The prevalence of HIV in adult Tuberculosis patients in Stellenbosch.

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"Declaration

I, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree.

Signature: .....Delmence Niland.....

Date: 10 August 2009"

Abstract

Objective

To determine the prevalence of HIV in, and the profile of, adult tuberculosis (TB) patients seen at Stellenbosch district hospital and the four surrounding clinics.

Methods

A retrospective descriptive study design was used.

The files of all the recently diagnosed adult TB patients who were admitted to the wards of Stellenbosch district hospital, seen at the hospital Out Patient Department (OPD) or seen in the four surrounding clinics during the period January –June 2008 were used to extract all the necessary information.

Results

During the six month period dedicated to the investigation, 278 patients were found to have proven new onset TB.

There were 56% male TB patients and 44% female TB patients. Most of the TB was in the 20 to 40 year old age group.

Of the TB patients, 33.1% were HIV positive, 28.4% were HIV negative, 29.5% were not tested and 9% refused to be tested. Of those tested 53% were HIV positive and 46% were HIV negative.

Conclusion

The prevalence of HIV in the tested TB patients was 53%. The reasons why 29% of the patients did not receive Voluntary Counselling and Testing needs to be investigated and addressed.

Although the Western Cape has been found to have the lowest HIV prevalence in TB patients in South Africa, it is of great concern that it is still rising, having more than doubled in the past ten years. More needs to be done to curb the spread of both HIV and TB.

1. Introduction

The rising prevalence of HIV has led to a marked increase in the incidence of TB in South Africa.[1] As the number of people with co-infection increases, so does the risk of spreading TB in our community.

As noted by the Centre for Disease Control, "Patients with both TB and HIV infection are five times more likely to die during anti-TB treatment than patients who are not HIV infected."[2]

Prevalence surveys are important in determining the impact of HIV on TB and the efficacy of TB control in areas of high HIV prevalence, by comparing them to TB trends in HIV negative TB patients.[1]

Statistics show, that in 2007 there were 9.27 million new cases of TB globally, compared to the 9.24 million new cases in 2006 and 8.3 million new cases in 2000.[3,4] The highest incidence rates were in Africa, namely 363/100 000 population,[4] an increase from 290/100 000 in 2000.[3] The prevalence rate of HIV in new TB cases in 2007 was 15% globally, 38% in Africa and 73% or more in South Africa.[4] The previous prevalence rate of HIV in new TB patients in South Africa had been 60% or more. [3]

Up until 1995 the notification rates for TB cases in South Africa had been stable at 200/100 000 of the population. This increase to 718/100 000 in 2004, when 60% of TB patients were HIV positive and the incidence of TB was increasing at 8.5% per year.[1] According to the WHO's 2009 global report, it rose to 948/100 000 population in South Africa in 2007.[4]

This rise can be explained by the fact that HIV increases the possibility of reactivating latent TB "from 10% to 50% during a person's life per year."[5]

In addition to increasing susceptibility to TB after a previous TB infection,[6,7] HIV also increases the incidence of TB in the community. This is due to the fact that HIV positive individuals usually have a low threshold for contracting TB. This further increases the transmission of TB in the community to HIV positive as well as negative individuals. [3,8,9]

However, worldwide a need still exists for more data regarding the interaction between HIV and the incidence of TB. [5]

In a study by Woods, 67% of smear positive TB was identified in HIV negative patients but only 33% of smear positive TB was picked up in HIV positive patients.[10] According to Corbett, studies among HIV positive persons attending Voluntary Counselling and Testing (VCT) and in home-based care found high rates of undiagnosed prevalent TB. [11] It is therefore useful to investigate why low TB case finding rates exist in HIV positive patients.

Many HIV positive patients have atypical, minor or subclinical symptoms of TB [9,12] and are thus not screened for TB according to current protocol. HIV patients that are screened for TB often have Zn negative TB or extra pulmonary TB. The different pattern of disease presentation makes diagnosis more difficult [6, 10, 12, 13, 14] subsequently resulting in a significant portion of TB cases being overlooked.

The combination of a high prevalence of untreated pulmonary TB in HIV patients and prolonged exposure time in the community accounts for the rising TB incidence rates in both HIV positive and HIV negative persons. [1, 7, 9 ,10, 12]

Active screening for TB in people infected with HIV with induced sputum for microscopy and culture is thus indicated, regardless of whether they are asymptomatic. [10] Controlling TB in areas of high HIV prevalence requires intensified case finding, improved cure rates, identification and treatment of latent TB in co-infected persons and TB prevention in those infected with HIV. [1, 3]

2. Project Aim

To determine the prevalence of HIV in, and the profile of, adult tuberculosis (TB) patients seen at Stellenbosch district hospital and the four surrounding clinics.

3. Objectives

1) To identify all adults with TB who were admitted to Stellenbosch hospital, treated at the hospital OPD or at one of the 4 surrounding clinics in a 6 month period.

2) To determine how many of these patients tested positive for HIV.

3) To describe the type of TB in terms of the age groups and gender.

4) To make recommendations to the Western Cape Provincial Health department regarding the introduction of an HIV screening protocol for all patients with TB (as is currently done in pregnant patients).

3. Methods

3.1 Type of study

It is a retrospective descriptive study design, taking all the information needed from the patients' files. No additional data was needed from the patients themselves.

