TB infection among HIV-infected men in Dar es Salaam, Tanzania

Master Thesis in Medicine

Jonas Nilsson 80

Supervisors
Rune Andersson, Professor in Global Health, MD, PhD.
Patricia Munseri, MD Muhimbili University

UNIVERSITY OF GOTHENBURG

Programme in Medicine

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Abstract
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Jonas Nilsson 2012, Sahlgrenska Academy, Institute of Biomedicine

Introduction
Tuberculosis (TB) is a leading killer among people living with human immunodeficiency virus (HIV). At least one in four deaths among people living with HIV can be attributed to TB, and many of these deaths occur in resource-limited settings. The prevalence of HIV in Tanzania is 5.7% and every year 120,000 people get ill with TB.

Objectives
- To evaluate the patients’ knowledge about HIV/TB co-infections and to get an understanding of the obstacles the patients are facing in order to carry through treatment.
- To evaluate adherence and the patients’ awareness of the importance of adherence. Furthermore to describe the clinical manifestations of TB including prevalence of pulmonary and different localizations of Extra-pulmonary TB.

Methods
Questionnaires with multiple-choice questions were handed out to 36 men attending one of 6 different clinics in Dar es Salaam. All the men had been diagnosed with HIV and TB.

Results and conclusions
The self reported adherence to medication was high; only six of the patients stated to ever have missed taking her TB medication on any occasion. The biggest obstacles that these patients are facing in order to follow TB-treatment are as follows: paying for transport to the clinic, long way to the clinic, and the side effects of TB-drugs. 34% of the patient got both their diagnoses within one month. 19 (52%) patients say they were tested for HIV because they have TB. 59% of the patients had their TB diagnose first, or both diagnoses within one month. The patients had typical TB symptoms such as cough, night sweats and fever.

75% of the patients had pulmonary TB, 34% had extra pulmonary TB and 8% had both. The frequency of Extra-pulmonary TB was lower in this study than showed before, but the study material might not be representative since it was not randomized and no admitted patients were included.
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1 Background

1.1 HIV pathogenesis

The HIV is a retrovirus that infects the CD4+ cells of the immune system, destroying or impairing its function. These cells, also called T-helper cells, are important in managing the immune system's response to infection. CD4+ cells, when activated by antigen, produce different cytokines such as IL-2, IFN-γ and IL-4. As the infection progresses, the immune system becomes weaker, and the person becomes more susceptible to infections. Some of the most common opportunistic infections are TB, candida infections, Pneumocystis pneumonia and infections with atypical mycobacterium.

The most advanced stage of HIV infection is acquired immunodeficiency syndrome (AIDS). It can take 10-15 years for an HIV-infected person to develop AIDS; antiretroviral drugs can slow down the process even further. The dominating transmission route for the virus is through sexual exposition. The highest risk is through anal sex. Vaginal sex is slightly more contagious from man to woman. High levels of the virus in the blood make the risk of transmission greater. Another important transmission route is sharing needles when using intravenous drugs.

1.2 TB pathogenesis

Tuberculosis (TB) is an infectious disease caused by the bacillus *Mycobacterium tuberculosis*. It typically affects the lungs (pulmonary TB) but can affect other sites as well (extra pulmonary TB). In general relatively few of the people infected with *Mycobacterium tuberculosis* will go on to develop TB disease. Symptoms from primary infection are generally insignificant and the infection is healed in at least 90% of the cases. The bacteria remain latent in the body and can be reactivated at any time during the remaining lifespan. The reactivation is generally caused by an immunosuppressive disease or treatment, or high age. The probability of developing TB is much higher among people infected with HIV. Without treatment, mortality rates are high. In studies of the natural history of the disease among sputum smear-positive and HIV-negative cases of pulmonary TB, around 70% died within 10 years.[1] TB is the second leading cause of death from an infectious disease worldwide (after HIV, which caused an estimated 1.8 million deaths in 2008).

1.3 HIV and Tb in the world

One third of the world's population has latent Tuberculosis (TB) infection, which increases the risk of becoming ill with TB. This infectious disease is a leading killer among people living with human immunodeficiency virus (HIV), and at least one in four deaths among people living with HIV can be attributed to TB. Many of these deaths occur in resource-limited settings. [2] People living with HIV also have an estimated 20 to 30 time's greater risk of developing active TB than people without HIV infection.[3]
The estimated total number of incident cases of tuberculosis worldwide rose to 9.4 million in 2009, more than at any other time in history. The worldwide tuberculosis incidence rates are estimated to have peaked in 2004 and since then decreased at a rate of less than 1% per year[4]. Tuberculosis is still a disease of poverty that is associated with overcrowding and undernutrition[5].

