# A STUDY TO EVALUATE THE EFFECTIVENESS OF STRUCTURED TEACHING MODULE ON THE KNOWLEDGE AND PRACTICES OF HEALTH WORKERS REGARDING TUBERCULOSIS AND DOTS THERAPY IN RURAL KOLAR, KARNATAKA

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# CHAPTER - I INTRODUCTION

If you use mind to study reality, you won't understand either your mind or reality. If you study reality without using your mind, you will understand both.

- Bodhi dharma

### INTRODUCTION

Tuberculosis (TB) is an ancient disease and its description has been found in the ancient Buddhist and Chinese writings. Tuberculosis is known by many names in India as 'Kshyya Rog', 'Tapedik' where as in western world it means Phthisis. In a Greek word, it means consumption (TB seemed to consume people from within with its symptoms of blood stained cough, fever, pallor, and long relentless wasting). In 'Ayurveda Tuberculosis is called "Rajayakshmadi" literally the kind of diseases. The condition Tuberculosis results in a drying up and loss of tissue (ksaya).

### **Concept of TB**

Tuberculosis is caused by Mycobacterium tuberculosis, and rarely by Mycobacterium bovis or Mycobacterium avium. The generic name of mycobacterium was introduced by Lehmann and Neumann in 1896. The organism was named so because of the mold like (Myo: fungus; bacterium: bacteria) pellicular growth of these organisms in liquid medium. The true bacterial nature of these organisms was soon established. The genus mycobacterium is the only genus in the family mycobacteriaceae and order Actinomyceetales. (Sharma Surendra and Mohan alladi, 2009)

Mycobacterium tuberculosis is a slender, straight or slightly curved bacilli with rounded ends, occurring singly, in pairs or in small clumps. It measures, 1-4  $\mu$ m x 0.2-0.8 $\mu$  (average 3 $\mu$ m x 0.3 $\mu$ m) in size. These bacilli are acid-fast (difficult to stain, but once stained, resist decolourisation with dilute mineral acids and are called acid-fast or AFB), non-sporing, non-capsulated and non-motile. Ziel-Neelsen staining is useful to study the morphology of these organisms. With this stain, tubercle bacilli are seen bright red (acid-fast), while the tissue cells and other organisms are stained

blue. Tubercle bacilli may also be stained with the fluorescent types and appear yellow luminous bacilli under the fluorescent microscope. Beaded or barred forms are frequently seen in M.tuberculosis. They are gram positive but are difficult to stain with the gram stain (Baveja, 2006).

### Historical aspects of TB

According to National Institute of Tuberculosis, Bangalore website (2007), The TB germ first infected animals, possibly inhaled or ingested from the soil, and it would have been passed on to humans through the animals flesh and milk. It affects many kinds of animals including cows, birds, fish and reptiles. The earliest evidence of TB in humans was from a Neolithic grave near Heidleberg, Germany, dating back to 5000BC, examinations of the spines of mummies and of tomb paintings from 4000BC confirms that TB was a common disease in Egypt and skeletal remains in Italy from the same date also showed TB in the spine. In 1720, the English physician Benjamin Marten was the first to Guess in his publication on, "a new theory of consumption". He stated that TB could be caused by "wonderfully minute living creatures", which once they had gained a foothold in the body, could generate the lesions and symptoms of the disease. It may be likely that by an habitual lying in the same bed with a consumptive patient, constantly eating and drinking with him or by very frequently conversing so nearly as to draw in part of the breath he emits from the lungs, a consumption may be caught by a sound person. By the mid 17<sup>th</sup> century, one in five deaths in London as recorded in the bills of mortality was due to TB (consumption). TB soon became an epidemic in Britain and major cities in the USA and Europe becoming known the "white plague" (TB sufferers appear markedly pale).

In the early eighteenth century Dr.Marten had written tuberculosis in deep. This showed the cause chain of infection and cure of the disease were still in dark.

Hermann Brehmer, a Silesian botony student suffered from TB and he was instructed by his doctor to seek a healthier climate. He traveled to Himalayan Mountains where he could pursue his botanical studies while trying to rid of the disease. He returned home cured and began to study medicine. In 1854, he presented his doctoral dissertation bearing the auspicious title, "Tuberculosis is a curable disease". In the same year, he built an institution in Gorbersdorf where, in the midst of fir trees, and with good nutrition, patients were exposed on their balconies to continuous fresh air. This setup became the blue print for the subsequent development of Sanatoria, a powerful weapon in the battle against tuberculosis. In 1865, the French military doctor Jean-Antoine Villemin demonstrated that consumption could be passed from humans to cattle. On 24th March 1882 in Germany Dr. Robert Koch discovered the cause of TB by mycobacterium tubercle bacillus. Hence the tuberculosis also known as Koch's disease and this day has been celebrated as World TB day every year. In 1890, Koch announced a glycerin extract of the tubercle bacilli as a "remedy" for tuberculosis calling it tuberculin. It was not effective, but was later adapted by Vonpirquet for a test for pre-symptomatic tuberculosis. This laid the foundations for the use of tuberculin in mantoux and heaf tests, which continue to be used today as important diagnostic and epidemiological tools. Robert Koch received the Nobel Prize in medicine in 1905 for this discovery. After discovery of tubercle bacilli, the real fight against TB then began. The measures available to doctors were still modest like improving social and sanitary conditions and ensuring adequate nutrition were all that could be done to strengthen the body's defenses against the TB bacillus. Sanatoria were found throughout Europe and United States this time

providing care like isolating the sick and the source of infection, from the general population, while enforcing rest together with a proper diet and well regulated hospital to assist the healing process.

In 1898, at Harvard University, the American bacteriologist Theobald Smith described the bovine tubercle bacillus called mycobacterium bovis, a variant of M.tuberculosis that infects and causes disease in cattle. Although there was some initial confusion and controversy over the role of M. bovis as a cause of tuberculosis in human beings a growing awareness of its importance in causing human tuberculosis led to commencement of animal tuberculosis control programmes in several industrialized countries during the early decades of the twentieth century. These programmes were based on the identification (by tuberculin testing) and slaughter of infected cattle, meat inspection and the wide spread heat -treatment (pasteurization) of cows milk. In several of the industrially developed nations including the UK, Canada and the USA this had dramatic effect on reducing the number of new cases of human tuberculosis, especially amongst farm workers and children. During that time serious public health threat of bovine tuberculosis was being brought under control the causative bacillus, M. bovis was being harnessed into the service of human kind as a vaccine to prevent tuberculosis. A strain of the bacillus was gradually weakened (attenuated) by repeated subculture by the French bacteriologists. Albert leon calmette and Camille Guerin. Eventually the vaccine, termed bacilli calmette Guerin (BCG) was produced and first used in 1921 and continues to be used throughout the world today.

### **Portal of Entry of TB Disease**

History reveals that TB disease entered India through the European migrants who came in search of greener pastures following the industrial revolution in Europe 1 and 3. TB was not a major problem in the Indian subcontinent in the early part of 19<sup>th</sup> century. TB was extremely rare in the upper plateau of the western Ghat, Nilligri hills and on the northern and southern slopes of Himalayas. The disease was however known as Kshaya or Yakshma by its symptoms. It can be presumed that the TB disease at that time was considered as one of the low profile disease. During the British rule, Dr A Lankaster for the first time conducted a Tuberculin survey in 1921 and the results revealed that high incidence of TB infection among the study population. Towards the end of 19<sup>th</sup> century, TB had penetrated the Indian population and had become quite common.

### Birth of Sanatoria in India

With the industrialization taking the forefront, the country witnessed migration of population from rural to the urban areas resulting in congestion of big cities and towns. The infrastructure development was not commensurate with the population growth. This became a fertile for the spread of infectious disease among the population. The first TB sanitarium was opened in Tilaunia near Ajmer of Rajasthan in the year 1906. It was intended mainly girls from mission schools and orphanages in North India who were suffering from TB. In 1908 a sanatorium at Almora in the foothills of Himalayas was started. Christian missionaries pioneered the starting of sanatorium for isolation of TB patients. The Indian Philanthropists took a lead in 1909 by opening a sanitarium at Dharampore in Simla Hills under the management of consumptives' homes society of Bombay. This resulted in encouraging the

governmental agency to open the King Edward Sanatorium at Bhowali in 1912. This was followed by opening up sanatoria in different parts of the country. With the passage of time and influx of patients to the sanatoria, it was realized that the available beds in these institutions were grossly inadequate to meet the requirements. In order to overcome this crunch, it was deemed fit to open TB dispensaries and TB clinics to supplement the activities carried out by the sanatoria. In India the first TB dispensary was established in 1917 at Bombay followed by another two dispensaries, one at Madras and the other at Calcutta, in 1929. The first free TB clinic in the country was started by Ramakrishna mission at Delhi in 1933. Following this, similar clinics were opened in other parts of the country.

### **Burden of Tuberculosis**

TB is one of the world's top ten causes of adult mortality. Of the world's population, one third is infected with tuberculosis. The world health organization estimates that 8.8 million people develop active TB disease every year, of these people 95% live in developing countries. It is estimated that TB kills between two to three million people each year roughly one person every 15 seconds. Of these deaths, 98% are in developing countries (WHO Report, 2006).

Globally there are more than 8 million new cases of tuberculosis each year; India and china alone account for more than 3 million of these cases(WHO report, 2006).



Fig. 1.1: showing the burden of TB

India has more cases of tuberculosis than any other country in the world and twice as many cases as china, which has the next highest number (Report on RNTCP, 1997).

Every year 1.8 million people in India develop tuberculosis. The nation wide annual risk of TB infection survey completed in 2003 showed that, each year 75 new smear positive pulmonary cases occur per 1,00,000 population, with a higher incidence in the northern states and in the urban population (TB India RNTCP status report, 2005).

Narayan, Kolappan and Selvakumar (2005) conducted a study to estimate the annual risk of tuberculosis infection in order to know the burden of TB in India. The results showed that the estimated number of bacillary cases was 3.8 million. The number of abacillary cases was estimated to be 3.9 million and in that extra pulmonary cases were 0.8 million giving a total burden of 8.5 million for 2000.

The states of Uttar Pradesh, Andhra Pradesh, Bihar, Haryana, Madhya Pradesh, Assam and Karnataka together account for 82% of the case finding activity during the quarter, while they constitute 82% of the population of the country (Report on NTI, 2003).

### Economical and social burden of Tuberculosis

The economic burden of TB on India is huge and is a great loss in terms of lives, money and lost workdays. TB was declared a "global emergency" by WHO in 1993 because of its toll on the health of individuals and the wider social and economic impact on overall development of a country. In India, TB causes huge economic loss with about 17 crore workdays lost due to the disease. The annual economic cost of tuberculosis to the Indian economy is more than 13,000 crore. The most affected age

group (15-54 years) is the economically productive age. Over 70% of TB cases in India occur in this productive age group (TB in India, RNTCP status report, 2009).

Ingle etal (2005) conducted a study on economic burden of TB among 156 patients attending DOT centers in Delhi. The results showed that the mean expenditure before registration in DOT centre was Rs.3385.5 irrespective of all socioeconomic classes. The upper lower socio-economic classes of patients incurred maximum mean expenditure of Rs.9782. Mean duration of wage loss was found to be 47.1 days. Study participants incurred economic loss both in terms of direct and indirect costs, more in lower socioeconomic group, besides delay in attending DOT centers for treatment. The study concluded that awareness campaign focusing on treatment availability and DOT centers could help in reducing such economic loss.

Tuberculosis is mainly a disease of the poor. The majority of its victims are migrant laborers, slum dwellers, residents of backward areas and tribal pockets. Poor living condition, malnutrition, shanty housing and overcrowding are the main reasons for the spread of the disease (TB in India, RNTCP status report, 2009).

Narayanan etal (2007) conducted a cross-sectional socio-economic survey to assess the standard of living index (SLI) and prevalence of TB in a 32780 house holds of rural population, south India. The results showed that 57% of the TB patients had a low standard of living index and prevalence of TB was higher amongst the landless (p<0.001), those living below the property line (p< 0.01) and in katcha houses (p<0.001), suggesting that tuberculosis disproportionately affects those with a low standard of living index.

TB is more common among men. They are more likely to default out of treatment. This increased morbidity and mortality in men affects the family and in particular the women in the family. Women bear the burnt of the disease more then

men. They ignore the disease initially fearing its interference in their daily chores. TB deaths among women have major implications for child survival, economic productivity and family welfare. There is also fear of stigma and rejection from family members and society. This is one main reason why women try to suppress TB symptoms. It is estimated that annually more than 100000 women with TB are abandoned by their families. Children of parents suffering from disease also have to bear the burden. More than 300000 children are forced to leave school every year, because their parents have TB. The social stigma of the disease adds to the burden for both men and women. Studies indicate that while men have to deal with the stigma at their workplaces and in the community, women are ostracized in the household and neighbored (TB in India, RNTCP status report, 2009).

Kelley etal (1996) conducted an exploratory study among 28 active tuberculosis patients on isolation and stigma; the experience of patients with active tuberculosis. The results revealed that all patients felt that their family and friends avoided and patients responded to these attitudes by isolating themselves. The study concluded that an awareness of patient's experiences can help nurses to understand behavior and help design interventions that address this behavior. Modifying community attitude and behavior poses a longer term challenge to the elimination of TB

### **Disease aspect of Tuberculosis**

Tuberculosis is a communicable disease caused by mycobacterium tuberculosis. Tuberculosis is divided into pulmonary and extra pulmonary TB. When TB affect the lung called pulmonary TB and when TB affects other parts of the body like lymph nodes, gastro intestinal tract, genito-urinary tract, meninges, pleura, pericardium, bones, joints, skin and other organs called extra pulmonary TB. The

pulmonary TB is classified as sputum positive pulmonary TB and sputum negative pulmonary TB. The pulmonary TB is an infectious disease. This means that people living with or coming in close contact with a patient who has infectious tuberculosis (in particular, smear positive) can catch the infection. Therefore it is very important to identify suspects who have symptoms of TB early in the course of the disease and ensure their examination. The diagnosis of extra pulmonary is based on one culture positive specimen from the site of the disease or histological evidence of TB.

Politis and Varkey (1981) in his article on pulmonary tuberculosis; a multifaceted disease, stated that one reason for the increasing misdiagnosis of tuberculosis in adults is the fact that one of every three may present with a roentgenographic pattern considered atypical for the disease. Such atypical patterne are pleural manifestations nodular forms of the disease and infiltrates in unusual locations. So awareness of these variations would help in the diagnosis of TB, which is progressively becoming a responsibility of physician involve in primary care.

### Risk of TB

TB primarily affects the lungs (80%) called pulmonary TB. TB can affect one in three people in the world .Only when the bacteria become active do people become ill with TB. Bacteria become active as a result of anything that can reduce the person's immunity, such as young and old, men and women, rich and poor, however some groups are vulnerable to get into TB illness are individuals with HIV/AIDS, Advancing age, those who are suffering from medical conditions like poorly controlled diabetes mellitus, chronic lung diseases such as chronic bronchitis and silicosis, cancer, advanced renal disease, malnutrition, alcoholism, diseases for which steroid therapy is prescribed or treatment with immunosuppressive drugs, heavy

smokers, the elderly, those belonging to lower socioeconomic groups, those who use intravenous drugs, those living /working in nursing homes, prisons, homeless shelters and drug treatment centers (VHAI, 1993).

Gupta and Rajesh Gupta (2003) studied a clinical profile in a study of 485 patients with Pulmonary TB, in that 87.7% were males and 12.2% were females, the proportion of smokers was more than that in the general population. In another study, among tuberculosis patients of both sexes aged more than 30 years, as compared with the same age and sex sufferers from other diseases, there were higher to moderate smokers and fewer light to non-smokers among the tuberculosis. The results revealed that, in smokers, the disease was more severe and disseminated type with more pulmonary tissue destruction and bacterial discharge. The healing process in smokers progressed more slowly, often requiring a hospital stay. Sputum conversation was also delayed and cavities got closed in fewer patients. It was concluded that smoking and tuberculosis primarily affect the lungs as both enter the lung through the inhalation route. Although smoking has no etiological role in TB, yet higher prevalence of TB has been observed in smokers.

Tekkel etal (2002) conducted a study on "Risk factors for pulmonary TB in Estonia. The objective of the study was to determine the risk factors for pulmonary TB incidence in Estonia. A case control design was used. 248 adult tuberculosis patients treated in Tallinn hospital between January 1999 and June 2000 were selected as sample. A questionnaire was administered to collect information on potential risk factors. The results revealed that the main risk factors for TB were not married, less educational level, low income, having been in prison, not having own place of residence, current unemployment, current smoking, alcohol consumption, shortage of food and contact with TB Patients. Risk of TB decreased for over weight persons

whose individual economic situation had improved during the last year. The study concluded that major risk factors were related to poverty and low socio - economic status.

### Mode of spread of TB

TB spreads from sputum positive pulmonary untreated TB patients to others. When a person with pulmonary TB coughs, sings, or sneezes, droplets containing TB bacteria are released into the air. People, who breathe these germs from the air, become infected with the bacteria. But infection does not denote disease. The germs harbored in the body and they lie in the dormant state. Ten percent of the people who harbor the infection develop the disease in a time span of 60 years. When the immunity of a person goes down due to risk factors, the chances of tuberculosis diseases developing in the person become higher. A single infected untreated person can spread the disease to 10-15 individuals in his community.

### **Pathogenesis**

While only 10% of TB infection progresses to TB disease, if untreated the death rate is 51%. TB infection begins when mycobacterium tubercle bacilli reach the pulmonary alveoli, infecting alveolar macrophages, where the mycobacterium replicates exponentially. The primary site of infection in the lungs is called the Ghons' focus. Bacteria are picked up by dendritic cells, which can transport the bacilli to local (mediastinal) lymph nodes, and then through the bloodstream to the more distant tissues and organs where TB disease could potentially develop: lung apices, peripheral lymph nodes, kidneys, brain, and bone (Joice M. Black, 2005).

Thompson and Langford (1996) writes that TB has three stages like primary (initial) infection, latent (dormant) infection and recrudescent (post primary) disease. During the first stage, the mycobacterium invades the tissues at the port of entry (usually the lungs) and multiplies over a period of approximately 3 weeks. They form a small inflammatory lesion in the lung before traveling to the regional lymph nodes and throughout the body, forming additional lesions. The number of lesions formed depends on the number of invading bacteria and the general resistance of the host. This stage is generally asymptomatic. Lymphocytes and antibodies mount a fibroblastic response to the invasion that encases the lesions, forming non-caseating granulomas. This marks the latent stage and the individual may remain in this stage for weeks or years, depending on the body's ability to maintain specific and nonspecific resistance. Stage three occurs when the body's unable to contain the infection and a necrotic and cavitation process begins in the lesion at the entry port or in other body lesions. Caseation occurs and the lesions may rupture, spreading necrotic residue and bacilli throughout the surrounding tissue. Disseminated bacteria form new lesions, which in turn become inflamed and form noncaseating granulomas and then caseating necrotic cavities. The lungs are the most common site for recrudescent disease, but it may occur anywhere in the body. Untreated disease has many remissions and exacerbations.

A person infected with TB is usually symptom free. Once the infection flares up into disease the patient has symptoms like cough for 3 weeks or more, evening rise of temperature, loss of appetite and loss of weight, chest pain and difficulty in breathing.

### **Evolution of diagnostic tool**

X-ray became one of the cornerstone for TB diagnosis. India did not lag behind in utilizing the facility and they were made available in the sanatoria as well as TB clinic in the later half of the 19<sup>th</sup> century. However limitations observed were that it was expensive, difficult to interpret, lack of training for accurate diagnosis and indiscriminate use of chest X-ray and Mobile mass Radiology (MMR) in the general population posting serious problems in classifying the disease. On one hand large number of non TB cases were being diagnosed as TB and put on treatment and on the other hand inter reader variation was observed in the interpretation of MMR films.

### **Sputum Smear Microscopy**

With the discovery and demonstration of TB by Dr Robert Koch using microscope followed by the technological up gradation of microscope as well as the staining techniques over a period, smear microscopy by Ziehl-Neelsen and the Fluroescence technique became the standard technique for diagnosing TB cases. It was found that this tool can be applied on wide scale as it happened to be cost effective, quite sensitive and specific. In order to minimize the disadvantages of the X-ray, sputum smear microscopy for diagnosis was found to be more effective and feasible.

### **BCG Vaccination**

It was discovered by France, Drs. Calmette and Guerin in 1931 hence the name bacillus calmette Guerin (BCG). It was one of the milestone in prevention of the TB. In India, Dr. Frimodt Moller was the first to introduce BCG vaccination in the year 1948. It is a live attenuated vaccine. According to WHO policy for BCG

vaccination, in a high TB prevalent country BCG vaccine should be given to all children at the earliest except children with symptoms HIV/ AIDS. Many countries including India use BCG vaccine as part of their TB control programs, especially for infants. The protective efficacy of BCG for preventing serious forms of TB (e.g. meningitis) in children is high (greater than 80%). However, the protective efficacy for preventing pulmonary TB in adolescents and adults is variable, from 0 to 80%. It is a standard method of vaccination, practically used all over the world. It is given intradermally 0.1 mg in left arm just above the insertion of deltoid muscles of newborns. It is given with DPT (Diphtheria, Pertusis and Tetanus) and polio vaccine. A satisfactory injection should produce a wheal of 5 mm in diameter. It protects developing severe forms of TB.

### **Evolution of TB treatment**

In the Pre-chemotherapy era the treatment of TB was directed merely towards strengthening the host's resistance. Special diets and rest were believed to improve the patients immune response, by avoidance of physical activity and by collapse therapy, such as artificial pneumothorax, pneumoperitoneum, thoracoplasty and plombage attempts were made to immobilize the involved lung tissue or to minimize the respiratory trauma by these measures, it was hoped to achieve a maximum of local rest, which would support the healing of destroyed lung tissue especially cavitations.

In 1940 the discovery of the bacteriostatic effect of sulfonamides in guinea-pigs infected with tubercle bacilli were found. It was demonstrated that a derivative dapsone known as promin (glucosulfone sodium) was capable of arresting the progress of fatal tuberculosis in guinea-pigs. The effect of dapsone on tuberculosis in

man was disappointing and these compounds were found to be effective in the treatment of leprosy.

In 1944, streptomycin an antibiotic newly isolated by Waksman from the soil organism streptomyces griseus showed a striking therapeutic effect on experimental tuberculosis in guinea-pigs. It was used for the first time in human patients.

In 1949, it was discovered that para-aminosalicylic acid (PAS) prevents the emergence of drug resistance if given in combination with streptomycin. Since then, the administration of 2 or more drugs in combination has been considered essential for adequate tuberculosis chemotherapy.

In 1952 the discovery of isoniazid as anti-tuberculosis drug was introduced and it has remained an important component of all primary drug regimens. Because, it is highly effective, relatively low toxicity and inexpensive.

The Bulletin of the World Health Organization (1961) states that, the Tuberculosis chemotherapy center, Madras, the Indian medical research council, the British medical research council, the government of madras state and world health organization jointly conducted a controlled clinical trial to compare the effect of 12 months of chemotherapy in two groups of patients. One group treated under good conditions of a sanatorium, the other under poor conditions at home. For this study, persons living in madras city, who were over 12 years of age, had a sputum smear positive for tubercle bacilli and had received no previous tuberculosis chemotherapy, were considered as population for the study. The patients allocated to home treatment were supposed to take their drugs at home and were expected to attend the centre once a week to collect weekly supply of medicine. In addition they were visited by a health visitor. Patients allocated to treatment in a sanitarium were remained in bed for 3-4 months. After that they were allowed to be up for 2 or 4 hours daily. After 6 months,

those considered to be sufficiently fit to go home. Patients admitted to home treatment were advised to take rest and return gradually to their previous physical activity only when medically fit. Most of them were ambulant much of the time. Female patients were not able to restrict their work at home and many male patients returned to work well before they were considered as fit, and some refused to stop work at all.

The patient in the sanitarium received a rich diet in terms of calories, fats and proteins (including animal proteins). The diet of home patients was inferior. The difference in the diet noted that the home patients had much less rest and soon resumed their previous activities. Sanatorium patients were treated in airy, well ventilated, clean wards; the great majority of home patients lived in over crowded conditions. The results showed hat, the sanatorium patients had gained more weight, the radiological progress in terms of reduced cavity size or cavity closure was similar in both groups and the decline of sputum positively occurred at almost the same speed in home and sanatorium patients. The study suggested switching on to ambulatory treatment better than the institutional treatment.

In 1964 it was demonstrated that an intermittent regimen can be as effective as daily regimens, thereby offering the advantage of fully supervisable medication.

A controlled clinical trial study was conducted at the tuberculosis chemotherapy centre (1964) to compare daily versus weekly regimen. For this study a standard oral regimen of 100mg of isoniazid plus 5g of sodium PAS twice daily was compared with a twice-weekly regimen of 1g of streptomycin given by intramuscular injection plus 14mg of isoniazid per kg body weight, given orally in a single dose. Both regimens were given to ambulatory patients at random. The oral regimen was dispensed for self-administration. For the intermittent regimens, the patients had to attend the clinic on 2 days a week at 3-4 day intervals. The treatment was fully

supervised i.e. each patient had first to take his isoniazid tablets in the presence of the staff (who checked that the tablets actually had been swallowed), and then received the injection of streptomycin. The results showed that, the intermittent regimen was highly successful and slightly more effective than daily regimen. This suggests that, there had been an intensive phase at the start of treatment; the susceptible bacilli would probably have been eliminated.

In 1972, the introduction of short-course regimen enabled the duration of treatment to be approximately halved from 12 to 6 months without lowering the therapeutic effects.

Tuberculosis control officer (1989) conducted a study on short course chemotherapy for pulmonary tuberculosis patients under field conditions in Pondicherry with the objective of obtaining on its feasibility, acceptability, toxicity and efficacy under field conditions. For this study a total of 1441 patients were selected who received a 6 months period short regimen of isoniazide(300mg), rifampicin(450mg) and pyrazinamide(1.5g) daily for two months initially followed by rifampicin(600mg) and isoniazide (600mg) twice a weak for the next four months. 98% of the patient had either mild or moderate diseases radio logically. Chemotherapy was completed by 68% of the patients, one of the patient has smear positive at the end of chemotherapy.81% showed radiography improvement. The study concluded that successful short course chemotherapy is feasible under existing field conditions. The availability of rifampicin and pyrazinamide represents the watershed in TB control in India, for it at most halved the duration of treatment from 12 to 6 months.

### Formulation of National TB control Programme (NTP)

National Tuberculosis Control Program (NTP) was formulated in 1962. Under programme District Tuberculosis Centers, Tuberculosis Hospitals Tuberculosis Centers were started. From the beginning, these centers also used to provide common health services and these services are to provide through primary health centers. Objectives of NTP were to reduce the problem of TB in the community sufficiently and quickly to a level where it ceases to be a public health problem, detection of maximum number of TB cases among the chest symptomatic attending the out patients and giving them treatment on domiciliary basis-the so called passive case finding, undertake case finding and treatment activities in all the health institutions as integral part of general health services and BCG vaccination at birth or soon after for prevention of childhood forms of TB. Unfortunately, despite the existence of a national TB control programme since 1962 the desired results not been achieved. In 1992, the government of India in conjunction with WHO and other, reviewed the TB situation and concluded that effort to control the disease has not succeeded. The main failure of NTP is implementation and supervision of the NTP was not done on the recommended lines, about 100 districts in the country did not even introduce NTP, all the key personnel at the District TB center (DTC) to run the programme in the Districts were never posted continuously, quality microscopy services, particularly in the primary health institutes (PHIs) were not provided; our case detection remained less than the expected cases continuous and regular supply of all anti-tuberculosis drugs, particularly Short Course Chemotherapy (SCC) drugs in the PHIs, could not be ensured, the recommended drug regimens of NTP were not prescribed, particularly in the teaching institutions, administrative and political support to various levels NTP was not provided, adequate budget required to run the

programme, particularly anti-tuberculosis drugs, vehicles etc, was not provided, NGOs and private medical practitioners were not involved in the programme and health education for tuberculosis remained negligible compared to malaria, leprosy, immunization, HIV and AIDS. The net result of all the mentioned weakness was that case finding in NTP was only about 30% of the expectation and treatment completion was about 35% with standard drug regimens and 45% to 50% with Short course chemotherapy.

### Formulation of Revised National Tuberculosis Control Programme

Shobha Malini and Das (2003) states that, RNTCP was begun in 1993 applying the principles of directly observed treatment short course (DOTS). India as adopted and implemented DOTS in different parts of the country since 1993, a full fledged programme was begun in India in 1997 and it was fully covered by 2005. the objectives of RNTCP are, to cure 85% of new sputum smear-positive cases (it means all identified TB patients has to be registered and all the registered cases treatment is provided until they are cured under direct observation treatment), continuous drug supply and regular sputum examination to be carried out and detect at least 70% of new sputum smear-positive cases (in this patients who has cough for more than 3 weeks and visits OPD by themselves will be examined by sputum test to diagnose TB).

Key facts and concepts on RNTCP (1997) states that, under NTP, at most half of patients treated with short-course chemotherapy regimens are cured. Under RNTCP, 8 out of 10 such patients are cured. Thus, at least 30% more patients are cured under RNTCP than under NTP. Multiple studies in India and elsewhere demonstrated that at least one third of patients do not take medicines regularly. It is

impossible to predict who these patients are. Directly observed anti-TB treatment was discovered in India and is now standard of care internationally, in both developed and developing countries.

Madhav murali and Udaya kiran (2004) conducted a comparative study of DOTS and non-DOTS interventions in Tuberculosis District TB centre, Mangalore. For this 306 newly diagnosed sputum positive out patients of pulmonary TB were selected using random trial. The results showed that 91% of the DOTS group and 53% of the non-DOTS group were observed to be cured of tuberculosis, using the sputum smear as the test to monitor cure. The study concluded that DOTS is a significantly superior health intervention in tuberculosis patients compared to self-administered regimen.

### **DOTS** therapy

DOTS therapy is directly observed treatment short-course. It is an element of the DOTS strategy. An observer watches and helps the patient to swallow the tablets. Direct observation ensures treatment for the entire course with the right drugs, in the right doses and at the right intervals. WHO has recommended these DOTS to control TB in world wide. DOTS strategy means to ensure treatment completion in which treatment observer (DOT provider) must be accessible and acceptable to the patient and accountable to the health system, DOT provider administers the drugs in intensive phase, ensures that the patient takes medicines correctly in continuation phase and provides the necessary information and encouragement for completion of treatment. There are 5 components in implementation of DOTS therapy. They are;

- Political commitment: TB can be cured and the epidemic reversed if all the governments accord it top priority. The government's commitment is measured in terms of granted funds, human resources and administrative support.
- Good quality diagnosis by sputum smears microscopy of patients presenting to the health facilities: Top quality microscopy allows health workers to detect the TB bacilli and is essential for identifying the infectious patients. Sputum microscopy is the best tool for detection as it provides information on the infectiousness of the patient helps in categorization of the patient for treatment and is an objective method to monitor the patient's progress.
- Uninterrupted supply of quality anti-TB drugs: In RNTCP, drugs supplied in
  patient wise boxes. No patient will ever begin treatment unless full course is
  available. Buffer stocks of drugs held at MSD, district and sub district levels.
  Quarterly reporting allows close monitoring of drug stocks and replenishment of
  drug supply as needed.
- Short course chemotherapy given under direct observation: Health workers or other trained treatment providers supervise each patient as she or he takes the medicine in their presence.
- Systematic recording and reporting: This evaluates the outcome of every patient
  put on treatment. There is a system of verifiable accountability at every level like
  national, state, district, sub district, health unit, anganwadi worker/ dai and
  patient.

Each level must do its part to ensure cure of the patient and to break the chain of transmission. The RNTCP creates a sub district level tuberculosis unit for the exclusive purpose of supervision and monitoring of TB control activities. The advantages of DOTS are DOTS don't require hospitalization or isolation, patients can

remain in their homes and return to work in a few weeks, DOTS is one of the most affordable ways of extending the life of a HIV-positive person and also helps to prevent multi-drug resistance, which is often fatal and up to 100 times more expensive to treat.

Muniyandi etal (2005) conducted a study to estimate the direct, indirect and total (diagnosis and treatment) costs to patients an account of TB treated in DOTS programme in Tiruvallar district of Tamilnadu. The objectives of the study was to estimate the costs incurred by TB patients treated under RNTCP in a district of Tamilnadu where services are decentralized for diagnosis and treatment. For this study 455 patients registered under RNTCP were interviewed to collect the following information on demographic, socio economic characteristics of patients, expenditure incurred due to illness and effect of illness on employment. Based on the data collected, various costs (direct medical, non medical, indirect and total costs incurred on account of tuberculosis before and during treatment) were estimated. In addition Standard of Living Index (SLI) was calculated for patients. The results revealed that out of 455 patients, 62% had low SLI. The median direct, indirect and total costs for 343 patients who successfully completed treatment were as follows; Pre treatment direct costs were Rs.340, during treatment direct costs Rs.100, more than 50% of patients did not incur any indirect costs in both pre treatment and during treatment periods and overall total costs were Rs.1398. About 12% of patients lost more than 60 work days and after completing treatment, 88% returned to work. The study concluded that the total patient costs were Rs.1398 /- and also the patients returned to work early established the economic benefits to patients treated under DOTS and

lended support to rapid expansion of DOTS programme, particularly in low-income countries.

Under DOTS, TB treatment is divided into two phases. That is Intensive Phase for 2-3 months and Continuous Phase for 4-5 months. In intensive phase the aim of treatment is rapid killing of bacilli, shorter the duration of infectiousness and rapid smear conversation. Whereas in Continuous Phase the aim of treatment is to eliminates residual bacilli, reduces failures and relapses, low number of Bacilli and less chance of drug resistant mutants, hence fewer drugs needed. Patients who are suffering from tuberculosis (pulmonary and extra-pulmonary) are classified into three groups based on their treatment. They are category-I, category-II, and category-III.

Category-I treatment is given to new sputum smear-positive patients, seriously ill sputum smear-negative patients and seriously ill extra-pulmonary patients. The recommended regimen in intensive phase 2(HRZE)3, it means isoniazide (600 mg) 2 tablets, rifampicin(450mg) 1capsule, pyrazinamide (1500mg) 2 tablets and ethambutol(1200mg) 2 tablets in a blister pack, administered three times a week for 2 months. The medication has to be taken by the patient under direct observation of the health workers. In Continuous Phase 4(HR) 3, it means isoniazide (600mg) and rifampicin (450mg) is given three times a week for 4 months. The weekly blister pack for self administration contains drugs which to be taken three times a week with vitamins in the remaining days of the week. During the continuation phase the drugs are collected every week from the treatment center. The first dose must be administered under direct observation. One weekly blister pack is given at a time to the patient for self-administration.

Category – II treatment is given to sputum smear positive relapse, sputum smear positive failure and sputum smear positive treatment after default. Here relapse

means a patient declared cured of TB by a physician, but who reports back to the health service and is found to be bacteriologic ally positive. Failure case means smear positive patient who is smear positive at 5 months or more after starting treatment or a patient who was initially smear negative but becomes smear positive during treatment. Default means a patient who received anti-tuberculosis treatment for one or more month from any source and who returns to treatment after having defaulted, i.e. not taken anti-TB drugs consecutively for 2 months or more. Recommended Regimen in category-II Intensive Phase is 2(HRZES)<sub>3</sub> /1(HRZE) 3, it means rifampicin combined with isoniazide, pyrazinamide and ethmbutol, supplemented with streptomycin for the first 2 months followed by the same drugs without streptomycin for one month given three times a week. The initial intensive phase should be given for 3 months. The tablets are given in the form of blister pack as in category-I. Apart from 4 these anti-TB drugs streptomycin injection 0.75 gms has to be administered first 2 months of the same day in which patient takes oral medication. In continuation phase 5 (HRE) 3, it means 5 months of isoniazide, rifampicin and ethambutol three times a week is given.

