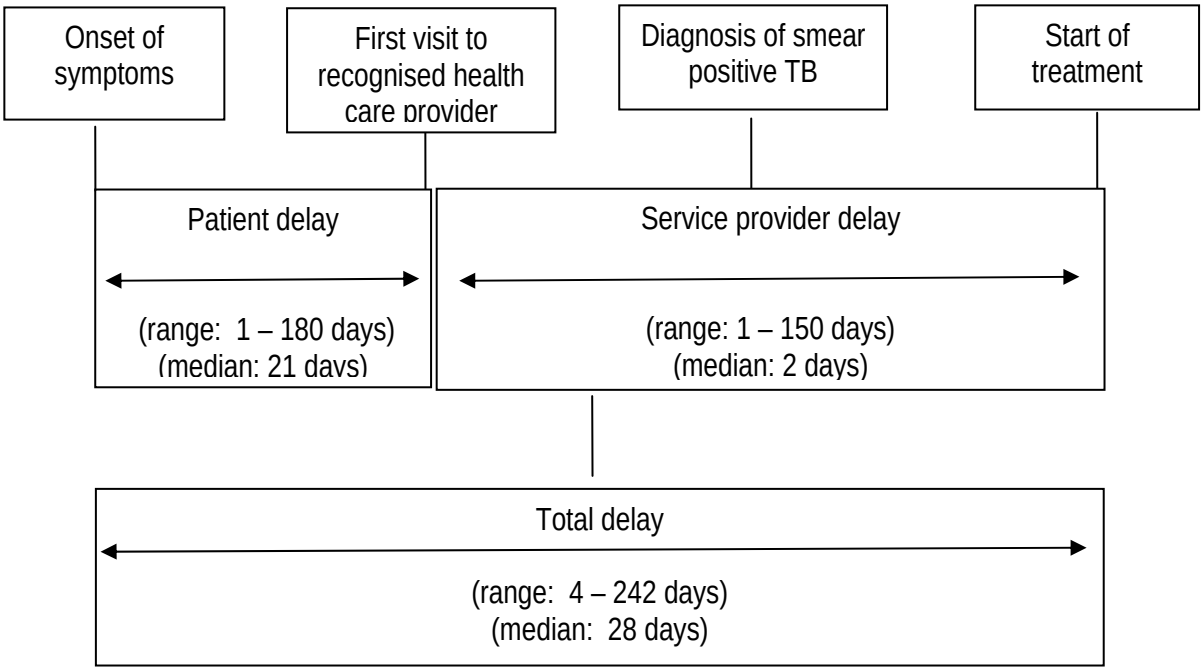
Delays in the diagnosis and start of treatment for TB

Two key objectives of a TB control programme are to reduce tuberculosis transmission through early detection of smear-positive PTB and to commence treatment as soon as possible. Delays in diagnosis and starting treatment increase the infectiousness of TB patients resulting in higher mortality and morbidity rates. It has been suggested that in an area where TB is endemic, each infectious case will result in between 20 and 28 secondary infections.[103] Recently Sonnenberg et al showed that within the first year of HIV infection the incidence of TB doubled, with a further slight increase for up to 7 years.[104]

Figure 8.10 shows that patient delay was defined as the time from the onset of TB symptoms to the first consultation with a health care provider at a health facility (either a clinic or hospital). Service provider delay was defined as the time from the first consultation to the initiation of treatment. The total delay was defined as the sum of the patient and service provider delays.

Figure 8.10: Components and magnitude of time delay from the onset of symptoms to the start of treatment in patients with smear-positive TB in present study

(Figure taken from Lienhardt C, Rowley J, Manneh K, Lahai G, Needham D, Milligan P, McAdam K. Factors affecting time delay to treatment in a tuberculosis control programme in a sub-Saharan African country: The evidence of Gambia. Int J Tuberc Lung Dis 2001; 5(3): 233-239)



Patient delay: In this study just over a third of the patients went to clinic within two weeks of being ill. A similar number waited for two to four weeks. Sixteen percent waited for longer than a month. The time taken from when respondents became ill to when they accessed a recognised health service provider varied from one to 180 days. The median patient delay for respondents to seek health care was 21 days. This was less than found in a study in Bushbuckridge, a rural area of Mpumalanga, where the median patient delay was 28 days.Error! Bookmark not defined.