In 2009, there were an estimated 2.6 million people who became newly infected with HIV. That is more than one fifth fewer than in 1997 when there was an estimated 3.2 million newly infected people. 1997 was the year when the HIV epidemic peaked[6].

There was an estimated 1.1 million HIV positive TB patients globally in 2009. Around 80% of them live in sub-Saharan Africa. W.H.O has identified goals for TB/HIV (Isoniazid preventive therapy, intensified case finding for TB, and Infection control). Achieving these goals will reduce the burden of TB among people living with HIV and therefore must be urgently implemented by all HIV services. People living with HIV need early diagnosis and treatment of active TB disease. If TB is not present, they should receive Isoniazid Preventive Treatment (IPT). The treatment is not expensive, but can lead to massive reductions in number of deaths. In 2009, more than 86,000 people living with HIV were put on isoniazid preventive therapy (IPT).[3]

1.4 HIV and Tb in Tanzania

5800 people died from TB in Tanzania 2010 (HIV excluded). The TB incidence is 79 000, of who 30 000 are HIV positive. The treatment success rates 2009 were 88% both among the smear positive cases, and the smear negative/extra pulmonary cases. 90% of the TB patients HIV status is known, and of these 38% is HIV positive[7]. Testing for TB and TB treatment is free of charge in all of Tanzania.

HIV infection in Tanzania is unevenly distributed across geographic area, gender, age, groups and social economic classes. The percentage of the population infected by HIV ranges from less than three percent across most of the country to more than 44.4 percent in certain sub populations. The epidemic has struck more the most economically active group of adults, those aged 15-45[8].

In 2011, 11,000 people in Tanzania will die from HIV-associated TB, and the projected number of deaths between 2011 and 2015 is 55,000 (given current levels of care) [3]

1.5 HIV/TB co infection

People living with HIV have an estimated 20 to 30 time’s greater risk of developing active TB than people without HIV infection.[3] HIV is therefore the biggest risk factor for developing TB. Research on mechanisms that take place during a co-infection with HIV and TB show that the clinical features of these patients are more likely to include extra pulmonary disease, military infiltrates and non-reactive tuberculin tests.[9] The number of atypical presentations of TB is linked with less CD4+ cells[10]. Patients with advanced HIV and low CD4+ cell count can also have atypical chest x-rays[11]. HIV-infected patients with
TB are less likely to have cavitary pulmonary disease than patients who are HIV-negative with TB. Up to 22% of HIV-positive persons with pulmonary TB have normal chest x-rays.[12]. Compared to HIV negative patients, fewer have positive sputum smear, which is one of the main ways to diagnose TB except for chest x-ray. Because sputum smear is the principal means of detecting TB especially in resource limited settings, smear-negative patients sometimes don’t receive a diagnosis and are often not treated correct, if at all. The mortality rate is higher among these patients than among HIV-positive patients with smear-positive TB[11]. One effect of this atypical presentation and difficulties diagnosing, could be that people with HIV and TB are more likely to be unaware of their TB-infection, thus being more likely to infect others. Lower CD4+ counts are also linked to mortality from TB. A study carried through in Tanzania showed that 15% of patients with HIV has an active tuberculosis.[13]

Both TB and HIV “attack” the immune system of the body, but in different ways. The HIV virus is an intracellular pathogen that reduces the number of CD4+ cells. This affects the immune systems response to the TB infection. The Tubercl bacilli infect the macrophages. In order to fight the infection of the macrophages, The CD4+ cells, when activated by antigen, produce different cytokines and interferons, that activates or enhances the macrophages killing ability. One of these is IFN-γ, which plays an important role in activating macrophages and cytotoxic T-cells, and inhibits their intracellular growth. During HIV infection the IFN-γ production is dramatically reduced. Thus the TB can develop and turn in to an active infection.

There are many drug interactions between TB drugs and HIV drugs which further complicates the matter. Side effects from treatment are more frequently reported in HIV positive patients.