Category –III treatment is given to sputum smear negative, not seriously ill and extra Pulmonary not seriously ill. Recommended regimen for intensive Phase is 2(HRZ)3, it means isoniazide (600mg) 2 tablets, rifampicin (450mg) 1 capsule and pyrazinamide (1500mg) 3 tablets in the blister pack administered 3 times a week for 2 months. In continuation phase 4(HR) 3, it means isoniazide (600mg) 2 tablets and rifampicin (450mg) 1 capsule three times a week for 4 months. The weekly blister pack for self-administration contains drugs that to be taken 3 times a week with vitamins in the remaining days of the week. Treatment of patient with DOTS is monitored while doing follow up of sputum microscopy through conversion rate, cure

rate and it is done as per sputum smear microscopy schedule like initial sputum examination, end of intensive phase of treatment, 2 months in continuation phase of treatment and end of treatment.

Central TB division, module (2002), states that generally patients with TB do not need hospitalization. Those who are extremely ill like haemoptysis, pneumothorax, or large accumulation of pleural fluid leading to breathlessness can be hospitalized during initial phase of treatment. Treatment outcomes are measured as cured, treatment completed, died, failure, defaulted and transferred out. Cured means initially sputum smear-positive patient who has completed treatment and had negative sputum smears, on two occasions, one of which was at the end of treatment. The treatment completed means sputum smear positive patient who has completed treatment, with negative smears at the end of the intensive phase but none at the end of treatment, sputum smear-negative TB patient who has received a full course of treatment and has not become smear-positive during or at the end of treatment and extra-pulmonary TB patient who has received a full course of treatment and has not become smear-positive during or at the end of treatment. Died means patient who died during the course of treatment regardless of cause. Failure means any TB patient who is smear positive at 5 months or more after starting treatment. Failure also includes a patient who was treated with Category III regimen but who becomes smear positive during treatment. Defaulted means patient who has not taken anti-TB drugs for 2 months or more consecutively after starting treatment. Transferred out means patient who has been transferred to another Tuberculosis Unit/ District and his/ her treatment result (outcome) is not known.

### STUDY SUBJECTS

### **Health workers**

Kasthuri Sundar Rao (2004) states that, Primary Health Centers (PHC) were started in 1952 as part of community development programme in order to provide comprehensive health care to people in rural areas. There fore primary health centers are located at the community development block head quarters and act as a focal point from where health services radiate into the area covered by the community development block covering approximately 100 villages and about 80,000 population. The primary health centre consists of a main building and three subcentres. The main functions of PHC are to offer both preventive and curative services through medical care, mother and child health including family planning, safe water supply and basic sanitation, prevention and control of locally endemic disease, collection and reporting of vital statistics, education about health, National health programmes, referral services, training of health workers, local dais and health assistants, basic laboratory services.

The national health plan (1983) proposed recognition of PHCs on the basis of one PHC for every 30,000 rural population in the plains and one PHC for every 20,000 population in hilly, tribal and backward areas for more effective coverage. As on 30<sup>th</sup> June 1999, 22,807 PHCs have been established in the country. The subcentres are the peripheral outpost of the existing health care delivery system in rural area. They are being established on the basis of one sub centre for every 5000 population in plains and one for every 3000 population in hilly, tribal and backward areas. As on 30<sup>th</sup> June, 1, 37,027 subcentres were established in the country.

As per Government of Karnataka health profile (2004), the number of district 27, the number of villages 27066, the rural population covered by sub-centre is 4275

and PHC is 20760. An average number of villages covered by a sub-centre are 3, PHC is 16 and CHC is 109. The ANM: population ratio is 1: 4275. Karnataka state has 27 districts with 176 taluks. It has number of hospitals 177, number of CHCs 253, number of PHCs 1679, number of PHUs 581, number of sub-centers 8143 and number of urban PHCs 17. The total number of male health worker 3748 and female health worker 10,022.

As per the information (2007) available from the office of the District health office, there are 76 primary health centers, and 395 sub-centers with 552 health workers in Kolar district. Job responsibilities of health workers are treatment of minor illness, maternal and child health, family planning, nutrition (distribution of iron and folic acid tablets and Vitamin A etc), control of communicable disease, immunization, Dai training, vital statistics, record keeping, primary medical care, referral services, and team activities.

The use of auxiliary nursing personnel to ease the shortage of professional nurses was first put into practice in India. A two year programme for the auxiliary nurse midwife was first established in 1951 at St.Marys hospital, Tarn Taran in Punjab state. By 1962, there were 263 courses being offered in India. The auxiliary nurse midwife (ANM) functions primarily in the community rather than the hospital. The practice of the ANM has helped to improve the amount of care given to the patient as well as the health teaching given to the public. In 1977 the ANM course was completely revised by the Indian nursing council. Based on the revised syllabus the ANM training programme is 18 months. The eligibility criterion is age limit 16-35 years, education 10<sup>th</sup> pass and health status is satisfactory based on medical report. The subject's thought during these 18 months are science subjects (Anatomy and physiology, microbiology, psychology, sociology, hygiene and nutrition), health

subjects-I (Fundamentals of nursing, nursing procedures and techniques and first aid and emergency nursing), Fundamentals of nursing – II (Introduction to child health, introduction to mental health, introduction to family health and introduction to community health), Community health nursing – I(Domiciliary midwifery, midwifery and maternal nursing and family planning and family welfare) and Community health nursing – II( Nutrition education, health education and communication skills and audiovisual education). Total instructional hours 450 and total clinical/ field experience 1560.

Park (2004) states that, the government of India set up multipurpose workers committee (Kartar Sing Committee) in 1972 to examine the need for multipurpose health worker (MPW) in rural health services. The committee recommended that, the present ANMs to be replaced by the newly designated female health workers. That the existing unipurpose workers (eg. Basic health workers. Family planning field workers, vaccinators) to be replaced by male health workers. The recommendations of Kartar Sing committee were accepted and implemented by the Government of India. Under this scheme establishing a health delivery system in rural areas through a team of MPWs – one male and one female health worker for every 5000 rural populations (3000 in hilly and difficult areas).

### Anganwadi workers

Kishore (2006) states that Integrated child development service (ICDS) was launched on 2<sup>nd</sup> October, 1975 (5<sup>th</sup> five year plan) in pursuance of the national policy for children. Under this scheme anganwadi worker started. The anganwadi, literally mean a courtyard play center, is a childcare center located within the village or the slum area itself. It is the focal point for the delivery of services at community levels to

children below six years of age, pregnant women, nursing mothers (15-45 years of age) and adolescent girls. Anganwadi is a meeting ground for women, mothers and other social and health workers for discussion, awareness programs, joint action for child development and women's empowerment. Each anganwadi is run by an anganwadi worker (AWW) supported by a helper who is a local woman.

Anganwadi worker is a part-time trained voluntary worker and preferably local woman. The anganwadi worker has one month of refreshment training programme, the eligibility criteria are, age 18-35 years, education 10<sup>th</sup> pass, Knowledge of Kannada and residence of the same village. The Syllabi of Anganwadi workers are, nutrition, community development ,preschool education, growth and development , safe drinking water, environmental sanitation, women empowerment program, communicable disease, record maintenance. Total theory is 240 hours.

Each anganwadi worker covers approximately 1000 population in rural and urban areas and 700 populations in tribal areas. As per reports of CDPO (2007) there are 3319 anganwadi workers with anganwadi centers in a district. There are 12.18 lack anganwadi workers in the country. There is only one anganwadi training centre in Kolar district in Bethamangala called as Kengal Hanumanthaiah anganwadi training centre, Kolar. Job responsibilities of anganwadi workers are immunization, health checkup, referral services, treatment of minor illnesses, supplementary nutrition, growth monitoring and promotion, nutrition and health education, early childhood care and pre-school education to children of 3 to 6 years, six killers' diseases and mental health and mental retardation.

After going through the syllabus of both health workers and anganwadi workers it informs that health worker learns on TB for about one hour class during their training period. This is not focusing on DOTS therapy. Here one of the job

responsibilities of the health worker is prevention and control of communicable disease. Where as anganwadi workers has one hour class on 6 killers disease during her training programme in which they focus on meaning of the TB, signs and symptoms the child shows and vaccination to prevent this. This shows that anganwadi workers lack of knowledge on TB. Here one of the job responsibilities of anganwadi worker is immunization and referral services.

### NEED FOR THE STUDY

In 1993, WHO declared TB as a global emergency and called countries to adopt DOTS as a TB control strategy. The world health organization has worked with country representatives and donors to implement the DOTS strategy with in national TB programmes in more than 100 countries. Every element of the strategy depends on trained and committed health care workers and volunteers without whom the strategy cannot work. Behind the workers is a community that wants to be free from tuberculosis. TB control needs community support and involvement. A successful DOTS strategy requires partnership between the primary health care team, other sectors and the community. The nurse or other primary health worker may be the first to suspect TB in patients who have been coughing for more than 3 weeks, or who have not responded to antibiotics, have lost weight or are feeling tired. The village volunteer (who extends the primary health care team into the community), helps TB patients complete their treatment by keeping a regular supply of drugs and assuring they are taken correctly.

The Revised National Tuberculosis Control Programme (RNTCP) in India, based on Direct Observed Short Course (DOTS), is one of the largest and fastest growing TB control programme in the world. The RNTCP places most responsibility

of treatment observation on the government health workers at primary health institutions. To make DOTS more convenient to patients, DOT providers from the non-governmental sector, such as anganwadi workers and community volunteers have been deployed.

Singh etal (2005) conducted a study on "Effectiveness of community based anganwadi workers in the directly observe treatment of TB patients in a rural area of Haryana". The objective of the study was to compare the treatment success rate among TB patient taking DOT from community based Anganwadi Workers (AWW) with that of TB patients with two-day modular training, included in the local DOT directory and were directly supervised by the TB programme staff. From the TB register held at the tuberculosis unit, treatment outcomes of all new sputum positive (NSP) patients (115) registered in Gurgon Tuerculosis unit from 1st January to 31st December 2002, were evaluated. The findings showed, that the cure rate among 41 new sputum positive patients, who has AWWs as DOT providers, was significantly better than for those who had others DOT providers (95% Vs 78%) respectively (P = 0.02) The study concluded that community based Anganwadi workers with adequate training and regular supervision, could contribute effectively to a TB programme as DOT providers.

Jain etal (1999) conducted a study to assess the knowledge, attitude and practices of newly diagnosed sputum positive cases of pulmonary TB cases in LRS institute of TB and allied diseases. The results showed that patients had inadequate knowledge. Lack of awareness or incorrect knowledge about the disease might lead to harbouring of wrong beliefs and misconception about various aspects of the disease which may affect the timely reporting of patient to the health institutions or poor compliance.

Mehra etal (2002) conducted a study on awareness regarding tuberculosis in a rural population of Delhi. It concludes that majority (50.2%) rural population depend on doctors and health care workers as a source of information. This indicates that health workers as well as anganwadi workers should have adequate knowledge then only they can provide correct information to the public.

Shaik Mohiuddin (2006) conducted a descriptive study to assess he knowledge regarding RNTCP and attitudes towards TB among 97 junior health assistants from 9 PHCs of Belgam Taluk. With structured questionnaire data was collected using purposive sampling technique. The results revealed that overall mean knowledge of RNTCP among junior health assistants, 16% had good knowledge, 71% had average and 12% had poor knowledge. 17.8% had positive attitude, 20% had negative attitude and 62% of them were neutral.

Education is the key to change in knowledge, attitudes and behavior. Education about TB and DOTS must be improved in order to reduce gaps between policies and their grass-roots implementation and ensure the adaptation of effective prevention strategies. The practice of DOTS for the prevention of TB are changing rapidly that nurses need to have continuing education to remain up-to-date their knowledge, skills and practices. Educational opportunities and access to information are not always easily available to many nurses in many areas. Good practices are dependent upon adequate, accurate and updated information. Before starting any educational session, it is important to assess the learning needs of the group and to be familiar with the cultural environment from which the participants come.

Considering the above findings, the researcher felt exploring the level of knowledge of health care workers about TB and DOTS therapy was highly essential since they were the implementers of DOTS therapy. After going through number of

review literature, consultation with research experts, subject experts and also authorities who are working in implementation of DOTS, the researchers decided that the health workers and anganwadi workers are working at grass root level in implementation of DOTS.

Most adults learn best by being actively involved in the learning process. So here researcher selected health workers and anganwadi workers, they also adults. Because of their time limit and more responsibilities they are unable to attend the teaching programme. Hence the researcher decided to distribute the module which updates the health workers information because it has lot of advantages namely it is written simple and understandable language with figures which stimulate students to read because it is exclusively prepared for that group, it is specific to the topic, it is built in exercise to strength the learning and improving memory, it is economical, portable, easily preserved for longer duration for future use.

Hence there is a need to educate health workers and voluntary workers through self instructional module in the implementation of DOTS programme. If they are educated in-depth they may have adequate knowledge and skill to work as DOT providers in future. This made the researcher to select the topic

### STATEMENT OF THE PROBLEM

"A Study to evaluate the effectiveness of Structured Teaching Module on the Knowledge and Practices of Health Workers regarding Tuberculosis and DOTS therapy in rural Kolar, Karnataka."

### **OBJECTIVES OF THE STUDY IS TO**

- 1. Assess the
  - a) Knowledge of Health Workers regarding tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 2. Evaluate the effectiveness of Structured teaching module on the level of
  - a) Knowledge of Health Workers regarding Tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 3. Find out the association between the level of
  - a) Knowledge regarding Tuberculosis and DOTS therapy with selected sociodemographic variables after implementation of structured teaching module
  - b) Practice regarding DOTS therapy with selected socio-demographic variables after implementation of structured teaching module.
- 4. Correlate between the knowledge and practice after implementation of the structured teaching module.

# **OPERATIONAL DEFINITIONS**

# **Effectiveness**

It refers to determine the extent to which the structured teaching module has achieved the desired effect as measured by Health workers gain in knowledge and practice scores.

# Structured teaching module

It refers to planned and organized self learning information material on TB and DOTS therapy. This includes meaning, magnitude of the problem, types of TB,

disease process, causes, signs and symptoms, complications, treatment and role of health workers in the management of patient with TB.

# Knowledge

It refers to correct responses of health workers to the structured knowledge questionnaire.

# **Practice**

It refers to correct techniques followed by health workers while administering/giving DOTS to tuberculosis patients which is rated by using five point observation scale.

# Health worker

It consisted of health workers as well as anganwadi workers who were working in primary health centers, sub centers and anganwadi centers

# **Tuberculosis**

It is a communicable disease caused by Mycobacterium tubercle bacilli

### **DOTS**

It is an administration of anti-tuberculin treatment under Direct Observation of Short Course treatment by care givers.

# **NULL HYPOTHESES**

- H01 There will be no statistically significant relationship between the pre and post test Knowledge scores of health workers on TB and DOTS therapy.
- **H02** There will be no statistically significant relationship between the pre and post test Practice scores of health workers on practices of DOT therapy.
- H03 There will be no significant association between the Health workers knowledge and their socio-demographic variables when compared after their exposure to the structured teaching module.
- H04 There will be no significant association between the Health workers' practice and their socio-demographic variables when compared after their exposure to the structured teaching module.
- **H05** There will be no statistically significant correlation between the knowledge and practice score among health workers' on TB and DOTS therapy.

# THEORETICAL FRAME WORK

Theoretical frame work for the present study (Fig.1) was based on general system theory which was abstracted by Ludwig Von Bertalanffy (1968) as cited by Fawcet (1995). This theory takes into account the inter-relationships between parts, and the whole, which have vast implications for nursing.

In this theory systems consist of a set of interacting components within a boundary that filters the type and rate of exchange with the environment. Systems are composed of both stractural and functional components. Stracture refers to the arrangements of the parts at a given time and function is the process of continuous change in the system as matter, energy and information are exchanged with the environment.

All living systems are open systems which promote the exchange of matter, energy and information with other systems (subsystem) and environment (suprasystem). The exchange within open system, between open system and their suprasystem is continuous. The dynamic balance within and between the system, the subsystem and suprasystem helps to create and maintain internal stability. The change in one part of the system creates change in other parts. In all systems, activity can be recorded into an aggregate of feed back circuits such as input, throughput and output.

This theory consists of 4 components such as input, throughput, output and feedback.

# 1. Input

According to Ludwig Von Bertalanffy (1968) the input refers to any form of energy, information or material that enters into the system through its boundaries. In the present study health worker is a system and has input within the system itself

(subsystem) and acquired from the environment (suprasystem). The input includes health workers background information on age, sex, general education, occupation, duration of professional experience, source of information and practices of DOTS which may influence the knowledge on TB and DOTS and practices of DOTS administration.

In the present study input refers to administration of stractured teaching module on TB and DOTS therapy to the health workers.

# 2. Throughput

It is a process that occurs between the input and output. It enables the input to be transformed into output in such a way that it can be readily used by the system. In this study, throughput refers to process of transformation of knowledge on TB and DOTS and practices on DOTS administration, distribution of STM on TB and DOTS through self learning.

# 3. Out put

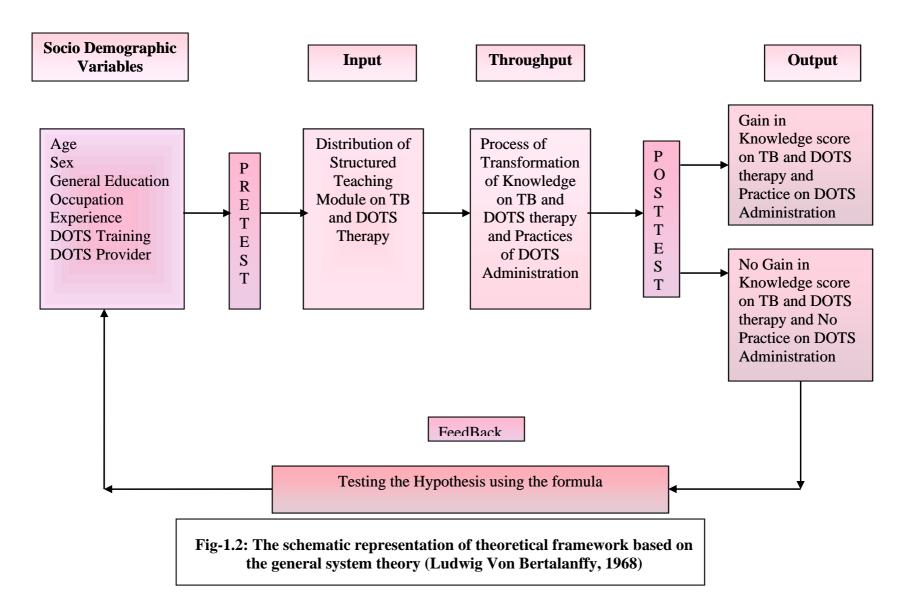
It is an energy, information and material that are transferred to enviournment. In this study it refers to gain in knowledge score on TB and DOTS therapy and practices of DOTS administration among Health workers after administration of structured teaching module on TB and DOTS therapy.

# 4. Feed back:

It refers to the output that is returned to the system, which allows it to monitor itself over time as an attempt to move closer to a steady state known as equilibrium or homeostasis. It may be positive, negative or neutral. In the present study, the feed

back refers to the effectiveness of stractured teaching module and it can be tested through null hypotheses as follows;

- Comparing the difference between pre and post test knowledge score on TB and DOTS therapy.
- ➤ Comparing the difference between pre and post test practice score on DOTS administration.
- Finding the association between knowledge score with selected sociodemographic variables.
- Finding the association between practice score with selected sociodemographic variables.
- ➤ Comparing the difference between knowledge and practice score of health workers.



# **Summary**

This chapter dealt with introduction, need for the study, statement of the problem, hypotheses, operational definitions and theoretical frame work. The literature reviewed follows in the next chapter.

# CHAPTER - II REVIEW OF LITERATURE

# REVIEW OF LITERATURE

The review of literature is an important step in any aspect of research because it gives deeper insight into the problem area. It helps the researcher to find out what is already known, what others have attempted to find out and what problems remains to be solved. It also shows whether the evidence already available solves the problems adequately without further investigation and it forms the foundation upon which all future work will be built.

Directly observed treatment, short-course (DOTS) was introduced in India in 1993 as part of the Revised National Tuberculosis Control Programme (RNTCP) following a review of India's National Tuberculosis Programme. A DOT being an effective strategy to control and treat tuberculosis, Government has involved Health workers to observe and assist the patients to take their medicine. Hence health workers required adequate knowledge and practices of DOTS in order to see that patient completes treatment without any complication or drop out. In turn health workers knowledge will influence the patients' knowledge and practice in managing with tuberculosis. Keeping this in mind, the literature review was carried out to highlight the salient aspects of the problem under study. In effort to comprehensively to review the various studies on TB and DOTS the researcher had referred both primary and secondary sources and presented under the following headings like studies related to:

- 2.1. Magnitude and Prevalence of TB in India
- 2.2. Risk factors of TB
- 2.3. Associated diseases
- 2.4. Psychosocial aspect of TB
- 2.5. Revised National Tuberculosis Control Programme
- 2.6. DOTS Administration Strategy
- 2.7. DOTS therapy and its implications on Health

- 2.8. Factors contributing to non-compliancy to TB Treatment
- 2.9. Knowledge Attitude and Practice aspects of TB and DOTS.
- 2.10. Effectiveness of Health Education and Structured Teaching Module on TB.
- 2.11. Quality of Life among TB Patients

# 2.1. Magnitude and Prevalence of TB in India

Navaneeth, Thinagaran and Sulaiman (2007) conducted a study to assess the prevalence of pulmonary tuberculosis among 372 adult patients with chest symptoms who traveled to a rural PES hospital Kuppam in South India. The results revealed that, out of 372 patients visited, 108 (29%) were diagnosed to have tuberculosis. Out of which 31 were females and 77 were males. Smear positive patients were 16.6% and smear negative patients were 12.35%. Study concluded that there was an urgent need for establishment of RNTCP at PES hospital, Kuppam.

Gopi, Subramani and Narayanan (2006) conducted a study on "Trend in the prevalence of TB infection among children aged <10 years and annual risk of TB infection (ARTI) after implementation of a DOTS programme in South India". For the study three tuberculin surveys were carried out using random sampling technique in a sub-district of Tiruvallur, South India. The first two surveys were carried out at intervals of 2.5 years (1999-2001 and 2001-2003), whereas the third survey (2004-2005) was completed in a year. The tuberculin skin test (TST) results of children aged <10 years were considered from all the surveys to study infection. The findings showed that ARTI estimates in the three tuberculin surveys were 1.6%, 1.4% and 1.2%, respectively. There was a significant decline in the trend of TB infection (P<0.001). After the introduction of DOTS the annual decline estimated from the first to the third survey was 6%.

Every year 1.8 million people in India developed tuberculosis. The nation wide annual risk of TB infection survey completed in 2003 showed that each year 75 new smear positive pulmonary cases occurring per 1,00,000 population, with a higher incidence in the northern states and in the urban population (TB India RNTCP status report, 2005).

Chadha etal (2005) conducted a study on "Annual risk of Tuberculosis infection in four zones of India, a comparative picture". Each zone constituted about 25% of the country's population and included contagious states. The survey in each zone was conducted independently following uniform methodology, with the National Tuberculosis Institute as the nodal centre and the Tuberculosis Research Centre, Chennai, as the collaborating centre with local support from state health authorities. A tuberculin survey was conducted in selected clusters of 26 districts in four defined zones of India. Children 1-9 years of age were subjected to tuberculin testing with 1Tubercular Unit Purified Protein Derivative RT 23 with between 80, and the maximum transverse diameter of in duration was measured 72h later. Prevalence of infection was estimated using the cut-off point (method-II) and the mirrorimage technique (method-II) among children without Calmette-Guerin scar. The results showed that estimated prevalence was found to be lowest in the southern zone (method I: 1.1%, method II: 1.0%); it was higher in the eastern zone (1.3% by both methods) and highest in the western (method I: 1.8%; method II: 1.6%) and northern zones (1.9% by both methods). The proportion of infected children was found to be significantly higher in urban than in rural areas in all zones.

As per Director, National Tuberculosis Institute Bangalore (2003), the states of Uttar Pradesh, Andhra Pradesh, Bihar, Haryana, Madhya Pradesh, Assam and Karnataka, together account for 82% of the case finding activity during the quarter while they constituted 82% of the population of the country.

The National TB Institute, Bangalore (2003) report stated that, active case finding activity during first quarter in the year 2003, it was found that out of 155 districts, there were 22216 Smear positive cases, 46934 Smear negative cases and 6481 extra pulmonary cases with the total cases of 75631.

TB had been one of the world's top ten causes of adult mortality. Of the world's population, one third had been infected with tuberculosis. The World Health Organization estimated that 8.8 million people develop active TB disease every year, of these people 95% live in developing countries. It had been estimated that TB killed between two and three million people each year's roughly one person every 15 seconds. Of these deaths, 98% were in developing countries (Report on tuberculosis in the United States, 2001).

# 2.2. Risk factors of TB

Narayanan etal (2008) conducted a "retrospective cohort study to estimate the excess general mortality and identify risk factors for TB related mortality among TB patients aged above 15 years who were registered under RNTCP Programme during the year 2000-2003, at Vellur TB unit in south India". For this study 3405 patients treated under DOTS Strategy were followed up from the date of start of treatment till the date of survival or the date of death. The results showed that 79.6% survived and 20.4% died. The study concluded that TB was one of the main causes of mortality in the younger age group. Among TB patients the major risk factors for mortality were old age (more than or equal to 45 years), and incomplete treatment.

Dheeraj Gupta etal (2008) conducted a study on manifestations of pulmonary tuberculosis in the elderly: a prospective observational study from North India. For the study 100 human immuno-deficiency virus (HIV) negative patients with pulmonary tuberculosis were included. The demographic, clinical, radiological and laboratory manifestations were

compared between young (n=50; under 60 years of age) and elderly (n=50; aged 60 years and above) with pulmonary tuberculosis. The results revealed that elderly patients, in comparison to younger patients, tended to be heavier smokers and had more co morbidity (40% vs 8%; p<0.05). They presented more frequently with constitutional symptoms (except fever) and less frequently with respiratory symptoms. The mean duration of symptoms and rate of sputum smear-positivity for acid-fast bacilli was similar in both groups. Both the groups were similar with respect to physical examination and chest radiograph findings. Median values of erythrocyte sedimentation rate and total leukocyte count were significantly higher and lower respectively in the elderly patients. The presentation of pulmonary TB in elderly patients differs from that of younger patients by the predominance of constitutional rather than respiratory symptoms. A high index of suspicion is required to make a timely diagnosis of tuberculosis in the elderly.

Van den Ende etal (2008) conducted a prospective study on risk factors for delay in the diagnosis and treatment of tuberculosis at a referral hospital. For the study 104 patients treated for pulmonary tuberculosis or extra-pulmonary tuberculosis patients were selected. The results revealed that the median total, health care and patient delay were 57, 28 and 25 days respectively. The health system delay before referral was significantly longer than the delay at study institution (18 vs 6 days, p< 0.0001). Risk factors for a longer health system delay were smear negative pulmonary TB or extra pulmonary TB and a trial of antibiotics. The later was also found to significantly prolong total delay, as did rural residence. No significant association was found between patient delay and age, sex, profession or health insurance status. Smear negative pulmonary Tb and extra pulmonary TB were associated with longer health system delays. A trial of antibiotics significantly increased the health system delay. Its use, recommended by the World Health Organsation in case of smear

negative TB and extra pulmonary TB in developing countries, it needs validation at tertiary health care level.

Narayanan etal (2007) conducted "a cross-sectional socio-economic survey to assess the Standard of Living Index (SLI) and prevalence of TB in a 32780 house holds of rural population, south India". The results showed that 57% of the TB patients had a low standard of living index and prevalence of TB was higher among the landless (p<0.001), those living below the poverty line (p< 0.01) and in katcha houses (p<0.001). The study suggested that tuberculosis disproportionately affects those with a low Standard of Living Index.

"World NO Tobacco Day" (2006) Report stated that, mortality from TB was 4 times greater among smokers than the non smokers, Risk of death from TB at ages 25-69 among smoker than non smoker was 12% versus 3% in rural India and 8% versus 2% in urban India. Among men in India, smoking caused about half of all TB deaths and a quarter of all deaths from any cause in middle age.

Tala, Raitio and Helenius (2003) conducted a study to find out whether the risk of occupational tuberculosis higher for young health cares workers in Finland. For the study 447 notified cases of nurses, assistant nurses, physicians, psychiatric nurses, medical laboratory workers and radiographers between 20 to 59 years were included. Incidence ratios were compared with age and occupation to the corresponding general population. The results showed that a higher rate of tuberculosis was seen among older people in general population whereas among health care workers higher incidence ratio was seen in younger age group (20-39 years). The risk of TB was significantly smaller and lower among health care workers. The study concluded that certain fields of health care, young workers are at the greatest risk of TB.

Gupta and Rajesh Gupta (2003) conducted a clinical profile study among 485 patients with Pulmonary TB, in that 87.7% were males and 12.2% were females, the proportion of

smokers was more than the general population. The same authors in another study (2003), among tuberculosis patients of both sexes aged more than 30 years, as compared with the same age and sex sufferers from other diseases, there were higher to moderate smokers and fewer among non-smokers among the tuberculosis. The results revealed that, in smokers, the disease was more severe and disseminated type with more pulmonary tissue destruction and bacterial discharge. The healing process in smokers progressed more slowly, often requiring a hospital stay. Sputum conversation was also delayed and cavities got closed in fewer patients. It was concluded that smoking and tuberculosis primarily affected the lungs as both enter the lung through the inhalation route. Although smoking had no etiological role in TB, yet higher prevalence of TB had been observed among smokers.

Tekkel etal (2002) conducted a study on "Risk factors for pulmonary TB in Estonia". Using a case control design, 248 adult tuberculosis patients treated in Tallinn hospital between January 1999 and June 2000 were selected as sample. A questionnaire was administered to collect information on potential risk factors. The results showed that the main risk factors for TB were marital status other than married, educational level less than higher, low income, had been in prison, not having own place of residence, current unemployment, current smoking, alcohol consumption, shortage of food and contact with TB Patients. Risk of TB decreased for over-weight persons whose individual economic situation had improved during the last year. The study concluded that major risk factors were related to poverty and low socio - economic status.

Han-Yu Huang etal (2002) conducted a study on nosocomial transmission of tuberculosis in two hospitals for mentally handicapped patients in eastern Taiwan. For the study active chest X-ray screening followed by passive symptoms screening were used to identify patients with pulmonary TB over 2 years in hospital A and B. The results showed that 94.8% inmates in hospital A and 96.3% inmates in hospital B were screened by chest X-

ray. During 2 years study period, TB was diagnosed by sputum cultures for 30 patients in hospital A (notified disease rate =619 per 100,000 population per year) and eight patients in hospital B (notified disease rate =203 per 100,000 population per year). Seventeen patients (56.7%) in hospital A had six cluster pattern strains and none did in hospital B, which highlighted the importance of immediate expert consultation and thorough isolation of TB suspects.

Jackson (1996) had done a study on pulmonary tuberculosis in a homeless person. The report revealed that, the factors associated with transmission were over crowding, inadequate ventilation and poor compliance with drug therapy. Many individuals did not complete their treatment, as it enhanced the transmission of tuberculosis.

### 2.3. Associated diseases

Yi Hu etal (2008) conducted a cross sectional study on prevalence of multi-drug resistance among pulmonary tuberculosis patients two rural countries of china. For the study culture positive pulmonary TB patients, newly diagnosed or re-treated over 10 years during 12 months were selected. The results showed that among 399 subjects, the overall resistance (i.e., resistance to at least one drug) in new cases was 50.4% and 63.4% respectively, in Deqing and Guanyun and 67.3% and 83.6% respectively, in previously treated cases. The rates of MDR-TB in new cases were 3.8% in Deqing and 14.7% in Guanyun and 16.3% and 34.3% in previously treated cases. The study concluded that newly diagnosed and previously treated TB patients from the short-term DOTS covered country were at higher risk for overall drug-resistance TB and MDR-TB. Hence standardized diagnosis and treatment strategies for drug-resistance TB are urgently needed for effective control of MDR-TB in rural china.

Hubbard etal (2008) conducted a study on poor outcome is associated with delayed tuberculosis diagnosis of HIV-infected children, in Mexico. For the study 73 HIV infected children medical records were reviewed. The results showed that thirteen (18%) children were diagnosed with TB, one was confirmed by culture to be positive. Among these children, the mean ages at HIV and TB diagnosis were 3.6 and 5.3 years respectively. There were a cumulative 29 hospital admissions prior to TB diagnosis, 24 of these were due to pneumonia. The mean duration of symptoms at TB diagnosis was 73 days. The most common symptoms were cough (92%) and anorexia (85%). Seven patients (54%) had disseminated TB and five (39%) died as a consequence of TB. The study concluded that high morbidity, hospital utilization and high mortality was associated with TB among HIV-infected children.

Udwadia Zarir (2006) in his article on "India's multi-drug resistance tuberculosis crisis" he stated that India has the highest number of TB cases than any other country in the world and many of these cases are MDR-TB. A combination of contributing factors has led to the current public health crisis, a failing National Tuberculosis programme, denial and lack of compliance on the part of patients, lack of regulation of doctors in private practice, governmental policy failure and corruption, social and economic problems and growing HIV epidemic. This situation must be combated on several fronts, including promoting social change, increasing government funding, seeking global aid, implementing DOTS, non-DOTS and NGO programmes, integrating TB and HIV programmes, funding research, enacting regulatory legislation and establishing continuing medical education programmes among private practitioners.

Kounteya Sinha (2006) in his article on "TB biggest killer of HIV positive" stated that Tuberculosis has become the single largest killer of AIDS patients in India. Figures compiled by India's National AIDS Control Organization has revealed that over 60% of AIDS patients who contacted TB ultimately die because AIDS is fuelling a resurgence of TB in the country.

Faced with this double plague, India has decided to scale up and integrate the National AIDS and TB control programmes from 2006.

Nachega etal (2002) conducted a cross sectional study on knowledge, attitude and perception to tuberculosis in HIV infected Sowetan adults, south Africa. For the study 28 HIV infected adults attending Chris Hani Baragwanath Hospital perinatal HIV research unit, Soweto were selected using standardized questionnaire. The results showed that majority (96.4%) were females, 39% reported that they have attended primary school education, 36.5% reported to have a person in house with TB, 70% of individuals agreed that if they are sick with TB, they could give TB to their family or friends while 50% agreed that exposure to TB is different from having TB. 98% answered that the cause of TB is germs, 60% confirmed that TB is caused by malnutrition, 80% individuals answered that they are at high risk of getting TB in their life time and a positive skin test means they are at risk of getting TB or taking medication will prevent TB disease. The study concluded that majority of HIV infected individuals of the study had good knowledge on transmissibility and importance of TB preventive therapy as well as the vulnerability of malnourished people for getting TB.

Pilyugina etal (2000) conducted a study on HIV related knowledge, attitude and practices of health workers in Odessa, Ukraine. For the study 321 health care workers from 12 hospitals were selected out of which 171 physicians and 141 nurses responded. The results showed that 89% described HIV problem in Odessa is complex, 45% noted increase in HIV patients clinical visits, 28% reported being in contact with HIV patient once or more in a month, health care workers perceived of having greater risk of aquiring HIV or hepatitis (83%) or TB (88%). 16% reported knowing a colleague infected by HIV through work. 54% expressed fear in caring for an HIV patients, 74% felt obligated to care for HIV patients. 76% reported of using gloves while handling blood, micro injuries were rarely followed up, 72% reported needle recap. Health care workers rated their HIV knowledge moderate (48%) to

sufficient (36%). Major HIV risk factors were identified by 84%. However risks were identified with kissing (33%), cough (9%), and everyday work with HIV plus colleague (28%).

Oliveira etal (1993) conducted a study on "Tuberculosis, Multi-drug resistant TB and HIV/AIDS, knowledge, attitude and practices among nurse professionals in Rio de Janeiro". For the study they used standardized questionnaire. The results showed that the mean age was 34 +/- 10 years. There were 89% women. Only 43% were aware of the morbidity and mortality related to MDR-TB, 63% reported that they had little or no technical knowledge about AIDS associated to TB or MDR-TB infection. Nurse professionals reported that they never had specific training regarding the care of HIV(77%) or TB (76%) patients. The knowledge about AIDS were obtained mainly (60%) by radio, TV or books. Regarding transmission there were a satisfactory knowledge about HIV (77%) and about tuberculosis (43%). The study concluded that there is an urgent need to improve training programmes and formation of nursing care guidelines for TB associated with HIV in Rio de Janeiro.

