

# Food Security and Nutrition among the Tuberculosis infected patients

A case study among the patients screened at Chest Clinic of Medical Research Institute of Colombo, Sri Lanka

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**vam**  
food security analysis

## Table of Contents

1.	Introduction .....	1
1.1	TB: A major health issue .....	1
1.2	TB in Sri Lanka .....	1
1.3	Tuberculosis and Nutrition .....	3
2.	Objectives.....	4
3.	Methodology.....	5
3.1	Data collection and sampling.....	5
3.2	Data analysis .....	5
3.3	Limitations of the study .....	5
4.	Results and Analysis.....	6
4.1	Food insecurity & Vulnerability.....	6
4.2	Malnutrition status of TB patients.....	10
4.3	Household characteristics of the TB infected patients.....	11
5.	Conclusion.....	13
6.	Recommendations .....	13
7.	Annex 1 .....	14
	What is Tuberculosis and how is it caused? .....	14
	Mtb Infection.....	14
	TB Disease.....	14
	Symptoms .....	15
	Diagnosis.....	16
	Treatment.....	16
	DOT (Directly Observed Treatment).....	17
	Multi-drug resistant TB (MDR- TB) .....	17
	TB Around the World.....	18
	World Tuberculosis Day - 24 March 2014 .....	18
8.	Annex 2: TB Patient Interview Checklist.....	20
9.	Bibliography .....	26

## List of Tables

TABLE 2: STRATUM SPECIFIC AND OVERALL PREVALENCE OF INFECTION AND ARTI (2013).....	2
TABLE 1: NUMBER OF TB INCIDENTS AND DEATHS IN 2011.....	19

## List of Figures

FIGURE 1: RISK OF TB WITH LOW BODY-MASS INDEX (BMI) .....	3
FIGURE 2: COPING STRATEGY INDEX.....	6
FIGURE 3: RELATIVE HOUSEHOLD EXPENDITURE .....	6
FIGURE 4: INCOME POVERTY .....	7
FIGURE 5: FOOD CONSUMPTION OF TB PATIENTS .....	8
FIGURE 6: FOOD SECURITY .....	8
FIGURE 7: HOW THE DAILY FOOD NEEDS WERE MET OVER THE PAST WEEK .....	9
FIGURE 8: MALNUTRITION STATUS OF TB PATIENTS .....	10
FIGURE 9: MALNUTRITION STATUS VS AGE OF TB PATIENTS .....	10
FIGURE 10: PERCENTAGE OF PATIENTS LIVING ALONE IN A HOUSEHOLD .....	11
FIGURE 11: PRIMARY LIVELIHOODS OF PATIENTS .....	11

# 1. Introduction

## 1.1 TB: A major health issue

Tuberculosis (TB) is a global health issue with over 2 billion of the world's population currently infected with TB out of which about 1 million die every year despite the availability of effective treatment for cure.<sup>1</sup> Sri Lanka had 10,329 new cases with a death toll of 511 in 2011. Only 4,126 patients were cured despite the availability of free health services.<sup>2</sup> We believe that this low rate of cure and mortality might remain in Sri Lanka because of co-morbidity and lack of proper nutrition. The aim of this study would be to assess the socio-economic and nutritional status of TB infected patients currently receiving treatment. The final outcome of this study would be to make an assessment to see if food supplementation would benefit TB infected patients in Sri Lanka. Refer to Annex 1 for details on Tuberculosis disease.

## 1.2 TB in Sri Lanka

TB has been a disease endemic to Sri Lanka for centuries. Traditionally known as “Kshaya Rogaya” or “Kasa Rogum” TB was considered as a hereditary disease which resulted in stigmatization and isolation of TB patients in the past. However, improved awareness and education through the health system is changing this notion gradually.

Nevertheless, there still remains some form of stigmatisation against TB patients that drives them away from their hometowns in to urban settings out of fear of isolation from their society in rural areas. This has resulted in clusters of TB patients living in the city of Colombo and has increased the spread of the mycobacterium infection. Furthermore, the risk of infection is aggravated because of slum like conditions under which most of these patients live in due to poverty. The high prevalence of TB in Urban settings is clearly evident in table 2 given below.

According to the first system of notification in 1909 the mortality from Tuberculosis was 44.5 per 10,000 living persons. The first chest clinic was known as the Anti-Tuberculosis Institute was opened in Pettah in 1916.

Currently, TB patients in Sri Lanka receive free treatment, regular follow up care and in some cases even financial assistance. Nevertheless, TB is still continuing to be a major health problem in the country with 8767 new cases in 2013, of which more than half (more than 5000 annually or 27/100,000) are smear-positive TB cases and if untreated will continue to spread the disease.

65% of adults and 45% of the general population in Sri Lanka are said to be infected with latent TB while nearly 17,000 people are currently estimated to suffer with the TB disease. The risk rate is also estimated to decline at a rate of 2% per annum. Colombo and other sub urban areas, densely populated are supposed to record the highest rates of infection. An estimated 50,000 people are expected to develop TB disease over the next 5 years with a majority patients from the economically age category, 15-54 years.

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<sup>1</sup> (World Health Organisation , 2014)

<sup>2</sup> (National Programme for Tuberculosis Control and Chest Diseases, Ministry of Health , 2013)

The estimated rate for smear-positive TB cases is substantially higher amongst males than in females, except in children.

It was estimated that 530 people receiving treatment died in the year 2011 of TB in Sri Lanka. However, this may not capture those who didn't receive TB treatment.

Sri Lanka currently has two systems for reporting TB cases:

1. Through hospital reports
2. Through Directly Observed Treatment Short-course (DOTS)<sup>3</sup> reports.

The emergence of multi drug-resistant tuberculosis (MDR-TB), defined as resistance against at least isoniazid and rifampicin, may pose a threat to the success of TB eradication programmes. All smear-positive patients who fail Category 1 or 2 regimens either have sputum samples taken or are referred to the National Reference Laboratory, for culture and drug-susceptibility testing, which is performed at the National Reference Laboratory. Among the 827 positive cultures on which Drug Sensitivity Testing was performed, 12 cultures were detected with MDR, in 2004. The fact that a substantial number of patients are treated in the private sector where data on proper case management are not readily available, potentially contributes to the further emergence of resistant TB strains.

'Annual risk of Tuberculosis Infection' (ARTI) can be defined as the probability of acquiring new infection or re-infection over the period of 1 year. Despite the simplicity, efficiency and reliability of the ARTI to assess the prevalence and efficiency of TB control, Sri Lanka is yet to conduct one. However, a national tuberculin survey has been conducted to estimate ARTI in 2013.<sup>4</sup> The results are as follows.

**Table 1: stratum specific and overall prevalence of infection and ARTI (2013)**

	Urban Sector	Rural Sector	Estate Sector
Prevalence of TB estimated	13.9%	2.2%	2.3%
ARTI	1.4%	0.2%	0.2%

Furthermore, the national estimate for the prevalence of TB was found to be 4.2% with the national estimate for ARTI being 0.4%. It was estimated that annual burden of newly infected or re-infected TB cases with potential of developing into active cases was 400/100,000, almost 10 times higher than the national new case detection rate of 48/100,000.

It is clearly evident that the urban sector shows a very high prevalence compared to the rural and estate sectors.

<sup>3</sup> The DOTS mortality figures only include patients who die during their treatment of any cause.