New scientific work has shown that we can prevent a million deaths among people living with HIV by end 2015 by providing integrated HIV and TB care.[14]

Knowledge gaps identified by WHO that still remain are amongst others

- Identification of the barriers to access antiretroviral therapy faced by HIV-infected TB patients.
- How to optimize health-care settings to provide antiretroviral therapy to HIV-infected TB patients.
- Operational models to integrate TB and antiretroviral therapy programs, including programs at the health sector and community levels

1.6 TB-drug resistance

Drug resistance arises due to the improper use of antibiotics in chemotherapy of drug-susceptible TB patients. This improper use is a result of a number of actions, including administration of improper treatment regimens by health-care workers and failure to ensure that patients complete the whole course of treatment. Essentially, drug resistance arises in areas with poor TB control programs. A study conducted in the district Temeke, Dar es Salaam between October 2005 and August 2006 showed that the drug resistance had not increased in comparison to a previous study conducted in 1995, the percentage of drug resistance against any of the four drugs tested for remained between 9 an 10 percent. MDR (defined as resistance against both rifampicin and isoniazid) was < 2%. This may be the result of an effective TB control program.[15] Studies show that that Tb drug resistance is low in a selected population in Dar es Salaam, and authors suggest that further efforts should be undertaken to support the Tuberculosis treatment program.[16, 17]
2 Aims
- To describe the clinical manifestations of TB in patients with HIV, including prevalence of pulmonary and different localizations of extra pulmonary TB
- To analyze time of diagnosis of TB in relation to diagnosis of HIV and start of antiretroviral treatment.
- To analyze the outcome of treatment, clinical and microbiological cure, and side effects of treatment.
- To evaluate adherence to TB medication.
- To evaluate the patients knowledge about TB and HIV an their awareness of the importance of adherence
- To get an understanding of the obstacles the patients are facing in order to carry through treatment.
- To evaluate if there is a correlation between adherence and socio-economic status and educational level.
- To evaluate the patients knowledge about HIV/TB co-infections.

3 Method

3.1 Study design
I met with, and collected information from HIV and TB infected patients attending different clinics in Dar es Salaam. Patients who choose to fill in the questionnaire were briefly informed about the study and it’s aims. The questionnaire includes questions about economic status, educational level, basic knowledge about HIV and antiretroviral treatment, knowledge about TB and anti TB treatment, knowledge regarding co-infection with TB/HIV, how HIV is transmitted, route of infection, sexual behavior and health status. Furthermore, we asked about adherence to treatment, side effects and stigmata, own opinion about what obstacles they are facing in order to follow treatment. The questionnaire was written in English, and then translated to Kiswahili. For the English version of the questionnaire, see appendix 1.

Before I got started, the plan was to meet patients at the HIV-clinic at the Muhimbili hospital. I soon realized that I would not get enough for the study in this place only. I got permission by the district officer to attend TB clinics in the Ilala and Temekte municipalities. In total, I gathered material from six different places. Five of those were TB-clinics, and one a HIV-clinic. In the IDC we got access to patient files, witch could be filtered on different diagnoses. This way I got the contact information to patients who have both TB and HIV. I then set appointments with these patients and paid for their transport. In other places such as the TB-clinics at Amana hospital, Nazi moja hospital and Temekte hospital I got help from nurses, who when they encountered HIV-infected patients took time to help them fill in the questionnaire.

People could participate in the study if the met the following criteria: (1) 18 years or older, (2) HIV positive, (3) diagnosed with TB, (4) received TB treatment or at least 4 weeks and (5) consent to participate by signature.
3.2 Statistical methods
All data was entered and processed in Microsoft Excel. The data was then imported to SPSS for further processing and analysis. The graphical presentation of the data is done both in SPSS and Microsoft Excel. The collected data that has been evaluated by me using ranges, means, medians and frequency.

3.3 Ethical considerations
Ethical clearance was obtained from the Research and Publication committee of Muhimbili University of Health and Allied Sciences. Permission to conduct the study and to access data was obtained from the Muhimbili National Hospital authorities. Participation in the study was voluntary. The participants were instructed of the right to, without further explanation, refuse to answer any questions. Their answers were being handled confidentially. All forms were coded with numbers. The patients did not write their names on the questionnaire, but on a separate list. All documents were destroyed after the project to ensure patients’ confidentiality. The patients did not receive any compensation for participating in the study. Some of the cases were asked to come to the clinic just to participate in the study. These patients were given compensation for their traveling costs to the clinic. The patients’ medical treatment was not affected, regardless of whether the patient chose to take part in the study or not.

3.4 Timeframe
The total time of the project is 20 weeks, of which 8 weeks will be carried out as a field Study at the Muhimbi National Hospital in Tanzania in February- May 2012. The remaining time will be spent preparing the study and analyzing data. During the fall of 2011 we will refine and translate the questionnaire and make other preparations such as learning more about the culture and conditions in Tanzania.
4 Results

4.1 Description of patients
There were 36 male participants aged between 25 and 67 years old. The average age was 40.6 years and the median 38.5 years.