The 2007 Stats SA data formed the baseline for the determination of the prevalence of HIV in TB patients in the Western Cape and Helderberg areas. The findings in this study of the prevalence of HIV in TB in Stellenbosch were compared to those mentioned above.

3.2 Study population

The study population comprised all adult, newly diagnosed TB patients who were admitted to the wards at Stellenbosch primary care hospital, or were seen at the hospital OPD or at one of the four surrounding clinics during the period January to June 2008. Patients had to have proven TB as defined below and not be treated on clinical or radiological grounds.

3.3 Laboratory procedures

3.3.1 Diagnosis of TB

Pulmonary TB was diagnosed if sputum was positive on smear or culture, excluding cases with only a single positive smear with fewer than 10 acid fast bacilli per 100 fields examined.

A TB pleural or pericardial effusion was diagnosed if the ADA of the lymphocytic pleural or pericardial aspirate was greater than 70 or cultured positive. [15]

Lymph node TB was diagnosed if a fine needle aspirate showed acid fast bacilli or cultured positive or if a biopsy confirmed it with histology.

TB of the bones i.e. spine, wrist and knee was diagnosed on MRI, bone scan or CT scan, usually with histology. The diagnosis of TB in bones requires a high index of suspicion, radiology, biopsy and culture. However it is important to treat for TB based on the clinical and radiological findings. A sterile culture is most likely due to TB and excludes a pyogenic infection or typhoid.[16]

TB of other organs was diagnosed if the fine needle aspirate showed acid fast bacilli or if TB was found on histology or culture.

Disseminated TB was diagnosed on combinations of MRI, CT scan, lumbar puncture, bone marrow biopsy, liver biopsy, blood tests, ADA, acid fast bacilli, histology or culture.

TB Meningitis was only diagnosed if a CT scan or culture confirmed the lumbar puncture (LP) findings.

TB diagnosed only on LP, clinical or radiological grounds was excluded as this could influence the reliability of the data.

3.3.2 Diagnosis of HIV

The study established how many of the patients diagnosed with TB were HIV positive, HIV negative, declined testing or were not tested.
According to the protocol, a positive Sensa Tri-line rapid HIV test had to be confirmed by a second rapid test, the Determine HIV 1 and 2 test.

Some of the patients were already known to have HIV and had a positive Elisa and CD4 count on file.

The patient's code number, age, gender, place where TB was diagnosed, date when diagnosed, type of TB, lab findings confirming TB and HIV status were documented.

3.4 Statistical methods

Descriptive statistics including frequency tables, means and standard derivations were used.

Differences or proportions observed were compared by Chi-square tests. Probability values of less than 0.05 ($p<0.05$) were considered significant.

3.5 Ethical approval

This research study was approved by the Committee for Human Research at the University of Stellenbosch as well as the Research Committee of the Department of Health & Social Services, Provincial Government of the Western Cape.

Consent was also obtained from the Superintendent of Stellenbosch hospital as well as the Primary Health Care Manager to use data on their TB patients for this study.

A waiver of informed consent was obtained as there was no direct patient contact and it would have been unfeasible to contact every patient whose records were being used. The files were also used for a limited time and a limited amount of information was extracted. In addition, strict confidentiality of patient information was observed and all data presented was kept anonymous.

4. Results

4.1 Overview of findings

From the hospital and clinic statistics 430 patients were identified as possibly having had new onset TB in the 6 month period of January to June 2008.

Of those:

- 278 were proven to have new onset TB, some for the first time and some after previous cure.

- 72 were treated empirically for TB, based on symptoms, clinical picture, some laboratory tests and radiological findings.

- 56 were found to have no TB at that time. They had previous TB, bronchiectasis, pneumonia, lymphoma, cancer or cryptococcal meningitis. Of those, 30 were HIV positive and 20 had died.

- 24 patients' hospital files were missing, so the necessary data could not be collected. Five of those notified as having TB could not be found in the community.