Service provider delay: In this study the median service provider delay, according to the patients, was two days. The clinic sisters at the three study clinics, however, that reported their sputum turn around time to usually be longer than two days. In Bushbuckridge the median service provider delay was one week.**Error! Bookmark not defined.**

In this study the median total delay from the onset of symptoms to the start of effective treatment was four weeks. In Bushbuckridge the median total delay was ten weeks.**Error! Bookmark not defined.** Total delays vary considerably. In two studies undertaken in Malawi and Nepal the median total delay was between eight weeks and 12 weeks.[105] [106] However much higher delays have been reported recently from Tanzania where the mean total delay was 26 weeks.[107] Previous sub-Saharan African studies have shown that service provider delays were responsible for the majority of the total delay.[108] [109]

Although in this study patients and health care workers differed in their reported length of service provider delay, it is encouraging to note that at a clinic level patient perception is that the service provider delay is minimal.

3. Knowledge, education and information

Patients' knowledge of TB: Over 90% of the patients knew that TB was curable and taking medication was important. Although most patients were aware of the contagious nature of TB there appeared to be little awareness of contact tracing. A number of patients had not told close family members they had TB and only a quarter of the patients knew they had to take children under 5 to the clinic.

Patients' knowledge of the link between TB and HIV: The testing uptake for HIV was considerably higher in those who were given information about TB/HIV and provides affirmation for recent developments within the NTCP to ensure provider-initiated HIV counselling for patients diagnosed with TB.

Information/Education about TB: Although three quarters of the patients got information about their health from the radio, most patients felt that information from health care providers was the most trust worthy. Most people with TB trust the information from HCPs. HCP, therefore, are in a strong position to maximise their opportunities to provide education to patients about TB and TB/HIV co-infection. A similar finding of the trust patients have in HCPs was shown in a study assessing maternal and neonatal follow up.[110]

OBJECTIVE 9
AN EXPLORATION OF THE EXPERIENCE OF PATIENTS WHO INTERRUPTED THEIR TB TREATMENT.

PURPOSE AND METHODOLOGY

Objective 9 was to explore the experience of patients who had interrupted their TB treatment. Treatment interrupters were defined as having interrupted their TB treatment for more than two consecutive months before the end of treatment.[q] Only treatment interrupters who interrupted their treatment during the study period 1 April to 30 September 2005 were considered.

The initial data collection tool had the same socio-demographic questions and questions aimed at assessing factors which assisted or hindered treatment adherence as the data collection tool used for TB patients on treatment. However, when the tool was piloted treatment interrupters expressed dissatisfaction with the length of the time taken to ask all the questions. The tool was shortened by removing questions on socio-demographic issues. Treatment interrupters were interviewed at home in their mother tongue (isiZulu) by two local fieldworkers.

The fieldworkers were trained to explain the study and follow the correct consent procedure. A number of the questions regarding the patients' diagnosis and treatment were of a sensitive nature. The fieldworkers, therefore, alerted the patients to the sensitive nature of the questions and recommended that no-one else be present during the interview. Confidentiality of the patients' diagnosis and treatment was maintained. The names of the patients were not documented; a study code was used as the patient identifier.

Fifty treatment interrupters were identified by clinic and research staff at the three study clinics using the TB registers. However, only half (27) of these treatment interrupters could be located.

Interviewing defaulters from treatment was not easy. Firstly they were difficult to locate. Secondly, although no treatment interrupters refused to be interviewed, seven treatment interrupters appeared not to trust the fieldworkers and were guarded in some of their answers or refused to answer some questions. In addition, they did not disclose their true feelings and emotions. No treatment interrupters were coerced into being interviewed.

FINDINGS

The findings have been summarised into four sections:

- Profile of treatment interrupters
- Knowledge about TB
- Anticipated and experienced barriers to TB services
- Reasons for interrupting treatment

[q] This is the definition of the NTCP and is contained in Appendix 1 of this study.

Profile of the defaulters

Seventeen male and 10 female treatment interrupters were interviewed. The age of the respondents ranged from 20 to 57 years, with a mean age of 37 and a median age of 35. The age range for both sexes was similar.

The number of people living in the households ranged from one to 13, with a mean of five and a median of four. The number of children under eight living in the household varied from 0 to 3, with a mean of 0.7 and a median of 1. Seventeen (63%) of the respondents lived in a house with someone who was employed and 10 (37%) lived in a house where no-one was employed.

Knowledge about TB

Twenty three (85%) of those interviewed indicated that they knew they had TB. Two knew they had TB/HIV co-infection and the remaining two said they had AIDS. Twenty three (85%) said that TB could be cured. Two responded that TB could not be cured; these two were not those who had said they had AIDS. Two responded that they did not know whether TB could be cured.