Figure 1

4.2 Education
Of the 35 participants with data on education, most had primary school level, see Table 1.
Table 1.

<table>
<thead>
<tr>
<th>Patient education</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never been to school</td>
<td>6</td>
</tr>
<tr>
<td>Primary school not finished</td>
<td>11</td>
</tr>
<tr>
<td>Primary school</td>
<td>66</td>
</tr>
<tr>
<td>Secondary school</td>
<td>9</td>
</tr>
<tr>
<td>High school</td>
<td>3</td>
</tr>
<tr>
<td>University/college</td>
<td>6</td>
</tr>
</tbody>
</table>

4.3 Employment
Half of the patients were self employed, 11% unemployed, see Table 2.

Table 2

<table>
<thead>
<tr>
<th>Patient social history n=36</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>31</td>
</tr>
<tr>
<td>Self employed</td>
<td>50</td>
</tr>
<tr>
<td>Not employed</td>
<td>11</td>
</tr>
<tr>
<td>Student</td>
<td>3</td>
</tr>
<tr>
<td>Other grant</td>
<td>6</td>
</tr>
</tbody>
</table>

4.4 Civic status
Fifteen participants were married, 3 were in long term relationships, 7 were never married, 2 was divorced and 2 were widows.

4.5 Smoking
Six percent of the participants were smokers, 58% no-smokers, and 36% were ex-smokers.
Fifty-six percent of the participants were vaccinated with BCG, 31% were not, and 14% did not know if they were vaccinated.

4.6 TB-Symptoms
Pulmonary TB was diagnosed in 75% of the patients, and of those 8% also had extra pulmonary TB. Of the 34% with extra pulmonary TB, 11 had TB in the lymph nodes, 3% in the skeleton, 3% in the abdomen, 11% in the pleura, and 6% of unknown location. One of the patients did not know if he had extra pulmonary TB or not.
Twenty-nine respondents answered the question about TB-symptoms when diagnosed and now. The results are presented in Figure 3.a and Figure 3.b.
4.7 General health status
The participants were asked to mark their present general health status, and their
genral health status before starting TB-treatment an on a scale from 1 to 5, 1
meaning “very poor”, 5 meaning “excellent”. Seventy-five percent choose 1 or 2
before starting treatment, and 11% choose 4 or 5. On general health status now, 53%
choose 4 or 5, and 17% choose 1 or 2.

Figure 4.a, and Figure 4.b

4.8 Period of treatment
The average treatment time was 103 days, the median was 95 days. The patient who started his treatment earliest started 11/4 2010. The long treatment is because he is infected with MDR TB. This was the only patient that had MDR. The patients that started last with their treatment started 14/3 2012. Thirty-four percent of the patients got both diagnoses within one month, 25% was diagnosed with TB first, 31% with HIV first.

4.9 Reason for TB-test
All participants except for one states that they were tested for TB because they were ill, and 3 participants also gave their HIV-diagnosis as a reason for taking the test.

Figure 5

Concerning HIV-testing, 19 patients say they were tested because they were diagnosed with TB. The rest of the answers were scattered between “my partner was infected” and “worried that my actual or previous partner was infected”.

4.10 Acid-fast bacteria in sputum
Eighteen of the 36 respondents were AFB+. Of these 18, 6 had turned AFB-. Of these 6 patients, 4 were on ART and 2 were not on ART. Of the total 22 patients who were on ART, 10 (45%) were AFB+. Of the 13 patients that were not on ART, 7 (54%) were AFB+.

4.11 Adherence
Thirty participants claim they never missed an occasion to take their tablets, 6 participants missed one or to occasions. The reasons stated for not taking the medicine was “feeling depressed” in one case, “I was to tired” in another one, “simply
forgot” in two cases and “away from home” was the reason for the remaining two cases.
Of the 22 participants who were on ART, 4 ever missed taking their medication, one for a time of two weeks, the other 3 missed only one occasion.

4.12 Obstacles in following treatment
The obstacles that the patients faced in following the TB-treatment is presented in figure 6

Figure 6

4.13 Knowledge of disease and its transmission

When asked “what do you think will happen if you interrupt the TB treatment?” 75% of the participants answered that they “will get ill”, 8% that they “will feel better”. When it comes to knowledge about TB-transmission, 94% answered that it spreads through the air when coughing. The knowledge about co-infection is presented in figure 7.
Ninety-seven percent of the participants answered that HIV is transmitted through sexual intercourse without a condom, 69% that its infectious through blood (transfusions, sharing needles), 44% that is spreads with oral sex without condom, 50% that the fetus can be infected during pregnancy or delivery, 22% answered that it’s infectious through breastfeeding.