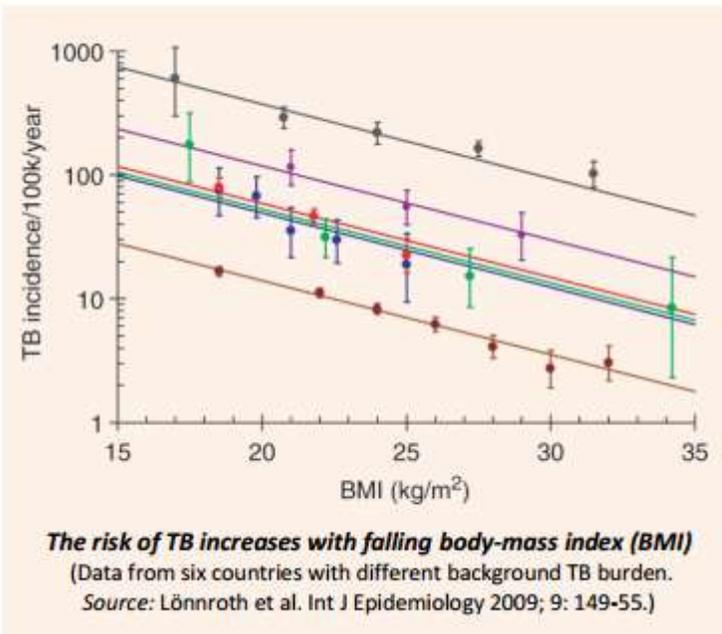
<sup>4</sup> (Pushpa Ranjan Wijesinghe, 2013)

### 1.3 Tuberculosis and Nutrition

TB and malnutrition are both problems of considerable magnitude that go hand in hand in many of the developing countries in the world to the very extent that TB is considered to be one of the most frequent underlying causes of wasting worldwide.<sup>5</sup> TB mortality rates in different economic groups are known to be inversely related to their economic levels. It has also been noted that the nutritional status in patients with active TB is significantly lower when compared to healthy controls. The low nutrition status in turn could also lead to secondary immunodeficiency that increases the TB infected patient's vulnerability to other infection. The wasting prevalent in TB patients could be tied with the low nutrition status that results from the loss of appetite, nutrient and micro-nutrient mal-absorption and altered metabolism.<sup>6</sup>

The following diagram clearly indicates a co-relation between the risks of TB with falling Body mass Index.<sup>7</sup>

Figure 1: Risk of TB with low body-mass index (BMI)



Undernourishment increases the risk of acquiring the infection and developing active TB. Further undernourishment will promote poor recovery, the high risk of death with TB and contracting secondary other infections.

<sup>5</sup> (Krishna Bihari Gupta, 2009)

<sup>6</sup> (Krishna Bihari Gupta, 2009)

<sup>7</sup> (2009)

## 2. Objectives

The Objectives of this study are as follows:

1. To study about the current status of TB in Sri Lanka and the major threats and challenges to household food security due to TB:  
There is a lack of TB related data in Sri Lanka and this study hopes establish some key data on the current TB situation in Sri Lanka. This study also hopes to assess the major threats and challenges faced by the household of TB patients due to food insecurity.
2. To study the negative impacts on the patients due to socio economic issues and stigmatization of active TB patients:  
Stigmatization of TB patients is evident in Sri Lanka. This study also aims to assess the impact on these patients due to stigmatisation via household information and background information collected.
3. To study the nutritional status among TB patients and its associations with food security:  
TB has long been known to affect the nutrition status of its patients. This study hopes to assess how badly TB patients have been affected nutritionally and what the patients current food security status is.
4. To study the possible benefits of supplementary food assistance along with proper TB treatment plans to patients.  
Speculation suggests that TB active patients undergoing treatment would benefit with food supplementation as nutrition is a major factor affecting treatment success rates. This study hopes to explore the probable benefits of a food supplementation plan.

## **3. Methodology**

### **3.1 Data collection and sampling**

The assessment collected primary data using a structured questionnaire with six modules mainly containing closed and open ended questions (Annex I). The data captured in the six modules are as follows.

Module 1: Background information

Module 2: Income sources

Module 3: Food consumption

Module 4: Coping strategies

Module 5: Expenditure

Module 6: extra notes

Background information was used in order to get a better idea of who the patient is. Data on income sources, expenditure were used to gain insight into the financial situation of the patients and to note the proportion of their income spent on food. Food consumption patterns were assessed to gain insight into the patients' nutrient status. In addition to the data collected from this questionnaire basic health details such as BMI was collected from each patient to capture their malnourishment status.

The patients were interviewed by either a medical doctor or Public Health Inspector (PHI). Patients were randomly picked at the queue of the TB clinic in the Medical Research Institute.

The data collection period continued for two weeks until the number of interviews exceeded 100. A total of 112 TB patients were interviewed. Data collection took place from 4- 16 November 2012.

### **3.2 Data analysis**

Primary data were entered into a spread sheet by using Microsoft Excel. Data were cleaned and analysed by using SPSS software. The Primary analysis tables were converted into figures, charts and graphs in order to facilitate the proper interpretation.

### **3.3 Limitations of the study**

The sample size was limited and very difficult to generate outputs by geo-graphical regions. The picked patients are mostly from Metro-Colombo and urban regions in Colombo. Therefore it is difficult to generate findings relevant to the other regions of the country as many factors become variable when looked at in a larger context. And also, the regional characteristics of the patients reported at Colombo clinics might be varied compared to the patients in the other regions.

Moreover, most people who reported their details were fallen into the lower income groups. Therefore, the actual situation may be different because the higher income groups may have completely different food consumption habits, coping strategies and nutritional statuses.

## 4. Results and Analysis

### 4.1 Food insecurity & Vulnerability

The coping strategy index is a key indicator of vulnerability to food insecurity. According to the standards, a score over 18, the worst, is categorized as high coping while a score of 0, the best, is categorized as no coping. According to data collected 37% of the individuals diagnosed to be patients were categorized with no coping while 42% of the patients were categorized with low coping. 16% of the patients were categorized with medium coping while 5% of the patients were categorized with high coping. The 5% of patients showing high coping strategies can be assumed to be mostly in the group that live alone and fend for themselves. Whilst the 16% showing a medium coping score can be a combination of both those living alone and those having less support from the household as depicted through the indicator in Figure 2. Out of the total patients 21% showing medium and high coping scores can be considered vulnerable to food insecurity.