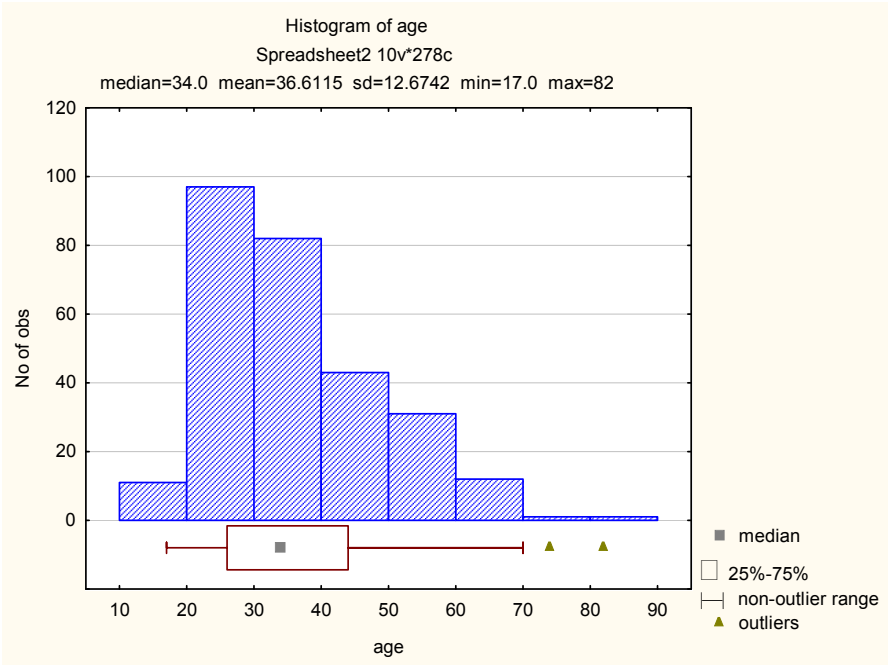
4.2 Proven TB patients

Of the 278 patients who were diagnosed with TB in the period January to June 2008, the following statistical data was derived.

4.2.1. Age related prevalence

The greatest prevalence of TB was in the 20 to 40 year old patients with a mean age of 36.6.

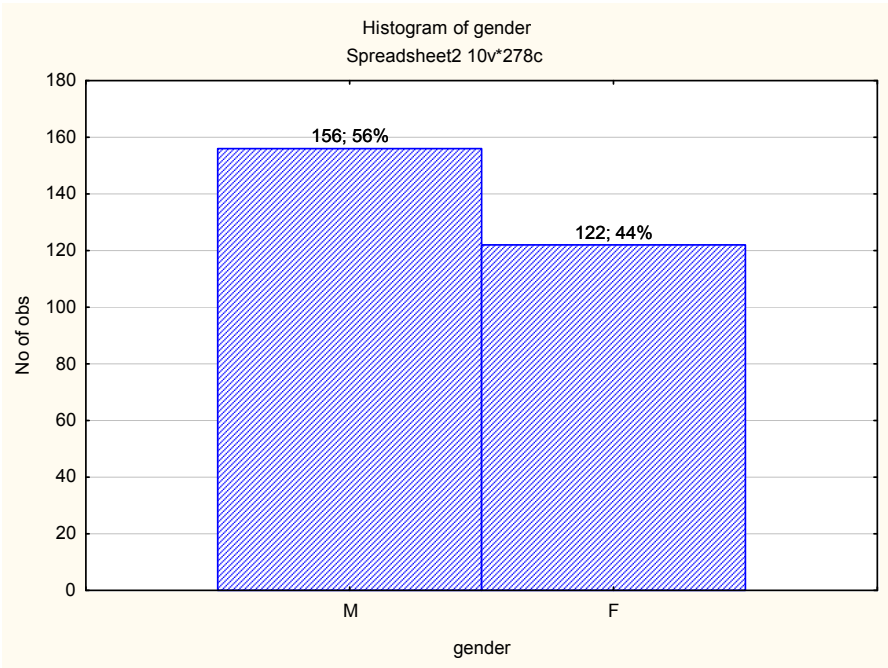
Graph 1: Age related prevalence



4.2.2. Gender related prevalence

There were 56% male TB patients and 44% female TB patients.

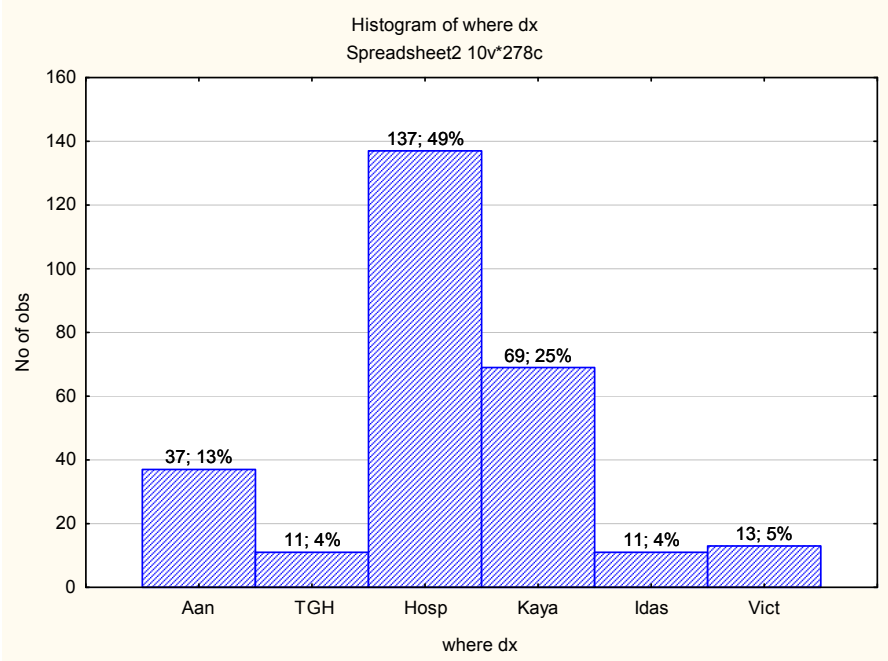
Graph 2: Gender related prevalence



4.2.3. Where diagnosis of TB was made

Stellenbosch hospital diagnosed 49% of the TB. Kayamandi clinic diagnosed 25% and the other three clinics, Aan Het pad, Idasvalley and Victoria Street, together diagnosed 22%. The remaining 4% was diagnosed at tertiary level. This was mostly bone TB, TB meningitis and disseminated TB which needed imaging and biopsies.