4.14 Positive and negative effects, TB treatment
Nine of the 36 patients, (25%), did not report any negative effects. The results of the experienced negative effects are presented in Table 3.a
Most of the patients, 78%, experienced one or more positive effects of the treatment. These positive effects are presented in Table 3.b
### Table 3.a
**Negative effects of TB-treatment**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less energy</td>
<td>26%</td>
</tr>
<tr>
<td>Sleeping disturbance</td>
<td>19%</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>33%</td>
</tr>
<tr>
<td>Feeling depressed</td>
<td>22%</td>
</tr>
<tr>
<td>Less interest in sex</td>
<td>15%</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>7%</td>
</tr>
<tr>
<td>Yellow eyes</td>
<td>7%</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>11%</td>
</tr>
<tr>
<td>Skin rashes</td>
<td>11%</td>
</tr>
<tr>
<td>Loosing weight</td>
<td>26%</td>
</tr>
<tr>
<td>Thinner face</td>
<td>11%</td>
</tr>
<tr>
<td>More abdominal fat</td>
<td>4%</td>
</tr>
<tr>
<td>Numbness in lower limbs</td>
<td>56%</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>No negative effect</td>
<td>30%</td>
</tr>
</tbody>
</table>

### Table 3.b
**Positive effects of TB treatment**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Percent of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>More energy</td>
<td>64%</td>
</tr>
<tr>
<td>Increased appetite</td>
<td>50%</td>
</tr>
<tr>
<td>Better sleep</td>
<td>53%</td>
</tr>
<tr>
<td>Feeling happier</td>
<td>56%</td>
</tr>
<tr>
<td>Spend more time in school or at work</td>
<td>14%</td>
</tr>
<tr>
<td>Spend less time in bed</td>
<td>8%</td>
</tr>
<tr>
<td>Easier to perform household activities</td>
<td>44%</td>
</tr>
<tr>
<td>No positive effects</td>
<td>22%</td>
</tr>
</tbody>
</table>
Patient weight
Patient weight when diagnosed and now is presented in table 4.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Range</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient weight when</td>
<td>22</td>
<td>40-67</td>
<td>53.7</td>
</tr>
<tr>
<td>diagnosed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient weight today</td>
<td>22</td>
<td>43-72</td>
<td>56.8</td>
</tr>
</tbody>
</table>

Of the 22 patients that answered the question about weight, 16 gained weight, and 6 lost weight. The median was 54.5 when diagnosed, and 56 “today”.
5 Discussion

5.1 Reason for testing

Only one patient was tested for TB without being ill. Thirty-one percent of the patients got their HIV-diagnosis more than one month before their TB-diagnosis. This indicates that HIV positive patients don’t get tested for TB. On the other hand, 34% of the patient got both their diagnoses within one month. Could be that the reason for that TB-test never was communicated clearly enough to the patients, and then off coarse, there is a risk for recall bias. 19 (52%) patients say they were tested for HIV because they have TB. These 52% are probably among the 59% of the patients who either had their TB diagnose first, or both diagnoses within one month. According to the WHO guidelines all HIV positive patients should be tested for TB. If this is the case or not in Tanzania is outside the boundaries of our study, but it would be interesting to get more knowledge about how the screening for TB in HIV patients, and the screening for HIV in TB patients work.

5.2 Symptoms when diagnosed and symptoms now.

The symptoms that the patients had before they got diagnosed, was typical TB symptoms such as cough, night sweats, and fever. Of the symptoms that the patients had when we met with them after at least 4 weeks of treatment, cough was the most common, but most of the patients did not have any symptoms at all. The treatment seems to be working fine, in the group that i examined. Bear in mind though, that the selection is not randomized. No one who died or was admitted took part in the survey.

Another result that gives an indicator that the treatment is working is the general health status. It’s the patient’s subjective view on how they felt prior to treatment, and the day I met with them. More than 50% of the patients agreed they have more energy, increased appetite, sleep better and are feeling happier after at least 4 weeks of treatment.

5.3 Adherence

The self reported adherence to treatment is good. There is a risk of over reporting that should not be forgotten.

I wanted to relate adherence to socioeconomic status and outcome, but since the reported adherence was so good, and the numbers of patients in the study so few, this was not possible.