Figure 2: Coping Strategy Index

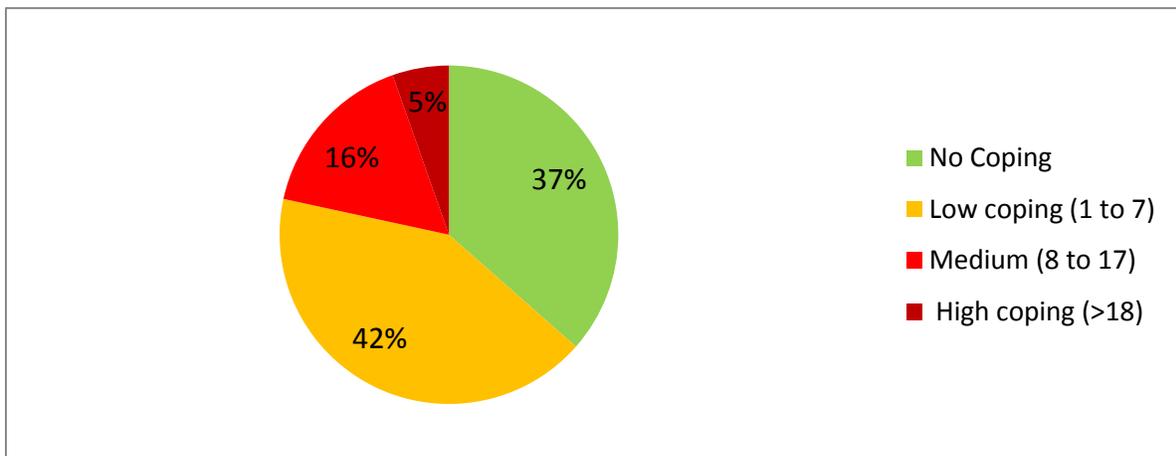
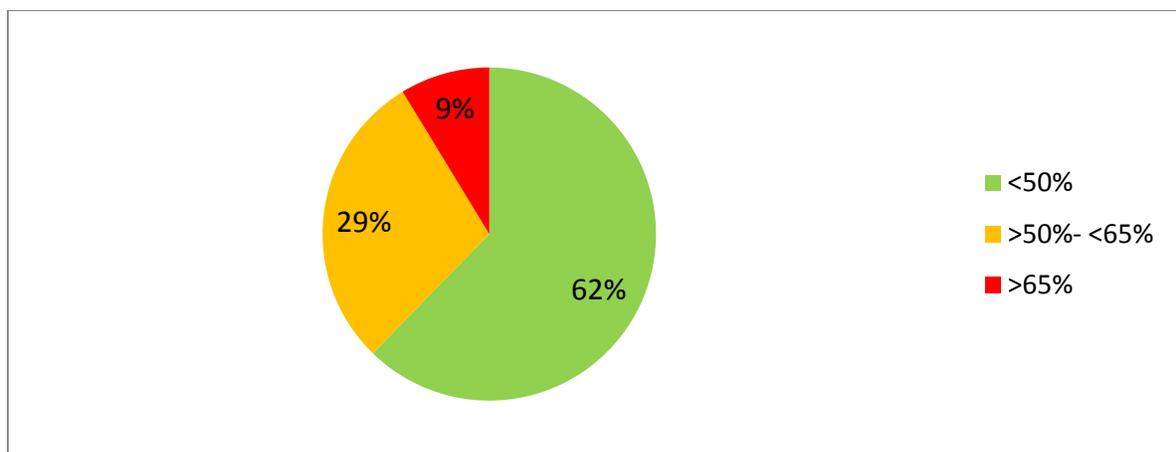


Figure 3: Relative household expenditure



The diagram above (Figure 3) portrays the number of patients spending more than 65% of their income on their household expenses, between 50% and 65% of their income on household expenses and less than 50% of their income on their household expenses. 9% of the patients can be noted spending more than 65% of their income on household expenses and can be classified as poverty struck and vulnerable towards food insecurity. This 9% can be assumed to be facing hardships and may be in a worse situation than expected if they're within the 10% living alone as depicted in Figure 3. If individuals amongst the 9% are the sole breadwinners for their family it will not only be them but their family that can be assumed to be going through hardships. Furthermore, 29% of the individuals diagnosed of TB can be noted to spending between 50 and 65 percent of their income on household expenses. These individuals can be classified as a group just managing through with household expenses either with the support of the rest of the household or by themselves. The rest of the 62% of the patients are said to spend less than 50% of their income on household expenses and can be classified as less vulnerable to food insecurity.

Figure 4: Income Poverty

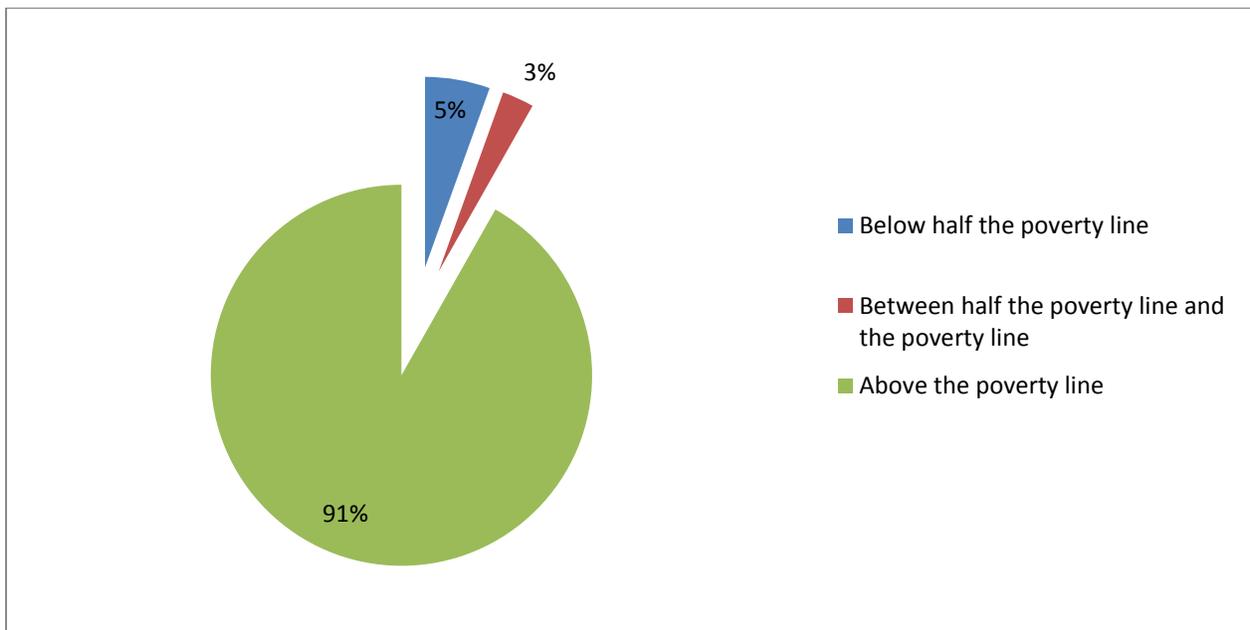
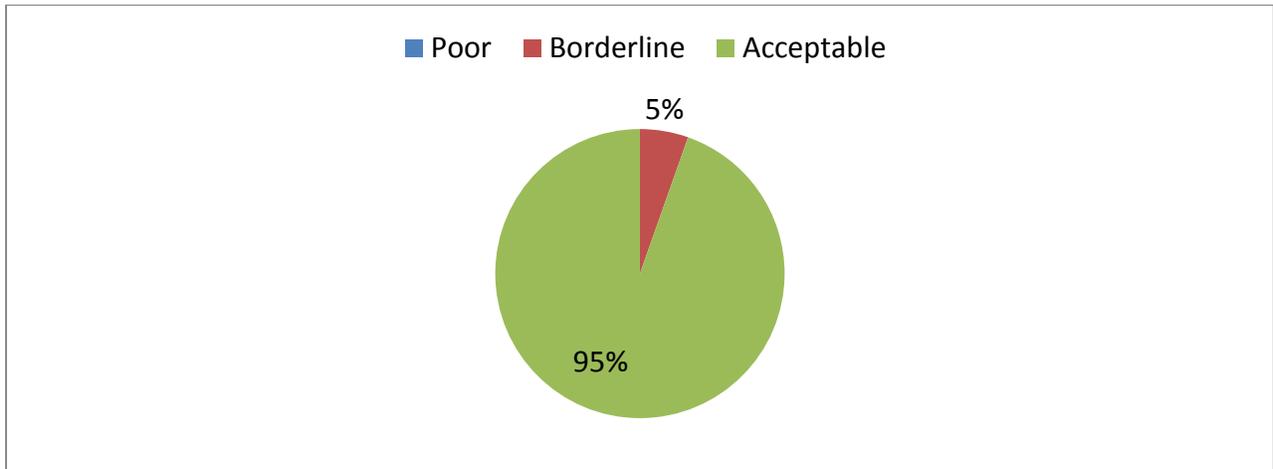


Figure 4 above depicts the poverty levels of the TB infected patients. According to Figure 4 it can be noted that 91% of the patients are above the poverty level and have enough money to fend for their day to day needs. It can also be seen that 8% of the patients are below the poverty line with 3% between half of the poverty line and the poverty line. This diagram portrays that generally the TB patients are financially stable. However the extent to which the 91% is better off is questionable as the poverty line measures only those who are unable to fend for their basic needs.