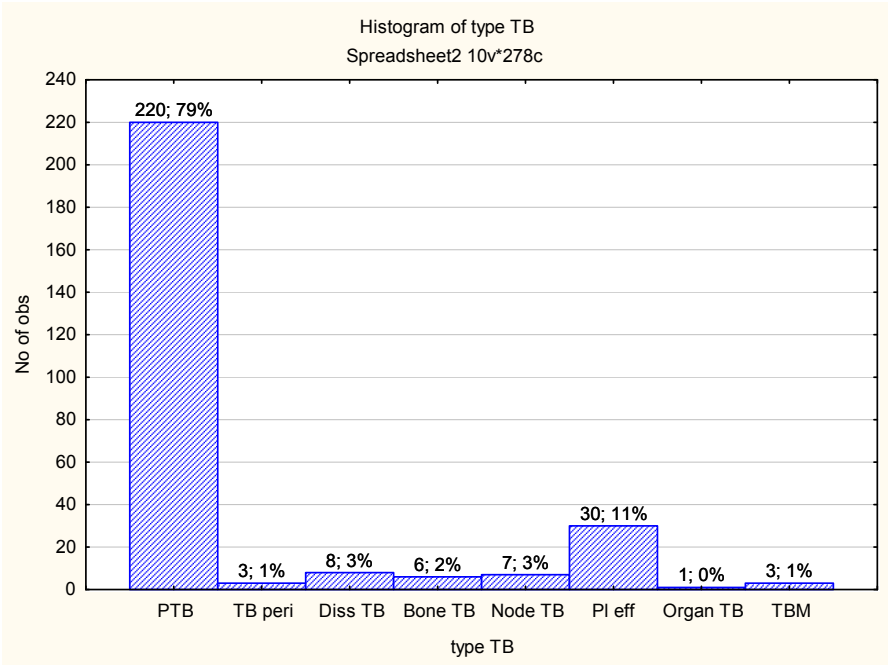
Graph 3: Place where TB was diagnosed



4.2.4. Type of TB diagnosed

Pulmonary TB made up 79% of the TB diagnosed; TB pleural effusions 11%; TB of the lymph nodes 3%; disseminated TB 3%; bone TB 2%; and TB pericarditis 1%. The 1% that had TB meningitis included only those that had been confirmed by imaging.

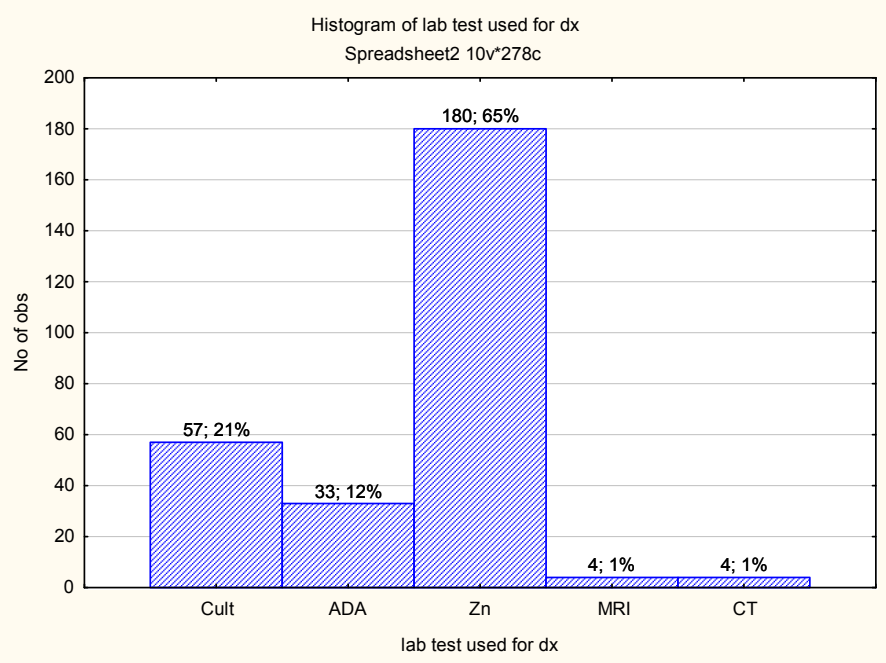
Graph 4: Type of TB diagnosed



4.2.5. Special investigations used to make diagnosis

Smear positive TB was found in 65% of the TB patients; cultures alone were used for diagnosis in 21% of patients; an ADA >60 in a lymphocytic effusion was diagnostic of TB in 12% of patients; the diagnosis was made with the help of an MRI in 1% and CT scan in 1% of the patients.