# 2.4. Psychosocial aspect of TB

Ganapathy etal (2008) conducted a study on Psycho-social dysfunction: perceived and enacted stigma among tuberculosis patients registered under revised national tuberculosis control programme in two tuberculosis units, Kancheepuram (rural) and Chennai (urban), Tamilnadu. For the study they interviewed 276 TB patients who registered for treatment. In addition, four focus group discussions were conducted among Directly Observed Treatment (DOT) providers and community members. The results revealed that out of 276 patients, 190 (69%) were males. There was no significant difference between the gender in relation to social stigma. Perceived stigma was higher than enacted stigma in both genders and significantly higher among males (low self esteem p<0.05), change of behaviour of

community (p<0.05), ashamed to cough in front of others (p<0.05). Study concluded that it is essential to adopt support strategies to enhance acceptance and for a successful health programme.

Bhaita, Dubey and Bhasin (2000) conducted a descriptive study on emotional problems among hospitalized tuberculosis patients in Delhi. Using systematic random sampling technique 550 patients were selected. The results revealed that 59.6% patients had loss of esteem, 16.3% had apathy and 15.9% had the desire to commit suicide. The loss of self esteem was found to be more (60.53%) prevalent among those in the age group of 30-50 years, where as the desire to commit suicide was more common in older age groups. Sixty three point five percent patients said that they avoided going to the parties themselves. Feeling of loneliness and being ignored by the family members was experienced by 12.5% of subjects. It was noticed that 20-40 years of patients' daily routine was affected to a great extent due to TB.

Asare Ram etal (1980) conducted an experimental study on psychosocial aspects of tuberculosis patients in S.R.N Hospital, Allahabad. For the study patients family back ground and behavior pattern were assessed using a semi-structured interview schedule and Hamilton rating scale for depression. The results showed that tuberculosis patients had significantly high scores on the Hamilton rating scale for depression.

# 2.5. Revised National Tuberculosis Control Programme

Vashist etal (2009) conducted a retrospective study on efficacy of repeat sputum examination under RNTCP in Delhi. For the study data was collected from monthly records of the laboratory abstracts for the six quarters for all the 24 districts of Delhi. The results showed that a total of 2, 43,244 TB suspects were examined for diagnosis during the six quarters. Of these, 37,666 were found positive on sputum smear microscopy giving a

positivity rate of 15.4%. During the same period, a total of 2,195 TB suspects underwent repeat sputum examination, of which 272 were found positive giving a mean positivity of 12.3%. The study concluded that a significant number of smear negative TB cases may in fact be smear positive due to various reasons and can be detected by a simple repeat sputum examination. Yield of sputum positive cases in sputum reexamination is almost the same as in initial sputum examination (i.e. 10-15%). There fore the policy of repeat sputum examination in symptomatic initial sputum negative cases failing the antibiotic trial should be meticulously followed as advocated in the RNTCP diagnostic algorithm.

Kulkarni, Sanjay and Maldhure (2004) conducted a hospital based pair matched case control study on protective effect of BCG vaccination in prevention of pulmonary tuberculosis among pulmonary tuberculosis patients in Government medical college hospital, Nagpur. For the study 412 patients of pulmonary TB reporting to the study hospital at the time of data collection and born 1962 on wards were included. The results revealed that the overall vaccine effectiveness was 53%. BCG vaccine was non-significantly more effective in less than or equal to 20 years. The study demonstrated that a moderate effectiveness of BCG vaccination in prevention of Pulmonary tuberculosis in study population.

Velayatil etal (2002) conducted a study on reasons for delay in the management of patients with pulmonary tuberculosis in Teheran. For the study 50 newly diagnosed pulmonary tuberculosis patients were selected. Results showed that mean patient delay before consulting a physician was 12.5+/-10 days, significantly higher among men than women. Mean delay until the physicians diagnosis was 93+/-8 days, significantly higher for women than for men. Almost no treatment delay was observed (mean 4+/-4 days after diagnosis had been confirmed). The major delay was the time taken by physicians to diagnose tuberculosis in symptomatic patients.

Harries etal (2001) conducted a cross-sectional survey on clinical diagnosis of smear-negative pulmonary tuberculosis: an audit of diagnostic practice in hospitals of Malawi. For the study adults aged 15 years or above who were registered and receiving inpatient treatment for smear negative pulmonary TB were assessed for diagnostic guidelines (cough > 3 weeks, no response to antibiotics, negative sputum smears and chest radiograph compatible with pulmonary TB). The results revealed that there were 259 patients in that 127 were men and 132 were women, with a mean age of 37 years, 93% had a cough >3 weeks, 95% had received one or more courses of antibiotics, 92% had submitted sputum samples for smear examination and 97% had chest radiographs performed. In 148(57%) patients, all four diagnostic guidelines were used, and in 238 (92%) patients three or more were used the diagnosis of smear negative pulmonary TB was considered correct by study criteria in 203 (78%) patients. In the remainder, 22(8%) were considered to have intrapulmonary TB and 34 (14%) another diagnosis. The study concluded that hospital practices in the diagnosis of smear negative pulmonary TB are reasonable, although there if room for improvement with in-service training and regular audits of practice.

Venkatesan etal (1999) conducted a study on socio economic impact of tuberculosis on patients and families of India. For the study interview schedule was used to collect data from 304 patients (in that 120 were females) on socio economic demographic characteristics, employment, income particulars, expenditure on illness and effects on children from newly detected sputum positive pulmonary Tuberculosis patients. Then the direct and indirect costs / money spend on Diagnosis, drugs, investigations, travel and loss of wages and total cost project for the entire 6 months of treatment were assessed. The results showed that the mean direct cost was Rs.2052/-, indirect Rs.3934/- and the total cost was Rs.5986/- respectively.

Tuberculosis research centre Madras (1996) conducted a longitudinal study for seven year on short-course chemotherapy in 18 districts in India under district tuberculosis

programme. For the study symptomatic patients aged 15 years or more, belonging to the districts concerned, with at least one sputum smear found positive for acid-fast bacilli (AFB), who had not had more than 2 months of previous specific anti-tuberculosis chemotherapy and were attending the government health facilities on their own were considered as sample of the study. The results showed that overall treatment completion for Short Course Chemotherapy was fairly constant (51-55%), but ranged from 29% to 45% for the standard regimen. The study concluded that it was feasible to employ Short course chemotherapy under the existing programme conditions

National Tuberculosis centre, Bangalore (1974) conducted a study on X-ray diagnosis of TB in well-functioning District TB Centers Bangalore. The study revealed that, nearly 70% of the cases diagnosed and put on treatment on the basis of X-ray, did not have tuberculosis at all. The proportion of cases diagnosed on the basis of X-ray alone and put on treatment unnecessarily was likely to be even higher in many centers. Hence the study concluded that the X-ray is not reliable to diagnose pulmonary tuberculosis.

Tuberculosis control officer (1989) conducted a study on short course chemotherapy for pulmonary tuberculosis patients under field conditions in Pondicherry with the objective of obtaining on its feasibility, acceptability, toxicity and efficacy. For this study a total of 1441 patients were selected who received a 6 months period short regimen of isoniazide(300mg), rifampicin(450mg) and pyrazinamide 1.5g) daily for two months initially followed by rifampicin(600mg) and Isoniazide (600mg) twice a week for the next four months. 98% of the patient had either mild or moderate diseases radiologically. Chemotherapy was completed by 68% of the patients, one of the patient had smear positive at the end of chemotherapy and 81% showed radiography improvement. The study concluded that successful short course chemotherapy was feasible under existing field conditions. The

availability of rifampicin and pyrazinamide represented the watershed in TB control in India, for it at most halved the duration of treatment from 12 to 6 months.

Research groups at the Pasteus Institute, Paris and Cornell University (1969) conducted an experimental study on sterilizing activity of various drug combinations in infected mouse. The findings revealed that effective chemotherapy is a biphasic antibacterial process, early killing occurring in the first phase and sterilization in the second. The more rapid the initial bacterial effect on susceptible organisms, the less likely are per sisters to emerge. Regimens containing rifampicin and pyrazinamide eliminate susceptible bacilli sooner and more lastingly than other regimens. The study concluded that isoniazid with ethambutol was the regimen least capable of sterilizing because the effect of ethambutol was essentially only bacteriostatic, isoniazid with rifampicin emerged as the most effective sterilizing regimen, rifampicin appearing to be mainly responsible for the sterilizing activity. Subsequently with isoniazid, streptomycin or rifampicin alone, rifampicin was the only drug capable of sterilizing the lungs and preventing relapse. The rifampicin serum level needed to be 3 times as high as that achieved in man.

A controlled clinical trial study was conducted at the tuberculosis chemotherapy centre (1964) to compare daily versus weekly regimen. For this study a standard oral regimen of 100mg of isoniazid plus 5g of sodium PAS twice daily was compared with a twice-weekly regimen of 1g of streptomycin given by intramuscular injection plus 14mg of isoniazid per kg body weight, given orally in a single dose. Both regimens were given to ambulatory patients at random. The oral regimen was dispensed for self-administration. For the intermittent regimens, the patients had to attend the clinic on 2 days a week at 3-4 day intervals. The treatment was fully supervised i.e. each patient had first to take his isoniazid tablets in the presence of the staff (who checked that the tablets actually had been swallowed), and then received the injection of streptomycin. The results showed that, the intermittent regimen was

highly successful and slightly more effective than daily regimen. This suggests that, there had been an intensive phase at the start of treatment; the susceptible bacilli would probably have been eliminated.

# 2.6. DOTS Administration Strategy

Singh etal (2005) conducted a study on "Effectiveness of community based anganwadi workers in the directly observe treatment of TB patients in a rural area of Haryana". The objective of the study was to compare the treatment success rate among TB patient taking DOT from community based Anganwadi Workers (AWWs) and they were directly supervised by the TB programme staff. From the TB register held at the tuberculosis unit, treatment outcomes of all new sputum positive (NSP) patients (115) registered in Gurgon Tuerculosis unit from 1st January to 31st December 2002, were evaluated. The findings showed that the cure rate among 41 new sputum positive patients, who had AWWs as DOT providers, was significantly better than for those who had others DOT providers (95% Vs 78%) respectively (P = 0.02) The study concluded that community based Anganwadi workers with adequate training and regular supervision, could contribute effectively to a TB management programme as DOT providers.

Meenalochani Mohanarani and SoumyaSwaminathan(2005) conducted a study on "Feasibility of community DOTS providers for TB treatment in HIV infected individuals". For this study a total of 62 TB patients (58 males and 4 females) with HIV infection attending the government hospital for thoracic medicine, Tambaram, Chennai were selected. Patients were given all the doses under supervision during the initial intensive phase through community DOT providers and in the continuation phase. Data was collected both from the patients, their DOT providers about their views on DOT, advantages of DOTS, drug intake, treatment adherence, problems faced by the patients and their DOT providers in addition to

the level of awareness of community DOT providers on TB and DOTS. The results revealed that, treatment adherence, 95% of 62 patients had taken > 75% of drugs and 39% had taken 100% drugs. DOT was appreciated both by the patients and their DOTS providers since it was cost-effective and patient-friendly. The study concluded that community contribution to TB care even among HIV infected population was feasible, affordable and cost effective. There was a need for greater health education and training on TB and DOTS for community DOT providers.

Balasnagameswara (1996) conducted a study on the "Feasibility of involving Dais under DOTS Programme". The study was conducted in 2 districts and DOTS was administered as 16 months regimen under the supervision of Dais. The study concluded that Dais could be used for supervised drug administration in District Tuberculosis Programme for increased cure rate.

Uplekar (1995) conducted a study on alternative approaches to improve treatment adherence in tuberculosis control programme. This study was undertaken to discuss alternative approaches successfully employed by two NGOs- one urban and the other rural – achieve desirable levels of treatment completion and cure rates. The aim of this study was to know the effectiveness of tuberculosis control programme. For this study Non Governmental Organizations (NGO) were adopted while providing services to large population. One was the most backward area of rural Gujarat and the other was in the slums, of Bombay. The urban NGO sees that the confirmed patients of tuberculosis are started on treatment by the medical officer at the clinics. Prior to registering the patient a screening is done to exclude non-residents of the area and temporary or migrant residents. This was done with the help of social workers who visited each patient's house to elicit the information and for locating the house for future visits. The rural NGO caters to the population of about 600,000 in three tehsils, from three centers. The supervisory staff comprised of TB workers, TB supervisors

and village based anganwadi workers. The anganwadi worker (AWW) of the newly diagnosed patient's village was informed about the patient. The AWW was then expected to periodically visit the patient and ensure treatment regularity. The incentive of Rs.15 was offered to AWWs for every case detected and Rs.30 was paid for every case completing treatment. Each TB worker also maintained a register. The findings of the study showed that both NGOs and AWW working in entirely different settings, evolved ways of achieving high treatment completion and cure rates by adopting innovative ways of treatment adherence.

# 2.7. DOTS therapy and its implications on Health

Subramani, Vasantha and Gopi (2009) conducted a study on weight gain in patients with tuberculosis treated under Directly Observed Treatment Short-course (DOTS) in one of the tuberculosis unit of Tiruvallur district, Tamil nadu. For the study data was collected on socio-economic and demographic characteristics, information on smoking and drinking habits, whether patient took treatment under supervision, the type of DOT centers and any problems in taking drugs. Weight was recorded at the initial stage of treatment and at the end of anti-TB treatment, from 1557 sputum smear positive TB patients. The results revealed that out of 1557 sputum smear positive patients registered under DOTS programme, the changes in weight ranged from a loss of 4 kgs to a gain of 20 kgs at the end of TB treatment, the average change in weight was 3.22kgs. The gain of weight at the end of treatment was associated with age (<45 years), DOT at government centers, no problems in taking drugs as reported by patients and cure rate. The study concluded that there was an association between gain in weight with DOT at government centers and cure of patients.

Bertolozzi and Terra (2008) conducted a qualitative study to find answers to "Does directly observed treatment (DOTS) contribute to TB treatment compliance among health professionals involved in DOTS implementation" in Sao Paulo city, Brazil. The results

showed that DOTS was effective in compliance, it allowed the professionals to support and monitor the patients and their needs not only asking patients to take medication but also caring for the sick person.

Walley etal (2008) conducted an experimental study on evaluate the effects of providing financial incentives to tuberculosis patients and health providers in china. For the study low income groups with new sputum smear positive were included. Transport incentives were provided to poor patients for their first visit as well as for referral and supervision incentives were provided for doctors. The results showed that the improvement was less in the intervention group (70%) than in the control group (99%). Travel incentives did not reduce patient and doctor delay in the intervention group compared with the control group (p>0.05). Providing incentives was not effective in improving TB control. There were two reasons for this; one is that, the poor were not well-targeted due to a lack of operational tools, and more influential health systems issues were not addressed.

Altin, Talay and Kumbetli (2008) conducted a study on factors associated with success for tuberculosis patients; a single centers experience in Turkey. For the study 586 pulmonary tuberculosis patients records were analyzed for five years. The results revealed that 76.1% were smear positive and 23.9% were smear negative tuberculosis patients. Treatment success was 91.7%, defaulted treatment was 5.1%, died were 2.4%, failure was 0.3% and transferred out was 0.5%. The risk factors for non-successful treatment outcome were retreatment patients, patients older than 46 years of age and the presence of rifampicin resistance. Study concluded that application of DOTS may increase success in all patients especially patients who are risk for low treatment success rate.

Subramani, Vasantha and Gopi (2008) conducted a study on "survival of TB patients treated under DOTS in a rural TB unit, South India". In the study they included TB patients registered during 1999 to 2004. The results showed that out of 3818 TB patients who were

initiated on treatment, 96%, 94% and 97% of category-I, II and III respectively were surviving after completion of treatment. Higher death rates were independently associated with patients age (45years), previous history of treatment, alcoholism and initial body weight (<35 Kgs). The study concluded that the survival probability was found to be similar in all patients irrespective of categorization. Necessary actions needed to be initiated in the programme to improve body weight and abstain from alcoholism.

Verma etal (2008) conducted a five-year follow-up study of revised national tuberculosis control programme of India at Lucknow. For the study 208 tuberculosis patients who were registered in Directly Observed Treatment, Short-course (DOTS) centre, Department of pulmonary Medicine, CSM Medical University, Lucknow were followed-up in their homes after five years of completion of treatment under DOTS strategy with the help of a health visitor. The results revealed that treatment success (cured + treatment completed) - 187 (89.9%), default-11(5.3%), death-9(4.3%) and treatment failure-1 (0.4). on follow-up at five years, only 80(42.8%) patient were traced, while 68 (36.4%) patients had migrated to other places and for 39 (20.8%) patients addresses could not be traced. The follow-up status of 80 patients (Cat-I: 37, Cat-II: 15, Cat-III: 28) revealed that 73 (91.2%) were asymptomatic, two had relapsed and five patients had died. Treatment under RNTCP was effective as revealed by the results at five year follow-up.

Subramani etal (2006) conducted a study on "Active community surveillance of the impact of different Tuberculosis control measures, Tiruvallur, South India". Using cluster sampling technique tuberculosis disease prevalence survey was carried out among rural population in south India. Study subjects were screened through symptoms, radiography and sputum examination after 2.5 years in DOTS implemented area. The results revealed that culture positive and smear positive tuberculosis declined by 2.3 and 2.5% per annum compared with 11.9 and 5.6% after DOTS implementation. The 2.5 year period of DOTS

implementation accounted for one-fourth of the decline in prevalence of culture positive tuberculosis over 33 years. Multivariate analysis showed that prevalence of culture-positive tuberculosis decreased substantially (10.0% per annum) owing to DOTS after only slight declines related to temporal trends (2.1% annual decline). Under DOTS, the proportion of total cases identified through clinical care increased from 81 to 92%.

As per RNTCP Status report (2005), every day in India under the RNTCP, more than 10,000 patients were examined for TB with free of charge. The diagnosis of these patients and the follow-up of patients on treatment were achieved through the examination of more than 40,000 laboratory specimens. As a result of these examinations, each day, more than 2,500 patients were started on treatment and > 2000 of them were cured, stopping the spread of TB in the community. In order to achieve this, more than 3, 50, 000 health care workers have been trained and more than 7,800 laboratory microscopy centers were upgraded and fitted with binocular microscope since the inception of the RNTCP.

Ingale etal (2005) conducted a study on "economic burden of TB among 156 patients attending DOT centers in Delhi". The results showed that the mean expenditure before registration in DOT centre was Rs.3385.5 irrespective of all socioeconomic classes. The upper lower socio-economic classes of patients incurred maximum mean expenditure of Rs.9782. Mean duration of wage loss was found to be 47.1 days. Study participants incurred economic loss both in terms of direct and indirect costs, more in lower socioeconomic group, besides delay in attending DOT centers for treatment. Study concluded that awareness campaign focusing on treatment availability and DOT centers helped in reducing such economic loss.

Muniyandi etal (2005) conducted a study to estimate the direct, indirect and total (diagnosis and treatment) costs to patients on account of TB treated in DOTS programme in Tiruvallar district of Tamilnadu. For this study 455 patients registered under RNTCP between

June and December 2000, in Tiruvallur district were interviewed to collect the information on demographic, socio economic characteristics of patients, expenditure incurred due to illness and effect of illness on employment. Based on the data collected, various costs (direct medical, non medical, indirect and total costs incurred on account of tuberculosis before and during treatment) were estimated in addition to assessment on Standard of Living Index (SLI) for patients. The results revealed that of 455 patients, 62% had low SLI. The median direct, indirect and total costs for 343 patients who successfully completed treatment were as follows: Pre treatment direct costs were Rs. 340, during treatment direct costs Rs.100, more than 50% of patients did not incur any indirect costs in both pre treatment and during treatment periods and overall total costs were Rs. 1398. About 12% of patients lost more than 60 work days and after completing treatment, 88% returned to work. The study concluded that the total patient costs were Rs. 1398 /- and also the patients returned to work early established the economic benefits to patients treated under DOTS and lended support to rapid expansion of DOTS programme, particularly in low-income countries.

Madhav murali and Udaya kiran (2004) conducted a comparative study on DOTS and non-DOTS interventions in Tuberculosis cure in District Tuberculosis centre, Mangalore. For the study 306 newly diagnosed sputum positive out patients of pulmonary TB were selected using randomized trial. The results showed that 91% of the DOTS group and 53% of the non-DOTS group were observed to be cured of tuberculosis, using the sputum smear as the test to monitor cure. The study concluded that DOTS is a significantly superior health intervention in tuberculosis patients compared to self-administered regimen.

Key facts and concepts on RNTCP (1997) states that, under NTP, at most half of patients treated with short-course chemotherapy regimens are cured. Under RNTCP, 8out of 10 such patients are cured. Thus, at least 30% more patients are cured under RNTCP than under NTP. Multiple studies in India and elsewhere demonstrated that at least one third of

patients do not take medicines regularly. It is impossible to predict who these patients are. Directly observed anti-TB treatment was discovered in India and is now standard of care internationally, in both developed and developing countries.

# 2.8. Factors contributing to non-compliancy to TB Treatment

Nwabkan etal (2008) conducted a retrospective study on outcome of directly observed therapy short course (DOTS) regimen in a rural community of the Nigerian Niger Delta. For the study 274 pulmonary tuberculosis patients who were registered at the time of data collection were included. The results revealed that out of 274 patients 100 were females and 174 were males with a statistically significant gender difference (p<0.001). the age range with the highest number of pulmonary TB was 3-40 and the age range with the lowest number was 71 years and above, 84.7% completed treatment with cure, 2.5% developed multidrug resistance at completion of treatment, 5.5% defaulted, 3.3% died in course of treatment and treatment in 11 people were still ongoing and the study concluded that more efforts should be made towards the tracing of defaulters.

Luh etal (2008) conducted a study on factors associated with a clinician's decision to stop anti-tuberculosis treatment before completion of the course in Taiwan. For the study medical charts of 1126 pulmonary tuberculosis patents reported to receive treatment were considered. Results revealed that out of 1126 pulmonary tuberculosis patients, 156 (13. 9%) had their diagnosis of TB changed by a clinician. Multivariate analysis showed that patients whose diagnosis was based on chest X-ray or other findings, female patients, patients who interrupted treatment for two months, patients who continued care at other health facilities (transfer) and patients with lung cancer were significantly more likely to have their diagnosis changed than other groups. A substantial proportion of patients were prescribed antituberculosis treatment based on chest X-ray findings alone, and considerable proportions

were advised to stop treatment before completing a full course. Findings of the study concluded that Taiwan National Tuberculosis Programme require immediate attention.

Karagoz etal (2008) conducted a study on evaluation of drug resistance in pulmonary tuberculosis patients at Sureyyapasa chest diseases hospital, Istanbul, Turkey. For the study all 1513 hospitalized pulmonary tuberculosis patients with culture positive mycobacterium tuberculosis specimens and corresponding drug susceptibility tests (DST) for isoniazide (INH), rifampicin (RMP), streptomycin (SM) and ethambutol, routinely performed for every tuberculosis cases were included. Results showed that out of 1513 cases, 1277 (84.4%) were new and 236 (15.6%) were previously treated cases. Of the 1513 isolates, 290 (19%) were resistant to at least one of the drugs tested. Resistance among new and previously treated cases was 16.3% (209 of 1277) and 34.3% (81/236) respectively. SM resistance and INH resistance were the most common drug resistance in previously treated cases. Multidrug resistance was detected in 3.2 %( n=41) of new cases and in 13.5% (n=32) of previously treated cases.

Mateus-Solarte and Carvajal-Barona (2008) conducted a cohort study on factors predictive of adherence to tuberculosis treatment, in Valle del Cauca, Colombia. For the study 300 patients newly diagnosed with tuberculosis were followed up over 26 weeks and treatment adherence was measured by determining whether the patient took all or part of the 84 doses in the 26 weeks of treatment. The results revealed that the high incidence of partial completion of treatment (65.6%) was found. Significant associated factors were living away from the family, overcrowding at home, lack of family support, living>10 min away from the treatment facility before. Several factors can be measured on pulmonary tuberculosis diagnosis that would help identify those patients at higher risk for treatment non-adherence. The predictive value of each of these factors alone was weak, but if associated their predictive value was high.

Chandrasekaran etal (2007) conducted a study to assess the proportion of patients' reregistered after default, failure or successful treatment, completion and evaluate their treatment outcome in rural area, south India. The findings revealed that 68% of the failures and 23% of the defaulters from Category-I treatment were only re-registered. This emphasizes the need to motivate the patient to continue the treatment.

Narayanan etal (2006) conducted a study on risk factors for non-adherence of TB patients to directly observed treatment in a rural tuberculosis unit, south India. The results showed that, out of 1666 patients interviewed, 67% adhered and 33% did not adhere to DOTS. Of 558 patients, the risk factors associated with non-adherence were illiteracy (39%), difficulty in accessing health facility (57%), and non-government DOT center (43%). The study concluded that, patient should be educated about TB and importance of DOT. All DOT centers should be more accessible and patient friendly.

Chandrasekaran etal (2005) conducted a study on default and its associated risk factors during the intensive phase of treatment among new sputum smear positive patients registered under a directly observed treatment short course programme in Tiruvallar district, Tamilnadu. For the study data was collected from the tuberculosis register, treatment cards and interview schedules. The findings showed that out of 1463 patients registered, drug regularity results were available for 1406 patients. The care rate was 76% with an overall default rate of 15%, of which nearly three-fourth occurred during the intensive phase. The potential risk factors were identified by multivariate analysis. A higher likelihood of default was associated with age > 45 years, illiteracy, alcoholism, DOTS inconvenience and cases identified and referred by the community. Of the 75 defaulters from two cohort periods visited separately, 53 defaulted during the intensive phase. Among these, only 31 patients were interviewed since 17 migrated, three died, one was untraceable at the address provided while another had treatment else where. Drug related (84%) and work related (32%)

problems were the other reasons for default reported by the patients interviewed. The majority of defaults occurred during intensive phase of treatment. All efforts should be made to retrieve these patients and return them to treatment to achieve the expected goal of the RNTCP.

Ashok Kumar etal (2002) conducted a study on a comparative evaluation of factors and reasons for defaulting in TB treatment in the states of west Bengal, Jharkhanda and Arunachal Pradesh. The defaulting pattern was analyzed in four centers, one was a private hospital, one in NGO and other two were government institutions. The findings revealed that the average default rate in four institutions was 27.19%. Government organizations showed higher rates of default (38.1% and 29.3%) compared to NGO (20%) and private hospital (10.78%). The reasons for defaulting were indifference after improvement in symptoms, distance from treatment center and lack of motivation. Intolerance to drugs and temporary illness caused defaulting in some patients. The study emphasized the need for situation specific measures for reducing default in treatment as well as proper and repeated motivation of patients during treatment.

Tuberculosis Research Centre (ICMR), Chennai (2002) conducted a study on "Risk factors associated with relapse among cured TB patients in a DOTS programme in South India". For this study sputum samples collected from a cohort of TB Patients registered in DOTS centre were examined for acid fast bacilli (mycobacterium tuberculosis) at 6, 12 and 18 months after treatment completion. Results showed that out of 534 cured patients, 503 (94%) were followed up for 18 months after treatment completion. Of these, 62 (12%) relapsed during the 18 months period, 48(77%) of the 62 relapses occurred during the first 6 months of follow up. Patients who took treatment irregularly were twice more likely to have a relapse than adherent patients. Others independent predictors of relapse were initial resistance to isoniazide and or rifampicin and smoking. The relapse rate among non smoking, treatment

adherent patients with drug- sensitive organisms was 4.8%. The study concluded that the relapse rate under the DOTS programme may be reduced by ensuring that patients take their treatment regularly and are counselled effectively about quitting smoking.

John and Puri (1998) stated that, compliance with chemotherapy was essential as drug resistance or relapse may occur if the patients fail to take this medication regularly. Factors contributing to non compliance were poor communication, unacceptable waiting time, social factors, and physical factors including poor eyesight, reduced strength and forgetfulness. Other possible reasons for non compliance include taste, size and method of administration of drugs. Nurses had a vital role to play in monitoring compliance. With the advent of new ant-tuberculosis drugs and newer drug regimens the picture of tuberculosis had changed. Chemotherapy had become a powerful weapon in the modern treatment of tuberculosis. One such treatment approach was DOTS therapy. It was fully supervised treatment, a solution to non compliance. Health workers/ nurses had to counsel and observe their patients swallowing each dose of powerful combination of medicines. Patients who failed to make their appointment were immediately to be contacted and helped to resume treatment.

Prabhakar (1996) conducted a retrospective case control study on defaults among tuberculosis patients treated under DOTS in urban setup of Bangalore city. For the study 264 new (CAT 1) and 219 retreatment (CAT II) bacteriological positive patients treated under DOTS were included. Results revealed that defaults were 25% in Category-I and 45% Category-II. The predictive factors associated with default were male and alcoholism. Majority of the patients defaulted in the intensive phase particularly after the 12<sup>th</sup> dose. The study concluded that males and alcoholics are predictive risk factors of default with DOT in an urban setting. Those returning for treatment after default and having poor knowledge of disease are additional risk factors among retreatment patients.

# 2.9. Knowledge/ Attitude /Practice towards TB and DOTS

Dietze etal (2008) used a cross-sectional research design to find out the knowledge of community health worker regarding TB control and their self perceived knowledge and their role in fighting the disease in Victoria, Brazil. For the study 105 health workers were selected using random sampling technique. The result showed that the longer time on the job was positively associated with increased understanding of the disease and activities performed in TB control. Study concluded that improvements in continuing education for these workers could faster a more effective contribution to detect new TB cases in the community and improved treatment adherence by patients.

Varma etal (2008) conducted a prospective cohort study on DOTS and improved TB treatment outcome in Thailand. For the study they collected epidemiologic data about TB patients treated at Public and Private facilities in four provinces of Thailand from 2004-2006. The results showed that 93% of patients received DOTS from health workers were completed treatment compared with 69% of patients received DOTS from self administered therapy. The study concluded that the magnitude of benefit was greater when DOTS was provided by health care workers compared with a self administration.

Biaoxu etal (2008) conducted a cross sectional study on gender difference in knowledge of Tuberculosis and associated health care seeking behavior among general population in rural area of China. For the study 1200 subjects were selected using systematic random sampling technique. The results revealed that only 16.0% knew the prolonged cough with more than three weeks as a sign of TB and women were less likely to learn information about TB and share it with other on their own initiatives, women (79.2%) were more likely to seek health-care than men (58.6%) did and a large part of women preferred to visit the lower level non-hospital health facilities at first such as village clinics and drug stores.

Nguyen Phuong Hoa, Nguyen Thikimchuc and Anna Thorson (2008) conducted a descriptive study on Knowledge, attitude and Practices on TB and choice of communication channels in a rural community, Vietnam. For the study using a random sampling technique 12,143 adults were included. The results showed that the average knowledge score was 4.2(maximum=8), men had a significantly higher knowledge than women (4.8vs4.0). More than half of the respondents thought TB was hereditary. In multivariate analysis gender, occupation, economic status, education, and sources of information were significantly associated with level of TB knowledge. Television and loudspeakers were suggested as good ways of supplying information.

Sarada etal (2008) conducted a study on health seeking behavior and knowledge about TB among persons with pulmonary symptoms and Tuberculosis cases in Bangalore slums. The results showed that pulmonary tuberculosis patients had poor knowledge about TB and most of those with pulmonary symptoms were not aware of the availability of free anti-TB services at Government health facilities. Study concluded that educational interventions to be implemented to slum dwellers and their health providers.

Vijayalakshmi and Lalitha (2007) in their article to communicate World TB Day on "TB any where Is TB every where" stated that, under RNTCP, DOTS was administered by health workers Anganwadi workers, Dais and voluntary workers such as Teachers. Personnel involved in implementation of DOTS therapy was not giving emphasize on preventive aspects. Since health workers and voluntary workers directly involved in DOTS programme there was a need for sensitizing, teaching and a research programme to evaluate their knowledge and practice. In order to up date the knowledge and skill of health workers and anganwadi workers in implementation of DOTS programme a structured teaching module would be helpful. A self instructional module (SIM) could become a learning package for achieving pre-specified objectives. A module could have self contained chapters and the

instructional materials necessary for the learning of specific unit or topic. Module could be used by a learner without the presence of the teacher. Hence SIM seems to be the latest trend in adult education strategy.

Sharma etal (2007) conducted a study on awareness and perception about TB among general population in Delhi. Using multistage sampling technique, 1008 subjects were interviewed. The results revealed that 99.1% heard about TB, 89.2% of them perceived it is an infectious disease and most of them were not aware of prevention and spread of TB. The study recommended that the need to widen the scope and intensify the information and education which need to be provided to the population based on gaps identified.

Kaona etal (2007) conducted a survey on assessment of factors contributing to treatment adherence and knowledge of TB transmission among patients on TB treatment was conducted in Ndola Zambia. For the study 400 patients were interviewed using structured questionnaire. The results revealed that the major factors leading to non-compliance were patients beginning to feel better (45% and 38.6%), lack of knowledge on benefits of completing course (24.7%), running out for drugs from home (25.4%) and TB drugs too strong (20.0%). Study concluded that patients had lack of knowledge.

Janet Mathias (2006) conducted a descriptive study to assess the Knowledge, Attitude and Practice among nursing professional in care of patients with Pulmonary Tuberculosis in 5 selected nursing educational institutions of Mysore city. For the study 80 staff nurses, 80 student nurses and 80 nursing teachers were selected using purposive sampling technique. The results revealed that the mean knowledge score of nursing teachers was 14.8, staff nurses 13.48 and nursing students 11.54. The mean attitude score of nursing teachers 112.29, student nurses 107.27 and staff nurses 105.3. The mean practice score of staff was 21.85 and students 20.18.

Singh etal (2006) conducted a cross sectional study on knowledge and attitudes towards TB in Lok Nayak slum colony, Delhi. Using systematic random sampling technique 208 adults were selected. Study revealed that only 174 (83.6%) heard of TB from neighbors (64.9%) and friends (62.1%), 2.3% knew that TB is caused by germ, 33% said to quit the job and 27.6% prohibited marriage of patients. Study concluded that extensive health education directing towards attitudinal change by community involvement is needed to create awareness and remove myths about TB.

Vijayalakshmi (2006) conducted a study to assess the level of knowledge on TB and DOTS therapy practices among junior health assistant trainees in a selected centre in Karnataka. For this study a descriptive research design was carried out. Using multi-stage sampling technique 90 subjects were selected. The findings of the study revealed that junior health assistant trainees had moderately adequate knowledge related to all the dimensions of TB and DOTS therapy. The mean score and standard deviation of TB and DOTS therapy was 56.58 and 7.58 whereas practice of DOTS therapy mean score and standard deviation was 57.26 and 2.69 indicating moderate level of knowledge and practice. The study recommended that modification in curriculum and clinical rotation plan of junior health assistant trainees need to be done to increase the level of knowledge and to implement DOTS therapy adequately.

Kamolrat Erbsirisook etal (2005) conducted a descriptive study to identify factors influencing nurse's knowledge in providing care to patients with pulmonary tuberculosis in tertiary care settings in Thailand. For this study a purposive sampling of 120 registered nurses were included. The data were collected using questionnaires on perception and knowledge of nurses in caring for patients with TB. The results revealed that 84.2% of the subjects had experiences in providing care to patients with TB. Most of them (85%) perceived that they did not have enough knowledge in caring for patients with TB and they needed more

knowledge. In addition, three quarters of them did not know the strategy of TB treatment like directly observed treatment short course (DOTS) and 72% perceived that the epidemic of TB was increasing, the control of TB infection was not standardized, and the prevention of TB transmissions to health personal was inadequate. 67% had moderate or lower levels of knowledge of TB in terms of patho-physiology and treatment, self care, management of side effects of drugs, long- term care and control of TB transmission in the community. Further it was found that nurses knowledge was significantly correlated with their educational background experience of caring for patients with TB, age, length of work and knowledge of DOTS (P < .05) Multiple regression analysis showed that knowledge of DOTS and length of work affected nurses knowledge in caring for patients with TB of statistical significant (P < .01). The study concluded that nurses required continuing education to improve their knowledge in caring patients with TB and DOTS.