Figure 5: Food consumption of TB patients



The food consumption levels have been illustrated in Figure 5. According to the diagram 95% of the patients have acceptable food consumption habits. However 5% of the patients can be noted to have food consumption habits that borderline acceptable and poor. These 5% of the patients may face adverse effects as improper food consumption habits can lead to the development of the resistant TB that may be difficult or impossible to cure.

Improper food consumption habits may also lead to lack of proper nutrition which can result in micro and macro nutrient deficiencies. These deficiencies may weaken the immune system and make the human body vulnerable to attack from other disease. Getting another disease while having TB will further harm the body. In addition to harming the body it will affect the recovery process and nullify the benevolent effects of the TB medication.

Figure 6: Food security

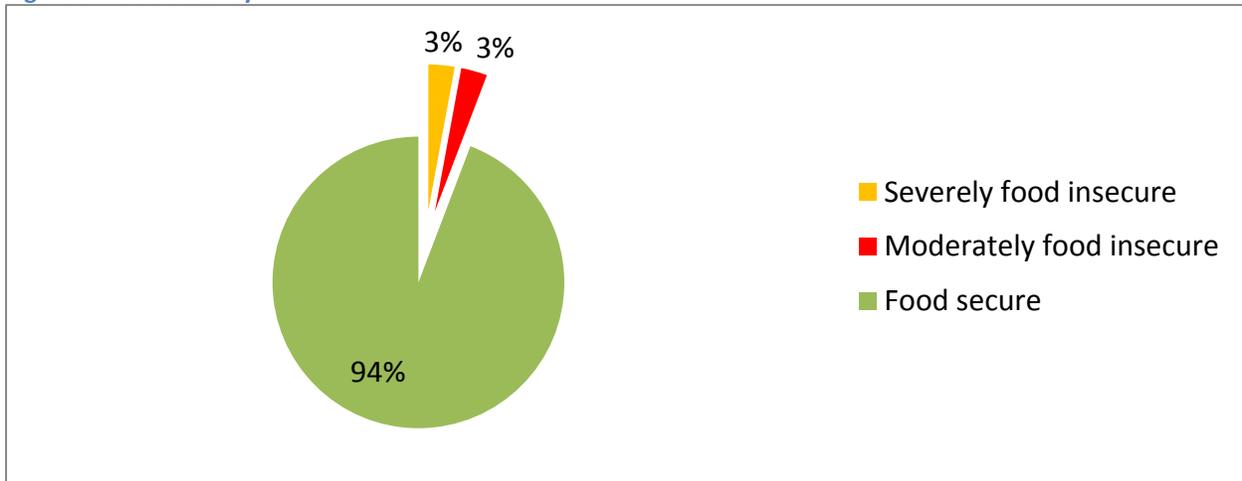


Figure 6 above shows the food security level of the TB patients in the study. The food security levels have been calculated by using key three variables. According to the results 94% of the patients were food secure with 3% moderately food insecure and 3% severely food insecure. The 6% of patients that are food

insecure can be assumed to be in the group of individuals within the 8% of patients below the poverty line depicted in Figure 4 and the 5% of the patients showing borderline food consumption levels.

However, the data used for this study was from a specific area and cannot be used to get a general idea about food security levels of TB patients island-wide as food security levels vary depending on the area concerned. However, comparing these food security levels to the normal food secure people in the area is useful to have an idea of the food security level specifically amongst TB patients.