5.4 Knowledge about disease and its transmission

94 % knew that TB spreads through the air when coughing. Only two knew that it can spread through food and beverages. The knowledge that TB could be spread through unpasteurized milk products is low. WHO says that there is not much known about bovine TB, but a study done in Tanzania shows that it might be a substantial fraction of the TB-burden. “Seven of 19 lymph node biopsies from suspected extra pulmonary TB patients were infected with M. tuberculosis and four with M. bovis. No mycobacteria were cultured from the remaining eight. Although the number of
samples was low, the high proportion (36%) of M. bovis isolates is of serious concern”[18]. This is a field that requires more research. Only 50% knew that the fetus might get infected with HIV during pregnancy or delivery, and 22% that it’s infectious through breastfeeding. This shows that people with HIV need to be further educated about the ways of transmission.

Ninety-seven percent of the participants answered that HIV is transmitted through sexual intercourse without a condom, 69% that it’s infectious through blood (transfusions, sharing needles), 44% that is spreads with oral sex without condom, 50% that the fetus can be infected during pregnancy or delivery, 22% answered that it’s infectious through breastfeeding.

5.5 Obstacles faced in TB-treatment
Paying for transport was the biggest obstacle according to the participants. This is a good reason for giving the patient the choice between DOT and Patient-Centered TB Treatment (PCT), as is the case in Tanzania. PCT gives patients the choice to either take the daily treatment at a health facility, supervised by a medical professional as under traditional DOTS, or at home, supported by a family or community member. There is no difference in outcome, when comparing DOT with self managed treatment[19]. Most of the patients therefore come to the clinic every two weeks to pick up medicines, instead of coming every day. Even so, paying for transport is the biggest obstacle.

5.6 Extra pulmonary and pulmonary TB
In the study, 75% had pulmonary TB, 34% had extra pulmonary TB and 8% had both. A study carried out 2008-2009 among HIV positive and TB infected TB patients admitted at Muhimbili National hospital in Dar es Salaam, showed that out of 387 patients, 15% presented extra pulmonary TB, and 32% presented both extra-pulmonary and pulmonary TB[20]. The difference between these studies is off course that one studied admitted patients, and I studied patients who are not admitted. The real numbers for how many pulmonary and extra pulmonary cases of TB there is in the HIV positive population of Dar es Salaam may be somewhere between. One population-based study of AIDS and tuberculosis in San Francisco showed that 60% of the HIV-positive group had at least 1 extra pulmonary site of disease compared to 28% of the HIV-negative group. Although this study was performed 1987, and the treatment for HIV has been improved a lot.

5.7 Methodological considerations and limitations
The Questionnaire and the patient information text were written in English and after that translated into Kiswahili by a secretary at our local supervisors office. After working with the questionnaire and using it on some patients, it came to my attention that some of the questions were mistranslated, and others switched places. Luckily I had not come very far, so we corrected the mistakes and carried on. It is possible though, that there are similar mistakes that did not come to my attention. Translating like this is an obvious weakness in the study.

It would have been better if the study population were bigger. I met difficulties on the way that made it impossible to find as many patients that I set out for. With a bigger number of participants the results would have been much stronger and it would have
been possible to do a multivariate analysis to find out if some of the findings were confounders. The study population was not randomized. No admitted or dead patients were included.

There is always a risk with misreporting when you do a survey. The patients are not trained in medicine, and might have misunderstood questions. There are also many cultural factors to consider. It is for example against the law to be homosexual in Tanzania, therefore I did not include questions that could have been of interest concerning homosexual relations. The diseases that I wanted to investigate are very stigmatized in Tanzania, which makes it harder to get honest answers. The interviews were held in Kiswahili, a language that I don't understand. Sometimes during interviews with patients, I got the impression that the nurse helped the patient a bit with some of the questions. I explained to the nurse that I was interested in finding out what the patient knew, not what she/he knew, and she seemed surprised at the idea.

It proved to be more difficult than I first thought to study the co-infection with TB and HIV. In Tanzania there is one TB clinic where you go to treat your TB, and one HIV clinic where you go to treat your HIV. The TB clinic has got information parameters about the patients TB, but not HIV, and the other way around. I choose to focus on the TB-clinic, and there pick the patient who was also HIV-positive. Therefore, I have not been able to get information such as CD4+ cell counts. With more time, this would have been possible.

Originally, I was planning to extract more data from the patient’s charts but this was more difficult than I first expected. The charts, if they existed, were handwritten, in no order, and contained various amount of information.

6 Conclusions
The main findings regarding men with HIV and TB in Dar es Salaam were:

- 34% of the patient got both their diagnoses within one month. 19 (52%) patients say they were tested for HIV because they have TB. 59% of the patients had their TB diagnose first, or both diagnoses within one month.
- The patients had typical TB symptoms such as cough, night sweats and fever
- The self reported adherence to treatment is good.
- Knowledge about diseases and its transmission is good, except for knowledge about HIV infection through pregnancy, birth and breastfeeding and TB infection through food and beverages.
- The biggest obstacle faced in following TB treatment was “paying for transport”.
- 75% of the patients had pulmonary TB, 34% had extra pulmonary TB and 8% had both.