Singh etal (2005) conducted a study on "Effectiveness of community based anganwadi workers in the directly observe treatment of TB patients in a rural area of Haryana". For the study new sputum positive (NSP) patients (115) registered in Gurgon Tuberculosis Unit taking DOT from community based Anganwadi Workers (AWWs) without a two-day modular training were included. The findings showed, that the cure rate among 41 new sputum positive patients, who has AWWs as DOT providers, was significantly better than for those who had others DOT providers (95% Vs 78%) (P = 0.02). The study concluded that community based Anganwadi workers with adequate training and regular supervision, could contribute effectively to a TB programme as DOT providers.

Punitha (2004) conducted a descriptive study to assess the knowledge of pulmonary tuberculosis among young adults of urban and rural area of Raichur. Using simple random technique 150 subjects were selected. The data was collected using structured interview schedule. The results reveled that among rural adults none of them got adequate knowledge,

13% of them got moderately adequate knowledge and 83% of them got inadequate knowledge. Whereas in urban young adults 5% of them got adequate knowledge, 48% of them got moderately adequate knowledge and 47% of them got inadequate knowledge. The study concluded that mean knowledge score was 18.4% among urban young adults which was higher than the rural. However inadequate knowledge was prominently seen.

Khan (2003) conducted a study to assess the knowledge on TB among general population of Karachi, Pakistan. Using simple random sampling technique, data was collected from 203 subjects. The results showed that 166 (82%) subjects said that TB is contagious, 98% of them aware that TB was curable and 62% of them had the source of information about TB were TV, radio, newspaper and magazine.

Enwuru etal (2002) conducted a descriptive study to assess knowledge, attitude and behavior related to the tuberculosis and approaches of tuberculosis therapy by the physician providing first step service in tuberculosis eradication dispensary, Turkey. For the study 66 subjects were selected. Results showed that 21.2% of the physician determined that disease could be spread by only with respiratory tract and about DOTS strategy 16.7% of them gave correct answers. Study concluded that the physicians had insufficient knowledge and periodic education was needed.

Yet another study of Enwuru etal (2002) was a cross sectional design to assess the knowledge and practices of registered practitioners in management of tuberculosis in north – western Somalia. For the study 53 doctors were selected through interview method. Study revealed that 32 (64%) had treated tuberculosis patients during the previous year, but only 1 had notified the authorities, 33 (66%) knew the most important symptoms & 32 (64%) identified sputum smear microscopy as the most important diagnostic test. Only four doctors prescribed the correct regimen and only 7 advocated direct observations. Sub optional knowledge was more common among doctors working in private practice. Patients are being

treated in private sector, but few doctors follow national treatment guidelines. Study concluded that training in diagnosis and case management is needed to improve tuberculosis control in Somalia.

Richar etal (2002) conducted a study to "assess Community Health Workers (CHWs) level of willingness to supervise tuberculosis treatment and to identify knowledge gaps regarding pulmonary tuberculosis in order to design a training proramme before their involvement in treatment supervision". For this a cross-sectional survey was conducted in 8 districts of Tigray, Ethopia in June 2002. A total of 279 CHWs were selected from 70 villages using a multistage/cluster sampling technique. CHWs were interviewed by trained nurse using a structured questionnaire. The results showed that CHWs mean and median knowledge score about PTB was 79.8% and 80% respectively. CHWs mentioned exposure to cold (43%) and bacteria (40.5%) as causes of PTB disease while coughing (80.3%) as its primary means of transmission. Most (30.3%) were willing to supervise tuberculosis treatment. CHWs who resided in rural villages and those who had been entitled to free medical services were more willing to be treatment supervisors. CHWs were less likely to be treatment supervisors when they had accountability to more than one village-based institution. The study concluded that CHWs should be trained on tuberculosis and its management prior to their involvement in TB treatment supervision. Reducing CHWs multiple responsibilities and continuous health sector support would be essential to sustain their volunteer services.

Bhat etal (1999) conducted a descriptive survey on knowledge and practices of private practitioners on tuberculosis control in private clinics and hospitals of Addis Ababa, Ethiopia. For the study 120 Samples were assessed through self administered questionnaire. Results revealed that the correct anti tuberculosis treatment regimens recommended by the National Tuberculosis Control Programme were mentioned by only 9.7% of the doctors, while 63%

listed 68 regimens. The majority (41.0%) monitored treatment using chest x-ray. Study concluded that education is necessary for the private practitioners.

Jain etal (1999) conducted a study to assess the knowledge, attitude and practices of newly diagnosed sputum positive cases of pulmonary TB cases in LRS institute of TB and allied diseases. The results showed that patients had inadequate knowledge. Lack of awareness or incorrect knowledge about the disease might lead to harboring of wrong beliefs and misconception about various aspects of the disease which may affect the timely reporting of patient to the health institutions or poor compliance.

Singla Neeta, Sharma and Jain (1998) conducted a study on "Awareness about tuberculosis among nurses working in a TB hospital and in a general hospital in Delhi, India", The objective of the study was to investigate the awareness of nurses about TB and to evaluate the differences in awareness, if any, between nurses working in TB and those in a general hospital. For this study a pretest questionnaire survey was performed on 213 nurses. The results showed that a substantial number of nurses had inadequate knowledge regarding causative factors, the importance of sputum examination, correct doses of routinely used short-course chemotherapy drugs, the minimum duration of short course chemotherapy, instructions at discharge, and health education for patients and family members. If responding correctly to 75% of the questions asked is taken as the criterion for satisfactory awareness, only 40.2% of TB nurses and 10.7% of general hospital nurses had a satisfactory level of awareness. There was no effect of increasing age or years of experience on the level of awareness. The study concluded that, there was a general lack of knowledge regarding various aspects of tuberculosis among nurses. Active interventions are required to improve awareness for a better implementation of the Revised National Tuberculosis Control Programme in India.

Mayo etal (1996) conducted a study to find out the effectiveness of nurses involvement in treating TB patients in South Carolina. The students and faculty of South Carolina College of nursing had done screening over the shelter staffs. Public health nurse began providing directly observed therapy twice weekly at the shelter and gave health education. Study suggested that as an ongoing health care to community and collaborative effort might reduce tuberculosis.

Uplekar etal (1996) conducted a study on the knowledge about Tuberculosis management among private practioner and its implications in both rural and urban areas of Pune district Maharashtra. To understand the level of management practices of private medical practitioners, a semi-structured questionnaire was administered. To determine the present public-private interaction in tuberculosis control, a joint group discussion was conducted for private doctors and public health functionaries in a rural primary health centre. There were 67 allopaths and 110 non-allopaths, 81 practicing in rural areas and 96in Pune city. The non-allopaths included were qualified doctors in homeopathy and Ayurveda as well as registered medical practitioners. The results showed that private medical practitioners relied upon X-ray as the most important diagnostic test for tuberculosis. Most drug regimens reported by private medical practioners did not confirm to those recommended nationally or internationally. This showed that lack of knowledge and awareness among private medical practioners, urban and rural, about important advances in the treatment of tuberculosis and the absence of communication between those involved in the implementation of disease control activities and the practicing private medical practitioners. Most doctors used more drugs than required for treating a case of tuberculosis. Use of a single drug in continuation phase by 9 doctors and non-inclusion of INH in the regimen by 23 doctors could have serious implication with regard to development of secondary drug resistance. Although non-allopaths did not receive any formal training in the management of TB, they routinely treated patients in their clinics. No significant differences were found between allopaths and non-allopaths in their diagnostic or treatment protocols.

Lew etal (1995) conducted a study on knowledge, attitudes and practices towards tuberculosis among private general practitioners (GP) in Korea. For the study 923 private general practioners were included from 29 health centers. The results revealed that 49% of general practioners considered that the Korean tuberculosis situation is not serious, 54% were worried about infection from patients, 47% answered that BCG vaccination cause's untoward reaction with poor limited effectiveness. Fifty percent did not consider sputum examination is essential in diagnosis. For initial treatment of active tuberculosis, only 11% were prescribing the current Korea National Tuberculosis Control Programme six months standard regimen. Seventy three percent were giving non-recommendable regimens and 16% were giving unacceptable bad regimen. Findings revealed the need for learning TB management.

Muthu Sivan (1992) conducted a study on the problems of tuberculosis patients in Government T.B. Hospital, Nagercoil. The objective of the study was to assess the knowledge and study the attitude, adjust mental problems, family burden and personality characteristics of TB patients. Total 150 patients were selected for data collection. The study revealed that, higher the education better was the knowledge, attitudes and practice. TB was increasing because of lack of awareness and illiteracy, superstitious and blind belief and our traditional customs and these things prevent the people to be aware of the real fact. Still many patients are sinking in the pool of misconception and blind beliefs. So health education would be helpful for people to acquire health practices in preventing TB.

# 2.10. Effectiveness of Health Education and Structured Teaching Module on TB

Dhingra etal (2008) conducted a study on DOTS in drug addicts with TB: Delhi experience. An interventional prospective study which involved free de-addiction drugs and

motivation along with free anti-tuberculosis drugs under Revised National Tuberculosis Pogramme was undertaken among 60 drug addicts who registered in SPM marg TB clinic (Pili Kothi). The results revealed that extensive counseling for de-addiction and motivation of the study patients along with nutritional food supplements improved the compliance and adherence to treatment with equal success rates as in non-addict tuberculosis patients. The overall success rate in drug addicts was 83.3%. the default rate was 3.3% and failure rate was 1.7% among study group were also within the permissible range of RNTCP(<4%).

Sharma and Sharma (2007) conducted a community based cross-sectional survey on impact of mass media on knowledge about tuberculosis control among 920 homemakers in Delhi. Results showed that 74.2% had seen specific TB related health messages in one or more of the mass media. The percentage of respondents who had correct information about various aspects of the disease was higher among those who had heard TB campaigns in radio and news print in communicating TB messages was found to be more limited than television and billboards.

Vijayalakshmi and Lalitha (2007) conducted a study to evaluate the effectiveness of structured teaching module on the knowledge of Anganwadi workers regarding tuberculosis and DOTS therapy in Narasapur Anganwadi center, Kolar. For the study a 30 Anganwadi workers were selected using a simple random sampling technique. Results revealed that the mean pretest knowledge score obtained was 31.9 with the standard deviation of 3.26. The mean posttest knowledge score was 37.43 with the standard deviation of 2.70. The mean difference showed statistically significant difference at p<0.1 level. Teaching module on tuberculosis and DOTS was found to be helpful in gaining the knowledge.

Arias etal (2005) conducted a study in university of Alabama at Birmingham, on effectiveness of training programme on TB / DOTS therapy among medical school faculty and students in 2001 and 2002. The findings revealed that TB / DOTS knowledge among

students was poor. Faculty were consistent reflecting topic areas that need to be reinforced. The study concluded there is a need to include the topic in depth in the curriculum because it was one of the public health problems which required attention.

Jacintha D'Souza (2003) conducted a quasi-experimental study on "Effect of intensive health education on adherence to treatment in sputum positive pulmonary TB patients" at District Tuberculosis Center (DTC) and a private hospital in Mangalore, Karnataka. For this 60 new sputum positive pulmonary TB patients who fulfilled the sampling criteria were taken. Thirty patients from the private hospitals formed the experimental group and the rest from DTC were control group. Interview method was used to collect the data. After assessing their knowledge about TB, each patient in the experimental group was given a comprehensive planned health education. The finding revealed that the total health status of patients improved significantly after receiving intensive health education compared with those who did not receive and also it was found that intensive health education had no significant associations with adherence to treatment. The number of defaults increased with time in the control group and it was decreased in the experimental group. This could be due to the reinforcement of health education given to them.

Asha Kumar (2002) conducted a quasi experimental study on counseling and education in the treatment compliance of pulmonary tuberculosis patients at Rohtak district. For the study 100 newly diagnosed pulmonary tuberculosis patients were selected. Fifty patients in the experimental group was given counseling and education on pulmonary tuberculosis along with DOTS therapy but the fifty patients in the control group were not given counseling and education but received only DOTS treatment. The findings of the study revealed that the treatment completion rate was 74% in the experimental group and 24% in the control group. The study concluded that the counseling and education on pulmonary

tuberculosis to the experimental group improved the knowledge score from 18% to 80% along with the increased treatment succession rate.

Anoop (2002) conducted a study on effectiveness of specific intervention on stress related to pulmonary tuberculosis among pulmonary tuberculosis patients admitted to Santa Bai Deva Rao Sivaram tuberculosis and Rajiv Gandhi institute of Chest disease, hospital, Bangalore. For the study 30 patients were included. The results revealed that there was a significant difference between pre and post test scores of knowledge and stress levels of patients. Knowledge domains (illness, psychosocial and health practice) were significant at 0.001 level. Coping and nutritional domains were significant at 0.05 level. The overall stress score was significant at 0.001 level. An emotional domain of stress was significant at 0.005 level. The study concluded that intervention programme was effective in bringing change in knowledge and stress level of TB patients.

Prasad etal (2001) conducted a study on the effectiveness of drug administration strategy and health education on knowledge of pulmonary tuberculosis patients at army tuberculosis hospital at Namkum, Bihar. The study comprised of 60 pulmonary tuberculosis male patients with freshly diagnosed pulmonary tuberculosis treated under DOTS treatment. The patients were divided in two groups, 30 patients in the experimental group received health education booklet and 30 patients in the control group received no health education booklet. The results of the study showed there was a difference in the posttest knowledge scores of patients in the control and experimental group but the difference was not statistically significant.

Rukmani (1998) conducted a quasi-experimental study to evaluate the effectiveness of structured health teaching to the defaulters of the domiciliary treatment for pulmonary tuberculosis at Pondichery. For this study, 40 defaulters were selected under PHC at Pondichery. Data was collected in their residence according to the presence of defaulters in

their house. The findings of the study revealed that the post test mean score of the experimental group was 84% and control group was 46%. The mean difference between pre and post test in the experimental group was 46.2% and in the control group there was no improvement in mean score. It showed structured health teaching was effective. The study emphasized that there should be an in-service education programme for community health nurses, Dais, village health guides and village health nurses. The study suggested that the course content of the curriculum should include the newer views (DOTS) on defaulting of pulmonary TB and its complication.

Subramanian etal (1996) conducted a study to evaluate the effectiveness of health education, on Knowledge of tuberculosis in a south Indian rural community, initially and after health education in 48 villages of Sriperumpudur, Chengai Anna district. For the study 466 respondents from 24 randomly selected villages were assessed through interview. The community was then educated about the important aspects of tuberculosis by means of pamphlets, film shows exhibitions, role plays and group discussions. After 2 years, the respondents were revisited and assessed through interview schedule. The results showed that an overall increase of knowledge on various aspects of TB, ranging from 18% to 58% showing intervention was effective.

Bajaj (1993) conducted a study to evaluate the effectiveness of a Self instructional module (SIM) on AIDS for 3<sup>rd</sup> year nursing students. The study aimed at evaluating the SIM on AIDS and its management. A random sampling technique was used to select the study subjects. One group pretest, post test method was adopted. Structured questionnaire was used to collect the data. The mean posttest knowledge scores of students were found to be significantly higher than the mean pretest knowledge scores indicative of SIM being an effective teaching strategy. However, there was an inadequate gain in knowledge in some areas of the SIM.

# 2.11. Quality of Life among TB Patients

Unalan etal (2008) conducted a study on to know the quality of life (QOL) different in patients with active and inactive tuberculosis. For the study 196 active, 108 inactive cases who attended dispensary of tuberculosis in Kayseri for a period of one year, plus 196 healthy control group were involved. The data collected on facts of stressors, effect of disease on patient, information related to disease, sleep period, and for personal information of the research group, the medical outcomes study short form-36(SF-36) and beck depression inventory (BDI). The results revealed that in all fields of quality of life, scores of the control group were higher than those of the patient groups. QOL scores in physical and social functionality dimensions of inactive cases were higher than in active cases (p<0.001). As BDI scores increased in active and inactive cases, physical component summary (PCS) and mental component summary (MCS) decreased. As the treatment period increased in active cases, MCS increased. In active and inactive cases, marital status and accompanying diseases have an effect on the decrease of PCS scores (p<0.05). in patients with tuberculosis, the QOL of men, single, patients with a high level of education and those not having a disease that accompanies tuberculosis were found to be high (p<0.05). The QOL was negatively correlated with age and BDI, while being positively correlated with monthly income, daily sleep period and treatment period (p<0.05).

Narayanan etal (2007) conducted a study on evaluation of post treatment of health related quality of life (HRQOL) among 436 tuberculosis patient in a TB unit south India using interview technique. The result showed that, the mean scores for social, physical, mental and economic wellbeing were 84, 74, 68 and 62 respectively on a scale of 100. The well-being scores were significantly related to age sex, education, employment and persistent

symptoms. The study concluded that, HRQOL of TB patients one year after successful completion of treatment was normal.

Dhingra and Rajpal (2003) conducted a study on Health related quality of life (HRQL) scoring in tuberculosis. For this study patients of tuberculosis, both pulmonary and extra-pulmonary, between 15 and 60 years of age, diagnosed and put on treatment at the New Delhi Tuberculosis centre under revised national TB control programme from April to June 2002 were included in the study. The quality of life of tuberculosis questionnaire contained questions related to symptoms (symptom score- score I) as well as physiological, psychological and social interaction of patients (socio-psychological and exercise adaptation score- score II). 78 consecutive patients were included in the study but 76 were available for follow up analysis. The results showed that a significantly higher HRQL score at 8 weeks was observed in patients whose sputum positive converted to negative at the end of intensive phase as compared to those who failed to convert, both at the end of intensive phase and even after its extension by 4 weeks. HRQL scores showed a statistically significant negative correlation with sputum grading at 0 week, 4 weeks and 8 weeks for each domain (symptom score, socio-psychological and exercise adaptation score). The HRQL scoring for tuberculosis (DR-12 scale) had strong construct validity and it's responsive to change in quality of life would be a useful additional evaluative tool for follow up of the patients during treatment under RNTCP.

# **Summary of the findings**

The studies reviewed under magnitude and prevalence of TB in India, it was found that there was a significant decline in the trend of TB infection among the children aged less than 10 years (Gopi, Subramani and Narayan, 2006) which was found to be higher earlier

(Chanda etal, 2005). Prevalence was higher in males than females in Kuppam. (Navaneeth, Thinagaran and sulaiman, 2007).

The studies reviewed under risk factors of TB, it was found that higher prevalence of TB was seen among people living in low standard of living (Narayanan and etal, 2007) smokers (Guptha and Rajesh guptha, 2003), married people, less educational level, current unemployment, not having own place of residence, alcohol consumption, shortage of food and contact with TB patients (Tekkel etal, 2002). Over crowding and inadequate ventilation (Jackson, 1996).

The studies under associated diseases, it was found that newly diagnosed and previously treated cases were at higher risk of TB( yi Hu etal, 2008), high morbidity and mortality was associated with TB among HIV infected children (Hubbard etal, 2008) and TB is the biggest killer of HIV positive patients.

Studies reviewed under DOTS and its implication on health, it was observed that DOTS was effective for improving compliance (Bertolozzi and Terra, 2008), DOTS implementation declined the prevalence of smear positive tuberculosis (Subramani and etal, 2006) DOTS reduces economic loss (Ingale and etal, 2005, Muniyandi and etal, 2005). A DOT was superior health intervention in TB patients (Madhavi Murali and Udaya Kiran, 2004).

Studies reviewed under development of RNTCP showed that employ of short course chemotherapy was feasible (TRC, Chennai, 1996), X-ray is not reliable to diagnose Tuberculosis (NTC, Bangalore, 1974).

Studies reviewed under DOTS administration strategy, it was found that, Anganawadi workers with adequate training can become effective DOT providers (Singh and etal, 2005), DOT was appreciated both by patients and their DOTS providers, because it was cost

effective and patient friendly (Meenalochain, Mohana rani and Soumya swami Nathan, 2005), Dais could be used for DOTS (Balasangameshwara, 1996).

The studies reviewed under factors contributing to non-compliance of TB treatment, it was observed that risk factors associated with non-adherence to treatment were illiteracy, difficult in accessing health facility (Narayanan and etal, 2006), Drug related and work related problems (Chandrasekaran and etal, 2005), distance from the treatment center and lack of motivation (Ashok kumar and etal, 2002) male gender and alcoholism (Prabhakar, 1996).

Studies related to Knowledge, Attitude and Practice of TB and DOTS highlighted that physicians had insufficient knowledge in treating TB as per RNTCP guidelines (Enwuru and etal, 2002, Bhat and etal, 1999, Uplekar and etal, 1996), Pulmonary TB patients had poor knowledge about TB (Sarada and etal, 2008), Muthu sivan, 1992). Health assistant trainees had moderately adequate knowledge on TB and DOTS (Vijaylakshmi, 2006), nurses had inadequate knowledge on TB (Singla neeta, Sharma and Jain, 1998).

Studies related to effectiveness of health education and Structured Teaching Module on TB were reviewed and it was found that health education improved knowledge on TB among health workers (Arias etal, 2005, Kamolrat Krbsirisook etal, 2005), health education improved knowledge among patients (Jacintha D Souza, 2003, Asha kumar, 2002, Rukmani, 1998). Health education improved knowledge of public (Subramanian and etal, 1996, Punitha 2004), Structured Teaching Module was effective in increasing the knowledge (VijayaLakshmi and Lalitha, 2007, Prasad etal, 2001, Preethi Nandennavar, 2004 and Bajaj 1993).

Studies related to Quality of life among TB patients were reviewed and it was observed that after completion of treatment for TB patients' health related to Quality of life was normal(Narayanana etal, 2007, Dhingra and Rajpal, 2003).

# CHAPTER - III METHODOLOGY

# **METHODOLOGY**

Research methodology includes research approach, research design, study setting, sampling technique, development of the tool, description of the tool, pilot study, data collection method, and data analysis. Methodology refers to the various logical steps that are generally adopted by an investigator in studying research problem.

## **AIM OF THE STUDY**

To evaluate the effectiveness of structured teaching module on Tuberculosis and DOTS therapy on knowledge and practice of health workers.

#### **OBJECTIVES OF THE STUDY IS TO**

- 1. Assess the
  - a) Knowledge of Health Workers regarding tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 2. Evaluate the effectiveness of Structured teaching module on the level of
  - a) Knowledge of Health Workers regarding Tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 3. Find out the association between the level of
  - a) Knowledge regarding Tuberculosis and DOTS therapy with selected sociodemographic variables after implementation of module
  - b) Practice regarding DOTS therapy with selected sociodemographic variables after implementation of module.
- 4. Correlate the difference between knowledge and practice after implementation of the structured teaching module.

#### **NULL HYPOTHESES**

- H01 There will be no statistically significant relationship between the pre and post test Knowledge scores of health workers' on TB and DOTS therapy.
- H02 There will be no statistically significant relationship between the pre and post test

  Practice scores of health workers' on practices of DOT therapy.
- H03 There will be no significant association between the Health workers' knowledge and their socio-demographic variables when compared after their exposure to the structure teaching module.
- H04 There will be no significant association between the Health workers' practice and their socio-demographic variables when compared after their exposure to the structured teaching module.
- H05 There will be no statistically significant correlation between the knowledge and practice scores among health workers on TB and DOTS therapy.

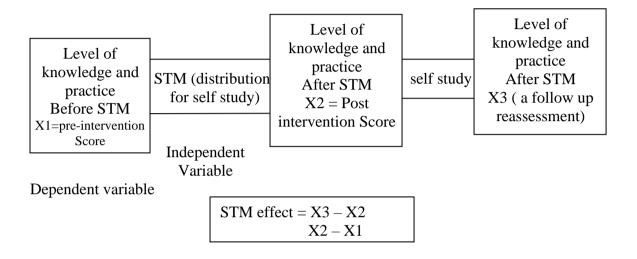
# 3.1. RESEARCH APPROACH

It indicates the procedure for conducting the study. In order to accomplish the objectives of the present study, an intervention approach was adapted.

## 3.2. RESEARCH DESIGN

For the present study a quasi-experimental one group pretest and post test design was used. In this design, a single group (experimental group) was selected. Then knowledge on TB and DOTS therapy and DOTS practices were measured (dependent variable). The structured teaching module (STM) on TB and DOTS therapy (independent variable) for health workers was then introduced. After one month of exposure to STM, knowledge on TB, DOTS therapy and practices on DOTS were carried out. A follow up reassessment on

knowledge on TB and DOTS therapy were remeasured. The differences due to the application of the experimental treatment were then determined by comparing the pre-test and post-test. The follow up post-test scores were also compared by the researcher with her personal interest to know the effectiveness of structured teaching module on long term effect which was not the part of the study objective.



(Here 'X' is the denotation for dependent variable)

Fig.3.1: Diagrammatic representation of the design of the study

## 3.3. STUDY POPULATION

In the present study health workers and anganwadi workers working in primary health centers and sub centers of Kolar were considered as study population.

# **3.4. SAMPLE**

In this study sample consisted of health workers and anganwadi workers who were randomly selected.

#### 3.5. SAMPLE SIZE

For the present study, 200 health workers and 200 anganwadi workers were included using randomization procedure. Sample size was determined by power analysis.

# 3.6. SAMPLING TECHNIQUE

For the present study, multi-stage sampling (cluster random sampling) method was adapted. In this sampling method large group or clusters became the sampling units. To obtain the sample, the researcher used the following techniques

- Researcher sampled the first clusters by drawing a simple random sample. All the taluks of rural Kolar (11taluks) name slips were made and put into the bowl. The taluk sample' was selected by reaching in and drawing out the slips of paper to get the names of 4 taluks (Kolar, Malur, Bangarpet and Chintamani).
- Those taluks had 36 primary health centers. Among them to get 20 primary health enters, same simple random procedure was followed by "lot method" and got Primary health centre sample. In that 20centres, 2 centres (20 health workers) were taken to conduct pilot study and 18 centres were taken to conduct main study.
- ➤ To get 200 health workers', male and female, the researcher prepared a name list of 205 health workers'(each primary health centre had 8 to 16 health workers) who met selection criteria of the study. From those 'health workers 200 health workers sample' was drawn using random number table.
- Similarly there were 1459 anganwadi centers. Among them 11 anganwadi centers were selected using a random number table (each anganwadi meeting centre had 13 to 25 anganwadi workers). In that one centre(20 anganwadi workers) was taken to conduct a pilot study and 10 centres were taken to conduct main study.

To get 200 anganwadi workers from 10 anganwadi centers, the researcher prepared name list of 206 anganwadi workers who met the selection criteria of the study. Using random number table, 200 anganwadi workers were selected. Because the sample needed to be selected from clusters in five stages, researcher selected multi-stage sampling method for the present study.

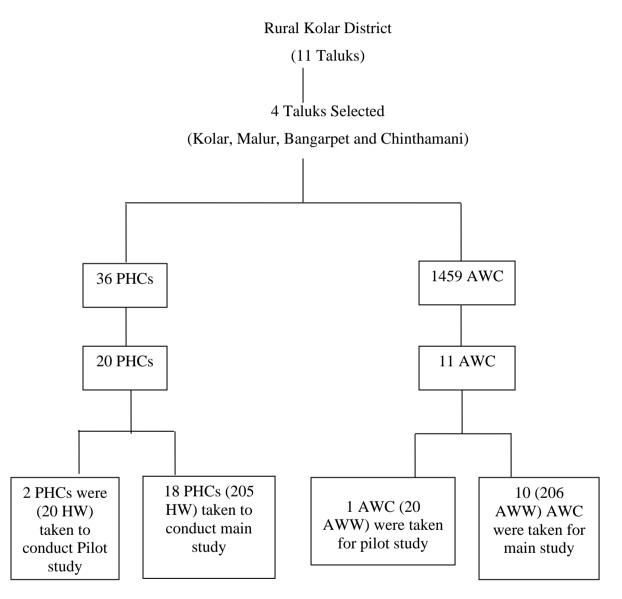


Fig. 3.2: Showing diagrammatic representation of Sampling Technique

#### 3.7. SAMPLING CRITERIA

#### **Inclusion criteria**

- Health workers and Anganwadi workers who were working in different primary health centers and sub centers and willing to participate in the study.
- Both male and female health workers

### **Exclusion criteria**

- Health workers who had the history of TB and underwent DOTS therapy.

# 3.8. SETTING OF THE STUDY

The study was carried out in primary health centers centers and Anganawadi centers of rural Kolar, Karnataka.

Kolar district belongs to Bangalore division, Bangalore division has Chickaballapur and Kolar as subdivisions. Chickaballapur subdivision has 6 taluks and Kolar subdivision has 5 taluks. Chickaballapur comes under Kolar district which has 11 taluks namely Kolar, Gudibande, Gowribidanoor, Chintamani, Chickaballapur, Bangarpet, Bagepalli, Malur, Mulbagal, Shidlagatta and Sreenivasapur. Except city area Kolar is called as rural Kolar. Kannada, Telugu, Urdu and Tamil speaking people live here. They produce more fruits and vegetables in general and production of mangos in particular.

To provide basic health care facility in rural area, primary health centers were started. It provides health protection to the public, prevents the spread of communicable diseases, conducts family planning programme, gives mother and child health programme, implements national programmes and carries out the measures for control and eradication of cholera, malaria, leprosy and tuberculosis and also implements immunization programme to the public. In the district there are 76 primary health centers (rural Kolar has 36 primary health

centres) as per 2002-03 censuses with 552 health workers (District health office information, 2007) and 3319 anganwadi workers with anganwadi centres (Child development project office information, 2007).

DOTS therapy is given by health worker or anganwadi workers. They were known as DOT agents and are paid incentive/ honorarism of Rs.250/patient after completing treatment. Availability of sample, feasibility of conducting study, geographical proximity and ethical clearance were met before selection of study setting. In each primary health centers / sub centers there were 8 to 15 health workers and each Anganawadi centers there were 13 to 25 Anganawadi workers who come every month for meeting. Similarly to each Anganawadi centers / Primary health centers/ subcentres where one to 10 tuberculosis patients come to receive free treatment/DOTS. These centers are situated free from disturbance, ample of space to accommodate health workers and have a peaceful environment.

District tuberculosis center started in Kolar in the year 1964. In 2003 the district implemented Revised National Tuberculosis Control Programme (RNTCP). As per district population requirement 5 TB units and 28 laboratories were started. To take care of these centers one medical officer, one senior treatment supervisor (STS) and one senior laboratory supervisor (STBLS) were appointed. Kolar, Bangarpet, Mulbagal, Gudibande and Shidlagatta taluks and Kamala Nehru Tuberculosis and Chest disease hospital, Kolar have functioning has treatment centers. District TB center functions under district TB officer.

## 3.9. VARIABLES

In the present study, the knowledge of health workers on TB and DOTS therapy and practice of DOTS therapy were the dependent variables Structured Teaching Module was the independent variable.

3.10. FUNCTIONAL VARIABLES

In the present study it referred to the selected variables like age, sex, education,

experience, occupation, DOTS provider and sources of information.

3.11. DEVELOPMENT AND VALIDATION OF THE TOOL

Based on research problem, the objectives stated for the present study were examined

by using,

Section A: Socio-demographic data

Section B: Knowledge questionnaire on TB and DOTS

**Section C**: Practice questionnaire on DOTS therapy

All sections of the tools (Annexure-IX) were developed after reviewing the related

literature, consulting with the research and subject experts and based on the experience of the

investigator. Then it was submitted to 17research and subject experts to check for

comprehensiveness, adequacy and appropriateness. The tool was translated in to Kannada

since study subject's communication and understanding/ approach were only in Kannada.

The following steps were followed to develop a tool.

Section A: Socio-Demographic data

This section (given in annexure-IX) consists of 7 items which elicited information

related to health workers age, sex, education, occupation, experience, source of information

and DOTS provider or not. Questionnaire was prepared on semi structured format.

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# Section B: Knowledge questionnaire on TB and DOTS

This section had structured knowledge questionnaire consists of 57(given in annexure-IX) items of multiple choice questions. These 57 items were distributed under 14 dimensions. The details are as follows:

Sl. No	Areas of knowledge	Item No
1.	General information on TB	1 and 2
2.	Tuberculosis and its causes	3, 4, 5, 6, 7, 8, 9, 10 and 11
3.	Signs and symptoms	12 and 13
4.	Complication	14
5.	Spread of TB	15 and 16
6.	Investigations	17, 18, 19 and 20.
7.	HIV/AIDS	21 and 22
8.	TB cases	23, 24, 25, 26 and 27
9.	RNTCP and DOTS	28, 29, 30 and 31
10.	DOTS categorization	32, 33 and 34
11.	DOTS treatment	35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45 and 46
12.	Side effects of treatment	47 and 48
13.	Prevention of TB	49, 50, 51 and 52
14.	Management of TB	53, 54, 55, 56 and 57

# **Section C: Practice Questionnaire on DOTS therapy**

The practice questionnaire was developed by the researcher (given in annexure-IX) to assess the activities/practice on DOTS therapy. This consists of 32 items. The statements were framed into a Likerts scale format. The details are as follows:

Sl.No	Areas of practice	Item No
1.	Identification of patient	1 2 2 4 5 6 and 7
	and treatment	1, 2, 3, 4, 5, 6 and 7
2.	Administration of	8, 9, 10, 11, 12, 13, 14
	medication to the patient	and 15
3.	Education to the patient on	16, 17, 18, 19 and 20
	treatment	10, 17, 10, 17 and 20
4.	Education to the patient	
	/family about the disease	21, 22, 23, 24 and 25
	and management	
5.	Follow-up of patient	26, 27 and 28
6.	Maintaining records and	29, 30, 31 and 32
	reports	27, 50, 51 and 52

The practice pattern items were scored on a five-point rating scale as 5,4,3,2 and 1. It had five alternative options. They are always, sometimes, once in a while, rarely and no time/not done.

- Scoring system For the knowledge questionnaire, one mark was awarded for the correct answer and no mark was awarded for the wrong answer. So total allotted score was 57.
- For the practice questionnaire uniformly all the items were positively worded and the scores were awarded based on their performance like always, sometimes, once in a while, rarely no time/ not done as 5, 4, 3, 2, and 1 respectively.
- For the knowledge and practice questionnaires, the scoring interpretation was given as follows

< 50 is below average - inadequate knowledge/ inadequate performance

51 to 75% - is average- moderately adequate knowledge/ moderately

adequate performance

adequate knowledge/ adequate performance

# Reliability

>75 % - is adequate -

The reliability of the measuring instrument is a major criterion for assessing the quality and adequacy. The reliability of the tool is computed by using test-re-test and split half technique with raw score method using spearman Brown prophecy formula.

Reliability coefficient 
$$\mathbf{r} = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2]X[N\Sigma Y^2 - (\Sigma Y)^2]}}$$

# Spearman Brown prophecy formula for reliability:

Spearman's Brown Prophecy formula r1=1 + r

Where,  $\mathbf{r}$  = Correlation coefficient computed on split halves

r1= The estimated reliability of the entire test.

- a) Test-re-test reliability: This was conducted among 40 health worker. The test-re-test reliability was 0.9
- b) Split half reliability: For 40 questionnaire, it was found to be 1.

# **Validity**

The Prepared instrument along with the objectives, module and criteria checklist were submitted to 17 experts and received only from 11 experts (Annexure-VII). The first draft of

the tool consisted of 71 knowledge and 40 practice items. Based on the suggestions given by the experts modification and rearrangement of the items were made. There were eleven items numbering 8,9,12,25,27,29,30,31,35,38,42 got deleted because of repetition and unsuitability. Four questions were added on multidrug resistance (1) prevention (1) and on HIV/ AIDS (2). Thus the second draft of the tool consisted of 57 knowledge items and 32 items in practice rating scale.

#### Translation of the tool

The tool was translated by language expert into Kannada and back translated it into English (Annuxture-IV).