**Figure 7: How the daily food needs were met over the past week**

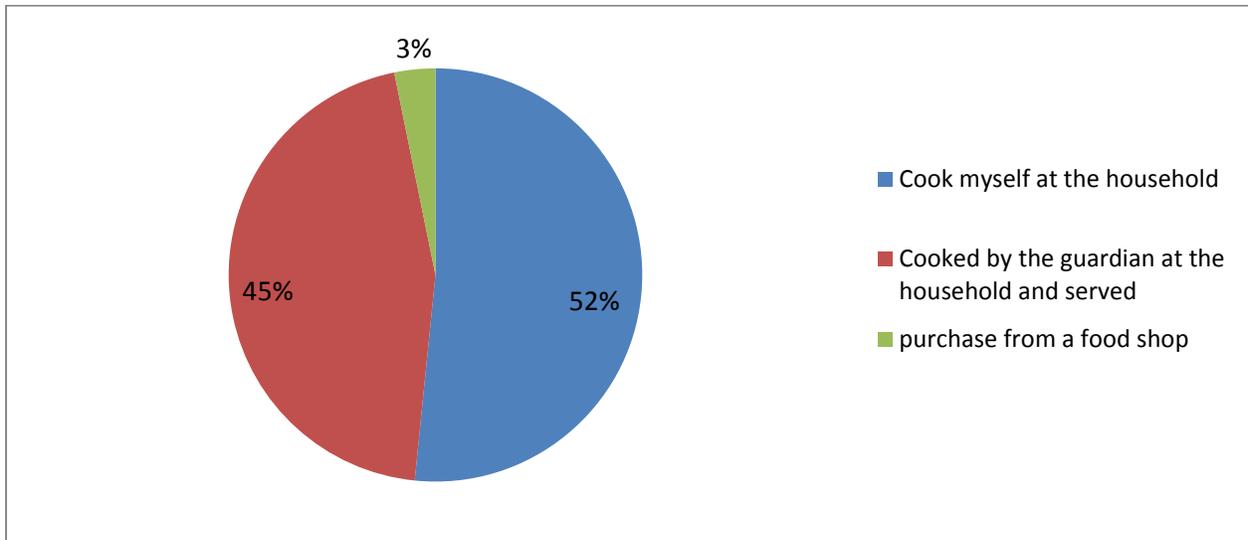


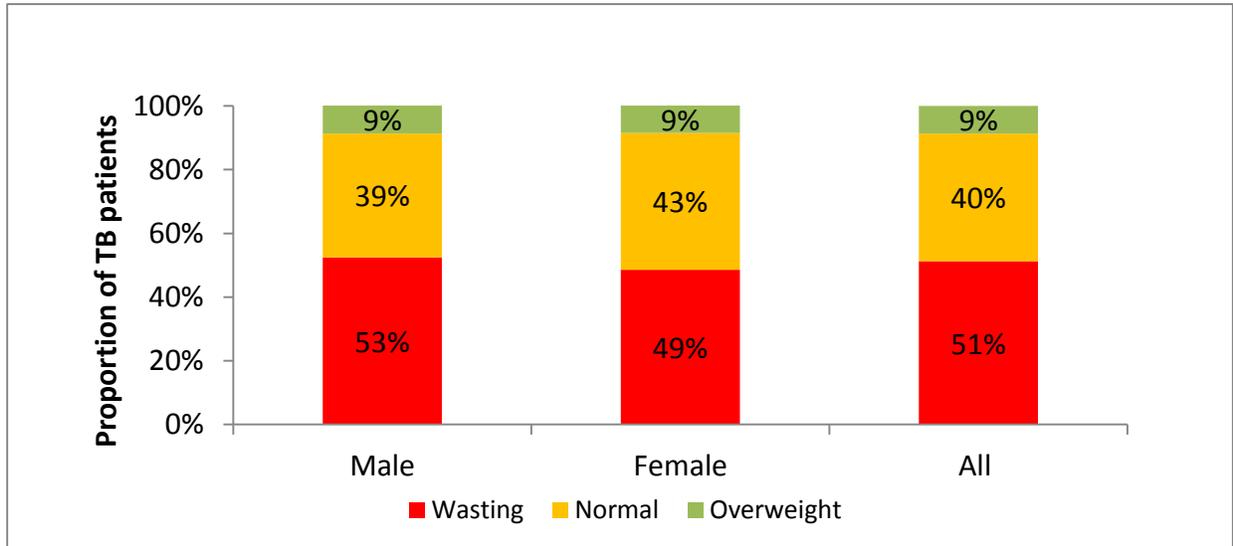
Figure 7 depicts the main food preparation methods amongst TB patients. It can be noted that 52% of the individuals prepare their own food at home while 45% are served food prepared by a guardian at home. The rest of the 3% have been recorded to purchase their meals from the shop.

This works as a good indicator as to which percentage of the TB patients receive support from the household. According to the diagram it can be seen that 52% of the patients have to fend for themselves and prepare their own meals even though 90% of the patients live in a household (shown in Figure 10). The majority of the 3% of the patients who buy their food from the shop can be assumed to be amongst the 9% of individuals that live alone in their household as it may be easier and cheaper to buy food for a single individual rather than to buy a food for just one individual. Based on this assumption and the readings portrayed in Figure 7 and can be said that only 45% of the patients actually receive support from their household even though 90% do not live alone.

This is a very important indicator as household support is can a huge advantage to the patient. During the medication most patients complain of loss of appetite together with many other side effects. Patients tend to skip meals or avoid nutritious meals due to the loss of appetite. This can result in nutrient deficiencies and other disease. Moral support and motivation from the household can help the patient to stay motivated and consume nutritious food and take the medicine in a timely manner. This encouragement can be considered to be a great advantage as improper intake of food and medicine may result in the development of the TB resistant bacteria.

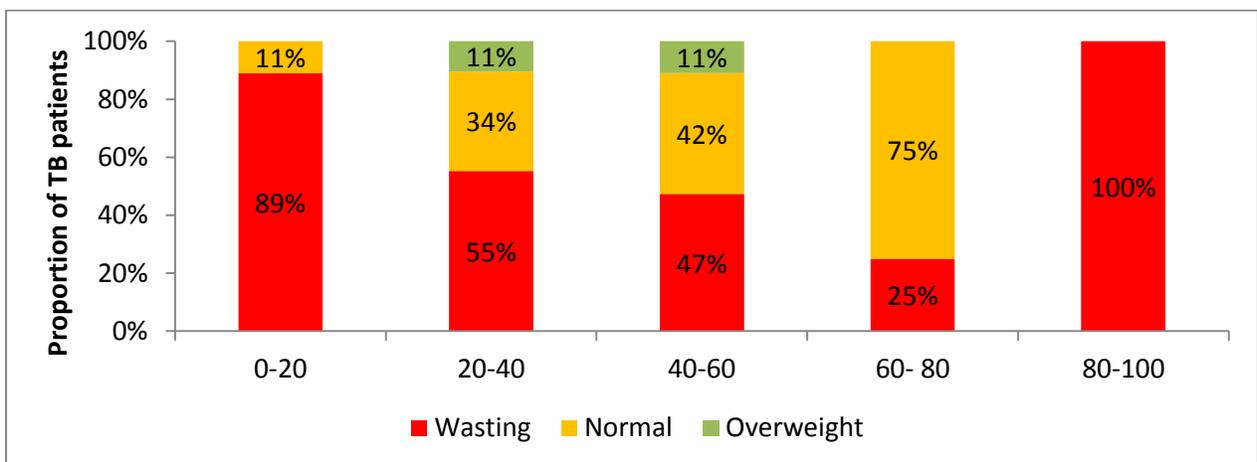
## 4.2 Malnutrition status of TB patients

Figure 8: Malnutrition status of TB patients



As per Figure 8, the malnutrition levels between male and female TB patients are very similar with equal obesity levels and a wasting rate of 53% and 49% in males and females respectively. The results indicate that there are more female patients (43%) that are normal than male patients (39%). On average the wasting rate amongst TB patients is 51%, a relatively high rate of wasting. These results indicate that TB could have an impact on the malnutrition status of patients, particularly wasting. A better idea can be gotten by comparing these results to the malnutrition rates of the specific areas the data was collected from.

Figure 9: Malnutrition status Vs Age of TB patients



According to Figure 9, the highest malnutrition wasting rates are evident amongst the oldest age group, 80 – 100 years with a 100% wasting rate. Following this the next highest wasting rate of 89% was prevalent amongst the 0 – 20 age group. Age groups 20 – 40 and 40 – 60 have a relatively low wasting rate (55% and

47% respectively) compared to the less than 20 and over 80 age groups but have overweightness of 11% in both groups. Comparatively the best age group in terms on nutritional levels is the 60 – 80 age group; it has a 75% rate of nutritionally normal patients. These reading suggest that the less than 20 age category and over 80 age category are the most vulnerable to the adverse effects of TB. The 20 -40 age group category also shows some form of vulnerability with a 55% rate of wasting and a 11% rate of obesity but is in a better condition compared to the oldest and youngest categories.

### 4.3 Household characteristics of the TB infected patients

According to Figure 10, it is evident that approximately 90% of patients live in a household. This portrays that most patients have support from other household members. Which means that they are better off compared to the 10% living alone as the side effects of TB medicine can be difficult to deal with when alone. It was also evident it was mostly unmarried patients that live alone due to isolation from their own family. The average household size of the TB infected household was reported as 4.8 which is higher than the national average HH size of 4.1.