Ten (37%) of those interviewed said that the treatment for TB needed to be taken for three months. A further 10 (37%) responded that the treatment needed to be taken for six months. Two people (7%) said that the treatment had to be taken for eight months. The remaining three people did not know. One respondent said *"They told me, but I forgot"* and another *"My whole life".*

Twenty two (82%) of those interviewed said that the treatment for TB could be accessed from the clinic. Three said that it could be accessed from the clinic or hospital and one person said it could be accessed from a doctor. The remaining respondent did not answer the question. Although 25 (92%) of the respondents knew where the treatment could be accessed from, half (12) had not gone for treatment after discharge from hospital. Fourteen of the 15 respondents who had gone for treatment did so at a clinic. The remaining respondent went to a hospital.

Anticipated and experienced barriers to TB services

Respondents were asked what problems they anticipated on going to a health facility. This was followed by a question about the problems they actually experienced at a health facility. The most commonly anticipated and experienced problems were access to health services and the attitude of health workers.

The most frequently experienced barrier to health care was the way in which nurses treated the respondents. Four modes of behaviour were identified:

1. Respondents said health workers did not respect patient confidentiality. One respondent said *"…they talk about us in the community telling people that we are sick and we have spread it in our homes…."* and another *"…..the gossiping of health workers…."*

2. Some respondents found the nurses uncaring and insensitive. One said *"The only thing they know is to shout at us and they forget that we also have hearts and we are people."* Another said *"It's the shouting of the health workers"…….that can chase me away."*

   One respondent interrupted treatment as she fell pregnant, and felt unable to discuss this with one of the health workers at the clinic. Another patient lost his card, and chose to default rather than go to the clinic to explain this as he was frightened of the health worker.

3. A number of respondents mentioned that nurses appeared not to have time to spend with them. One respondent said *"… they don't have time for us"* and another *"they don't have time to explain clearly on what we need to do."*

4. A couple of respondents said they thought the nurses were incompetent. One respondent said she overheard a nurse saying to a nursing assistant that the nursing assistant should look after the patient as she (the nurse) didn't know about TB and didn't want to work with it.

The second most common barrier to TB services experienced by respondents was access to the services.

1. Getting to the clinic was dependent on physical wellbeing, time and money, as it included travelling to the facility and in some cases paying for transport.

2. Accessing the relevant staff and treatment within the clinic. (Appendix 2: Table 27) Within the clinic access was dependent on having the time to wait in long queues and the strength and motivation to do so. Patients said,

   "It's just that when I go to fetch my treatment…….I would have to wait till very late in the afternoon and then I got tired"
   "To wait for a long time and it's always full at the clinic."
   "To arrive and find long queues and end up leaving without my treatment. I then ended up leaving everything because I was already better."

   A couple of respondents said that having to attend the clinic themselves to get treatment was a problem due to time limitations. Another patient said he would have lost his job if he had sat all day in the clinic once a month waiting for his treatment.

Reasons for interrupting treatment

When asked more specifically about the issues that contributed to their interrupting their treatment, two thirds (20 out of 27) of the respondents said they did not know about having to take more treatment. Half (13 out of 27) of the respondents said that as they were feeling better they had not gone back for treatment.

Less than a third of the respondents (8 out of 27) said that access to the clinic was a barrier to attending health services. When asked to describe this barrier in more detail, half (14 out of 27) of the respondents said that they were too sick to get to the clinic, the clinic was too far to walk to and transport expensive or unavailable. One respondent said *"I have to take four taxis because I am sick".*

Five of the respondents were too busy to go to the clinic. Four of these were women who spoke of their multiple family responsibilities and demands which left them little physical and/or emotional energy to continue and complete their TB treatment. One woman had to care for her extended family living in a different house, effectively preparing food and running two houses.

Two further barriers mentioned included a lack of encouragement and/or support from family and friends and fear of the effects of treatment and injections.

SUMMARY

The majority of TB defaulters knew they had TB, which could be cured and that treatment had to be accessed from a clinic. However, only a third knew the duration of TB treatment. When asked their reason for defaulting, a number of defaulters said they did not know that they needed more treatment and as they felt better had stopped their treatment.

A number of health service related factors were barriers to accessing treatment. These included the way nurses related to patients, nurses lack of respect for confidentiality and the long waiting times for patients to receive attention. Patient related factors included family responsibilities and the difficulty very ill patients have in waiting for treatment.

RECOMMENDATIONS

1. TB patients need information on the length of treatment
2. Confidentiality of patients to be respected by all health care workers.
3. Fast queues for patients who are on "clinic DOT" or who are coming to collect TB medication for the month to be instituted.
4. Supportive family and community members to assist in promoting adherence.

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