#### **Pre-Testing of the Tool**

Try out of the modified version of tool in Kannada was carried out among 40 health workers who fulfilled the inclusion criteria. The structured questionnaire was administered for 40-50 minutes. The subjects found the language of the tool was simple and understandable.

## 3.12. DEVELOPMENT AND VALIDATION OF THE STRUCTURED TEACHING MODULE

The following steps were involved to develop a structured teaching module.

#### Survey of literature and books

An extensive literature review was done to find out the various dimensions of TB and DOTS. Review of books like microbiology, community medicine, medicine, medical surgical nursing, WHO publications on TB and DOTS, global status and Indian status report

books on tuberculosis and RNTCP. Indian journal on Tuberculosis, International journal of TB and chest medicine, communicable disease journal, public health journals were also reviewed. Also extensive search was done in Medline, tbcindia.com, and pub med to understand the content related to structured teaching module.

#### Discussion with guides and specialists

Guides and specialists from department of medical surgical nursing, community health nursing, community health medicine, psychiatric nursing, RNTCP and chest medicine, psychology and psychiatric social work helped in identifying areas that should be covered in the module.

#### Formulation of structured teaching module to health workers

With the information obtained from various sources, the content on module was prepared. The content on structured teaching module was as follows;

#### Chapter-I - Magnitude of the Problem.

As an introductory chapter it discusses on the Tuberculosis problem in India and World.

#### Chapter-II-Tuberculosis and its causes

This chapter explains about meaning, causes, risk factors, spread, types, clinical manifestations and complications specific to pulmonary tuberculosis.

#### Chapter-III- Investigation of pulmonary TB

It explains about specific investigations performed to diagnose pulmonary TB.

#### Chapter-IV- Extra Pulmonary TB with Investigation

This chapter describes individually all types of extra pulmonary Tuberculosis, its signs and symptoms and investigations.

#### Chapter-V- HIV with TB

It discusses in brief about HIV-TB. Since TB is commonly seen among HIV patients.

#### Chapter-VI-National TB control Programme

This chapter explains about NTCP, reason for failure of NTCP and implementation of RNTCP.

#### Chapter- VII-Direct observed treatment short course

This chapter gives in-depth information on DOTS therapy.

#### Chapter-VIII-Multi-drug TB

It describes about meaning, causes and prevention aspects of multi-drug resistance TB

#### Chapter-IX-Prevention of TB

This chapter explains measures to be followed in preventing the spread of disease including BCG vaccination.

#### Chapter- X- Role of health worker in prevention, control of TB.

This chapter explains the role of health worker before treatment initiation, during treatment and after treatment. This also focuses on nutrition and exercises to TB patient.

#### Content validation of the structured teaching module

Two experts from community medicine, two experts from RNTCP and chest medicine, one experts from community health nursing, one from psychiatric nursing, one from psychiatric social work validated the structured teaching module for applicability, feasibility, relevance, suitability and validity of its content, suggestions given by the experts with regard to structured teaching module were duly incorporated and information booklet was finalized.

#### Translation of the structured teaching module

The structured teaching module was translated by language expert into Kannada (Annexure-XI) and back translated it into English (Annexure-X). The health workers and anganwadi workers were knowledgeable to read and understand the information if it is given in Kannada. Hence structured teaching module was adopted to influence the knowledge and practice on TB and DOTS.

#### 3.13. ETHICAL ISSUES

Before conducting the study, the study methodology was explained to the District Health officer and District Tuberculosis officer of Kolar District, Ethical clearance was obtained from District Tuberculosis officer, of Kolar District in Kolar (Annuxture-I). During the data collection the procedure was explained to the subjects and told that the information will be kept confidential, rights are preserved, personal identity will not be revealed and informed written consent was obtained. Subjects were given the freedom to withdraw from the study at any stage.

#### 3.14. PILOT STUDY

A pilot study was conducted among 40 subjects (20 health workers and 20 anganwadi workers) from 12<sup>th</sup> February to 30<sup>th</sup> March 2007 using multi stage sampling technique.

A pre test was conducted to assess their knowledge and practices on DOTS then the module was distributed which has different chapters on TB and DOTS, built in assignments, to discuss later for clearing their doubts which in turn helps to improve their knowledge and practice. After 4 weeks, a post test was conducted. A pilot study was undertaken with the following objectives:

- ➤ To find out the feasibility and practicability of the study.
- ➤ To find out and handle any difficulties encountered by the subjects while completing the study.
- ➤ To find out the suitability and practicability of the structured teaching module for the study subjects.
- To check the possibilities of collecting the information in the proposed time i.e. within 2 to 3 days of a month end.

The pilot study helped the researcher to take the following steps to conduct main study feasible and practicable

- ➤ In the pilot study health workers collected the questionnaire and were unable to give it back saying that to come later which made the researcher to take help from medical officer asking to be presence at the time of data collection.
- ➤ Health workers and anganwadi workers felt questionnaire and module were understandable and able to read.
- ➤ Developed good communication with medical officers of PHCs and anganwadi supervisors to conduct a meeting for convenient time and date which helped he researcher to collect the sample with in 2-3 days.

The findings of pilot study as follows;

#### Socio demographic data;

- Majority (77.5%) of health workers ware females and only 22.5% were males.
- ◆ 47.5% were between the age group of 47-49 years and only 2.5% of them were between the age group of 19-24 years.
- ♦ Most of them (72.5%) were with SSLC qualification, 5 % of them with BA and 5% of them with MA qualification.
- Majority (45%) of health workers were having 11- 20 years of experience and only 15% of them had 1-10 years of experience and other 15% had 31 − 40 years of experience.
- ♦ 62.5 % health workers got information on TB and DOTS therapy from mass media (like news paper, Television and Radio) where as 27.5% got from health professionals (i.e. medical officers) and 10% of them have not got any information from any other sources.
- Among study subjects 50% of them were health workers and 50% of them were anganawadi workers.
- Out of 40 study subjects only 40% of them were giving DOTS treatment to the patients where as 60% of them were not giving DOTS treatment because Tuberculosis patients were not present in those particular PHC area.

#### Data on Knowledge of TB and DOTS therapy;

• The pre test results revealed that majority (57.5%) of health workers had moderately adequate knowledge (51-75) where as 40% of subjects had adequate knowledge and 2.5% of them had inadequate knowledge related to TB and DOTS therapy

• The post test results revealed that most (52.5%) of them had moderately adequate knowledge, 45% of them had adequate knowledge and only 2.5% of them had inadequate knowledge after structured teaching module.

Table -1: Distribution of Health workers Knowledge score on TB and DOTS

Variables	3.5	ar.		
Knowledge	Mean	SD	P-value	t-value
Pretest	40.83	6.214	0.14	-1.48
Post test	41.93	7.170	0.14	1.40

The above table showed that the pretest mean knowledge score was 40.83 and post test mean knowledge score was 41.93 showing the improvement in knowledge score was only 1.10. The t value (-1.48) was lesser than the p value. Hence it was not significant.

#### Data on practice of DOTS therapy;

 Out of 40 study subjects only 16 were giving DOTS treatment. All of them (16) had moderately adequate practices (51-75%) related to DOTS in pre and posttest practices.

Table-2:.Distribution of Health workers practice score on DOTS Administration

Variable Practice	Mean	SD	P-value	t-value
Pretest	87.88	5.451	0.000	-8.58
Post test	95.06	3.820		

The above table showed that the pretest mean practice score was 87.88 and post test mean practice score was 95.06 showing the improvement in practice score was 7.18. The t value (-8.58) was greater than the p value. Hence it was significant.

Association between health workers level of knowledge on TB and DOTS therapy with selected variables:

It was found that there was no association between knowledge score of TB and DOTS therapy with selected demographic variable except age. It was found that age had association with knowledge score of TB and DOTS therapy (the chi-square value was 0.057 showing statistically significant).

#### Association between health workers practice on DOTS therapy with selected variables;

Out of 40 subjects the practice was carried out by only 16 study subjects. It was found that there was no association between practice score of DOTS therapy with selected demographic variables.

#### **Conclusion:**

From the findings of the pilot study, it can be concluded that,

- The health workers had moderately adequate knowledge on TB and DOTS therapy in pre and post test knowledge score after structured teaching module distribution.
- ➤ The health workers had moderately adequate practice on DOTS therapy in pre and post test practices score after structured teaching module distribution.
- There was no association between knowledge score with selected socio-demographic variables except age.
- ➤ There was no association between practice score with selected socio-demographic variables.

Based on the pilot study findings it was decided to conduct discussion on module after post test one and conduct follow up study after four weeks to see the improvement in knowledge scores of health workers.

#### 3.15. Data collection procedure:

Data was collected from 1st April to 20th June 2007 in four phases as follows

#### First phase: preparation phase

A formal permission was obtained from the District Health Officer (Annexure-II), Deputy Director of Women and Child Welfare Department Officer (Annexure-III), Kolar to select subjects. At the same time permission for clubbing the monthly meeting in PHCs in three different times to collect the data was obtained. Health workers and anganwadi workers were selected using multistage random sampling technique. Co-operation from the medical officers of concerned PHCs and Child Development Project Officer and anganwadi supervisors of concerned anganwadi centers were obtained to permit the subjects to participate in the study. The time schedule was made by the researcher in consensus with the Medical officers and anganwadi supervisors to visit the centers to administer knowledge questionnaire aspect data collection.

#### **Second phase: Intervention phase**

Prior to the commencement of the study, subjects were explained about the purposes, nature and subjects role in the study. Having assured confidentiality, informed consent was obtained from the subjects. Then data was collected in primary health centers and anganwadi centers asking subjects to fill up the research tool in the presence of the researcher. Thus self-report method was used for assessing the level of knowledge on TB and DOTS therapy. The researcher clarified the doubts as and when required. The subjects were not permitted to discuss with each other while completing the tool. Co-operation was obtained from the health workers and anganwadi workers who were giving DOTS to the patients. Based on their time schedule of giving DOTS a visit was made by the researcher to a particular village to observe

the practice skills of subjects at the time of administering DOTS. Researcher used a structured non-participatory observation technique to rate the practice of DOTS skills of subjects. After the tool completion the module on TB and DOTS was distributed which had a series of chapters on TB and DOTS, built in assignments, to discuss later for clearing their doubts which in turn helps to improve their knowledge and practice.

#### Third phase: Post assessment

Post test was done after four weeks completion of module distribution. After collecting post-test data, the subjects were also encouraged to share their experiences and clarify their doubts. During this time, discussion on module was done based on subject's request. They were advised to practice as much of the techniques as they could and then to report at the same practice venue for the follow up assessment.

#### Fourth phase: follow up assessment

Follow-up post test was done eight weeks following module distribution. A discussion was held about utility and practicability of the module. Individual discussion was also held with subjects at the time of DOTS administration.

#### 3.16. Method of data analysis

Data analysis was done using the following statistical methods

- ➤ Descriptive statistical methods such as number, percentage, mean, standard deviation were used to assess the level of knowledge and practice on TB and DOTS therapy among health workers
- Paired 't' test was used to compare the pre and post test scores
- Inferential statistics like chi-square and multivariate analysis was used to find out the association between knowledge and practices with socio-demographic variables.
- ➤ Pearson's test was used to correlate knowledge and practice scores

#### **Summary**

This chapter dealt with the research approach, research design, study setting, sampling design, sampling technique, construction of tool and module, method of data collection and plan for data analysis. The forth coming chapter deals with analysis of data using above statistical methods.

# CHAPTER - IV ANALYSIS

#### **ANALYSIS**

This chapter deals with the analysis and interpretation of the data gathered to evaluate the effectiveness of structured teaching module on TB and DOTS therapy among health workers.

The analysis and interpretation of data were based on the data collected from health workers through structured knowledge questionnaire and five point practice performance observation rating scale. The results were computed using descriptive and inferential statistics based on the following objectives and hypotheses of the study.

#### Objectives of the study is to:

- 1. Assess the
  - a) Knowledge of Health Workers regarding tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 2. Evaluate the effectiveness of Structured teaching module on the level of
  - a) Knowledge of Health Workers regarding Tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 3. Find out the association between the level of
  - a) Knowledge regarding Tuberculosis and DOTS therapy with selected sociodemographic variables after implementation of structured teaching module
  - b) Practice regarding DOTS therapy with selected socio-demographic variables after implementation of structured teaching module.
- 4. Correlate between the knowledge and practice scores after implementation of the structured teaching module.

Based on the above objectives the following null hypotheses were stated.

#### **Null Hypotheses:**

- H01 There will be no statistically significant relationship between the pre and post test Knowledge scores of health workers on TB and DOTS therapy.
- H02 There will be no statistically significant relationship between the pre and post test Practice scores of health workers on practices of DOTS therapy.
- H03 There will be no statistically significant association between the Health workers Knowledge and their socio-demographic variables when compared after their exposure to the structure teaching module.
- H04 There will be no statistically significant association between the Health workers
  Practice and their socio-demographic variables when compared after their exposure to the structure teaching module.
- **H05** There will be no statistically significant correlation between the knowledge and practice scores among health workers on TB and DOTS therapy.

Based on the objectives and hypotheses, the data collected were tabulated, organized and presented under the following sections.

- Section –I Frequency percentage distribution of health workers' socio demographic data
- Section –II Pre assessment of health workers knowledge on TB and DOTS and Practices on DOTS
- Section-III Effectiveness of structured teaching module on knowledge of TB and DOTS among health workers
- **Section –IV** Effectiveness of structured teaching module on practice of DOTS

  Administration among health workers
- **Section –V** Association between health workers knowledge and Socio-demographic variables

**Section –VI** Association between health workers practice and Socio-demographic variables **Section – VII** Correlation between knowledge and practice of health workers

#### **SECTION-I**

### FREQUENCY PERCENTAGE DISTRIBUTION OF HEALTH WORKERS' SOCI-DEMOGRAPHIC DATA

This section deals with frequency percentage distribution of health workers related to socio-demographic data. Tuberculosis had been a major public health problem in India, coupled with rising number of cases of AIDS, in whom the most common opportunistic infection is tuberculosis. The Revised National Tuberculosis Control Programme (RNTCP) pressurized to involve health workers, anganwadi workers and other voluntary workers in implementation of DOTS. The researcher felt the need to evaluate the effectiveness of structured teaching module on TB and DOTS among health workers. Before assessing the knowledge on TB and DOTS and practices on DOTS therapy health workers were assessed for their socio-demographic characteristics and it was analyzed using descriptive statistics like frequency and percentage and were presented from table-1 to table -7.

TABLE-1. FREQUENCY PERCENTAGE DISTRIBUTION OF HEALTH
WORKERS' IN RELATION TO AGE

(N=400)

SL. NO	Age in years	Frequency	Percentage
1	18-28	39	9.75
2	29-38	143	35.75
3	39-48	95	23.75
4	49-58	123	30.75
	Total	400	100.0

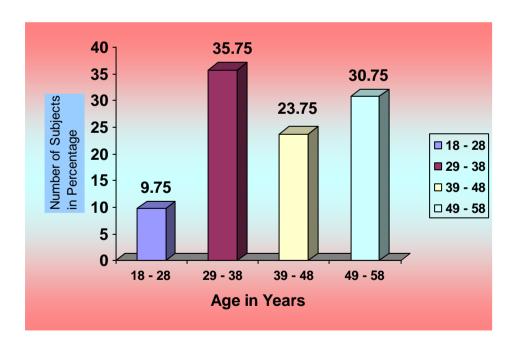


Fig-4.1 Bar diagram showing distribution of health workers based on their age

The above table and bar diagram showed that majority (35.75%) of health workers were belonging to the age group of 29 to 38 years and only 9.75% were found to be between

18 to 28 years. Remaining 23.75% of them between 39 to 48 years of age group and 30.75% of them between 49 to 58 years of age group.

TABLE-2. FREQUENCY PERCENTAGE DISTRIBUTION OF HEALTH
WORKERS' IN RELATION TO GENDER

(N=400)

Sl. NO	Gender	Frequency	Percentage
1	Female	332	83.0
2	Male	68	17.0
	Total	400	100.0

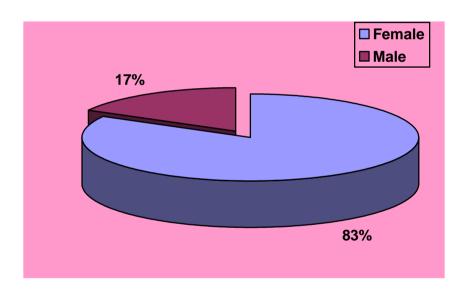


Fig-4.2 Pie diagram showing distribution of health workers based on their Gender

The above table and pie diagram showed that majority (83.0%) of health workers were females and only 17.0% were males.

## TABLE-3.FREQUENCY PERCENTAGE DISTRIBUTION OF HEALTH WORKERS' IN RELATION TO GENERAL EDUCATIONAL STATUS

(N=400)

Sl. NO	Education	Frequency	Percentage
1	Below SSLC	1	0.25
2	SSLC	290	72.5
3	PUC	79	19.75
4	Degree	28	7.0
5	JOC	2	0.5
	Total	400	100.0

The above table showed that majority (72.5%) of health workers had SSLC and only one (0.25%) was found to have below SSLC, 19.75% were with PUC, 7.0% were with Degree and 0.5% were with Job oriented courses.

TABLE -4. FREQUENCY PERCENTAGE DISTRIBUTION OF HEALTH WORKERS' IN RELATION TO OCCUPATION

(N=400)

SI. NO	Occupation	Frequency	Percentage
1	Health workers	200	50.0
2	Anganwadi workers	200	50.0
	Total	400	100.0

The above table depicts that out of 400 subjects, 200 were health workers and 200 were anganwadi workers.

TABLE-5. FREQUENCY PERCENTAGE DISTRIBUTION OF HEALTH WORKERS' IN RELATION TO DURATION OF PROFESSIONAL EXPERIENCE (N=400)

Sl. NO	Work Experience in Years	Frequency	Percentage
1	Below 1	15	3.75
2	1 - 9	72	18.0
3	10 – 19	183	45.75
4	20 – 29	64	16.0
5	30 & above	66	16.5
	Total	400	100.0

The above table showed that distribution of health workers in relation to their work experience. Out of 400 health workers, majority (45.75%) had 10 to 19 years of experience whereas only 3.75% had below 1 year of experience. Remaining 18.0% had 1to 9 years, 16.0% had 20 to 29 years and 16.5% had 30 and above years of work experience.

## TABLE-6. FREQUENCY PERCENTAGE DISTRIBUTION OF HEALTH WORKERS' IN RELATION TO SOURCE OF INFORMATION

(N=400)

Sl. NO	Source of information	Frequency	Percentage
1	Health professionals	102	25.5
2	Mass media	273	68.25
3	No information	25	6.25
	Total	400	100.0

The above table depicts distribution of health workers in relation to source of information. Majority (68.25%) of them got information from mass media where as 25.5% of them got information from health professionals and only 6.25% of them did not get any formal information on TB and DOTS therapy.

TABLE-7. FREQUENCY PERCENTAGE DISTRIBUTION OF HEALTH
WORKERS' STATUS IN RELATION TO DOTS ADMINISTRATION
(N=400)

SI. NO	DOTS provider	Frequency	Percentage
1	Yes	114	28.5
2	No	286	71.5
	Total	400	100.0



Fig-4.3. Pie diagram showing distribution of health worker's in relation to DOTS provider

The above table and pie diagram showed that majority (71.5%) of health workers were not having patients receiving DOTS treatment at the time of data collection where as only 28.5% were having patients to receive DOTS treatment and they were giving DOTS treatment to their TB patients.

#### **SECTION-II**

## PRE ASSESSMENT OF HEALTH WORKERS' KNOWLEDGE ON TB AND DOTS AND PRACTICES ON DOTS

This section deals with **first objective** of the research that was to assess the health workers' knowledge on TB and DOTS and practice on DOTS therapy. Knowledge of health workers on TB and DOTS was very important because they were used as DOTS providers in primary health centers and sub centers level. Hence knowledge and practice assessment of health workers was done before exposure to structured teaching module. To analyze the knowledge and practice of health workers researcher used descriptive statistics like frequency, percentage, mean and mean percentage, standard deviation and inferential statistics like t-test. There were 57 questions in knowledge questionnaire and 32 statements in observation rating scale related to practice. The data were analyzed and were presented from table 8 to table 12.

Based on the mean percentage, knowledge scores obtained by the health workers were grouped under below average (who scored less then 50%) or inadequate knowledge, average (who scored 51 to 75%) or moderately adequate knowledge and above average (who scored above 75%) or adequate knowledge.

TABLE-8. DISTRIBUTION OF DIMENTIONWISE KNOWLEDGE SCORES ON TB
AND DOTS THERAPY AMONG HEALTH WORKERS'

(N=400)

SL. NO	No. of questions	Dimensions of Knowledge	Mean %
1	1-2	General information on TB	62
2	3-11	Meaning and causes of TB	70
3	12-13	Signs and symptoms of TB	87
4	14	Complication of TB	92
5	15-16	Spread of TB	97
6	17-20	Investigations	59
7	21-22	HIV/AIDS and TB	76
8	23-27	Case classification	46
9	28-31	RNTCP and DOTS	67
10	32-34	DOTS categorization	54
11	35-46	DOTS treatment	57
12	47-48	Side effects of DOTS	63
13	49-52	Prevention of TB	58
14	53-57	Management of TB	70

The above table depicts dimension wise mean percentage of knowledge scores on TB and DOTS therapy. There were 14 dimensions. The highest mean percentage (97%) was seen in the area of "spread of TB" and the lowest (46%) mean percentage was seen in the area of "case classification". Remaining nine dimensions (D1, D2, D6, D9, D10, D11, D12, D13, D14) health workers had moderately adequate knowledge where as in three dimensions (D3, D4, D7) they had adequate knowledge.

TABLE-9.DISTRIBUTION OF HEALTH WORKERS' ON OVER ALL KNOWLEDGE SCORES

(N=400)

Sl. No.	Knowledge score	Frequency	%
1	Below 50%	61	15.3
2	50 – 75%	225	56.3
3	Above 75%	114	28.5
	Total	400	100.0

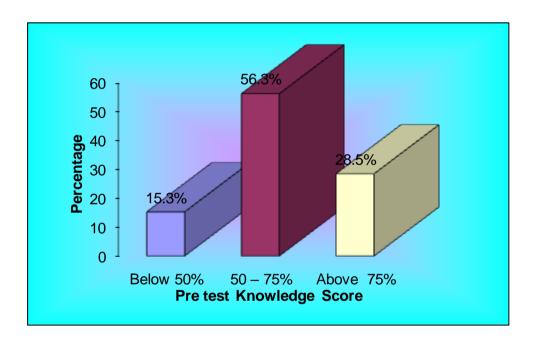


Fig.4.4. - Bar diagram showing distribution of knowledge scores among health workers

Above table and bar diagram showed that overall knowledge scores of health workers on TB and DOTS therapy. Majority (56.3%) of the health workers had moderately adequate knowledge where as 15.3% of them had inadequate knowledge and only 28.5% of them had adequate knowledge.

TABLE-10. DISTRIBUTION OF HEALTH WORKERS' ON OVER ALL PRACTICE SCORES

(N=114)

Sl. No.	Practice score	Frequency	%
1	Below 50%	114	100.0
2	50 – 75%	-	-
3	Above 75%	-	-
	Total	114	100.0

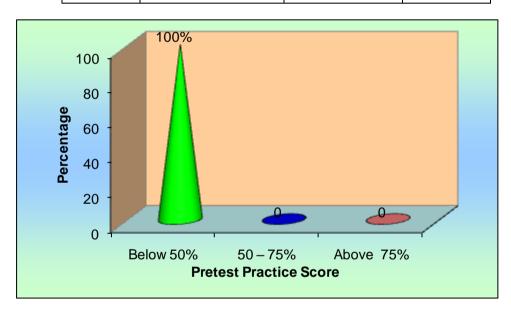


Fig.4.5. Bar diagram showing overall practice score of health workers

Above table and bar diagram showed that overall practice scores of health workers on DOTS administration. Based on the mean percentage, practice scores obtained by the health workers were grouped under inadequate performance (who scored less then 50%), moderately adequate performance (who scored 50 to 75%) and adequate performance (who scored above 75%). All (100%) health workers had inadequate practices and none of them had moderately adequate or adequate practices.

TABLE-11. DISTRIBUTION OF MEAN AND STANDARD DEVIATION OF PRE

TEST KNOWLEDGE AND PRACTICE SCORES OF HEALTH WORKERS

(N=114)

Variable	Mean	S.D.
Knowledge score (N=400)	65.7	13.9
Practice score(n=114)	32.6	7.7

The above table showed that the mean knowledge score of pretest was 65.7 with S.D of 13.9 where as the mean practice score of pretest was 32.6 with S.D of 7.7. The analysis of knowledge scores were based on the data collected from all the subjects (N=400) where as the analysis of practice scores were based on the data collected from 114 subjects who could only show the demonstration of administration of DOTS practice because they were only having the patients with TB receiving DOTS therapy.

The researcher assessed the knowledge and practice of two groups (health workers=200 and anganwadi workers=200) of subjects. To find out the homogeneity in the level of knowledge and practice, they were compared. Inferential statistics 't' test was used. The findings were shown in table 12.

Table-12. COMPARISON OF PRETEST MEAN SCORE BETWEEN HEALTH
WORKERS AND ANGANWADI WORKERS ON KNOWLEDGE AND
PRACTICE

(N=400)

Variables		HW n = 200	AWW n = 200	't'	р
	Mean	70.6	60.8		
Knowledge	SD	11.7	14.2	7.6***	0.003
		(n=64)	(n = 50)		
Practice	Mean	36.4	27.7		
	SD	6.5	6.3	7.2***	0.003

\*\*\*p < 0.001

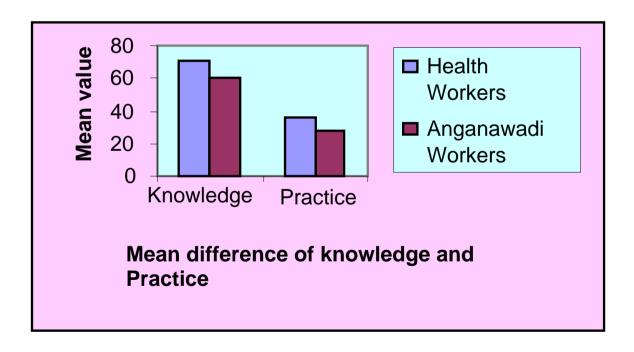


Fig.4.6. Bar diagram showing comparison of knowledge and practice between health workers and anganwadi workers

The above table and bar diagram showed that the pretest mean knowledge score of health workers was 70.6 with SD of 11.7 and the anganwadi workers was 60.8 with SD of 14.2. The 't' value is 7.6 indicating that there was a significant difference in knowledge score between health workers and anganwadi workers.

The pretest mean practice score of health workers was 36.4 with SD of 6.5 and anganwadi workers was 27.7 with SD of 6.3. The 't' value was 7.2 indicating that there was a significant difference in practice score between health workers and anganwadi workers.

#### SECTION-III

## EFFECTIVENESS OF STRUCTURED TEACHING MODULE ON KNOWLEDGE OF TB AND DOTS AMONG HEALTH WORKERS

This section deals with the first part of the **second objective** of the study that was "to assess the effectiveness of structured teaching module on the level of knowledge of health workers regarding TB and DOTS" and **null hypothesis** was "there will be no statistically significant relationship between the pre and post test Knowledge scores of health workers on TB and DOTS therapy. Knowledge of health workers on TB and DOTS was assessed after exposure to structured teaching module. To know the difference between pre and post test knowledge score, researcher used descriptive statistics like mean, standard deviation and inferential statistics like paired't' test. The results were presented from table 13 to 15.

TABLE -13: DIFFERENCE BETWEEN PRE AND POST TEST KNOWLEDGE SCORES ON TB AND DOTS THERAPY

(N=400)

Variable	Mean	SD	df	Paired 't' value	P-value
Knowledge Pre test	65.7	13.9	1	9.5	12.71
Post test	70.9	12.5			

Not Significant

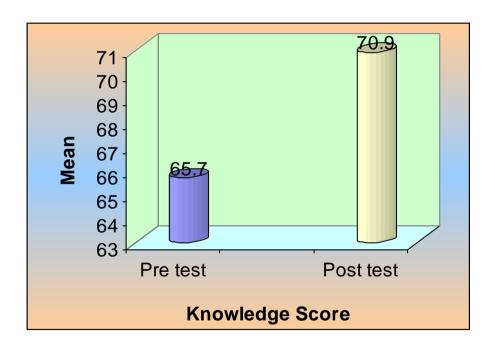


Fig. 4.7. Bar diagram showing the pre and post test mean knowledge score of health Workers

The above table and bar diagram depicts the mean, standard deviation and paired't' value of pre and post knowledge score on TB and DOTS therapy. The mean pre test score was 65.7 and SD 13.9 where as mean post test score was 70.9 and SD 12.5. The paired't' value was 9.5 which was lesser than table value indicating no significant difference between pretest knowledge score and post test knowledge score. Therefore the first null hypothesis was retained. However, it was found that post test knowledge mean score was higher than pretest knowledge mean score indicating the effectiveness of structured teaching module.

Since the knowledge gain in the post test was only moderately adequate, the investigator conducted a group sessions with health workers to clarify their doubts and encouraged them to read structured teaching module regularly to improve their knowledge. After four weeks of gap a follow up post test was carried out and its findings were presented in the following table.

TABLE -14: DISTRIBUTION OF PRE AND FOLLOW UP POST TEST

MEAN KNOWLEDGE SCORES OF HEALTH WORKERS' ON TB AND DOTS

THERAPY

(N=400)

Variable	Mean	SD	df	Paired 't' value	P-value
Knowledge					
Pre test	65.7	13.9			
			1	18.0*	12.71
Follow up					
Post test	80.2	11.4			

<sup>\*</sup>Significant at 0.05 level

The above table showed the mean, standard deviation and paired't' value of pre and follow up posttest mean knowledge score on TB and DOTS therapy. The mean pre test score was 65.7 with the SD of 13.9 where as mean follow up post test score was 80.2 with the SD 11.4. The paired't' value was 18.0 which was grater than table value indicating there was a significant difference between pretest knowledge score and the follow up post test knowledge score.

Since there were two categories of subjects namely health workers (n=200) and anganwadi workers (n=200), the comparison of their knowledge scores in pretest, post test and follow up post test was carried out and presented in the following table number 15.

TABLE-15. DISTRIBUTION OF KNOWLEDGE SCORES COMPARISON
BETWEEN HEALTH WORKERS' AND ANGANWADI
WORKERS'

(N=400)

Variables		HW (n = 200)	AWW (n = 200)	't'	p
Pre test	Mean	70.6	60.8	7.6***	0.003
Knowledge	SD	11.7	14.2	7.0***	
Post test Knowledge	Mean	75.2	66.7	7.2***	0.003
	SD	9.3	13.7	7.2	
Follow up Post test Knowledge	Mean	83.4	77.0	C Odedede	0.002
	SD	9.0	12.6	5.9***	0.002

<sup>\*\*\*</sup>p < 0.001

The above table showed that the mean pretest value of health workers was 70.6 with SD of 11.7 where as the mean post test value was 75.2 with SD of 9.3 showing the improvement of knowledge score was 4.6. In follow up post test of health workers mean value was 83.4 with the SD of 9.0 which showed the improvement in mean score was 12.8.

The mean pretest value of anganwadi workers was 60.8 with the SD of 14.2 where as the mean post test value was 66.7 with the SD of 13.7 showing the improvement in knowledge score was 5.9. In follow up post test of anganwadi workers mean value was 77.0 with SD of 12.6 showing the improvement in mean score was 16.2. The calculated 't' value for pretest knowledge was 7.6, post test was 7.2 and follow up post test was 5.9 which were greater than the table value and it was significant at 0.001 level indicating that there was a significant difference between health workers and anganwadi workers with regard to knowledge gain.

While comparing the mean score of knowledge gain, it was seen that health workers had 12.8 and the anganwadi workers had 16.2 indicating that the knowledge gain in anganwadi workers was higher than the health workers.

#### **SECTION-IV**

## EFFECTIVENESS OF STRUCTURED TEACHING MODULE ON PRACTICE OF DOTS ADMINISTRATION AMONG HEALTH WORKERS

This section deals with second part of the **second objective** that was "to evaluate the effectiveness of structured teaching module on the level of practice of health workers regarding DOTS therapy" and **null hypothesis** "there will be no statistically significant relationship between the pre and post test Practice scores of health workers on Practices of DOT therapy". After implementation of structured teaching module, health workers were assessed on practices of DOTS administration procedure. To know the difference between pre and post test practice scores, researcher used descriptive statistics like mean, standard deviation and inferential statistics like paired to test. The results were presented in table 11 and 12.

TABLE - 16: DIFFERENCE BETWEEN PRE AND POST TEST SCORES OF PRACTICES ON DOTS ADMINISTRATION

(N=114)

Variable	Mean	SD	df	Paired 't' value	P-value
Practice Pre test	32.6	7.7	1	29.2*	12.71
Post test	56.3	7.2			

\*Significant at P < 0.001

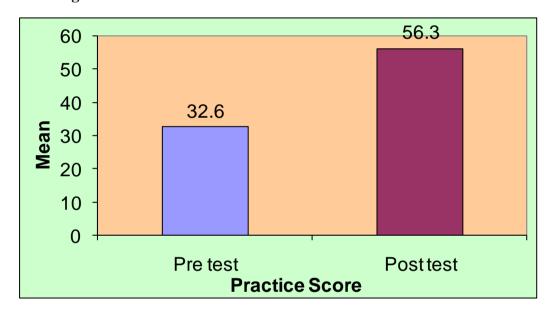


Fig.4.8. Bar diagram showing the pre and post test mean practice score

The above table and bar diagram showed the mean, standard deviation and paired't' value of pre and post practice scores of DOTS therapy. The mean pre test score was 32.6 and SD 7.7 where as mean post test score was 56.3 and SD 7.2. The paired't' value was 29.2 which was greater than the table value indicating significant difference between pretest practice scores and post test practice scores hence the second null hypothesis was rejected.

Since there were two categories of subjects namely health workers (n=64) and anganwadi workers (n=50), the comparison of their practice scores in pretest and post test was carried out and presented in the following table number 17.

TABLE - 17. DISTRIBUTION OF PRACTICE SCORES COMPARISION BETWEEN
HEALTH WORKERS AND ANGANWADI WORKERS

(N=114)

Variable	es	HW (n=64)	AWW (n= 50)	't'	P
Pretest	Mean	36.4	27.7	7.2***	0.003
Practice	SD	6.5	6.3	7.2	
Posttest Practice	Mean	60.1	51.6	7.7***	0.003
	SD	6.9	4.0		

#### \*\*\*p < 0.001

The above table showed that the pre test mean practice score of health workers was 36.4 with the SD 6.5 and anganwadi workers was 27.7 with SD 6.3. The 't' value was 7.2 which was greater than the table value showing there was a significant difference between health workers and anganwadi workers practice score in pretest. Similarly the post test mean practice score of health workers was 60.1 with SD of 6.9 and anganwadi workers 51.6 with the SD of 4.0. The 't' value was 7.7 which was greater than the table value showing there was a significant difference between health workers and anganwadi workers practice score in post test.

#### **SECTION-V**

## ASSOCIATION BETWEEN HEALTH WORKERS' KNOWLEDGE AND SOCIODEMOGRAPHIC VARIABLES

This section deals with first part of **third objective** that was "to find out the association between the level of knowledge regarding TB and DOTS therapy with selected sociodemographic variables after implementation of structured teaching module" and the **null hypothesis** was "there will be no statistically significant association between the Health workers knowledge and their socio-demographic variables when compared to their exposure to the structure teaching module". To know the association the investigator used chi-square test and the findings were presented in table 18.