Figure 10: Percentage of patients living alone in a household

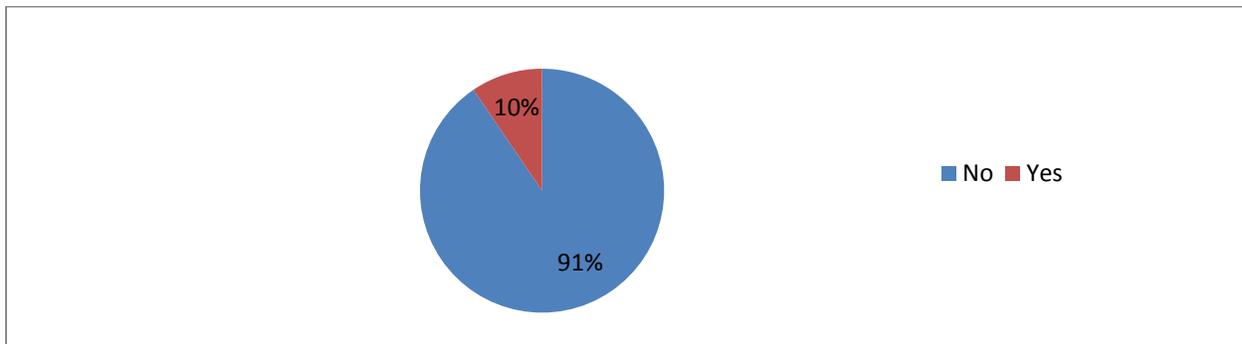
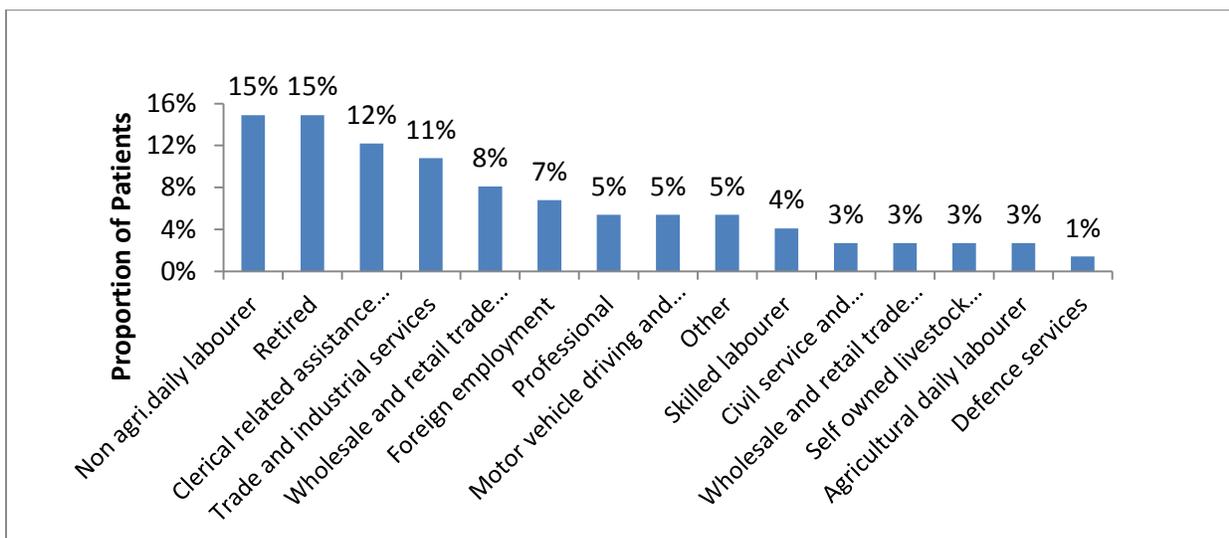


Figure 11: Primary Livelihoods of patients



As per Figure 11, the primary livelihood of patients is non-agricultural daily labour and retired pension dependent individuals; both account for 15% each of the proportion of patients. The high rate of retired individuals as patients and their dependency on retirement benefits suggests that the patients are of an older age and not from the working class. The next livelihood that showed a high rate of TB infected patients was clerical related staff with a proportion of 12% and trade and industrial services with a proportion of 11%.

According to the statistics three of the four livelihood groups showing the highest number of TB patients may entail activities that expose individuals to unhygienic environments. This may be a reason as to why the numbers of TB patients are high in the first four livelihood groups excluding retired personnel. Retired personnel may be of an older age group and therefore may have weaker immune system that increases their vulnerability to TB.

The rest of the livelihoods comprise of a fairly low proportion of patients: less than 8%. Three livelihoods show a proportion of 5% while 4 others show a proportion of 3%. This depicts the spread of the proportion of patients over a number of livelihoods.

## 5. Conclusion

In conclusion it could be depicted that the malnutrition status of TB patients was significantly high for specific age groups particularly amongst the young and old. Wasting was at a staggering 51% amongst the TB patients suggesting a need for nourishment. The youngest age group (< 20 years) and the oldest age group (>60yrs) showed higher rates of wasting compared to other age groups among the TB patients.

Furthermore it was noticed that 9% of the HH were reported as below the poverty line and that only 6% of the Households with TB patients were reported to be food insecure. However caution should be taken as the food insecurity index is based on rural set up combined with the fact that 9% uses more than 65% their income on food.

Moreover, 5% of the TB patients were reported to have poor food consumption habits and 21% of the patients reported practice medium or high negative coping.

The main livelihood groups affected by TB were concluded to be workforce in the non-agricultural daily labour, clerical related assistance services, Trade and Industrial Services, wholesale workers and retail trade workers.

## 6. Recommendations

In order to get a broad picture, the survey could be completed in all the other TB treatment centres across Sri Lanka. This would give an idea about patients from different geographical backgrounds, income groups, livelihood groups and communities and would aid in giving a comprehensive idea of the TB situation in Sri Lanka.

Furthermore, the accuracy of the study could be improved if the data could be collected from all TB patients in Sri Lanka irrespective of income group. However, the feasibility of this proposal can be questioned.

Use an Annual risk of Tuberculosis Infection (ARTI) to assess the prevalence and efficiency of TB control.

## 7. Annex 1

### What is Tuberculosis and how is it caused?<sup>8</sup>

Tuberculosis, also known as TB is an infectious bacterial disease caused by Mycobacterium Tuberculosis (Mtb) which is not limited to but most commonly affects the lungs. It is a severely contagious airborne disease transmitted from person to person via droplets generated by coughing and sneezing of people with the active pulmonary TB. These droplets are inhaled by susceptible persons who are in close proximity. The Mycobacteria entering the respiratory passages causes small areas of infection called granulomas. There are two stages of the illness: TB infection and TB disease.

In individuals with a strong immune system the mycobacteria can remain dormant without leading to the active disease with symptoms. This is known as the latent Tuberculosis infection. In others the active symptoms of TB develop and is known as TB disease. Active TB can develop immediately after exposure to a sick contact or can manifest years later when the immunity declines in the patient with latent TB infection.

### Mtb Infection

Based on recent public health data, approximately a third of the world's population is infected with Mtb. However, only one in ten infected persons goes on to develop the active disease.<sup>9</sup>

In asymptotic infected persons the only evidence of the presence of mycobacteria is a positive tuberculin skin test. TB bacteria can remain dormant for years without developing in to the active disease and most people may never develop symptoms in their lifetime.

However, one in ten with latent TB Infection (LTBI) are at risk of developing active disease. LTBI can be treated with a simple medical regimen to reduce the risk of developing active disease.

### TB Disease

The TB disease usually develops in those with a weakened immune system seen in HIV infected patients, malnourished, patients receiving immune suppressive therapy, elderly and those with an immature immune system such as children.

During the initial infection of the lung, the TB bacteria can spread via the bloodstream to other organs such as lymph nodes, liver, vertebrae, Central nervous system, gastrointestinal and genitourinary tracts.

### *Who is most at risk?*

Even though all age groups are at risk, Tuberculosis mostly affects young adults in their most productive years.

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<sup>8</sup> (htt)

<sup>9</sup> (World Health Organisation, 2014)

People who are co-infected with HIV and Mtb are said to be 21 to 34 times more likely to develop active disease due to their weakened immune system.<sup>10</sup> The risk of active TB is also greater in persons suffering from other conditions that impair immune function such as malnutrition. Children can be considered to be at risk, particularly HIV infected children. About half a million children (0-14 years) fell ill with TB, and 74 000 HIV-negative children died from the disease in 2012. Use of tobacco contributes to the increase in morbidity and mortality of TB.