Afterword
The timeframe for this study, in combination with difficulties in Tanzania that I could not foresee, made this study less reliable than I hoped. I however hope that I in some way made a small contribution, and by doing it learned a lot, not only about the co-infection of HIV and TB. I want to Thank my supervisors Rune and Patricia, and all the staff at the Tamovac MUHAS for all their help. And finally a big thanks to all the patients who participated, without them there would not be any study at all.
Populärvetenskaplig sammanfattning

Tuberkulos hos HIV-infekterade män i Dar es Salaam, Tanzania


WHO (World health organisation) har satt upp ett antal utvecklingsmål till år 2015. Ett av dessa handlar om HIV, där ett delmål är att halvera antalet döda i HIV orsakade av tuberkulos. För att klara detta behöver man bland annat bli bättre på att diagnostisera TB.

I den här studien har jag tittat på män som har både HIV och TB i Tanzanias huvudstad, Dar es Salaam. I Tanzania är det gratis att få behandling för båda sjukdomarna. Målet var bland annat ta reda på om behandlingen är framgångsrik, och vilka hinder patienterna stöter på när de ska fullfölja behandlingen.

Trettiosex patienter, på sex olika kliniker deltog i studien. Frågeformulär med flervalsfrågor och patienternas behandlingskort användes vid insamling av data. Patienterna fylldes antingen själva i frågeformulären, eller blev assisterade av en sjuksköterska eftersom många inte kan läsa och skriva. Frågeformuläret innehöll frågor angående sociala förhållanden, symptom, kunskapsfrågor om HIV och TB samt frågor om behandling och sidoeffekter av behandlingen.


Av de patienter som deltog i studien fick 52% både TB och HIV diagnosen inom loppet av en månad. Patienterna hade typiska TB symptom, såsom hosta, nattliga svettningar och feber. Det som patienterna upplevde som det största hindret för att kunna följa behandlingsplanen för TB var att betala för transport till kliniken. Sjutton procent av de som deltog i studien hade TB i lungorna, 34% hade TB i en annan del av koppen än lungorna och 8% hade TB både i lungorna och minst en annan kroppsdel.
References


8. TACAIDS.


Appendix

Patient Questionnaire

| TB infection among HIV-infected men in Dar es Salaam. |

Patient Questionnaire

**PID nr:**

1. **Gender:**
   - [ ] Female
   - [ ] Male

2. **Age:** ____

3. **Level of education:**
   - [ ] Never been to school
   - [ ] Primary school not finished
   - [ ] Primary school
   - [ ] Secondary school
   - [ ] High school
   - [ ] University/College

4. **Social history:**
   - [ ] Employed
   - [ ] Self employed
   - [ ] Not employed
   - [ ] Student
   - [ ] Disability pension
   - [ ] Other grant: _______________________

5. **Civic status:**
   - [ ] Married
   - [ ] Long term relationship
   - [ ] never married
   - [ ] Divorced
6. Do you smoke cigarettes?
- yes
- no
- Previously, but no longer

7. When were you diagnosed with Tb?
   Year: ____________ Month: ____________ Day:__________

8. Was the TB in the lungs?
   - Yes
   - No
   - I don’t know

9. Were you diagnosed with TB outside the lungs?
   - Yes
   - No
   - I don’t know

10. If you you have/had outside the lungs, in which organs did you get TB?
    - Lymphnodes
    - Skeletal
    - Abdomen
    - Urinary tracts/genetalia
    - Central nervous system
    - Skin
    - Lung sac
    - Heart sac
    - Other: ________________________________

11. When did you start your Tb treatment?
    Year: _________ Month: _________ Day: ________

12. How would you describe your general health status now?
    (Choose one of the numbers)
13. How would you describe your general health status just before starting TB treatment? (Choose one of the numbers)

Very poor 1 2 3 4 5 Excellent

14. What symptoms have you had from TB?
- [ ] Cough
- [ ] Cough with blood
- [ ] Fever
- [ ] Nightsweats
- [ ] Weightloss
- [ ] Fatigue
- [ ] Other: ________________________________

15. Did you ever get vaccination against TB?
- [ ] Yes
- [ ] No
- [ ] I don’t know

16. Why were you tested for TB? Tick one or several boxes.
- [ ] I was ill
- [ ] I was tested because I have HIV
- [ ] Someone in my surroundings has/had TB
- [ ] Other: ________________________________