TABLE – 18: DISTRIBUTION OF HEALTH WORKERS' KNOWLEDGE SCORES AND ITS ASSOCIATION WITH SOCIO-DEMOGRAPHIC VARIABLES

(N=400)

		Post test 1	Knowledge			
Sl .NO.	Variables	Below Median 71.9	Above Median 71.9	χ²	df	P value
1	<b>Age group</b> ≤ 38 years > 38 years	93 97	9 121	1.7	1	3.84
	Sex Female Male	172 18	160 50	14.5***	1	10.83
3	Education ≤ SSLC > SSLC	139 51	152 58	0.03	1	3.84
	<b>Occupation</b> Health workers Anganawadi workers	73 117	127 83	19.4***	1	10.83
5	Experience ≤ 20 years > 20 years	146 44	135 75	7.5**	1	6.63
	<b>Source of information</b> Got information Not got information	181 9	194 16	1.4	1	3.84

<sup>\*\*\*</sup>P < 0.001, \*\* P < 0.01

The above table projected chi-square value of level of knowledge on TB and DOTS therapy in association with selected demographic variables after implementation of structured teaching module. Six selected variables were taken to find out the association.

With regard to age, there were two age groups, below 38 years and above 38 years. The chi-square value was 1.7 which was lesser than the table value indicating that there was no association between knowledge score of health workers with age at 0.05 level of significance hence the null hypothesis was retained.

With regard to sex, there were two groups, male and female. The chi-square value was14.5 which was greater than the table value so there was an association between knowledge score of health workers with sex at 0.001 level of significance hence null hypothesis was rejected.

With regard to education, there were two groups, up to SSLC and above SSLC. The chi-square value was 0.03 which was lesser than the table value so there was no association between knowledge score of health workers with level of education at 0.05 level of significance hence the null hypothesis was retained.

With regard to occupation, there were two groups, health workers and anganwadi workers. The chi-square value was 19.4 which was greater than the table value so there was an association between knowledge score of health workers with occupation at 0.001 level of significance hence null hypotheses was rejected.

With regard to experience, there were two groups, below 20 years and above 20 years of experience. The chi-square value was 7.5 which was grater than the table value so there was an association between knowledge score of health workers with duration of professional experience at 0.01 level of significance hence the null hypothesis was rejected.

With regard to source of information, there were two groups, got information about TB and DOTS and not got information about TB and DOTS. The chi-square value was 1.4

which was lesser than the table value so there was no association between knowledge score of health workers with information received or not at 0.05 level of significance hence null hypotheses was retained.

The above description concluded that there was no association between health workers post test knowledge score with the selected socio-demographic variables except with sex, occupation and experience. They were significant either at 0.001 or at 0.01 levels. Hence overall there was no sufficient evidence to reject the null hypothesis.

The researcher used **multivariate analysis** to know which independent variable (sociodemographic data) had significant impact on dependent variable (knowledge). The analysis done with single, double and combined variables effect on dependent variable. The socio-demographic variable which had impact on knowledge score were only included. The findings were presented from table 19 to 21.

TABLE – 19: DISTRIBUTION OF SINGLE SOCIODEMOGRAPHIC VARIABLES IMPACT ON POST TEST KNOWLEDGE SCORE

(N=400)

Sl. No	Independent variable	Dependent variable	F-value	df	p-value	Level of significance at 0.05
1	Age group	Post test knowledge	0.06	3	0.97	NS
2	Sex	Post test knowledge	0.02	1	0.88	NS
3	Education	Post test knowledge	0.95	4	0.43	S
4	Occupation	Post test knowledge	4.63	1	0.03	S
5	Experience	Post test knowledge	2.11	4	0.07	S

The above table projected multivariate analysis results of single variable influencing the post knowledge scores on TB and DOTS among health workers.

With regard to age group the multivariate value (0.06) was lesser than the table value (0.97) indicating that there was no significant relationship between age and knowledge score. Hence it can be concluded that age was not influencing the knowledge.

With regard to sex, the multivariate value (0.02) was lesser than the table value (0.88) indicating that there was no significant relationship between sex and knowledge score. Hence it can be concluded that sex was not influencing the knowledge.

With regard to the education multivariate value (0.95) was greater than the table value (0.43) indicating that there was a significant relationship between education and knowledge score. Hence it can be concluded that education was influencing the knowledge.

With regard to the occupation multivariate value (4.63) was greater than the table value (0.03) indicating that there was a significant relationship between occupation and knowledge score. Hence it can be concluded that occupation was influencing the knowledge.

With regard to the experience multivariate value (2.11) was greater than the table value (0.07) indicating that there was a significant relationship between experience and knowledge score. Hence it can be concluded that experience was influencing the knowledge.

TABLE – 20: DISTRIBUTION OF DOUBLE SOCIODEMOGRAPHIC VARIABLES IMPACT ON POST TEST KNOWLEDGE SCORE

(N=400)

Sl. No	Independent variable	Dependent variable	F-value	df	p-value	Level of significance at 0.05
1	Age and education	Post test knowledge	0.03	3	0.99	NS
2	Sex and age	Post test knowledge	2.07	2	0.12	S
3	Sex and education	Post test knowledge	4.36	1	0.03	S
4	Education and occupation	Post test knowledge	1.97	1	0.16	S
5	Age and experience	Post test knowledge	0.71	5	0.61	S
6	Sex and experience	Post test knowledge	0.08	2	0.91	NS
7	Education and experience	Post test knowledge	1.03	6	0.40	S
8	Occupation and experience	Post test knowledge	2.12	2	0.12	S

The above table projected multivariate analysis results of double variables influencing the post knowledge score on TB and DOTS among health workers.

With regard to age and education, the multivariate value (0.03) was lesser than the table value (0.99) indicating that there was no significant relationship between age and education with knowledge score. Hence it can be concluded that age and education in combination were not influencing the knowledge.

With regard to sex and age the multivariate value (2.07) was greater than the table value (0.12) indicating that there was a significant relationship between sex and age with

knowledge score. Hence it can be concluded that sex and age in combination were influencing the knowledge.

With regard to sex and education, the multivariate value (4.36) was greater than the table value (0.03) indicating that there was a significant relationship between sex and education, with knowledge score. Hence it can be concluded that sex and education in combination were influencing the knowledge.

With regard to education and occupation, the multivariate value (1.97) was greater than the table value (0.16) indicating that there was a significant relationship between education and occupation with knowledge score. Hence it can be concluded that education and occupation in combination were influencing the knowledge.

With regard to age and experience, the multivariate value (0.71) was greater than the table value (0. 61) indicating that there was a significant relationship between age and experience with knowledge score. Hence it can be concluded that age and experience in combination were influencing the knowledge.

With regard to sex and experience, the multivariate value (0.08) was lesser than the table value (0.91) indicating that there was no significant relationship between sex and experience with knowledge score. Hence it can be concluded that sex and experience in combination were not influencing the knowledge.

With regard to education and experience the multivariate value (1.03) was greater than the table value (0.40) indicating that there was a significant relationship between education and experience with knowledge score. Hence it can be concluded that education and experience in combination were influencing the knowledge.

With regard to occupation and experience the multivariate value (2.12) was greater than the table value (0.12) indicating that there was a significant relationship between

occupation and experience with knowledge score. Hence it can be concluded that occupation and experience in combination were influencing the knowledge.

TABLE – 21: DISTRIBUTION OF COMBINED SOCIODEMOGRAPHIC

VARIABLES IMPACT ON POST TEST KNOWLEDGE SCORE

(N=400)

Sl. No	Independent variable	Dependent variable	F-value	df	p-value	Level of significance at 0.05
1	Age, Sex and Education	Post test knowledge	0.05	1	0.53	NS
2	Age, Education and Occupation	Post test knowledge	1.28	2	0.27	S
3	Sex, Education and Experience	Post test knowledge	0.38	1	0.53	NS
4	Education, Occupation and Experience	Post test knowledge	0.41	1	0.51	NS

The above table projected multivariate results of combined variables (co-variance) influencing the post knowledge score on TB and DOTS among health workers.

The combined effect of age, sex and education multivariate value (0.05) was lesser than the table value (0.81) indicating that there was no significant relationship with knowledge score. Hence it can be concluded that there was no evidence to show that the combined effect of age, sex and education influencing the knowledge score.

The combined effect of age, education and occupation multivariate value (1.28) was grater than the table value (0.27) indicating that there was a significant relationship with knowledge score. Hence it can be concluded that there was an evidence to show that the combined effect of age, education and occupation influencing the knowledge score.

The combined effect of sex, education and experience multivariate value (0.38) was lesser than the table value (0.53) indicating that there was no significant relationship with

knowledge score. Hence it can be concluded that there was no evidence to show that the combined effect of sex, education and experience influencing the knowledge score.

The combined effect of education, occupation and experience multivariate value (0.41) was lesser than the table value (0.51) indicating that there was no significant relationship with knowledge score. Hence it can be concluded that there was no evidence to show that the combined effect of education, occupation and experience influencing the knowledge score.

### **SECTION-VI**

# ASSOCIATION BETWEEN HEALTH WORKERS' PRACTICE WITH SOCIODEMOGRAPHIC VARIABLES

This section deals with **third objective** that was "to find out the association between the level of practice regarding DOTS therapy with selected socio-demographic variables after implementation of structured teaching module and the **null hypothesis** "there will be no statistically significant association between the Health workers practice score and their socio-demographic variables when compared to their exposure to the structure teaching module. To know the association the investigator used a chi-square test and presented in table 22.

TABLE - 22: DISTRIBUTION OF HEALTH WORKERS' PRACTICE SCORE AND ITS ASSOCITION WITH SOCIO-DEMOGRAPHIC VARIABLES

(N=114)

		Post test	Post test Practice			
Sl No.	Variables	Below Median 57.8	ow Above n 57.8 Median 57.8		df	P value
1	Age group ≤ 38 years >38 years	42 15	13 44	29.6***	1	10.83
2	Sex Female Male	56 1	42 15	14.3***	1	10.83
3	<b>Education</b> ≤ SSLC > SSLC	45 12	35 22	4.2*	1	3.84
4	Occupation Health workers Anganawadi workers	8 49	56 1	82.0***	1	10.83
5	Experience ≤ 20 years > 20 years	54 3	21 36	42.4***	1	10.83
6	Source of information Got information Not got information	53 4	57 -	4.2*	1	3.84

<sup>\*\*\*</sup>P < 0.001, \* P < 0.05.

The above table projected post test chi-square value on level of practices on DOTS therapy in association with selected socio demographic variables. There were six selected variables related with the level of practice.

With regard to age, there were two groups, below 38 years and above 38 years. The chi-square value was 29.6 which was greater than the table value indicating that there was a significant association between practice score of health workers with age at 0.001 level of significance, hence the null hypotheses was rejected.

With regard to sex, there were two groups, male and female. The chi-square value was 14.3 which was greater than the table value indicating that there was a significant association between practice score of health workers with sex at 0.001 level of significance hence null hypothesis was rejected.

With regard to education, there were two groups, up to SSLC and SSLC. The chisquare value was 4.2 which was greater than the table value indicating that there was a significant association between practice score of health workers with education at 0.05 level of significance hence null hypotheses was rejected.

With regard to occupation, there were two groups, health workers and anganwadi workers. The chi-square value was 82.0 which was greater than the table value indicating that there was a significant association between practice score of health workers with occupation at 0.001 level of significance hence null hypotheses was rejected.

With regard to experience, there were two groups, below 20 years and above 20 years of experience. The chi-square value was 42.4 which was greater than the table value indicating that there was a significant association between practice score of health workers with experience at 0.001 level of significance hence null hypotheses was rejected.

With regard to source of information, there were two groups, got information on TB and not got information on TB. The chi-square value was 4.2 which was greater than the table

value indicating that there was a significant association between practice score of health workers with source of information at 0.05 level of significance hence the null hypotheses was rejected.

The above description concluded that the chi-square values were greater than the table values and it was significant at 0.001 and at 0.05 levels, hence the null hypothesis was rejected.

The researcher used **multivariate analysis** to know which independent variable (socio-demographic data) had significant impact on dependent variable (practice). The analysis done with single and combined variables effect on dependent variable. The socio-demographic variable which has impact on practice scores were only included and the findings were presented from table 23 to 24.

TABLE – 23: DISTRIBUTION OF SINGLE SOCIODEMOGRAPHIC

VARIABLES IMPACT ON PRACTICE SCORES

(N=114)

Sl. No	Independent variable	Dependent variable	F-value	df	p-value	Level of significance at 0.05
1	Age	Post test Practice	0.59	3	0.62	NS
2	Sex	Post test Practice	0.78	1	0.38	S
3	Education	Post test Practice	0.53	3	0.66	NS
4	Occupation	Post test Practice	2.92	1	0.09	S
5	Experience	Post test Practice	0.19	3	0.89	NS

The above table projected multivariate analysis results of single variable influencing the post practice score on DOTS practices among health workers.

With regard to age group, the multivariate value (0.59) was lesser than the table value (0.62) indicating that there was no significant relationship between age and practice score. Hence it can be concluded that age was not influencing the practice.

With regard to sex, the multivariate value (0.78) was greater than the table value (0.38) indicating that there was a significant relationship between sex and practice score. Hence it can be concluded that sex was influencing the practice.

With regard to education, the multivariate value (0.53) was lesser than the table value (0.66) indicating that there was no significant relationship between education and practice score. Hence it can be concluded that education was not influencing the practice.

With regard to occupation, the multivariate value (2.92) was greater than the table value (0.09) indicating that there was a significant relationship between occupation and practice score. Hence it can be concluded that occupation was influencing the practice.

With regard to experience, the multivariate value (0.19) was lesser than the table value (0.89) indicating that there was no significant relationship between experience and practice score. Hence it can be concluded that experience was not influencing the practice.

Multivariate analysis showed that, among five variables' only two variables such as 'sex' and 'occupation' had statistically significant association with practice score.

TABLE – 24: DISTRIBUTION OF DOUBLE SOCIODEMOGRAPHIC

VARIABLES IMPACT ON PRACTICE SCORES

(N=114)

Sl. No	Independent variable	Dependent variable	F-value	df	p-value	Level of significance at 0.05
1	Age and Experience	Post test	0.04	1	0.82	NS
2	Sex and Experience	Post test	0.64	1	0.42	S
3	Education and Experience	Post test	0.004	1	0.94	NS

The above table projected multivariate results of double variables (co-variance) influencing the post practice score on DOTS practices among health workers.

The combined effect of age and experience, multivariate value (0.04) was lesser than the table value (0.82) indicating that there was no significant relationship with practice score. Hence it can be concluded that there was no evidence to show that the combined effect of age and experience influencing the practice score.

The combined effect of sex, and experience multivariate value (0.64) was greater than the table value (0.42) indicating that there was a significant relationship with practice score.

Hence it can be concluded that there was an evidence to show that the combined effect of sex and experience influencing the practice score.

The combined effect of education and experience, multivariate value (0.004) was lesser than the table value (0.94) indicating that there was no significant relationship with practice score. Hence it can be concluded that there was no evidence show that the combined effect of education and experience influencing the practice score.

Based on the multivariate analysis findings, there was no sufficient evidence to reject the null hypothesis.

### **SECTION-VII**

### CORRELATION BETWEEN KNOWLEDGE AND PRACTICE OF HEALTH WORKERS

This section deals with **fourth objective** that was to "correlate between knowledge and practice after implementation of structured teaching module" and the **null hypothesis** was "there will be no statistically significant correlation between the knowledge and practice scores among health workers on TB and DOTS therapy"

TABLE – 25: CORRELATION BETWEEN KNOWLEDGE AND PRACTICE SCORES OF HEALTH WORKERS

(N=114)

Variables	r	df	Calculated value	Table value
Post test Knowledge score (N=400) and Practice Score (n=114)	0.18	112	1.94	1.98

The above table showed that correlation between knowledge and practice scores of health workers. The Pearson's 'r' value was 0.18, the calculated value (1.94) was lesser than the table value (1.98) at 112 degree of freedom. Hence there was no correlation between knowledge and practice scores of health workers. There fore null hypothesis was retained **Summary:** 

Analyzing and interpreting data on knowledge of TB and DOTS therapy and practices on DOTS therapy from 400 health workers were discussed comparing with the findings of earlier studies in the next chapter.

# CHAPTER - V DISCUSSION

### **DISCUSSION**

Although Revised National Tuberculosis Control Programme had been implemented since 1997 in India, the awareness about this programme has not been recognized by health care professionals. This was because of the lack of interest among professional organizations and government to update the knowledge of health care professionals at peripheral level. Present study could be considered as premier effort. The literature reviewed for the present study showed the gaps in the following areas:

- Most of the studies were conducted on knowledge, attitude and practice aspects of patients, general population and health professionals on tuberculosis.
- There were few studies on knowledge aspects of health workers and anganwadi workers related to TB and DOTS
- There were no published studies on knowledge and practice aspects of health workers and anganwadi workers on TB and DOTS administration.
- There were few studies to know the effectiveness of structured teaching module on other conditions but on TB and DOTS there was only one study
- Most of the studies revealed that physicians in some of the hospitals and clinics were not prescribing DOTS and they were depending on daily administration of anti-TB drugs. This was one of the reasons that they were having lack of knowledge related to RNTCP and this issue was one of the reasons for relapse of TB or default. The studies related to prevention of daily dosage administration technique had been grossly under explored.

Present study was the preliminary attempt to include few of the above issues which had not been addressed in prior researches in Indian population. Researcher was interested to find out the knowledge about TB and DOTS therapy and practices of DOTS among health workers who had been implementing DOTS therapy to TB patients in their day to day work. Data obtained from 400 health workers were analyzed in chapter-IV and the findings were

discussed with reference to the objectives and hypotheses of the present study under the following sections.

- Section I : Distribution of socio-demographic data of health workers
- Section II : Pre assess of health workers knowledge on TB and DOTS and practices on DOTS.
- Section III : Effectiveness of structured teaching module on knowledge of TB and DOTS among health workers.
- Section IV : Effectiveness of structured teaching module on practice of DTOS administration among health workers.
- $Section-V: Association \ between \ health \ workers \ knowledge \ and \ socio-demographic \\ variables.$
- Section VI : Association between health workers practice with socio-demographic variables.
- Section VII: Correlation between knowledge and practice of health workers.

#### **SECTION-I**

### DISTRIBUTION OF SOCI-DEMOGRAPHIC DATA OF HEALTH WORKERS'

Socio-demographic data of health workers revealed that:

- 1. Age: With regard to age, most of the health workers (35.75%) were belonging to the age group of 29-38 years and only 9.75% were found to be between 18 to 28 years. The age
  - treatment. According to Elizebeth Hurlock (1998), a developmental psychologist, the age

group 29-38 years was considered to be adequately experienced enough to give DOTS

- groups of 29-38 years were referred to as "young adult" with their developmental task of
- "fighting and hunting", which were essential to render services to humanity with no
- supervision. These health workers themselves were the providers of DOTS treatment as
- well as source of motivation to the TB patients to have consistent and continuous
- adherence with treatment regimen. There was hardly any supervision on their work. They
- had to have adequate knowledge about the importance of DOTS therapy to realize and
- function meticulously in the administration of DOTS therapy. The age group of majority
- subjects of the present study was found to be more in favour of administration of DOTS
- with or without supervision. Assessing their level of knowledge on TB and DOTS would
- help to develop teaching programme. The knowledge gain about TB and DOTS in them
- would render great help to TB patients in long run.
- 2. Sex: With regard to sex, majority of the health workers (83%) were females and only 17% were males. Researcher included both health workers and anganwadi workers as study subjects. As per recruitment rule, only females were appointed as anganwadi
  - workers. Hence the present study had more females than males.
- **3. General education:** With regard to general educational qualification, majority (72.5%) of the health workers had SSLC and only (one) 0.25% had below SSLC qualification. The required qualification to enter health worker training programme had been SSLC. This

finding was different from the findings of Vijayalakshmi and Lalitha (2006) on their study on knowledge of TB and DOTS therapy practices among junior health assistant trainees. They found that majority had PUC qualification and only 7.8% had SSLC qualification. Health sector deals with life of people. Health care professionals need to have minimum secondary school leaving certificate to have basic understanding of concept of diseases and their role in health field. If an individual has PUC qualification, he or she may think in nursing to climb the career ladder rather than continuing their service in rural community as health worker. When health workers have below SSLC qualification, it would be difficult for them to function effectively their role.

- **4. Occupation:** Among 400 subjects, 200 (50%) were health workers and 200 (50%) were anganwadi workers. This was because that the investigator set the criteria of having the cluster with equal representation of health workers and anganwadi workers who were involved in implementation of RNTCP programme.
- 5. Duration of professional experience: With regard to professional experience majority (45.8%) of health workers had 10 to 19 years of experience and only 3.8% had below one years of job experience. This finding assured that the 10 to 19 years of professional interaction with community people would enable health workers to convince the population about the treatment adherence in RNTCP.
- 6. Source of information about TB and DOTS: With regard to source of information in TB and DOTS, majority (68.3%) of the subjects responded that they got information about TB and DOTS therapy from mass media and only 6.3% reported that they had not got any information. Mass media became one of the educational source in educating common public and also health care professionals. This finding supported the study conducted by Vijayalakshmi and Lalitha (2006) on knowledge of TB and DOTS therapy

practices among junior health assistant trainees. The findings stated that, 87.7% got information from TV.

7. Practice of DOTS administration: Related to practice of DOTS administration, out of 400 subjects, majority (71.5%) of the health workers were not giving DOTS, only 28.5% were giving DOTS. This was because there were no TB patients in their respective areas of posting. This finding was similar to the study conducted by Vijayalakshmi and Lalitha (2007). They carried out a study to evaluate the effectiveness of STM on knowledge of anganwadi workers' regarding TB and DOTS therapy in a selected Kolar. The findings of their study revealed that most of the participants were not giving DOTS to the patients.

#### **SECTION-II**

## PRE ASSESSMENT OF HEALTH WORKERS' KNOWLEDGE ON TB AND DOTS AND PRACTICES ON DOTS

The first objective of the present study was to assess the health workers knowledge on TB and DOTS and practices on DOTS revealed that

1. Dimension wise knowledge score: With regard to dimension wise mean percentage on knowledge score, a questionnaire were distributed with 14 dimensions. The findings revealed that, in three dimensions like 'spread of TB'(97%), 'Complications of TB'(92%) and 'HIV/AIDS and TB'(76%) health workers had adequate knowledge, in nine dimensions like 'general information on TB'(62%), 'meaning and causes of TB'(70%), 'investigations of TB'(59%), 'RNTCP and DOTS'(67%), 'DOTS categorization'(54%), 'DOTS treatment' (57%), 'side effects of DOTS' (63%), 'prevention of TB' (58%) and 'management of TB'(70%) they had moderately adequate knowledge and in one dimension like 'case classification' (46%) they had inadequate knowledge. This study was supported by the study conducted by Meenalochani etal (2005) on feasibility of community DOT providers for TB treatment in HIV infected individuals- a pilot study revealed that 50% mentioned TB germs as the cause of the disease and 72% had told coughing was responsible for the spread of the disease. Chest X-ray was quoted by 81% while sputum examination was given by 65% as investigation to be done for treatment. Of 62 DOT providers, 66% had mentioned 6 months or 6-9 months as duration of treatment for TB. Only 7 had heard of DOT when patients approached them for drug observation. The findings of Jain, Neeta and Sharma (1998) on awareness about tuberculosis among nurses working in a tuberculosis hospital and a general hospital in Delhi, states that moderate number of nurses had inadequate knowledge regarding causative factors, the important of sputum examination, correct doses of routinely used

short course chemotherapy drugs, the minimum duration of short course chemotherapy, instructions at discharge and health education for patients and family members. This shows that there is a general lack of knowledge among health care workers towards TB and DOTS therapy. The inadequate knowledge on "case classification" could be due to the reason that, the health workers follow the physicians' treatment order as it is and the doctor also writes in the case file, about the patients' diagnosis, illness stage and the case classification, health workers have no significant role in this area.

2. Overall knowledge score percentage: Regarding overall knowledge score of health workers it was grouped under inadequate knowledge, moderately adequate knowledge and adequate knowledge. The majority of (56.3%) health workers had moderately adequate knowledge, 28.5% of them had adequate knowledge and only 15.3% of them had inadequate knowledge. The findings of the present study brings an alertness to the nurse educators and nurse administrators having moderately adequate knowledge can be equated with nurses having inadequate knowledge. Those who have had inadequate knowledge may perceive about themselves as if they have adequate knowledge and may not approach colleagues or supervisors to clarify their doubts or rectify their mistakes. They tent to continue with their pronotions and wrong practice. This may not help to those TB patients who are receiving DOTS therapy. Since the present study had shown majority (56.3%) of them having moderately adequate knowledge and health workers with inadequate (15.3%) knowledge when the scores were put together the number of health workers having inadequate knowledge was more than the health workers who had adequate knowledge. Although Dulayme, Hashim and Alkubaisy (2003) on knowledge of health care workers and tuberculosis patients found that majority (95.5%) of health care workers had good knowledge on TB but it can not be generalized to Indian setting. Where as the study of Kamolrat (2005) on DOTS: a predictor of improving nurses' knowledge in

caring for patients with pulmonary tuberculosis in Thailand showed that 85% of them perceived that they did not have enough knowledge in caring for patients with tuberculosis and 90% of them did not know the strategy of TB treatment like DOTS. This brings to the attention of health care delivery system that health professionals need to be updated with their knowledge. The researcher considers the findings of the present study could be included in the integrated research review and carry out meta analysis to justify the knowledge of health workers on TB and DOTS therapy adequate or not. The policy maker in India requires evidence base for altering any policy or making a new policy. It was found in this study that anganwadi workers were the providers of DOTS where as they did not have structured curriculum to study about TB and DOTS therapy and their knowledge was found inadequate. Considering these evidences the researcher would recommend the policy makers, nursing council members and the nursing faculty members to consider the learning needs of health workers mainly the anganwadi workers and develop a short term courses on TB and DOTS therapy. The researcher felt the need for structured teaching module and prepared it in English as well as in Kannada to enable the study subject to learning about TB and DOTS therapy. The theoretical frame work for the present study was based on general system theory developed by Von Bertalanffly (1968) had shown if the input is inadequate the process can help to improve the output. The present study had shown that the pretest knowledge score was inadequate (input). There fore structured teaching module was prepared as process to improve the output.

3. Overall practice score percentage: Regarding overall practice score of health workers it was grouped under inadequate practice, moderately adequate practice and adequate practice. The findings on practice of health workers revealed that all (100%) health workers had inadequate practices. This finding was similar to the findings of the study conducted by Dulayme, Hashim and Alkubaisy (2003) showed that health care workers

had poor practice. It was also observed that caste problem and superiority complex had been still existing in the rural Kolar because of this patients were forcibly taking away DOTS medications from anganwadi workers which was not brought to the notice of senior treatment supervisors at correct time hence periodic supervision of anganwadi workers are required. This finding draws attention to the health care delivery system in control of tuberculosis programme in turn to train all health workers and anganwadi workers in administration of DOTS as well as educate the community. There were many reasons and observations for poor practice of DOTS administration by study subjects. One of the reasons was that the anganwadi workers were belonging to schedule caste from whose hands TB patients were not willing to take the medicines. They demanded to get 6 months medicines completely for their hands for self administration. Although DOTS itself means direct observed treatment short course. It was mandatory that medicines have to be administered by health workers every alternative day to guarantee the medicine intake. That was not possible to them. The patients who have grabbed the medicines may take medicines in right dosage at right time and right combination or may not take. When inadequate dosage are taken the TB bacilli does not get destroyed, when the drugs are not regularly taken the TB bacilli become immune to the antibodies and anti-TB drugs become no more effect to the patient. Then patient becomes drug resistant TB patient. When the out come is failure, the supervisors of health workers blame their staff members. When the TB is not cured, patients and their family members not satisfied. The health workers already placed low in the community as schedule caste get frustrated with scolding and blames. The frustrated health worker does not involve herself in 100% practice. This finding is highly significant for establishing the need for learning about DOTS practice irrespective of the caste they belong to. The subjects of the present study had health workers who have undergone 18 months of training and anganwadi workers

had undergone one month training. Whether it is 18 months training or one month training it made no difference in terms of gaining scores on practice of DOTS. It is a priority need that they have to be taught. The learning content need not be changed for both the categories because health workers did not show adequate practice than that of the anganwadi workers so the researcher decided to prepare structured teaching module on TB and DOTS common for both the groups.

4. Overall mean knowledge and practice score: Overall mean knowledge score of health workers was 65.7 with SD of 13.9 where as overall mean practice score of health workers was 32.6 with SD of 7.7 indicating that they had moderately adequate knowledge on TB and DOTS therapy but had inadequate practice on DOTS administration. This study was supported by the study conducted by Dulayme, Hashim and Alkubaisy(2003) wherein the findings was that 95.5% of health workers had good knowledge on TB and their practice was poor. One of the reasons may be, there is a defective in implementing DOTS strategy (DOTS five components like political commitment, diagnosis by microscopy, adequate drug supply, directly observed short course chemotherapy and accountability) at administrative level. Eg. Political commitment, the first requisite of DOTS management is only on paper. Politicians are not serious and not actively involved in the crusade against TB. Even allopathic doctors both in public and private sector are not serious in implementing DOTS and awareness on DOTS is poor in both of them. Some doctors knowingly or unknowingly prescribe anti-TB drugs as they like, most of the health workers are not aware of DOTS and its success in TB control. The professional organizations has not come forward to adopt DOTS and popularize its members on DOTS hence the knowledge regarding treatment guidelines among doctors and health workers is low hence the education regarding recent trends or guidelines on TB and DOTS is essential if we want this knowledge to transfer to the periphery. Hence the present study is one of such effort. The present study finding suggest that more research studies should focus on educating public and private practitioners as well as health workers on recent trends on TB and DOTS.

5. Comparison of mean knowledge and practice score of health workers and anganwadi workers: The comparison between health workers and anganwadi workers knowledge and practice score was not there in the study but the researcher involved two groups of subjects as a sample hence comparison was done. The pretest mean knowledge score of health workers was 70.6 with SD of 11.7 and the anganwadi worker was 60.8 with SD of 14.2. The 't' value is 7.6 indicating that there was a significant difference in knowledge score between health workers and anganwadi workers. The pretest mean practice score of health workers was 36.4 with SD of 6.5 and anganwadi workers was 27.7 with SD of 6.3. The 't' value was 7.2 indicating that there was a significant difference in practice score between health workers and anganwadi workers. The pretest mean knowledge score of health worker was higher than the pre test knowledge score of anganwadi worker. This could be due to the reason that health workers undergo 18 months of training and their curriculum has got a unit on diseases of the respiratory system where in a topic on TB and its management is learnt. Where as anganwadi workers do not undergo any kind of structured educational programme in the health field as a pre requisite for getting appointed as anganwadi worker only after joining as a anganwadi worker, health supervisor teach them 6 killers' disease and one among that is TB. The same could be applicable for the practice score difference where in the pre test practice score of health worker was higher than the pre test practice score of anganwadi workers.

#### **SECTION-III**

## EFFECTIVENESS OF STRUCTURED TEACHING MODULE ON KNOWLEDGE OF TB AND DOTS AMONG HEALTH WORKERS

The first part of the second objective and the first null hypothesis of the study was to compare the pre and post test knowledge scores of health workers on TB and DOTS therapy. The data were analyzed. Based on the findings the discussions were held.

### They are as follows:

- The mean knowledge pre test score was 65.7 and SD 13.9 where as mean post test score was 70.9 and SD 12.5. This result suggested that structured teaching module on TB and DOTS was effective in increasing the knowledge score (5.2 points) but not large. The paired't' value was 9.5 indicating that there was no statistically significant difference between pretest and post test knowledge score. This finding goes hand in hand with the researchers null hypothesis that "structured teaching module will not increase the knowledge score". This finding was similar to the findings of the study conducted by Arias, Paz de Zavala, Sierra etal (2002) on knowledge of TB and DOTS among medical students and faculty. Earlier researches by Vijayalakshmi and Lalitha, (2007), Preethi Nandennavas (2007), and Mary Minerva, (2003) showed that Structured Teaching Module increased the knowledge score. This may be due to one of the reasons that health workers are involved in implementing a number of national health programmes and administering DOTS, is one of the additional responsibility. They were also forced to involve themselves as DOTS provider which might have made them to gain only the limited knowledge on TB and DOTS through structured teaching module.
- ➤ The effectiveness of structured teaching module was not made effective improvement hence the researcher conducted discussion classes and clarified their doubts and conducted follow up post test on knowledge after two months of pretest.

The mean pre test score was 65.7 with the SD of 13.9 where as mean follow up post test score was 80.2 with the SD 11.4. The paired 't' value was 18.0 which was grater than table value indicating that there was a significant difference between pretest knowledge score and the follow up post test knowledge score. This finding may be because of the reason that the researcher emphasized the need for learning about TB and DOTS to decrease the mortality rate among tuberculosis patients in turn the health workers also would have realized the need for improving their knowledge and utilizing the opportunity of teaching given by the researcher.

### Comparison of knowledge score between health workers and Anganwadi workers

Analysis of the mean pretest and post test knowledge score of health workers were 70.6 and 75.2 respectively where as the mean pre and post test knowledge score of anganwadi workers were 60.8 and 66.7 respectively. This showed that there was a difference between health workers and anganwadi workers knowledge score. Health workers and anganwadi workers differed in pretest knowledge score as well as after exposure to structured teaching module. The knowledge gain in health workers was lesser than the anganwadi workers. Although both the group showed post test knowledge score was higher than the pretest knowledge score. The core role of anganwadi workers were towards caring and educating children under five and the implementation of DOTS was one of the additional responsibility given to them. They had administrative instruction to give DOTS therapy but had only informal, incidental brief teaching on illness of TB and the need for administration of DOTS therapy. The structured teaching module provided an opportunity to learn systematically about TB and DOTS therapy to meet the job demand. Therefore anganwadi workers scored better than health workers. Whereas health workers undergo 1½ years formal training. Based on their syllabus they learn various

communicable diseases and their management. One such area was TB and DOTS therapy. That could be the reason that health workers showed increased pretest knowledge scores on TB and DOTS therapy comparing to anganwadi workers. But the post test findings comparison showed that the knowledge gain in health workers were lesser than the anganwadi workers. It could be due to few reasons like "saturation feeling" or casual response to the questions appeared in the research tool. Health workers had been seeing patients with TB everyday and assisted them for investigation and treatment. So they felt that they knew everything and knowledge on TB and DOTS therapy reached 'saturation' level and structured teaching module taken them to super saturation level. Because of that they had given less importance in reading the module to increase their knowledge proportionately with anganwadi workers. Another reason could be that "ice berg theory". The researcher analyzed the level of knowledge of health workers based on their written response to the structured research tool which had no scope for probing knowledge.

#### **SECTION-IV**

## EFFECTIVENESS OF STRUCTURED TEACHING MODULE ON PRACTICE OF DOTS ADMINISTRATION AMONG HEALTH WORKERS

The second objective and null hypothesis were "to evaluate the effectiveness of structured teaching module on the level of practice of health workers regarding DOTS therapy". The data were analyzed. Based on the findings the discussions were held.

### They are as follows:

It was observed that effectiveness of structured teaching module in improving practice were analysed on the data collected from 114 subjects (practice) using paired 't' test. The mean practice pretest score was 32.6 and post test score was 56.3 indicating that there was drastic increase (23.7 points) in practice score which was significant at 0.001 level. This finding was different with the researcher stated null hypothesis that the structured teaching module will not increase the practice score. This finding was encouraging to note that, Structured Teaching Module although not increased Knowledge score but improved practice score. The reason could be that Health workers learnt DOTS administration by observing the DOTS technique and that made them to follow the correct technique in administration of DOTS even though they had inadequate knowledge. The researcher herself is a nurse educator and involved in teaching the nursing students for the last 15 years. When the learning materials were placed in the paragraph form the readers find it difficult to understand at the same time if the learning materials were put into simpler steps the students understanding was better. The structured teaching material was prepared for the present study used the text book style to impart knowledge about TB and DOTS therapy. Where as the practice of DOTS administration was explained as if the procedural steps to be carried out Small sentences, simple language and instructional statements are seem to be more understandable to the study subjects so the expected result the researcher found in practice and not in the knowledge.