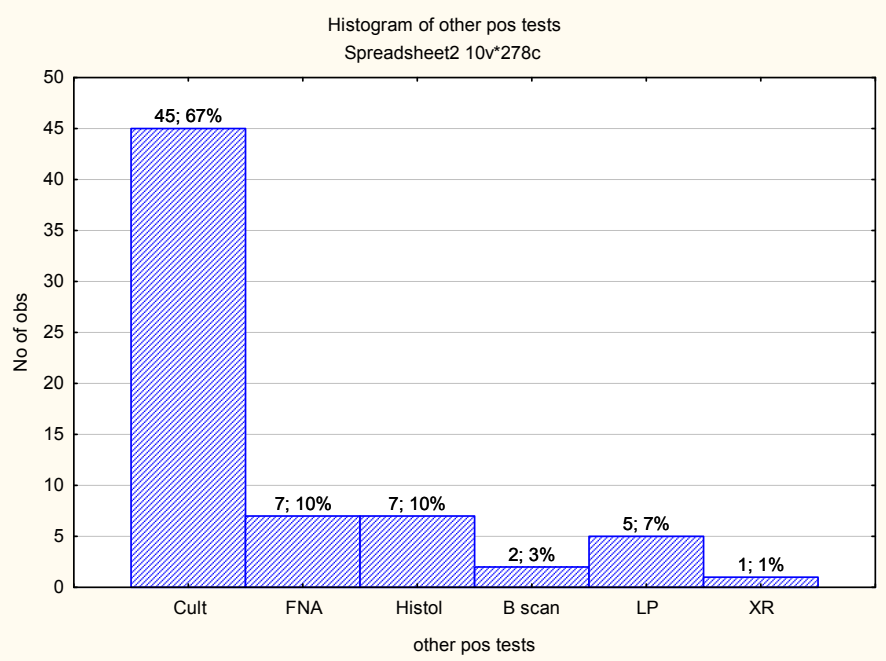
Graph 5A: Special investigations used to make diagnosis



Additional tests used to confirm the diagnosis of TB were:

- Culture 67%;
- Fine needle aspirate (*FNA)* with cytology (10%);
- Biopsy with histology including bone marrow and liver biopsy (10%);
- Lumbar puncture (7%);
- Bone scan 3%; and
- X-Rays 1%;

Graph 5B: Additional tests confirming the diagnosis of TB



4.2.6. HIV status of TB patients

Of the TB patients diagnosed:

33.1% were HIV positive;

28.4% were HIV negative;

9% declined testing; and

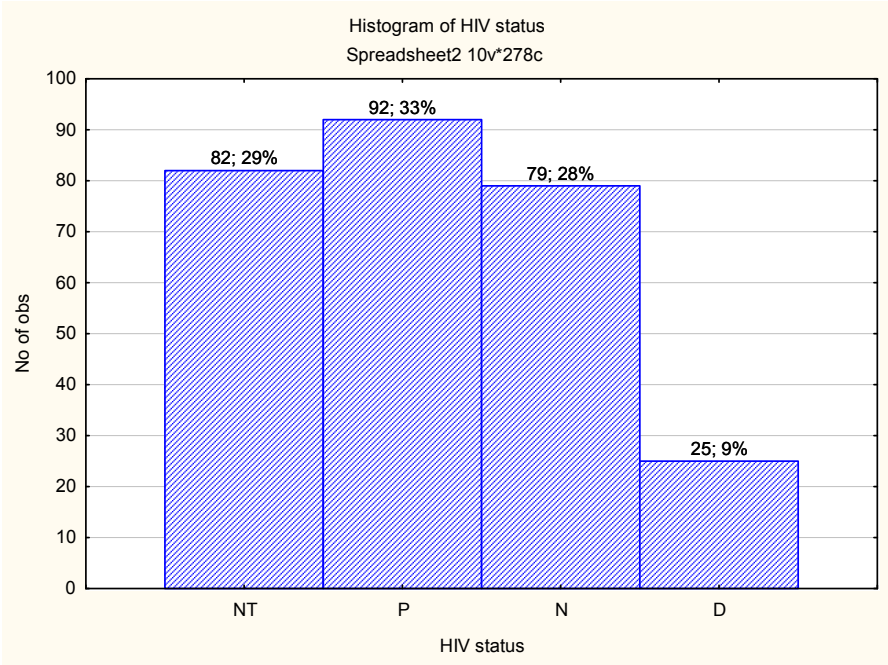
29.5% were not tested for HIV.

Of the 171 patients that **were** tested:

53% were HIV positive; and

46% were HIV negative.