Worldwide over 95% of cases and deaths with TB are in developing countries and in developing countries the number of people living in poverty is relatively high, so is food insecurity.<sup>11</sup> This results in under-nutrition which increases the risk of developing TB and its complications.

Therefore, it can be said that young adults in developing countries are more at risk of being afflicted with the disease and tobacco use increase the likelihood of complication.

## Symptoms

The symptoms of TB depend on the affected organ. The most common site is the lung and is known as pulmonary Tuberculosis. Pulmonary Tuberculosis is one of the most infectious forms of TB.

A TB infection occurring in any other part of the body is known as extra pulmonary TB and is less infectious when compared to pulmonary TB.<sup>12</sup>

### Pulmonary Tuberculosis

One of the most common symptoms of pulmonary Tuberculosis is a cough lasting for more than 2 weeks. This may or may not be accompanied with several other symptoms such as shortness of breath, chest pain, low grade fever, night sweats, loss of appetite, loss of weight, fatigue and haemoptysis.<sup>13</sup>

### Extra- Pulmonary Tuberculosis

Symptom of extra-pulmonary TB depends on the organ affected. The TB infection can affect any of the following organs. <sup>14</sup>

- Bone and joints (skeletal TB)
- Lymph nodes ( lymph node TB)
- The digestive system (gastrointestinal TB)
- The bladder and reproductive system (Genitourinary TB)
- The Nervous system (central nervous system TB)

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<sup>10</sup> (World Health Organisation, 2014)

<sup>11</sup> (World Health Organisation, 2014)

<sup>12</sup> (NHS, 2012)

<sup>13</sup> (National Programme for Tuberculosis Control and Chest Disease , 2011)

<sup>14</sup> (NHS, 2012)

Infection at these sites maybe associated with constitutional symptoms such as fever, night sweat, loss of weight and fatigue in addition to local symptoms.<sup>15</sup>

## Diagnosis

There are tests and laboratory investigations available to diagnose TB infection and pulmonary disease. The recommended investigations in the Sri Lankan Health care System are: <sup>16</sup>

1. Tuberculin skin test (to detect latent infection)
2. Chest X-Ray
3. Sputum culture for mycobacteria
4. Sputum Microscopy

Other Tests for TB may include biopsies and cultures of affected organs or tissues, Bronchoscopy for biopsy or culture, CT scan of the affected area, Lung biopsy, and Mycobacterial culture of bone marrow or blood and Pleural biopsy.

The disease can also alter the results of tests such as Complete blood count (CBC), Peripheral blood smear, Erythrocyte sedimentation rate and C-reactive protein.

## Treatment

TB can be treated and cured with medication. Treatment of TB infection is often with one medication given for 6 to 9 months. Treatment of TB disease is with a combination of anti- tuberculosis medications the duration of which can be on an average of 6 months but may take as long as two years depending on the involved organ.

The TB disease medication normally varies between 6 months to 2 years and drug doses several times a day depending on the type of infection. It is vital that TB medication be continued properly according to doctor's plan; it can lead to drug resistance if medication isn't followed properly. This will mean that the drugs will no longer work and that the TB patient might result in disability or even death.

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<sup>15</sup> (National Programme for Tuberculosis Control and Chest Disease , 2011)

<sup>16</sup> (National Programme for Tuberculosis Control and Chest Disease , 2011)

## **DOT (Directly Observed Treatment)**

DOT is the name given to the World Health Organisation (WHO) recommended TB control strategy. This strategy is the most important strategy in TB control. According to this strategy the patient's medication is taken under the direct supervision and observation of a health worker or trained volunteer. This will ensure that the patient receives the correct medication in the correct dosage during the correct time frame without interruption. This will also guarantee that the patient completes the full course of treatment. Further, it also helps motivate the patient and helps early detection of any adverse effects the disease or medication may have on the patient.

According to the WHO, DOT is the most cost-effective way to stop the spread of TB in communities with a high incidence, by curing it.

Prevention is better than cure. Therefore it would be best avoiding the risk of developing the disease. Such risks of catching TB include:

- being in close proximity of people with the disease
- Living in crowded or unclean conditions
- Having poor nutrition

Avoiding such risks can also help prevent the spread of disease.

## **Multi-drug resistant TB (MDR- TB)**

Multidrug-resistant tuberculosis (MDR-TB) is a form of TB caused by bacteria that do not respond to the two most powerful anti-TB drugs, isoniazid and rifampicin. The primary cause of MDR-TB is the inappropriate or incorrect use of anti-TB drugs, or use of poor quality medicines. All which cause drug resistance as the Tuberculosis bacilli becomes resistant to the medication. Disease caused by resistant bacteria fails to respond to conventional, first-line treatment. MDR-TB is treatable and curable by using second-line drugs. However second-line treatment options are limited and recommended medicines are not always available. In some cases more severe drug resistance can develop. Extensively drug-resistant TB, XDR-TB, is a form of multi-drug resistant Tuberculosis that responds to even fewer available medicines, including the most effective second-line anti-TB drugs.

About 450 000 people developed MDR-TB in the world in 2012. More than half of these cases were in India, China and the Russian Federation. It is estimated that about 9.6% of MDR-TB cases had XDR-TB.

If proper medication isn't used and followed the disease increases the chances of killing the patient as the bacteria fail to respond to the medication.

## TB Around the World

Tuberculosis (TB), a disease that is curable but still kills three people every minute. (Stop TB Partnership, 2014) It has infected over 2 billion people, also 1/3<sup>rd</sup> of the world's population. Out of which about 35% of the infected 2 billion reside in the South- East Asian region and 20% of the infected 2 billion reside in India Sri Lanka's closest neighbor.

Existing conditions such as extreme poverty, poor sanitation, lack of proper health care and the emergence of new multi-drug resistant Tuberculosis bacilli have complicated the disease in the South-East Asian region making TB a cause for concern in the region.

Despite impressive progress towards the global targets for reductions in TB cases and deaths with drops in mortality by over 45% since 1990 the global burden remains huge with significant challenges to be faced.

In 2012, 1.3 million patients died of TB of the estimated 8.6 million cases that were noted. The fact that over 95% of the deaths occur in low and middle income countries further aggravates the situation creating a drastic impact on the needy: the poor and vulnerable communities.

### Global level Challenges

- Around 3 million people (equal to 1 in 3 people falling ill with TB) are currently being 'missed' by health systems.
- There is slow progress in tackling multi-drug resistant TB (MDR-TB): 3 out of 4 MDR-TB cases still remain without a diagnosis, and around 16 000 MDR-TB cases reported to WHO in 2012 were not put on treatment.
- Provision of antiretroviral therapy (ART) for TB patients known to be living with HIV needs to increase to meet WHO's recommendation that all TB patients living with HIV promptly receive ART.

*- World Health Organization*

## World Tuberculosis Day - 24 March 2014

In 2014, the WHO together with the Stop TB Partnership launched the World Tuberculosis Day for the year 2014 with the slogan "Reach the 3 million". The significance behind the number 3 million in the slogan is the one third of the 9 million TB infected patients that are missed by health system's screening system annually.

World TB Day provides the opportunity for TB affected people and their communities, government civil society organizations, health-care providers, and international partners to call for further action to reach out to the 3 million by taking initiative towards innovative approaches that ensure access to diagnosis, treatment and cure to anyone suffering from TB.