### Comparison of Practice score between Health workers and Anganwadi workers

The mean practice pretest and post test score of health workers was 36.4 and 60.1 respectively where as the mean practice score pretest and posttest score of Anganwadi workers was 27.7 and 51.6 respectively. The p value was 0.003 indicating that there was a significant difference between health workers and anganwadi workers practice score. It was interesting to observe that even though the difference was seen in mean score obtained by health workers and anganwadi workers, the improvement was same (23.7 in health workers and 23.9 in anganwadi workers) in both groups. The mean score gain in health workers and anganwadi workers were same could be due to the reason that practice of DOTS administration would not change because of the different designation they were having procedural error rectification and learning to administer DOTS accurately were the job based requirements for both that is for the health workers and anganwadi workers and there fore their reading of structured teaching module brought in same level of improvement practice score.

#### **SECTION-V**

## ASSOCIATION BETWEEN HEALTH WORKERS' KNOWLEDGE AND SOCIODEMOGRAPHIC VARIABLES

The first part of third objective and the null hypothesis were "to find out the association between the level of knowledge regarding TB and DOTS therapy with selected socio-demographic variables after implementation of structured teaching module". The data were analyzed. Based on the findings the discussions were held.

### They are as follows:

- The association between health workers' knowledge with socio-demographic variables after implementation of structured teaching module revealed that the chi-square value of sex was 14.5 which was greater than the table value so there was an association between knowledge score of health workers with sex at 0.001 level of significance.
- ➤ With regard to occupation, the chi-square value was 19.4 which was greater than the table value hence there was an association between knowledge score of health workers with occupation at 0.001 level of significance.
- With regard to experience, the chi-square value was 7.5 which was grater than the table value so there was an association between knowledge score of health workers with experience at 0.01 level of significance. It was found in the present study that the sociodemographic variables such as age, sex, general education, occupation, duration of professional experience and source of information about TB and DOTS having significant association with post test knowledge score. The findings have implications to nurse administrators that the health workers between the age group of 30 and 40 years (majority of study subjects were with the age range of 29 to 38 years) female (majority 83%), with general education SSLC (72.5%), professional experience of 10 to 20 years (45.8% had 10 to 19 years) can learn health related information through structured teaching module.

The knowledge gain also can be expected to a significant level. This finding was supported by Dietze, Maciel, Vieira etal (2008) on knowledge of community health workers in TB control and their self perceived knowledge and role in fighting the disease, revealed that the longer time on job was positively associated with increased understanding of the disease and activities performed in TB control.

- The multivariate analysis results of knowledge on single variable revealed that there was a significant relationship between knowledge with education, occupation and experience. The function of multivariate analysis was to find out which are the independent variables in combination, influences the dependent variables. The variables namely general education, occupation and duration of professional experience in combination had significant association with knowledge score. Based on this findings, it would be inferred that the incumbent of the role of the health worker when has more than 10 years of experience has self realization of using the given opportunity of participating in the research study with due weitage and gains knowledge which is a mandatory. Thus the health workers had used the opportunity of participating in the present study and gained the knowledge from STM on TB and DOTS which is mandatory for playing the role of health workers to improve the job performance which is mandatory and in turn get job satisfaction.
- Double variable analysis revealed that there was a significant relation between sex and age, sex and education, education and occupation, age and experience and education and experience. Similar to chi-square and multivariate analyses, the double variables also had shown the associations among the variables indicating that the health workers with their inbuilt characteristics of age, sex, education, occupation and experience, when they use structured teaching module, these characteristics influence learning process and result in gain in knowledge.

#### SECTION-VI

## ASSOCIATION BETWEEN HEALTH WORKERS' PRACTICE WITH SOCIODEMOGRAPHIC VARIABLES

The third objective and the null hypothesis were "to find out the association between the level of practice regarding DOTS therapy with selected socio-demographic variables after implementation of structured teaching module. The data were analyzed. Based on this discussions were held.

### They are as follows:

- In association between health workers' practice score with selected socio demographic variables findings revealed that, the observed chi-square values were greater than the table values with regard to age, sex, occupation and experience and they were significant at 0.001. The level education and source of information were significant at 0.05 level. The null hypothesis of the study "there was no significant association between practice score with socio-demographic variables" had to be rejected since the findings showed that there was a significant association. All the 6 socio-demographic variables showed significant association with post test practice score. The socio-demographic characteristics played an important role in the present study. These personal characteristics had helped the study subjects to improve the practice scores after learning the structured teaching module. The findings have implications to health supervisors that the structured teaching module preparation for all the nursing procedures is essential to improve the performance of health workers. Self learning of nursing procedures again and again from structured teaching module helps to retain the efficiency of carrying out the procedure.
- ➤ The multivariate analysis results of practice on a single variable revealed that there was a significant relationship between practice with sex and occupation.

The double variable analysis results on practice revealed that there was a significant relationship between sex and experience. This may be one of the reasons that the health workers inbuilt characteristics of sex and experience, when they use structured teaching module, these characteristics influence learning process and result in gain in practice.

#### **SECTION-VII**

### CORRELATION BETWEEN KNOWLEDGE AND PRACTICE OF HEALTH WORKERS

The fourth objective and the null hypothesis were to "correlate between knowledge and practice after implementation of structured teaching module". The data were analyzed. Based on the findings the discussions were held.

### They are as follows:

Pearson's 'r' value was 0.18. The calculated value was lesser than the table value (1.98) at 112 degree freedom. This indicated that there was a weak correlation which was not significant. This finding was in consensus with the researcher's null hypothesis that there was no correlation between knowledge and practice score. Thus the null hypothesis was retained. The weak correlation between knowledge and practice could be due to the reason that the study subjects were giving DOTS to minimum of one patient to maximum of four patients and gained skill that was necessary. But regard to knowledge of TB and DOTS learning was concerned, the anganwadi workers expressed that administration of DOTS and learning about TB and DOTS. Research finding had proven in the past that when ever there was a gain in knowledge, there was a gain in practice showing strong association between knowledge and practice. Where as in the present study the weak

correlation existed between knowledge and practice scores indicating that knowledge need not lead to improved practice. The efficiency with which one practices need not to be based on the level of knowledge. The factor that played a vital role for this finding could be due to "reward system". According to government policy if a health worker administers DOTS, she is given monetary benefit for her practice of DOTS where as when she possess an improved knowledge about TB that is not acknowledged monetarily. Monitory benefit is a positive reinforcer to implement DOTS effectively. In order to get monetary benefit the practice of DOTS considerably improved and therefore no association was seen between knowledge and practice.

## The researcher made some of the observations related to attrition during data collection:

- ➤ Patients were unwilling to receive treatment from anganwadi workers who were belonging to a lower caste.
- ➤ Village leaders were hesitant to take treatment from low level (low caste) health care personnel that was from anganwadi workers.
- ➤ Health workers were not interested in giving DOTS because they were seniors and also they were involved in implementing many number of national control programme. Hence it was difficult to implement RNTCP programme consistently.
- After few months of DOTS treatment especially those patients who showed sputum positive in the intensive phase and showed sputum negative in the continuous phase, visit private practitioners seeking treatment to the impending side effects of antituberculosis drugs. On examination by seeing negative sputum report private practitioners would declare that patient has no TB. Hence patients also discontinue the treatment.

- ➤ Some times private practitioners prescribe AKT4 instead of DOTS hence patient become defaulters.
- Some of the patients had come to their relatives' house for treatment support once symptoms subsided they had gone back to their native home without taking referral or continuing the treatment.

Summary: The chapter on discussion revealed that socio-demographic characteristics of study subjects had significant association with post test knowledge and practice scores; structured teaching module had helped in improving the post test knowledge and practice scores; there was no correlation between post test knowledge and practice scores. These findings indicated the benefit of structured teaching module on TB and DOTS. The implications of these findings are that knowledge on TB and DOTS alone is not improving the practice of DOTS, and therefore continuous, constant and direct supervision on health workers' practice of DOTS administration is required along with physical and psychological rein forcers.

# SUMMARY

### **SUMMARY**

This chapter presents a brief summary of the study with limitations, nursing implications, recommendations for future research and conclusion. The present study aimed at finding out the effectiveness of structured teaching module on TB and DOTS among health workers in rural Kolar, Karnataka.

### The study had the following objectives that are to:

- 1. Assess the
  - a) Knowledge of Health Workers regarding tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 2. Evaluate the effectiveness of Structured teaching module on the level of
  - a) Knowledge of Health Workers regarding Tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 3. Find out the association between the level of
  - a) Knowledge regarding Tuberculosis and DOTS therapy with selected sociodemographic variables after implementation of structured teaching module.
  - b) Practice regarding DOTS therapy with selected socio-demographic variables after implementation of module.
- 4. Correlate the knowledge and practice score after implementation of the module.

### **NULL HYPOTHESES**

- H01 There will be statistically no significant relationship between the pre and post test Knowledge scores of health workers on TB and DOTS therapy.
- H02 There will be statistically no significant relationship between the pre and post test

  Practice scores of health workers on practices of DOT therapy.
- H03 There will be statistically no significant association between the Health workers

knowledge and their socio-demographic variables when compared to their exposure after the structure teaching module.

H04 - There will be no significant association between the Health workers practice and their socio-demographic variables when compared to their exposure after the structure teaching module.

H05- There will be statistically no significant correlation between the knowledge and

Practice score among health workers on TB and DOTS therapy

A quasi-experimental one group pre test, post test design was applied to test the effectiveness of structured teaching module.

The study was conducted in the following phases

### First phase: preparation phase

A formal permission was obtained from the District Health Officer, and CDP Officer, Kolar to select subjects. At the same time permission for clubbing the monthly meeting in PHCs in three different times to collect the data was obtained. Health workers and anganwadi workers were selected using multistage random sampling technique. Co-operation from the medical officers of concerned PHCs and anganwadi supervisors of concerned anganwadi centers were obtained to permit the subjects to participate in the study. The time schedule was made by the researcher in consensus with the Medical officers and anganwadi supervisors to visit the centers to administer knowledge questionnaire aspect data collection.

### **Second phase: Intervention phase**

Prior to the commencement of the study, subjects were explained about the purposes, nature and subjects role in the study. Having assured confidentiality, informed consent was obtained from the subjects. Then data was collected in primary health centers and anganwadi centers asking subjects to fill up the research tool in the presence of the researcher. Thus self-report method was used for assessing the level of knowledge on TB and DOTS therapy. The researcher clarified the doubts as and when required. The subjects were not permitted to discuss with each other while completing the tool. Co-operation was obtained from the health workers and anganwadi workers who were giving DOTS to the patients. Based on their time schedule of giving DOTS a visit was made by the researcher to a particular village to observe the practice skills of subjects at the time of administering DOTS. The researcher used a structured non-participatory observation technique to rate the practice of DOTS skills of subjects. After the tool completion the module on TB and DOTS was distributed which had a series of chapters on TB and DOTS, built in assignments, to discuss later for clearing their doubts which in turn helps to improve their knowledge and practice.

### Third phase: Post assessment

Post test was done after four weeks completion of module distribution. After collecting post-test data, the subjects were also encouraged to share their experiences and clarify their doubts. During this time, discussion on module was done based on subject's request. They were advised to practice as much of the techniques as they could and then to report at the same practice venue for the follow up assessment.

### Fourth phase: follow up assessment

Follow-up post test was done eight weeks following module distribution. A discussion was held about utility and practicability of the module. Individual discussion was also held with subjects at the time of DOTS administration.

### **MAJOR FINDINGS**

The data was analyzed using descriptive and inferential statistics. Following were the silent findings of the study

- Most of the health workers (35.75%) were belonging to the age group of 29-38 years and only 9.75% were found to be between 18 to 28 years
- Majority (83%) were females, the rest (17.0%) were males.
- ➤ Majority (72.5%) had SSLC and only 0.25% had below SSLC qualification.
- Among 400 subjects, 50% were health workers 50% were anganawadi workers.
- ➤ On duration of job experience majority (45.8%) had 10-19 years and only 3.8% had below one year.
- ➤ While majority (68.3%) heard on TB and DOTS therapy from mass media and only 6.3% of them not heard on TB and DOTS therapy either from mass media or health professionals.
- ➤ Out of 400 subjects, majority (71.5%) Health workers were not giving DOTS and only 28.5% were giving DOTS.
- Dimension wise knowledge score on TB and DOTS therapy revealed that in three dimensions like 'spread of TB'(97%), 'Complications of TB'(92%) and 'HIV/AIDS and TB'(76%) health workers had adequate knowledge, in nine dimensions like 'general information on TB'(62%), 'meaning and causes of TB'(70%), 'investigations of TB'(59%), 'RNTCP and DOTS'(67%), 'DOTS categorization'(54%), 'DOTS

- treatment'(57%), 'side effects of DOTS'(63%), 'prevention of TB'(58%) and 'management of TB'(70%) they had moderately adequate knowledge and in one dimension like 'case classification'(46%) they had inadequate knowledge.
- ➤ Over all knowledge score of health workers revealed that 56.25% had moderately adequate knowledge, 15.25% had inadequate knowledge and 28.25% had adequate knowledge on TB and DOTS therapy.
- ➤ Overall practice score revealed that all (100%) health workers had inadequate practice on DOTS practices.
- ➤ Overall pretest mean knowledge score of health workers was 65.7 with SD of 13.9 where as overall pretest mean practice score of health workers was 32.6 with SD of 7.7 indicating that they had moderately adequate knowledge on TB and DOTS therapy but had inadequate practice on DOTS administration.
- The comparison between health workers and anganwadi workers knowledge and practice score revealed that the pretest mean knowledge score of health workers was 70.6 with SD of 11.7 and the anganwadi worker was 60.8 with SD of 14.2. The 't' value was 7.6 indicating that there was a significant difference in knowledge score between health workers and anganwadi workers. The pretest mean practice score of health workers was 36.4 with SD of 6.5 and anganwadi workers was 27.7 with SD of 6.3. The 't' value was 7.2 indicating that there was a significant difference in practice score between health workers and anganwadi workers.
- The effectiveness of structured teaching module on knowledge of TB and DOTS revealed that the mean knowledge pre test score was 65.7 with SD of 13.9 where as mean post test score was 70.9 with SD of 12.5. The paired 't' value was 9.5 indicating that there was statistically no significant difference between pretest and post test knowledge score.

- ➤ The effectiveness of structured teaching module was not made effective improvement hence the researcher conducted discussion classes and clarified their doubts and conducted follow up post test on knowledge after two months of pretest. The mean pre test score was 65.7 with the SD of 13.9 where as mean follow up post test score was 80.2 with the SD 11.4. The paired 't' value was 18.0 which was grater than table value indicating that there was a significant difference between pretest knowledge score and the follow up post test knowledge score.
- ➤ Comparison of knowledge score between health workers and anganwadi workers revealed that the mean pretest and post test knowledge score of health workers were 70.6 and 75.2 respectively where as the mean pre and post test knowledge score of anganwadi workers were 60.8 and 66.7 respectively.
- ➤ Effectiveness of structured teaching module on practice of DOTS revealed that the mean practice pretest score was 32.6 and post test score was 56.3 indicating that there was drastic increase (23.7 points) in practice score which was significant at 0.001 level.
- Comparison of practice score between health workers and anganwadi workers revealed that the mean practice pretest and post test score of health workers was 36.4 and 60.1 respectively where as the mean practice pretest and posttest score of anganwadi workers was 27.7 and 51.6 respectively. The p value was 0.003 indicating that there was a significant difference between health workers and anganwadi workers practice score.
- Health workers' knowledge score in relation to sociodemographic variables revealed that there was no association between health workers post test knowledge score with the selected socio-demographic variables except with sex, occupation and experience. They were significant either at 0.001 or at 0.01 levels.

- The multivariate analysis results of knowledge on single variable revealed that, there was a significant relationship between knowledge with education, occupation and experience.
- ➤ Health workers practice score in relation to socio-demographic variables revealed that, the chi-square values were greater than the table values and it was significant association with age, sex, general education, occupation, duration of professional experience and source of information at 0.001 and at 0.05 levels
- The multivariate analysis results of practice on a single variable revealed that there was a significant relationship between practice with sex and occupation.
- Comparison between knowledge and practice shows that the practice score is more consistent than knowledge score since the coefficient variation of knowledge score is more than the practice score. Pearson's correlation coefficient between knowledge and practice shows there is a weaker correlation between knowledge and practice.

Out of 400 health workers 40% of them said that they did not have time to read the module hence they required teaching. On their request, group sessions were conducted to discuss on module content and clarified their doubts.

### MERITS OF THE STUDY

After a thorough search made by the researcher on the studies conducted with health workers, it was found that there were no such studies conducted in India, Karnataka, and Kolar setting.

- This study helped the health workers and anganwadi workers to gain knowledge on TB and DOTS and practice related to DOTS administration.
- The module distributed on TB and DOTS will help the health worker and anganwadi workers in managing patient with TB.

### **LIMITATIONS**

In spite of the merits and positive aspects, the present study has its own limitations like any other. The following are the limitations of the present study.

- The size of the sample representing health workers were 400(200 health workers and 200 anganwadi workers) in that only 114 health workers had the patients receiving DOTS. Hence practice could not be observed on all.
- ➤ Most of the health workers were women hence the study findings were not adequately focused on men.

### **CONCLUSION**

From the findings of the present study, it can be concluded that;

- ➤ Structured teaching module on TB and DOTS was effective in increasing the knowledge score but not large and it was not statistically significant.
- > Structured teaching module on TB and DOTS was effective in increasing the practice score which was statistically significant.
- There was no association between health workers' post test knowledge score with socio-demographic variables except sex, occupation and experience.
- > There was an association between health workers' post test practice score with sociodemographic variables.
- ➤ There was no correlation between the knowledge and practice scores of health workers.

From the above findings it can be concluded that, there is an urgent need for an inservice education programme on TB and DOTS to all heath workers and anganawadi workers at primary health centers and sub center level of rural Kolar to implement DOTS therapy successfully.

### Problems faced by the researcher at the time of data collection

At the time of data collection, the researcher faced a few problems as follows;

- 1) The researcher had to visit remote places to collect data.
- 2) Lack of transport facility as well as, within a short period, visiting more than 3-4 Primary Health Centers and Anganawadi centers made the researcher to hire vehicle.
- 3) Sometimes the researcher had to wait longer time in order to complete the meeting in primary health centers and anganawadi centers before collecting data.
- 4) In some places researcher needs to bring patients to DOTS centers in order to observe DOTS practices.

5)

### IMPLICATIONS FOR NURSING

The findings of the study have several implications for nursing administration, nursing practice, nursing education and nursing research.

### **Nursing administration**

The present study would help the nursing administrators to take adequate steps in formulating the policies that provide support at both institutional and community levels.

- ➤ The nursing administration should encourage social support networking in the organization of TB programmes in rural area.
- The community nursing administrators can plan money, material and manpower to conduct training programme for all health workers at PHC level in turn they provide in service education on TB and DOTS to all anganwadi workers who come under PHC level.
- ➤ Health workers and anganwadi workers in turn can be encouraged to give health education to patients whom ever they come across.
- The social network can be strengthened and supported by conducting case presentations and journal clubs on TB and DOTS for staff nurses in the hospital level and public health nurse / health workers / junior health assistant trainees at community level.
- Nursing supervisors could encourage nurses for early recognition of symptoms of TB and take actions to prevent as well as to administer appropriate treatment.
- ➤ Community nursing administration could boost health workers morale by various measures such as offering best PHC and sub centre awards, best health workers awards etc. to improve their practice and to maintain high standard of nursing care services.

### **Nursing practice**

It was observed from the findings of the study that, all health workers had inadequate practice in pretest and moderately adequate practice in post test. This indicated structured teaching module was effective in improving the practice of DOTS. One of the important aspects of health care delivery system is educating health workers and anganwadi workers.

- ➤ Health workers who get trained in TB and DOTS can help patients to understand meaning, causes, spread, signs and symptoms and management of TB through health education either one to one basis or in group.
- ➤ Health workers can assist patients in identifying signs and symptoms of TB and help them to use DOTS.
- Similarly family members and significant others can be equipped with knowledge of TB and DOTS and practices of DOTS administration.

### **Nursing education**

The findings of the study proved that, effectiveness of structured teaching module was effective in improving the knowledge score of health workers on TB and DOTS but not at large. Implication for nursing education could give great emphasis in motivating the nursing personnel who work in community and hospital with the aim of promoting health in all patients and their relatives. Community health nurse/health workers who provide care at door steps should be motivated to educate people on prevention of illness rather than cure. Although health workers give services to patients with communicable and noncommunicable diseases that are not sufficiently prepared with adequate knowledge and skills in implementing DOTS to TB patients in hospital and community. Health workers education must be based on the concept of primary care approach which is simple and relevant.

- Education about TB and DOTS during training period may go a long way towards improving the preparation of trainees of health workers programme and in primary prevention measures.
- Along with a few hours of classes on TB in health workers training programme, there could be more emphasis on Revised National TB control programme since there is a lacuna.
- ➤ Refresher courses on TB and its management could be conducted at frequent intervals for the health workers and anganwadi workers. ASHA (Accreditated Social Health Activist) can be taught about TB and DOTS to implement DOTS programme successfully.

### **Nursing research**

- There is an ample of scope for research in the field of TB and DOTS. The results of this study showed that there is a moderately adequate knowledge in pre and post test and inadequate practice in pretest and moderately adequate practice in post test. Hence to strengthen TB control programme further research can be done.
- The literature reviewed for the present study showed that, in spite of WHO recommendation on DOTS treatment against tuberculosis, private practitioners were still prescribing daily regimen and also it was proven to be one of the reasons for multi-drug resistance. Hence more research should focus on prevention of multi-drug resistance.

### RECOMMENDATIONS

- A similar study can be undertaken with a control and experimental group.
- A similar study can be conducted in another setting.
- ➤ Interventional studies can be conducted for nurses working in various supervisory capacities.
- A similar study can be undertaken only among health workers.
- > Similar study can be undertaken only among anganwadi workers.
- > Similar study may be undertaken on junior health assistant male and female separately.
- With same sample study can be conducted on TB and HIV.
- ➤ Knowledge, attitude and practices on TB and DOTS therapy can be conducted among various health care personnel involved in implementation of RNTCP programme.

# ABSTRACT

### **ABSTRACT**

### INTRODUCTION

TB is one of the world's top ten causes of adult mortality. Of the world's population, one third is infected with tuberculosis. The world health organization estimates that 8.8 million people develop active TB disease every year, of these people 95% live in developing countries. It is estimated that TB kills between two and three million people each year roughly one person every 15 seconds. Of these deaths, 98% are in developing countries (Report on tuberculosis in the United States, 2001). India has more cases of tuberculosis than any other country in the world and twice as many cases as china, which has the next highest number (Report on RNTCP, 1997).

### **BACK GROUND OF THE STUDY**

The Revised National Tuberculosis Programme (RNTCP) in India, based on Short course (DOTS), is one of the largest and fastest growing TB control programme in the world. The RNTCP places most responsibility of treatment observation on the government health workers at primary health institutions. To make DOTS more convenient to patients, DOT providers from the non-governmental sector, such as anganwadi workers and community volunteers have been deployed.

Shaik Mohiuddin (2006) conducted a descriptive study to assess the knowledge regarding RNTCP and attitudes towards TB among 97 junior health assistants from 9 PHCs of Belgam Taluk. With structured questionnaire data was collected using purposive sampling technique. The results revealed that overall mean knowledge of RNTCP among junior health assistants, 16% had good knowledge, 71% had average and 12% had poor knowledge. 17.8% had positive attitude, 20% had negative attitude and 62% of them were neutral.

The experiences, experts' opinion and available review literature on the topic made the investigator evaluate the effectiveness of structured teaching module on the knowledge of TB and DOTS and practices of DOTS among health workers of rural Kolar.

### Objectives of the study is to;

- 1. Assess the
  - a) Knowledge of Health Workers regarding tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 2. Evaluate the effectiveness of Structured teaching module on the level of
  - a) Knowledge of Health Workers regarding Tuberculosis and DOTS therapy
  - b) Practices of Health Workers regarding DOTS therapy
- 3. Find out the association between the level of
  - a) Knowledge regarding Tuberculosis and DOTS therapy with selected sociodemographic variables after implementation of module
  - b) Practice regarding DOTS therapy with selected sociodemographic variables after implementation of module.
- 4. Compare the difference between knowledge and practice after implementation of the module.

### **Methods**

The conceptual frame work for the present study used was Ludwig Von Bertalanffy system theory (1968). To achieve objectives of the study a quasi experimental study with one group pre and post test design was carried out in primary health centers and anganawadi centers of rural kolar. A sample of 400(200 health workers and 200 anganawadi workers) subjects were selected using multistage random sampling technique.

### **Methods of Data collection**

A formal written permission was obtained from Child Development Project (CDP) officer and District Health Officer (DHO) of Kolar district. After consultation with the medical officer and anganawadi supervisors, primary health centers and anganawadi centers were selected to collect the data. The subjects were assessed with pretest then a module on TB and DOTS was administered. After a month posttest was conducted using the same tool.

### **Findings**

The data was analyzed on the basis of objectives and hypothesis of the study.

### Distribution of the participants according to the socio demographic characteristics

Distribution of the participants according to the socio demographic characteristics revealed that most of the health workers (35.75%) were belonging to the age group of 29-38 years and only 9.75% were found to be between 18 to 28 years. Majority (83%) were females, the rest (17.0%) were males. Majority (72.5%) had SSLC and only 0.25% had below SSLC qualification. Among 400 subjects, 50% were health workers 50% were anganawadi workers. Majority (45.8%) had 10-19 years of experience and only 3.8% had below one year of experience.

### The level of knowledge and practice of health workers on TB and DOTS administration

The level of knowledge on TB and DOTS and practice on DOTS administration revealed that 56.25% had moderately adequate knowledge, 15.25% had inadequate knowledge and 28.25% had adequate knowledge. Related to overall practice score all (100%) of them had inadequate practices.

The comparison between health and anganwadi workers' knowledge and practice score revealed that the pretest mean knowledge score of health workers was 70.6 and the anganwadi workers was 60.8. The 't' value was 7.6 indicating that there was a significant difference in knowledge score between health workers and anganwadi workers. The pretest mean practice score of health workers was 36.4 and anganwadi workers was 27.7. The 't' value was 7.2 indicating that there was a significant difference in practice score between health workers and anganwadi workers.

### The effectiveness of structured teaching module on knowledge of TB and DOTS

The effectiveness of structured teaching module on knowledge of TB and DOTS revealed that the mean knowledge pre test score was 65.7 where as mean post test score was 70.9. The paired 't' value was 9.5 indicating that there was statistically no significant difference between pretest and post test knowledge score. The effectiveness of structured teaching module was not made effective improvement hence the researcher conducted discussion classes and clarified their doubts and conducted follow up post test on knowledge after two months of pretest. The mean pre test score was 65.7 where as mean follow up post test score was 80.2. The paired 't' value was 18.0 which was grater than table value indicating that there was a significant difference between pretest knowledge score and the follow up post test knowledge score.

### **Effectiveness of structured teaching module on practice of DOTS**

Effectiveness of structured teaching module on practice of DOTS revealed that the mean practice pretest score was 32.6 and post test score was 56.3 indicating that there was drastic increase (23.7 points) in practice score which was significant at 0.001 level. Comparison of practice score between health workers and anganwadi workers revealed that the mean practice pretest and post test score of health workers was 36.4 and 60.1 respectively where as the mean practice pretest and post test score of anganwadi workers was 27.7 and 51.6 respectively. The p value was 0.003 indicating that there was a significant difference between health and anganwadi workers', practice score.

### Association of knowledge score with sociodemographic variables

Association of knowledge score with sociodemographic variables revealed that, there was no association between health workers' post test knowledge score with the selected socio-demographic variables except with sex, occupation and experience. They were significant either at 0.001 or at 0.01 levels. The multivariate analysis results of knowledge on single variable revealed that there was a significant relationship between knowledge with education, occupation and experience.

### Association of practice score with sociodemographic variables

Association of practice score with sociodemographic variables revealed that the chisquare values were greater than the table values and it was significant association with age, sex, general education, occupation, duration of professional experience and source of information at 0.001 and at 0.05 levels. The multivariate analysis results of practice on a single variable revealed that there was a significant relationship between practice with sex and occupation.

### Comparison between knowledge and practice

Comparison between knowledge and practice of health workers revealed that the practice score is more consistent than knowledge score since the coefficient variation of knowledge score was more than the practice score. Pearson's correlation coefficient between knowledge and practice showed there was a weaker correlation between knowledge and practice.

### Conclusion

Health workers have a major role in prevention and care of patient with TB while administering DOTS. DOTS are a universally accepted method of treating TB patients. Health workers knowledge about TB and DOTS must be adequate for the safe delivery of DOTS and in turn to give health education about prevention, treatment and follow up care of TB. Structured Tool module on TB and DOTS scientifically found more helpful in knowledge gain (but not statisfically significant) and practice gain which was statisfically significant. Such module need to be accessible, available and affordable to health workers in this own work centers.

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### APPENDEX – VI

### LIST OF EXPERTS VALIDATED TOOL AND MODULE

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### 6. Dr. A. Parathasarathy

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### 7. Dr. Sailaxmi Gandhi

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### 9. Dr. Krishna Iyer

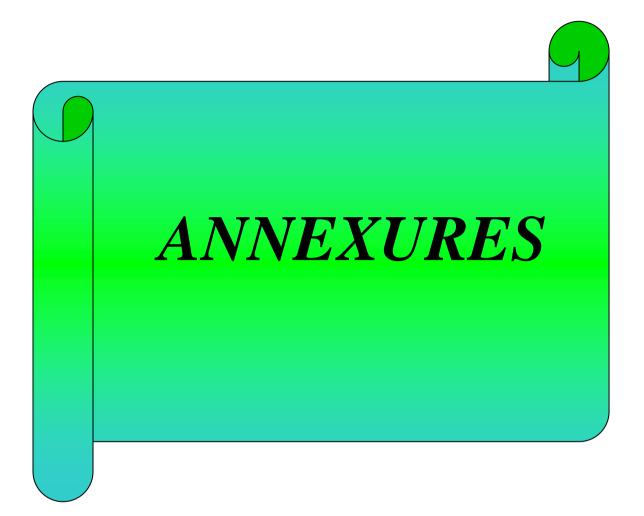
Professor in Community Medicine

Dept. of Community medicine Sri Devaraj urs medical college Tamaka, Kolar - 563101

### 10. Dr. Krishnaveni

Professor in Community Health Nursing Principal of Mallige college of Nursing Bangalore.

### 11. Ms. Chandravadana Principal Junior Health Assistant Training centre SNR District Hospital, Kolar.



### **ANNEXTURE**

### **CONSENT FORM**

### **Dear Participants**

I would like to get some information regarding your knowledge on TB and DOTS therapy and Practices of DOTS administration. The information will be used only for the partial fulfillment of the PhD in nursing program and the information will be kept confidential. Kindly answer to all the questions given in the questionnaire.

Signature of the Investigator

I here by given my consent to participate in the study and received kannada version hand book on TB and DOTS therapy for Health workers and Anganawadi workers from Mrs. G.VijayaLakshmi PhD nursing Scholar.

SL NO.	NAME AND ADDRESS	TELEPHONE NO.	SIGNATURE
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

APPENDIX – VIII SECTION-A

# STRUCTURED QUESTIONNAIRE ON TB AND DOTS THERAPY

# DEMOGRAPHIC DATA

Dear,
Respondents kindly fill your response to the following questions
1. Code no:
Date:
2. Age:
3. Sex:
4. Educational qualification:
5.Occupation:
6. Experience:
7.Do you attend any training programme on TB and DOTS? Yes/NO  If yes, Specify
<ul><li>8. Did you get any information on TB and DOTS therapy from any of the following means</li><li>a) Mass media</li><li>b) Health professionals</li><li>c) Any other</li></ul>
9. Are you DOTS provider? If yes, mention the place of giving DOTS with your address and contact number.
SECTION-B

### KNOWLEDGE QUESTIONNAIRE ON TB AND DOTS THERAPY

Responder is requested to read each question carefully and tick correct response by placing a correct ( $\sqrt{}$ ) against the items provided.