Graph 6: HIV status of TB patients

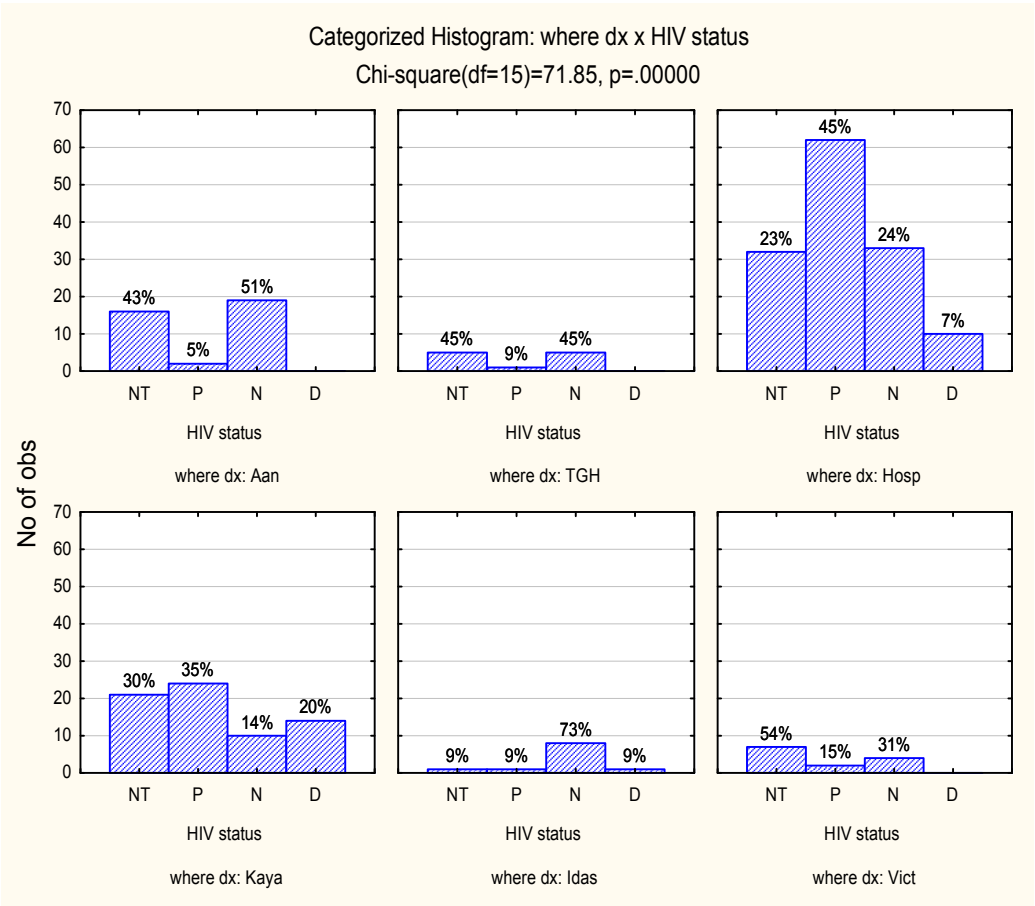


4.2.7. Locations where TB patients were tested for HIV

The following table and histogram (table 1) indicates the places where the relevant TB patients were, or were not, tested for HIV.

	Not tested	Tested		Declined testing
		HIV +	HIV -	
Hospital	23%	45%	24%	7%
A Het Pad	43%	5%	51%	0%
Kayamandi	30%	35%	14%	20%
Idasvalley	9%	9%	73%	9%
Victoria	54%	15%	31%	0%
TGH	45%	9%	45%	0%

Graphs 7: Categorized Histogram: where TB was diagnosed and HIV status

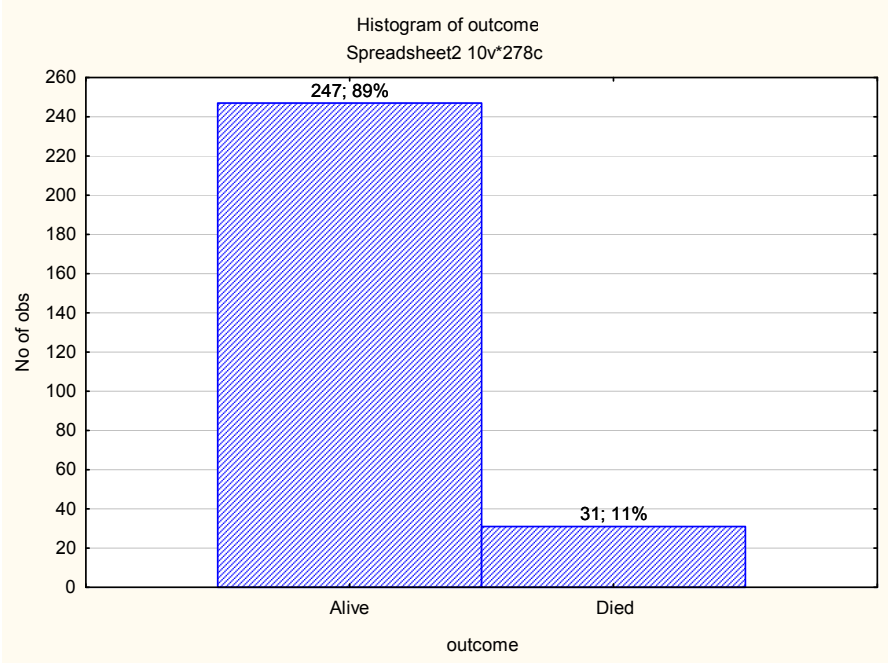


€4.2.8. Mortality figures in the TB patients

11% of the patients with proven TB died.

Of those: 64% were HIV positive;
20% were not tested;
10% declined testing; and
6% were HIV negative.

Graph 8: Mortality figures in the TB patients



4.3 Empirically treated patients

72 patients were treated empirically for TB, based on symptoms, clinical picture, some lab tests and radiological findings.

4.3.1. HIV status of empirically treated patients

Of the empirically treated patients:

68% were HIV positive;
14% were HIV negative;
3% refused testing; and
15% were not tested for HIV.

Of those that **were** tested for HIV:
83% were HIV positive; and
17% were HIV negative

4.3.2. Type of TB diagnosed

Smear negative pulmonary TB was diagnosed in 71% of the patients where TB culture was either negative, went missing or where the patients could not produce sputum and the patients had the clinical and radiological picture of TB.