17. Have you ever missed to take your TB medication?
- [ ] Yes
- [ ] No

If you answered no on question 17, please skip to question 21.
18. At how many occasions did you miss to take your TB medications the last two weeks?
Please state:_______________________

19. How many occasions per day do you take your TB medication?
Please state:___________

20. If you ever missed to take your TB tablets, what was the reason?
You may tick several boxes.

☐ I take medicine from a traditional healer instead
☐ Feeling depressed
☐ Because of my religious beliefs
☐ Simply forgot
☐ Away from home
☐ Run out of tablets
☐ Missed appointment
☐ Share tablets with others
☐ Could not afford to visit the clinic
☐ Was busy with other things
☐ Was too sick
☐ Was too tired
☐ Wanted to avoid side effects of TB drugs
☐ I felt sad or depressed
☐ I felt better
☐ I had too many tablets to take
☐ Other, please state:________________________________________

21. In your opinion, what are the greatest obstacles you face in following the TB treatment? You may tick several boxes.
No obstacles  
Paying for transport to and from the clinic  
Lost days at work due to appointment at the clinic  
Paying for medication  
Side effects of TB drugs  
Difficulties taking tablets at the right times  
Long way to the clinic  
Long queues at the clinic  
Too few appointments with physician  
Too many tablets to take  
Miss time from school  
Must help at home and therefore can not come to the clinic  
Too little information about the medication or treatment  
Too little information about how to take my medication  
Transportation problems to and from the clinic  
Too weak/ ill to visit the clinic  
Other, please state:____________________________________________

22. What do you think will happen if you interrupt the TB treatment? Tick one or several boxes.
☐ Nothing  
☐ I will get ill  
☐ I will feel better  
☐ The medicine might not work when I start taking them again  
☐ I can start taking the medication if i get ill again.  
☐ I don’t know

23. Since you started taking TB medication, have your quality of life improved?
☐ Yes  
☐ No, the same  
☐ No, worse

24. If you answered yes on the question above have you experienced any of the following positive effects since you started taking antiretroviral drugs?  
You may tick one or several boxes.
☐ More energy
Increased appetite
Better sleep
Felling happier
Spend more time in school or at work
Spend less time in bed
Easier to perform household activities
Other, please state: ____________________________

25. How is TB transmitted? Tick one or several boxes.
- Shaking hands
- Hugging
- Kissing
- Sexual intercourse with condom
- Sexual intercourse without a condom
- Breastfeeding
- Through the air (coughing)
- Through blood (transfusion, sharing needles, open wounds)
- Through food and beverages
- Mother to child during pregnancy or delivery
- Oral sex without a condom

26. What do you know about being ill from both TB and HIV at the same time? Tick one or several boxes.
- Because of HIV, people get ill easier from TB
- Because of TB, people get ill easier from HIV
- There is no relation between HIV and TB
- I don’t know

27. Did you experience any of the following negative effects during TB treatment?
   Tick one or several boxes.
- Less energy
- Sleeping disturbances
- Loss of appetite
- Feeling depressed
- Less interest in sex
- Diarrhoea
- Yellow eyes
- Blurred vision
- Skin rashes
- Losing weight
Thinner face
More abdominal fat
Numbness in lower limbs
Other, please state: _______________________________

28. When were you diagnosed with HIV infection?
Year: ____________ Month: ____________ Day:_________

29. Why were you tested for HIV? You can tick several boxes.
☐ I was ill
☐ My partner was HIV positive
☐ My child was HIV positive
☐ Worried that my actual partner was infected with HIV
☐ Worried that previous partner was infected with HIV
☐ I was pregnant
☐ Because I was diagnosed with TB
☐ Other: ________________________________

30. How is HIV transmitted? Tick one or several boxes.
☐ Shaking hands
☐ Hugging
☐ Kissing
☐ Sexual intercourse with condom
☐ Sexual intercourse without a condom
☐ Breastfeeding
☐ Through the air (coughing)
☐ Through blood (transfusion, sharing needles, open wounds)
☐ Through food and beverages
☐ Mother to child during pregnancy or delivery
☐ Oral sex without a condom

31. Do you take / have taken HIV medication?
☐ Yes
☐ No
☐ Have taken before but not anymore
If you answered yes on question 31, please answer the following questions. If you answered no, you may stop here.

32. When did you start your HIV treatment?
Year: ____________ Month: ____________ Day: _________

33. Have you ever missed to take your HIV medication?
☐ Yes
☐ No

34. At how many occasions did you miss to take your HIV medications the last two weeks?
Please state:_______________________

35. How many occasions per day do you take your HIV medication?
Please state:__________