World TB day is also an opportunity to create awareness worldwide about the burden of TB and its annual status on prevention and control efforts. This day also serves as an opportunity to mobilize commitment from political and social groups for further improvement.

**Table 2: Number of TB incidents and deaths in 2011**

Region	Incidence	Prevalence	Deaths	Population
Africa	2,300,000	2,500,000	220,000	857,382,000
Americas	260,000	330,000	21,000	943,019,000
Eastern Mediterranean	660,000	1,000,000	99,000	608,628,000
Europe	380,000	500,000	45,000	899,500,000
South-East Asia	3,500,000	5,000,000	480,000	1,830,361,000
Western Pacific	1,700,000	2,500,000	130,000	1,808,797,000
Global Total	8,800,000	11,830,000	995,000	6,947,687,000

## 8. Annex 2: TB Patient Interview Checklist

### Patient checklist



#### Before you start the interview...

- Say your name and that you are working on behalf of the United Nations World Food Programme.
- Explain that we are conducting a survey about food in the household.
- Say the interview will take about 15 minutes. Ask for permission to start the interview.
- Remember to be patient and respectful at all times.

#### Geographical information

A1	District Code	_ _
A2	District code	_ _
A3	DS division name	_ _   _ _   _ _
A4	GN name	_ _   _ _   _ _
A5	Clinic name	_ _   _ _   _ _
A5	Patient Registration Number	_ _   _ _
A6	Patient Reg. Date	_ _  DD _ _  MM _ _  YYYY

#### Section 1: Background information

1. 1	Are you living alone in the household? 0 = No( Skip to section 1.3) 1 = Yes	_
1. 2	If yes, why are you living alone? <b>(do not read the answers)</b> 1= Never married 2= No body in the family are alive 3= Family members isolated purposely 4= Migrated outside the village and living alone 5= Other, Specify	_ _____

1. 3	If no, How many persons live in this household?	_ _  persons
1. 4	Have you changed your place of residence for last twelve months? 0 = No( Skip to section 1.6) 1 = Yes	_
1. 5	If yes, what was the main reason for changing? <b>(do not read the answers)</b> 1. Other members of the family discriminations due to the disease 2. Easy to live outside the village without knowing to anyone 3. Other, specify	_ _____
1. 6	When was the first time that you were screed as a TB patient	Year:  _ _ _ _ _  Month:  _ _   _ _
1. 7	When did you attended the clinic for treatment	Year:  _ _ _ _ _  Month:  _ _
1. 8	What is the distance to your clinic from your current residence	_ _  kilometres

## Section 2: Income sources

What are your/ household's main income sources?	Income source (last 30 days) (use codes)
2.1 First income source	_ _ , or other: _____
2.2 Second income source	_ _ , or other: _____
<b>Income sources:</b>	
1= Civil service and management	
2= Professional( Medical doctor, Engineer and Teaching ect)	
3= Clerical and related assistance services	
4= Trade and industrial services	
5= Wholesale and retail trade owned (including market vending, sidewalk vending and peddling, small shop)	
6= Wholesale and retail trade owned by others (including market vending, sidewalk vending and peddling, small shop)	
7= Self owned livestock management	
8= Livestock management owned by others	

- 9= Fishing
- 10= Defence services ( Military, Police, security etc)
- 11= Garment servants
- 12= Motor vehicle driving and operation
- 13=Skilled labourer (such as mason, carpenter etc)
- 14 = Agricultural daily labourer (unskilled)
- 15 = Other daily labourer (unskilled, non-agricultural)
- 16= Retired
- 17= foreign employment
- 18= Other, specify \_\_\_\_\_

**Section 3: Food consumption**

<b>3.1 How did you serve your daily food needs mainly within last seven days?</b> 1=cook myself at the household 2=cooked by the guardian at the household and served 3=purchase from a food shop 4=Other, specify		__ _____
<b>How many days in the last week did you consume the following food items?</b> Write 0 for food items that were not consumed.		Number of days in the last week (0 to 7 days)
3.2	Rice and other cereals (finger millet etc.)	__  days
3.3	Tubers (potato, sweet potato, cassava etc.)	__  days
3.4	Bread / Chapti / Roti	__  days
3.5	Pulses / Dhal	__  days
3.6	Fish	__  days
3.7	Meat (beef, pork, chicken, mutton)	__  days
3.8	Eggs	__  days

3.9	Dairy (curd, liquid milk, powder milk etc.)	__  days
3.10	Coconut products, palm oil, vegetable oil, fats etc.	__  days
3.11	Vegetables (including leaves)	__  days
3.12	Fruits	__  days
3.13	Sugar / Jaggary	__  days

#### Section 4: Coping

**How many days in the past week has anyone in your household/you had to adopt the below coping mechanisms?**

Write the number of days that each mechanism was used in the last week (0 to 7). Write 0 for mechanisms that were not used.

4.1	<b>Eating less-preferred foods</b>	__  days
4.2	<b>Borrowing food/money from friends and relatives</b>	__  days
4.3	<b>Limiting portions at mealtime</b>	__  days
4.4	<b>Limiting adult intake</b>	__  days
4.5	<b>Reducing the number of meals per day</b>	__  days
4.6	<b>Go to bed feeling hungry</b> (anyone in the household)	__  days
4.7	<b>Go a whole day without a meal</b> (anyone in the household, exclude fasting)	__  days

#### Section 5: Expenditures

	<b>How much money did your household spend on the following food items in the <u>last 30 days</u>?</b>	<b>Rupees spent in the last 30 days</b>
5.1	Rice	_ _ _ _ _ _ _
5.2	Bread / Chapati / Roti / Hoppers / String hoppers	_ _ _ _ _ _ _
5.3	Pulses / Dhal / Gram	_ _ _ _ _ _ _
5.4	Fish	_ _ _ _ _ _ _

5.5	Meat (beef, pork, chicken, mutton)	_ _ _ _ _ _ _
5.6	Eggs	_ _ _ _ _ _ _
5.7	Curd	_ _ _ _ _ _ _
5.8	Palm oil, vegetable oil, coconut oil, fats	_ _ _ _ _ _ _
5.9	Milk (liquid and powder)	_ _ _ _ _ _ _
5.10	Vegetables (including leaves)	_ _ _ _ _ _ _
5.11	Fruits	_ _ _ _ _ _ _
5.12	Coconut products (except oil)	_ _ _ _ _ _ _
5.13	Sugar / Jaggary	_ _ _ _ _ _ _
5.15	Prepared food (food and drinks from restaurants and stalls)	_ _ _ _ _ _ _
5.15	Special nutritional food (FBF, etc.)	_ _ _ _ _ _ _
5.16	All other food items	_ _ _ _ _ _ _

	<b>How much money did your household spend on the following non-food items in the <u>last30 days</u>?</b>	<b>Rupees spent in the last <u>30 days</u></b>
5.17	Payments on debts	_ _ _ _ _ _ _
5.18	Milling	_ _ _ _ _ _ _
5.19	House rent	_ _ _ _ _ _ _
5.20	Education	_ _ _ _ _ _ _
5.21	Consumable households items (e.g. soap, candles, matches, detergent)	_ _ _ _ _ _ _
5.22	Cooking fuel/firewood	_ _ _ _ _ _ _
5.23	Transportation (busses, hired three-wheelers etc.)	_ _ _ _ _ _ _
5.24	Communication (phone bills and phone booth charges)	_ _ _ _ _ _ _
5.25	Livelihood inputs (tools, seeds etc.)	_ _ _ _ _ _ _



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