Disseminated TB was diagnosed in 10% of the patients based on a combination of sonar, bloods, CXR and LP. TB meningitis was diagnosed on lumbar puncture in 8% of the patients. Abdominal TB was diagnosed in 8% of the patients based on

sonar, clinical picture and abnormal liver functions. Lymphadenopathy on CXR with the clinical picture of TB was found in 3% of the patients.

4.3.3. Mortality figures

18% of the empirically treated patients died.

Of those: 85% were HIV positive; and

15% were HIV negative.

5. Discussion

5.1 Prevalence of HIV in TB patients

There were many articles written and studies done on the prevalence of HIV and the incidence of TB in SA and the Western Cape. Many of them made reference to the fact that the 2 epidemics are fuelling each other and that in order to control the one, one needs to control the other.

The data on the prevalence of HIV in TB patients in the Western Cape came from the Department of Health's statistical notes (2000) [5], the article by Geoffrey Setswe (2004) [21] and the article by Wood (2005).[10] The statistics show how the incidence of TB in the Western Cape continues to grow, being the highest in the country. The HIV prevalence in the Western Cape may be lower than in the other provinces, but is still rising and is a cause for concern.

Looking at the data on the prevalence of HIV in TB patients in the Western Cape, which was 28% in the Western Cape in 2004 and

87% of the patients in the Cape Flats in 2005, the figure of 53% of the tested TB patients in Stellenbosch in 2008 is to be expected.

The fact that 38% of the Stellenbosch TB patients' HIV status is still unknown, however, is a problem. This should be addressed, considering the fact that TB is the most common opportunistic infection, as well as one of the main causes of death in people who have HIV/AIDS.

HIV patients have a more rapid progression of the disease to active TB, and as such have a higher morbidity and mortality rate. In order to control the progression of TB in HIV patients, it is important to decrease the viral load and improve the immunity of HIV positive TB patients. This can be done by determining the HIV status in all TB patients and starting HAART as soon as the TB treatment permits it. It is thus important to make a point of screening all new TB patients for HIV.

5.2 Lack of HIV testing in a third of TB patients

The fact that HIV testing was not done in as much as 29% of the confirmed TB patients and 15% of those empirically treated is an area for improvement that was identified during this study.

One of the reasons found for this is that patients had to be counselled by a trained HIV counsellor in order to be tested for HIV. Only one HIV Counsellor had been allocated to Stellenbosch hospital and she was only on duty on weekdays. No replacement was available when she was sick or on leave. As a result, patients admitted to the hospital

needing HIV testing when the counsellor was not available could not be tested as they had not been properly counselled. At times, patients in the wards were not tested for several days, especially over weekends.

The social worker, who was also able to do Voluntary Counselling and Testing (VCT), offered assistance in this regard, when possible. However, she was also only on duty during the day and off on weekends and her time was limited as she was often fully booked. The fact that she did not speak Xhosa also meant that she could only counsel patients who spoke English or Afrikaans fluently. A great number of the TB patients had a very basic knowledge of these languages and needed a Xhosa speaking counsellor.

The other stumbling block to VCT was patients' fear that staff known to them at the hospital or clinics might disclose their HIV status to others in the community. When VCT was mentioned, patients often said that they needed to think about it first and would go for testing later. This was more of a problem in the clinics than at the hospital as the clinic staff often lived in the same community as the patients who attend the clinic. As these patients did not actually refuse testing, it was not documented as a refusal to test. Thus patients were often discharged without having VCT. They were given a letter requesting VCT at their local clinic, but were often not tested there either, for reasons already mentioned. The data gathered shows that the lack of testing was a bigger issue at the clinics than at the district hospital.

To prevent further problems with VCT, it should be ensured that there is a counsellor available at all times at the hospital and clinics, to

counsel patients when needed. It should be made clear that testing would benefit the patient and that the results would be strictly confidential. The patient would then be assured of confidentiality.

5.3 Mortality in TB

Of the 11% of proven TB patients that died 64% were HIV positive, 6% were HIV negative, and the other 30% either declined testing or were not tested for other reasons, as seen in Graph 7.

In spite of the percentage of patients who were not tested, the mortality rate was still 10 times greater in the patients who were HIV positive than those who were HIV negative.
This is even more apparent in the empirically treated TB patients where, of the 18% that died, 85% were HIV positive and 15% HIV negative.

In an HIV study done at Baragwanath Hospital in 1990, 34% of the patients who were diagnosed with HIV died. Tuberculosis was the most common complicating infection in those patients. [23]

An important contributing factor to the high mortality in HIV and TB is the possibility of more than 1 underlying pathology e.g. cryptococcus infection. This can present as meningoencephalitis, and is being found increasingly in patients with HIV. Other presentations include lung infections and skin lesions. [24]

5.4 Delay in diagnosis and treatment of TB in patients

The delay in diagnosis of TB and initiation of TB treatment, leading to prolonged exposure to the community was another finding during this study.

Many of the patients who were admitted to hospital with symptoms of respiratory infection suggestive of TB, had sputum sent off for AFB screening. They were started on antibiotics, had blood tests and a CXR done and waited for the AFB results. This was supposed to take 36-48hours. After a few days, the patients who were feeling better were discharged with a letter to follow up for their sputum results. Those who had not improved and who had clinical and radiological signs of TB were started on TB treatment. These too were discharged when they felt better, with a letter to follow up for sputum AFB and culture results. They were given a few days-supply of TB medication until they returned.

On follow up, sputum AFBs were sometimes said to be still pending and some had gone missing. In those cases new dates were given and new sputum AFB sent. Not all patients returned for follow up. The results of those who did not return on the scheduled dates did not always get filed. When these patients returned in the following months, as their health was deteriorating, the laboratory had to be called for the AFB results. Those found to have TB could then be referred to a TB clinic for treatment. Those whose sputums had leaked or gone missing had to be repeated.

For purposes of this study, the laboratory was phoned to obtain the results of 66 of the 430 suspected TB patients, as they were not in the patients' files.

Of these:

31 (7% of the suspected TB patients) had no TB;

24 (6%) had TB; and

11(3%) of samples had gone missing or leaked.

This delay in obtaining patients' TB results and giving these results to the patients meant a delay in initiating treatment, further progression of the disease with increased mortality and morbidity and further spread of TB in the community.

A system needs to be established to ensure that the TB results on all patients who have given sputum samples are obtained, that the results are filed, and that those patients who are positive but did not follow up, are traced and put on TB treatment.

5.5 Negative AFBs in patients with PTB

Another issue identified during this study was the amount of sputum AFBs returning negative in patients that clinically and radiologically had TB.

Up to six sputum samples were often sent off over 3 weeks, before a positive AFB was identified. Doctors therefore often sent a sputum TB culture initially, to have a better chance at detecting the TB. Of the TB

diagnosed 65% was diagnosed on screening for Acid Fast Bacilli (AFB) but as much as 21% was only found on TB culture.

The tools available to diagnose TB are not very sensitive (AFB) or take too long (culture up to 8 weeks). There is an urgent need for tools which are more accurate, more sensitive and quicker. It is also important to make sure that a competent service is in place, where sputum samples are not lost or leak and that the results are obtained promptly, ideally within 48 hours.

It is recommended that a high index of suspicion be implemented for smear negative, extra pulmonary or disseminated TB in immune suppressed patients and that alternative tests, such as bloods, biopsies or imaging be done.

5.6 Missing files

Of the 430 of the files needed, 24 (6%) could not be found during this study. The area where the files are liaised is currently too small for this purpose and this is unfortunately a common occurrence. It has been identified as an area for improvement.

6. Strengths and Limitations of the study:

6.1 Strengths:

The fact that the data used in this study was extracted from the clinical notes meant the data was more reliable as it was based on objective

findings. Data extracted from interviews or questionnaires tends to be more subjective.

TB diagnosed on clinical or radiological grounds was excluded as some of those patients might not actually have had TB and this would have influenced the accuracy and reliability of the data. Only laboratory proven TB was taken into account in order to make sure that the data was reliable and valid.

Also excluded was HIV that was not verified by a second different confirmatory test, as the original HIV diagnosis could have been the result of a false positive test which would have affected the reliability of the findings.

6.2. Limitations:

The limitations identified in this study lay in the data collection process, which was incomplete.

Not all the files of TB patients during the relevant 6 month period covered in this study could be obtained. There were 24 files missing out of the 430 identified, which amounts to 6% of the total number of files.

The fact that a total of 38% of the TB patients were not tested for HIV also affected the validity of the findings.

7. Recommendations:

1. One of the problems picked up during this study was the absence of HIV testing in as much as 29% of the confirmed TB patients and 15% of those empirically treated.

   To address this issue it should be ensured that there is always an HIV counsellor available at the hospital and the clinics, to counsel patients when needed. It should be made clear that testing would benefit the patient and that the results would be strictly confidential. The patient would then be assured of confidentiality.

   It should be protocol, as it is in pregnant patients, that all TB patients be counselled and be given every opportunity to undergo HIV testing during their TB treatment. Those found to have a CD4 count approaching 200 could then be referred for HAART.

2. The delay in obtaining patients' TB results and giving these results to the patients, leading to a delay in initiating treatment and further progression of the disease, needs to be addressed. This can be done by establishing a system that ensures that all TB results are reviewed by a designated person, that all patients who test positive for TB are traced and put on TB treatment and that all results are then filed.

3. To address the problems with missing TB sputum samples or sputum AFBs returning negative in patients with clinical and radiological TB, the following is recommended:
   - TB tests which are more accurate, more sensitive and quicker must be found.

- It is also important to make sure that a competent service is in place, where sputum samples are not lost or leak, and that the results are obtained promptly, ideally within 48 hours.

4. To address the problem of the 6% of files that could not be found during this study, the following is proposed:
   The area where the files are liaised needs to be moved to a larger room with more space to ensure proper filing. It is the overcrowding and chaos that leads to files going missing.

8. Acknowledgments

I would like to thank the hospital and clinic staff who offered their time to assist me in accessing the data from the files of the TB patients. Of the hospital staff I would especially like to thank Michelle Arendse for drawing almost 430 files for me, John Bester and Selwyn Fortuin for accessing the computer records of the TB patients and Quinton Lawrence for drawing the files of the deceased patients. I am also grateful to the laboratory staff for being so helpful when taking my many calls in connection with laboratory results.

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