### Part – I: General information of TB

- 1) World "TB Day" is on
  - a) 1<sup>ST</sup> December
  - b) 24<sup>th</sup> March
  - c) 16<sup>th</sup> October
  - d) 7<sup>th</sup> April
- 2) WHO declared TB is one of the global emergency in the year
  - a) 1993
  - b) 1992
  - c) 1997
  - d) 1998

### Part - II. Meaning and causes of TB

- 3) Tuberculosis is a
  - a) non-communicable disease
  - b) genetic disorders
  - c) anthropoid born infection
  - d) communicable disease.
- 4) TB can occur in
  - a) all age group
  - b) only males
  - c) only females
  - d) only children
- 5) TB is caused by
  - a) virus
  - b) bacteria
  - c) fungus
  - d) protozoa
- 6) TB commonly affects
  - a) less immune person

- b) only adultc) only children
- d) only old age
- 7) Pulmonary TB is spread through
  - a) insect
  - b) droplet infection
  - c) mosquito
  - d) rat.
- 8) A single untreated patient with pulmonary TB can spread to
  - a) one to one person
  - b) 2 to 5 persons
  - c) 5 to 10 persons
  - d) 10 to 15 persons.
- 9) TB can infect
  - a) only lungs
  - b) only bones and joints
  - c) only meninges
  - d) any part of the body
- 10) When TB affects the lung it is called as,
  - a) cardiac TB
  - b) pulmonary TB
  - c) lymphatic TB
  - d) extra-pulmonary TB
- 11) When TB affects the pleura, lymph nodes, abdomen, genital tract, skin, joints,

bone and meninges called

- a) cardiac TB
- b) pulmonary TB
- c) lymphatic TB
- d) extra-pulmonary TB

### Part-III. Signs and symptoms of pulmonary TB

- 12) TB is a common opportunistic infection among patient with
  - a) malaria
  - b) leprosy
  - c) cholera
  - d) AIDS
- 13) Common symptoms of pulmonary TB include
  - a) cough more than 3weeks, weight loss, evening rise of temperature
  - b) leg pain, headache
  - c) fever, nausea, vomiting.
  - d) diarrhea, jaundice, gastroenteritis

### Part-IV. Complication

- 14) Complications of pulmonary TB are
  - a) haemoptysis, pleural effusion
  - b) jaundice, cancer
  - c) HIV, SARS
  - d) arthritis, gastroenteritis

### Part-V. Spread of TB

- 15) Mode of transmission in pulmonary TB is by
  - a) sexual contact and touching
  - b) coughing, or sneezing
  - c) rat bite and mosquito bite
  - d) blood and fluid transmission.
- 16) In pulmonary TB bacilli are present in the infected persons
  - a) urine
  - b) sputum
  - c) blood
  - d) stool

### **Part-VI. Investigations**

- 17) As per RNTCP the required sputum sample to diagnose lung TB is
  - a) one sample on the spot
  - b) two on the spot and one in the early morning
  - c) two on the spot and one over night
  - d) one sample early in the morning
- 18) The screening test of choice for pulmonary tuberculosis is
  - a) chest X-ray
  - b) history collection
  - c) scanning
  - d) mantoux test
- 19) To confirm TB, mantoux test done for;
  - a) adults
  - b) adolescents
  - c) above 50 years of age group
  - d) below 5 years of age group
  - 20) Manoux test has to be read with in
    - a) 10-12 hrs
    - b) 12-24 hrs
    - c) 24-48hrs
    - d) 48-72 hrs

### Part-VII. HIV /AIDS

- 21) The causative organism of AIDS
  - a) HIV
  - b) BCG
  - c) bacteria
  - d) fungus
- 22) TB is a common opportunistic infection among HIV patient, if it is not treated it causes
  - a) death
  - b) loss of weight
  - c) tiredness
  - d) no problem

### Part-VIII. Case classification

- 23) A patient declared cured of TB by a physician, but reports back to the Health service and found to be bacteriologic ally positive. Then he is considered as
  - a) new case of TB
  - b) old case of TB
  - c) relapse of TB
  - d) irregularity in treatment
- 24) A patient who is smear-positive at 5 months or more after starting treatment is considered as
  - a) failure
  - b) relapse
  - c) chronic
  - d) acute
- 25) A patient who is initially smear-negative but becomes smear-positive during treatment called as
  - a) failure
  - b) relapse
  - c) acute
  - d) chronic
- 26) A patient, at any time after registration, has not taken anti-TB drugs for 2 months or more called as
  - a) failure
  - b) new case
  - c) relapse
  - d) defaulted
- 27) A patient who has never had treatment for TB or has taken anti-TB drugs for less than one month is considered as
  - a) new case of TB
  - b) old case of TB
  - c) relapse of TB
  - d) irregularity treatment

### Part-IX. RNTCP and DOTS

- 28) Under RNTCP treatment of TB is classified as
  - a) acute and chronic
  - b) intensive and continuous phase
  - c) acute and continuous phase
  - d) intensive and chronic phase
  - 29) Expansion of "DOTS" is
    - a) direct observed treatment service
    - b) direct observed treatment short-course
    - c) direct observed treatment supply
    - d) direct observed treatment status
- 30) Patient comes to the health center weekly once to collect tablets and gives back the empty strips to DOTS provider is known to be that he is in
  - a) acute phase
  - b) chronic phase
  - c) intensive phase
  - d) continuous phase
- 31) Under RNTCP, treatment of TB is classified as
  - a) category-I, category-II and category-III
  - b) grade-I, grade-III and grade-III
  - c) stage-I, stage-II and stage-III
  - d) class-I, class-II and class-III

### Part-X. Categorization of patient under DOTS

- 32) New sputum smear-positive case, seriously ill sputum smear-negative case and seriously ill extra-pulmonary cases are treated under
  - a) category-I
  - b) category-II
  - c) category-III
  - d) category-IV

- 33) Sputum smear-positive relapse, sputum smear-positive failure and sputum smear-positive treatment after default are treated under
  - a) category-I
  - b) category-II
  - c) category-III
  - d) category-IV
- 34) TB patients with sputum smear-negative not seriously ill and extra- pulmonary not seriously ill are treated under
  - a) category-I
  - b) category-II
  - c) category-III
  - d) category-IV

### **Part-XI. DOTS Treatment**

- 35) Combination of drugs used in category-I intensive phase are
  - a) Isoniazide (I), Rifampicin (R), Pyrazinamide (P) & Ethambutol (E)
  - b) Isoniazide, Rifampicin, Pyrazinamide, Ethambutol & Streptomycin (S)
  - c) Isoniazide, Rifampicin, Pyrazinamide
  - d) Isoniazide, Rifampicin
- 36) Combination of drugs used in category-I continuous phase are
  - a) Isoniazide, Rifampicin
  - b) Isoniazide, Rifampicin, Pyrazinamide
  - c) Isoniazide, Rifampicin, Ethambutol
  - d) Isoniazide, Pyrazinamide
- 37) Combination of drugs used in category-II intensive phase is
  - a) Isoniazide, Rifampicin, Pyrazinamide & Ethambutol
  - b) Isoniazide, Rifampicin, Pyrazinamide Ethambutol Streptomycin and Isoniazide, Rifampicin, Pyrazinamide & Ethambutol
  - c) Isoniazide, Rifampicin, Pyrazinamide
  - d) Isoniazide, Rifampicin
- 38) Combination of drugs used in category-II continuous phase is
  - a) Isoniazide, Rifampicin
  - b) Isoniazide, Rifampicin, Ethambutol
  - c) Isoniazide, Rifampicin, Pyrazinamide
  - d) Isoniazide, Pyrazinamide

- 39) Combination of drugs used in category-III intensive phase is
  - a) Isoniazide, Rifampicin, Pyrazinamide & Ethambutol
  - b) Isoniazide, Rifampicin, Pyrazinamide, Ethambutol, Streptomycin
  - c) Isoniazide, Rifampicin, Pyrazinamide
  - d) Isoniazide, Rifampicin.
- 40) Combination of drugs used in category-III continuous phase are
  - a) Isoniazide, Rifampicin.
  - b) Isoniazide, Rifampicin, Pyrazinamide
  - c) Isoniazide, Rifampicin, Ethambutol
  - d) Isoniazide, Pyrazinamide
- 41) The duration of treatment in category-I intensive phase includes
  - a) weekly thrice for 2 months
  - b) daily for 6 months
  - c) daily for 2 months
  - d) weekly thrice for 3 months
- 42) The duration of treatment in category-I continuous phase includes
  - a) daily for 2 months
  - b) weekly thrice for 4 months
  - c) daily for 6 months
  - d) weekly thrice for 3 months
- 43) The duration of treatment in category-II intensive phase includes
  - a) HRZES for 2 months and HRZE for one month, weekly thrice
  - b) HRZES daily for 2 months and HRZE daily for one month
  - c) HRZES weekly thrice for 2 months and HRZE once daily
  - d) HRZES daily for 2 months and HRZE weekly thrice for one month
- 44) The duration of treatment in category-II continuous phase includes
  - a) weekly thrice for 5 months
  - b) weekly once for 5 months
  - c) weekly twice for 5 months
  - d) daily once for 6 months
- 45) The duration of treatment in category-III intensive phase includes
  - a) weekly thrice for 2 months
  - b) daily for 6 months
  - c) daily for 2 months
  - d) weekly thrice for 3 months

- 46) The duration of treatment in category-III continuous phase includes
  - a) weekly thrice for 4 months
  - b) weekly thrice for 3 months
  - c) daily for 6 months
  - d) daily for 2 months

### Part-XII. Side effects of DOTS

- 47) Peripheral neuropathy is a common side effect of isoniazide therapy and the best option for treating this problem with
  - a) ferrous sulfate 300mg TID for 3 months
  - b) withdrawing isoniazide and replacing it with another drug
  - c) pyridoxine (vit. B6) 50 mg for the duration of isoniazide therapy.
  - d) calcium carbonates 300 mg TID for 3 months.
- 48) Side effects of Isoniazide is
  - a) burning sensation of the hands and feet
  - b) impaired vision
  - c) ringing/loss of hearing
  - d) don't know

### Part-XIII. Prevention of TB

- 49) Sputum positive pulmonary tuberculosis patient can breast feed her child
  - a) with precaution
  - b) without precaution
  - c) decreasing feeding time
  - d) stop feeding
- 50) Vaccinating the child for BCG helps to
  - a) prevent TB
  - b) prevent complications of TB
  - c) cure TB
  - d) eradicate TB
  - 51) BCG vaccine to be effective it is to be administered
    - a) soon after the birth
    - b) at the age of one month
    - c) at the age of one year
    - d) at the age of 10 years

- 52) BCG vaccine is given
  - a) intramuscularly
  - b) intra-dermally
  - c) orally
  - d) intravenously

### Part-IVX. Management of TB

- 53) Disposal of infected person's sputum should be done by
  - a) pouring clean water on it
  - b) pouring tap water on it
  - c) burning it
  - d) throwing out.
- 54) Type of exercise required for pulmonary TB patients is
  - a) leg exercises
  - b) daily walking
  - c) deep breathing and coughing exercises
  - d) stomach exercises
- 55) Family members of pulmonary TB patient who has cough more than 3 weeks must undergo
  - a) eye test
  - b) blood test
  - c) urine test
  - d) sputum test
- 56) Relapse of TB can be prevented by taking
  - a) adequate rest
  - b) adequate food
  - c) full course of DOTS
  - d) adequate exercise
- 57) After completion of treatment the patient with TB can lead a
  - a) poor quality of life
  - b) hospital life
  - c) normal life
  - d) isolated life

# SECTION-C

# PRACTICE SCALE ON DOTS THERAPY

The researcher observes each practice of the DOTS provider and places a tick mark ( $\sqrt{}$ ) against each statement in the appropriate column.

SL. NO.	PRACTICES	5	4	3	2	1
1	Identification of patient and treatment Initially a patient with TB or his representatives approaches; Invites the patient					
2	Identifies the patient by name					
3	Enquires about his/ her condition					
4	Checks the registration number					
5	Confirms the TB number from the treatment card					
6	Finds convenient time and place for DOTS administration					
7	Takes red / blue / green treatment box and confirms the patient name/ number.					
	Administration of medication to the patient					
8	Takes medicine from the blister pack and administers to the patient during intensive phase					
9	Observe the patient swallowing medicine with the help of water					
10	Demonstrate the patient how to take medicine from the blister pack and swallow, who are going to continuous phase					

	1	 1	 	
11	Explains all those patients with continuous phase, the importance of taking remaining drugs at home			
12	Informs the patient the purpose of returning empty blister pack to the DOTS provider during the next visit for medication			
13	Checks the returned blister pack for its emptiness before giving medicine for the immediate forth coming week.			
14	After administration of medication records/ marks in the register			
15	Informs the patient next coming day for treatment and her/ his availability timings			
16	Education to the patient on medication Gives information to the patient, the type of medication the patient has to take			
17	Tells the patient about the duration of treatment			
18	Informs the patient to take treatment till the completion of treatment duration			
19	Educates the patient/ family about DOTS and the only choice of treatment to cure TB			
20	Motivates the patient / family who are in direct contact with sputum smear positive patient to get investigated for TB			
	Education to the patient /family			
	about the disease and its management			
21	Gives education on TB, early			

	recognition of symptoms, availability of DOTS with free of cost and importance of treatment adherence			
22	Identify the patient who are irregular for treatment to come very next day of the intensive phase and within one week of continuous phase			
23	Intimates the health authority who are not coming for treatment regularly			
24	Educate the patient to prevent irregular treatment to avoid drug resistant TB			
25	Motivate the patient to take diet rich in protein, iron, calcium and vitamin B6			
26	Follow-up of patient Makes it compulsory that the patient undergoes sputum examination after completion of two months of treatment in intensive phase and after completion of full course of treatment			
27	Makes follow up assessment of those patients under treatment in community			
28	Intimates health authority/ refer the patient to PHC if the patient complaints of any side effects related to DOTS			

	Maintaining records and reports		
20	Maintains treatment card properly		
29	Culturity all the treatment could to		
30	Submits all the treatment cards to senior treatment supervisor to transfer the information into TB statistics register		
31	Records and reports the outcome of every patient put on treatment		
32	Maintains good rapport with the patient and medical authority in implementation of DOTS programme		

# **Note:**

Always -5, Most often -4, Sometimes -3, rarely -2, No time -1

# **ANSWER KEY**

QUESTION	ANSWER
1	b
2	a
3	d
4	a
5	b
6	a
7	b
8	d
9	d
10	b

QUESTION	ANSWER
11	d
12	d
13	a
14	a
15	b
16	b
17	b
18	a
19	d
20	d

QUESTION	ANSWER
21	a
22	a
23	С
24	a
25	a
26	d
27	a
28	b
29	b
30	d

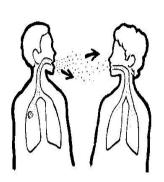
QUESTION	ANSWER
31	a
32	a
33	b
34	С
35	a
36	a
37	b
38	b
39	С
40	a

QUESTION	ANSWER
41	a
42	b
43	a
44	a
45	a
46	a
47	С
48	a
49	a
50	b

QUESTION	ANSWER
51	a
52	b
53	С
54	С
55	d
56	С
5 7	С

# MODULE ON TB AND DOTS FOR ANGANWADI WORKERS AND HEALTH WORKERS









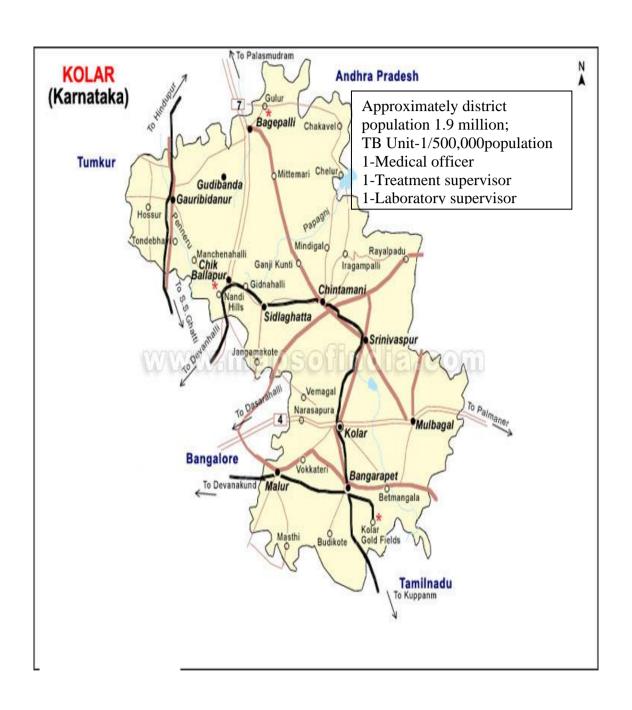
Module-1to10

1.	Magnitude of Tuberculosis
2.	TB and its causes
3.	Investigations of Pulmonary TB
4.	Extra pulmonary Tuberculosis
5.	HIV-TB
6.	National TB control Programme
7.	Directly observed treatment short course
8.	Multi drug resistant TB
9.	Control of TB
10.	Role of health worker and Anganwadi worker in
	prevention and control of TB

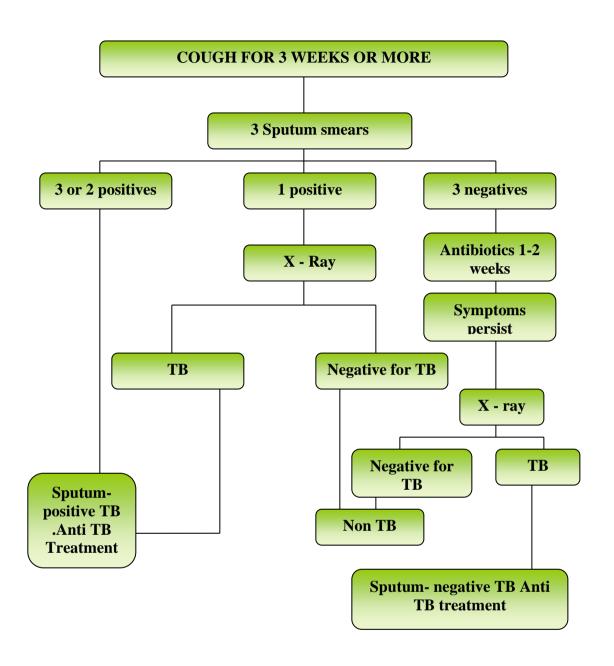
# G. VIJAYALAKSHMI

**Vice Principal** 

Sri Devaraj Urs College of Nursing, Tamaka, Kolar – 563 101.



	CONTENT	PG.NO
	Purposes of the module	01
1.	Magnitude of Tuberculosis	02
2.	TB and its causes	04
3.	Investigations of Pulmonary TB	10
4.	Extra pulmonary Tuberculosis	14
5.	HIV-TB	19
6.	National TB control Programme	21
7.	Directly observed treatment short course	24
8.	Multi drug resistant TB	38
9.	Control of TB	40
10.	Role of health worker and Anganwadi worker in prevention and control of TB	42



1. This module is designed to help anganwadi workers and health workers the required

knowledge and practices in implementation of revised national tuberculosis control

programme.

2. After undergoing this modular training health workers and anganwadi workers able to

work efficiently in implementing revised national Tuberculosis control programme.

DESCRIPTION OF THE MODULE

Health care services related to TB in India are provided by multipurpose health workers and

voluntary health workers. Effective control of TB is possible if all these health workers join

together and work towards common goal. This module is prepared to help anganwadi

workers and health workers who are working under primary health centers and sub centers to

update their knowledge on TB and DOTS practices. During training period health workers

and anganwadi workers will read and understand the topics and their part in control of TB.

The content in this module is brief and each chapter is organized under the following

headings.

This module has following chapters;

Chapter I : Magnitude of TB

Chapter II : TB and its causes

Chapter III : Investigations of Pulmonary TB

Chapter IV : Extra pulmonary TB

Chapter V : HIV-TB

**Chapter VI**: National Tuberculosis Control Programme

Chapter VII : Directly Observed Treatment Short course

Chapter VIII : Multi-drug resistance

**Chapter IX**: Control of TB

Chapter X : Role of health workers and anganwadi workers in prevention

and control of TB

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### **CHAPTER - I**

# Magnitude of TB

### **Introduction**:

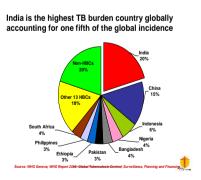
The greatest challenge today before us is the prevention in spread of Tuberculosis (TB) / pulmonary tuberculosis in the world. But however TB is preventable and curable, the incidence of TB is increasing in developing countries. So one of the important responsibilities of health care professionals is to acquire updated knowledge and educate the patient in prevention and cure of TB.

### **Background material:**

The TB is caused by tubercle bacilli called mycobacterium tuberculosis was discovered by Robert Kock on 24<sup>th</sup> March 1882. Hence TB is also called as Koch's disease and every year 24<sup>th</sup> March celebrated as "World TB Day".

### Global Scenario:

As per WHO report (2005), out of 22 high- burden countries in the world India stands first.



### Scenario of TB in India:

TB is a burden to our country. In spite the availability of chemotherapy for TB, there are 14 million tuberculosis cases in India and staggering 5, 00,000

deaths every year due to this disease. Most TB cases occur in the 15-59 year age group (economically the most productive years) and nearly 50% of population in India is infected with TB. In 1993, WHO declared tuberculosis to be a global emergency

### Exercise-1

- 1) World "TB Day" is on
  - a) 1<sup>ST</sup> December
  - b) 24<sup>th</sup> March
  - c) 16<sup>th</sup> October
  - d) 7<sup>th</sup> April
- 2) WHO declared TB is one of the global emergency in the year
  - a) 1993
  - b) 1992
  - c) 1997
  - d) 1998

### **CHAPTER-II**

### **Tuberculosis and its causes**

### What is tuberculosis?

Tuberculosis is an infectious /communicable disease caused by mycobacterium Tuberculosis.

# Is TB continues to be a serious problem?

Even though TB is completely curable, large number of people continues to become ill and die from disease.

- a. Many cases remain undiagnosed due to lack of awareness both on the part of patients regarding the disease and the facilities available for diagnosis.
- b. Moreover, many smear-positive patients, after having started treatment, do not complete their course of medicine. This leads to multi-drug resistant tuberculosis (MDR-TB) which is difficult to treat.
- c. Infection with HIV increases the risk of tuberculosis among the people.
- d. Rapid population growth, migration and poor socio-economic conditions pose major challenges favoring the spread of the disease.

### Who are at risk of TB?

TB can affect one in three people in the world .Only when the bacteria become active do people become ill with TB. Bacteria become active as a result of anything that can reduce the person's immunity, such as young and old, men and women, rich and poor, however some groups are vulnerable to get into TB illness are:

- a. Individuals with HIV/AIDS
- b. Advancing age
- c. Those who are suffering from medical conditions
  - Poorly controlled diabetes mellitus
  - Chronic lung diseases such as chronic bronchitis and silicosis
  - > Cancer
  - Advanced renal disease
  - Malnutrition

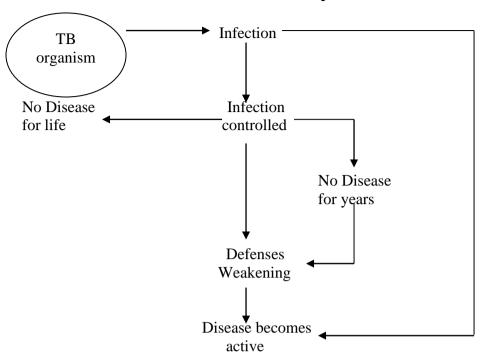
### ➤ Alcoholism

- d. Heavy smokers
- e. Those belonging to lower socioeconomic groups
- f. Those who use intravenous drugs
- g. Those living /working in nursing homes, prisons, homeless shelters, drug treatment centers.

### How TB is spread?

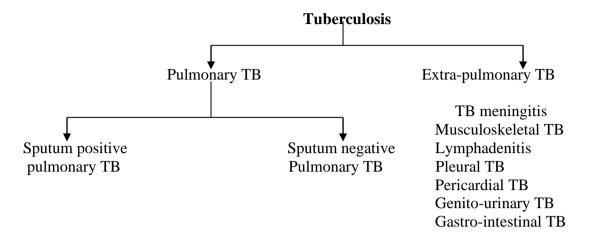
TB spreads from sputum positive pulmonary untreated TB patients to others. When a person with pulmonary TB coughs, sings, or sneezes, droplets containing TB bacteria are released into the air. People, who breathe these germs from the air, become infected with the bacteria. But infection does not denote disease. The germs harbored in the body and they lie in the dormant state. Ten percent of the people who harbor the infection develop the disease in a time span of 60 years. When the immunity of a person goes down due to risk factors, the chance of tuberculosis diseases developing in the person becomes higher. A single infected untreated person can spread the disease to 10-15 individuals in his community.

### Disease process



### How TB is classified?

TB is classified as follows



### What do you mean by Pulmonary TB?

When TB affects the lung tissues is called pulmonary TB. Pulmonary TB is classified into two types

### 1) Sputum positive pulmonary TB

Patients who have TB germs in the sputum are called sputum positive pulmonary TB or a patient with at least 2 sputum specimens positive for acid-fast bacilli by microscopy or a patient with at least one sputum specimens positive for acid-fast bacilli by microscopy and radiographic abnormalities consistent with pulmonary TB.

### 2) Sputum negative pulmonary TB

Those patients whose sputum is negative are called the sputum negative pulmonary TB patients or a patient who fulfils all the following criteria. Like 2 sets (taken at least 2 weeks apart) of at least 2 sputum specimens negative for acid-fast bacilli on microscopy; radiographic abnormalities consistent with pulmonary TB and a lack of clinical response despite one week of a broad spectrum antibiotic and a decision by a physician to treat with a full course of anti-TB chemotherapy.

Generally the sputum positive TB patients are the people who spread the disease in the community.

The intake of co lour the tubercle bacilli takes hence it is called acid-fast bacilli

### What are the Signs and symptoms of TB?

A person infected with TB is usually symptom free. Once the infection flares up into disease the patient has symptoms like:

- a. Cough for more than 3 weeks or more
- b. Evening rise of temperature
- c. Loss of appetite and loss of weight
- d. Chest pain
- e. Difficulty in breathing



A patient who has cough for 3 weeks or more (usually blood-stained sputum), fever and chest pain or without chest pain can be suspected has having symptoms of pulmonary tuberculosis.

# **Complications of TB**

Complications of pulmonary TB are;

- a. Haemoptysis
- b. Spontaneous pneumothorax
- c. Pleural effusion
- d. Cardio-pulmonary insufficiency
- e. Bronchiectasis, fibrosis of the lungs

### **Exercise-2**

Gangamma is 25 years old, has come to the health care centre has she was not feeling well. By asking her health worker finds that Gangamma had cough with expectoration for four weeks and felt very tired. Gangamma also tells the health workers that she has been coughing up blood stained sputum.

What should be the health worker suspect Gangamma to be suffering from?

### Explain your answer?

- 3) Tuberculosis is a
  - e) non-communicable disease
  - f) genetic disorders
  - g) anthropoid born infection
  - h) communicable disease.
- 7) TB can occur in
  - a) all age group
  - b) only males
  - c) only females
  - d) only children
- 8) TB is caused by
  - a) virus
  - b) bacteria
  - c) fungus
  - d) protozoa
- 6) A single untreated patient with pulmonary TB can spread to
  - e) one to one person
  - f) 2 to 5 persons
  - g) 5 to 10 persons
  - h) 10 to 15 persons.
- 7) TB can infect
  - a) only lungs
  - b) only bones and joints
  - c) only meninges
  - d) any part of the body
- 8) When TB affects the lung it is called as,
  - e) cardiac TB
  - f) pulmonary TB

- g) lymphatic TB
- h) extra-pulmonary TB
- 9) When TB affects the pleura, lymph nodes, abdomen, genital tract, skin, joints, bone and meninges called
  - a) cardiac TB
  - b) pulmonary TB
  - c) lymphatic TB
  - d) extra-pulmonary TB
- 10) TB is a common opportunistic infection among patient with
  - e) malaria
  - f) leprosy
  - g) cholera
  - h) AIDS
- 11) Common symptoms of pulmonary TB include
  - e) cough more than 3weeks, weight loss, evening rise of temperature
  - f) leg pain, headache
  - g) fever, nausea, vomiting.
  - h) diarrhea, jaundice, gastroenteritis
- 12) Complications of pulmonary TB are
  - e) haemoptysis, pleural effusion
  - f) jaundice, cancer
  - g) HIV, SARS
  - h) arthritis, gastroenteritis
- 13) Mode of transmission in pulmonary TB is by
  - e) Sexual contact, and touching
  - f) Coughing and sneezing
  - g) Rat bite and mosquito bite
  - d) Blood transmission and fluid transmission

### CHAPTER-III

### **Investigations of Pulmonary TB**

Pulmonary TB can be diagnosed by

- 1. Sputum test,
- 2. Chest X-ray and
- 3. Tuberculin test.

### 1. Sputum test

Sputum test is the first and best to confirm pulmonary TB. Each TB patient should have 3 sputum samples examined by microscopy within 24 hours. The chances of finding TB organisms are greater with 3 sputum samples than with one or two samples. Secretions build up in the airways overnight, therefore an early morning sputum sample is more likely to contain the TB organism than a sample later in the day.

In practice a suspect provides sputum samples in the following manner

$$Day - 1$$

Sample 1 : Suspect provides an "on the spot" sample under supervision on presentation to the health facility. Then the subject is given a sputum container to take home for an early morning sample the following morning.

$$Day - 2$$

Sample 2 : Suspects brings an early morning sputum sample.

Sample 3: Suspects provides another "on the spot" sample.



Based on the sputum smear results, the patients are classified as sputum positive TB patients and sputum negative TB patients.

If the initial 3 smears are negative, but pulmonary TB is still suspected because of persistent symptoms, the suspect should be given broad spectrum antibiotic treatment for respiratory infection for at least one week and reexamined 2 weeks after the first sputum smear examination. Specific anti-TB medication should not be commenced unless the presence of AFB is confirmed.

Sputum smear examinations are better than X-ray because microscopy;

- a. Is more objective and reliable
- b. Is more specific than X-rays for the diagnosis of TB
- c. Provides information regarding infectious status of patients who must be treated on a Priority basis (which X-rays do not)
- d. Can be used to follow the progress of patients on treatment



# 2. X-ray

If the patient comes to OPD with signs & symptoms of pulmonary TB and initial 3 sputum smears are negative, but pulmonary TB is still suspected because of persistent symptoms, the suspect should be given broad spectrum antibiotic treatment for respiratory infection for at least one week and reexamined 2 weeks after the first sputum smear examination, if symptom persist, chest X-ray is taken, if this shows positive or features suggestive of active TB then the patient is diagnosed as sputum negative TB. So X-ray plays a very limited role in diagnosis.



# Diagnosis of pulmonary TB is through X-ray is unreliable because

- a. Other chest diseases can resemble TB as in X-ray.
- b. Pulmonary TB may show various types of radiographic abnormalities.
- c. Observer variations are greater with x-ray.

### 3. Mantoux test

A skin test to assess previous BCG vaccination, or infection with TB organism. The Mantoux test is accepted as the standard tuberculin test. It is

carried out by injecting intradermally purified protein derivative in 0.1ml & the result of the test is read between 48 to 72 hours. The result of the test is observed for erythema & induration. If an individual showing an induration of 10mm/more it is interpreted that he/she is positive or present or past with mycobacterium tuberculosis infection. If the reaction is less then 6mm then he/she is considered as negative and if the reaction is between 6 to 9mm, it is considered as doubtful.

This test is not useful in diagnosing TB diseases because a positive test only indicates that an individual is infected by TB bacilli but it does not indicate the presence of active disease similarly, a negative test does not rule on TB. But this test is useful for evaluating children below 5 years who may have TB and carrying out epidemiological surveys to estimate the prevalence of TB infection in a population.

### Exercise -3

- 14) In pulmonary TB the bacilli are present in the infected person's
  - e) Urine
  - f) Sputum
  - g) Blood
  - h) Stool
- 15) As per RNTCP the required sputum sample to diagnose lung TB is
  - e) One sample on the spot
  - f) Two on the spot and one in the early morning
  - g) Two on the spot and one over night
  - h) One sample early in the morning

- 16) The screening test of choice for pulmonary tuberculosis is
  - e) Chest X-ray
  - f) History collection
  - g) Scanning
  - h) Mantoux test
- 17) To confirm TB mantoux test done for;
  - a) Adults
  - b) Adolescents
  - c) Above 50 years
  - d) Below < 5 years
- 18) Manoux test has to be read with in
  - e) 10-12 hrs
  - f) 12-24 hrs
  - g) 24-48hrs
  - h) 48-72 hrs

### **CHAPTER-IV**

# **Extra Pulmonary TB**

# What do you mean by extra pulmonary TB?

Tuberculosis, which affects other than lungs, is called extra pulmonary Tuberculosis. This includes TB of the pleura, lymph nodes, abdomen, genitourinary tract, skin, joints, bones and meninges.

# 1) TB meningitis



When TB affects meninges of the brain is called TB meningitis. It is most often seen in children but also occurs in adults.

# Signs and symptoms of TB meningitis are

- a. Headache & behavioral changes
- b. Confusion
- c. Lethargy, altered consciousness
- d. Neck rigidity
- e. Paresis of cranial nerves

- f. Hydrocephalus & cerebral edema
- g. Convulsions

Investigations done for TB meningitis is lumbar puncture (LP) procedure is the technique used for draining CSF from the brain, CSF is tested for presence of mycobacterium tubercle bacilli.

## 2) Spinal TB



When TB affects spine or vertebral bodies it is called as spinal TB

Signs and symptoms of spinal TB are

- a. Back pain, Increases during bending
- b. Mild fever, anorexia, weight loss and deformity.

Investigations done to diagnose Spinal TB are CT scan and Mantoux test CT scan reveals characteristics lesions of TB.

## 3) TB knee

When TB affects knee it is called as TB knee the signs and symptoms are

- a. Pain & swelling
- b. Patient may hold the knee in a flexed position to compensate for the pain
- c. Pain causes the patient to limp
- d. Loss of weight and appetite

Investigations done to diagnose TB Knee is synovial aspiration which reveals the presence of TB organism.

## 4) TB Hip

When TB affects hip called TB of the hip. The signs and symptoms are

- a. Pain results in a limp and difficulty in walking
- b. Muscle spasm, swelling and flexion deformity, with real or apparent shortening
- c. Relaxation of muscle spasm during sleep causes the child to wake with a shrill "night cry".

Investigation to diagnose hip TB is aspiration of synovial fluid for acid fast bacilli.

## 5) Lymphadenitis

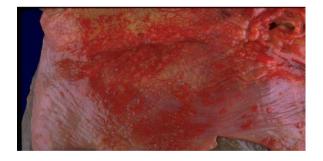


It is an inflammation of lymph nodes by TB bacilli. The signs and symptoms are

- a. enlarged lymph nodes in cervical and mediastinal glands, rarely axillary's and inguinal glands are seen.
- b. Initially the nodes are painless and mobile, latter it becomes malted and forms caseation and liqification
- c. In this area swelling becomes fluctuant and may discharge
- a. Weight loss and anorexia

Investigation to diagnose lymph node TB is aspiration of "collar stud" abscess for acid fast bacilli.

### 6) Pleural TB



When TB affects the pleural area it is called as pleural TB. Signs and symptoms of pleural TB are;

- a. Pleural effusion
- b. Fever
- c. Pleuritic chest pain

- d. Dyspnea
- e. Weight loss and anorexia

Investigation to diagnose pleural TB is thoracentesis.

## 7) TB of upper airway

When TB affects larynx, pharynx and epiglottis called TB of upper airway.

Signs and symptoms of TB upper airway are

- a. Horseness of voice
- b. Dysphagia
- c. Productive cough
- d. Weight loss and anorexia

Investigation to diagnose upper respiratory TB is throat culture.

## 8) Pericardial TB



Pericardial TB means inflammation of the pericardium with TB bacilli

Signs and symptoms of pericardial TB are

- a. Fever, retrosternal pain and friction rub
- b. Pericardial effusion

- c. Cardiovascular symptoms
- d. Cardiac tamponade

Investigation to diagnose pericardial TB is culture of pericardial fluid and chest X- ray.

## 9) Urinary TB

When TB affects urinary system called urinary TB. The signs and symptoms are

- a. Urgency to urinate
- b. Increased frequency of urination
- c. Dysuria or painful urination
- d. Hematuria and blood mixed in the urine
- e. Flank pain or pain in the waist line



Investigation to diagnose urinary TB is urine culture, here 3 morning urine specimens are collected to diagnose.

#### 10) Genital TB

When TB affects genital system it is called genital TB. The signs and symptoms are

- a. In females it causes infertility, pelvic pain and menstrual abnormality
- b. In males it causes epididymus, slightly tender mass, orchitis and prostitis.

## 11) Gastrointestinal TB

When TB affects gastrointestinal system called gastrointestinal TB. The signs and symptoms are;

- a. fever, night sweats, anorexia
- b. weight loss, right iliac fossa mass
- c. abdominal pain, diarrhea, sleenomegaly
- d. TB peritonitis is characterized by abdominal distension and pain.

Investigation to diagnose gastrointestinal TB is ultrasound/ CT scan, barium enema and laproscopy.

#### **Exercise -4**

Ramappa is 35 years old. He has come to the health centre because he does not feel well. By asking him questions the health worker finds out that Ramappa has knee pain, swelling, difficult to walk and he limps while walking. Apart from this Ramappa also has loss of appetite, loss of weight and tiredness.

What should the health worker suspect Ramappa to be suffering from? Explain your answer?

#### **CHAPTER-V**

#### HIV - TB

AIDS occurs due to human immuno deficiency virus (HIV). Who has HIV infection they suffer from the disease throught their life. To get AIDS to an HIV infected person it takes usually 7 to 10 years. During these years they won't show any symptom of disease but they are capable of spreading the disease.

- a. In our country 5.1 million people are infected with HIV.
- b. Estimated 2 million people co-infected with TB and HIV
- c. Autopsy studies revealed that 53% of AIDS death is due to TB.

The emergence of the HIV epidemic has posed major challenges to TB control efforts globally.



## Impact of HIV on TB

- ➤ HIV increases the risk of disease reactivation in people with latent TB
- ➤ HIV infected persons are more susceptible to new TB infection
- ➤ The HIV infected TB patients can spread TB to other people.
- ➤ HIV is the most powerful risk factor for progression of TB infection to TB disease.

## Impact of TB on HIV

- a. TB shortens the survival of patient with HIV infection
- b. TB accelerates the progression of HIV as observed by a six- to- seven fold increase in the HIV viral load in TB patients.
- c. TB is the cause of death for one out of every three people with AIDS world wide.
- d. An HIV positive person infected with mycobacterium tuberculosis has a 50% lifetime risk of developing TB.
- e. An HIV negative person infected with mycobacterium tuberculosis has only a 10% risk of developing TB.

Immune resistance weakens in AIDS patients due to HIV. Because of this TB occurs. In order to control the deadly duo of HIV-TB, it is essential that both HIV and TB control programme work together.

## Impact of HIV on TB control programme

In population where HIV/TB is common, health services are struggling to cope with the large and rising numbers of TB patients with the following consequences.

- ➤ Inadequate supervision of anti-TB chemotherapy.
- ➤ High mortality rates during treatment.
- ➤ High default rates because of adverse drug reaction.
- ➤ High rates of TB recurrence.
- ➤ Increased emergence of drug resistance.
- ➤ Increase in TB case load and therefore an increased burden on the health care services.

## Exercise -5

- 19) The causative organism of AIDS
  - a) HIV
  - b) BCG
  - c) Bacteria
  - d) Fungus
- 20) TB is a common opportunistic infection among HIV patient, if it is not treated it causes
  - a) Death
  - b) Loss of weight
  - c) Tiredness
  - d) No problem

#### **CHAPTER-VI**

## **National TB Control Programme**

National TB Control Proramme started in India on 1962. Under this programme District tuberculosis centers, Tuberculosis hospitals and Tuberculosis centers started. From the beginning these centers also used to provide common health services and these services is to provide through primary health centers.

## **Failure of National Tuberculosis Control Programme**

Failure of National Tuberculosis Control Programme occurred because of

- a. Implementation and supervision of the NTP was not done on the recommended lines
- b. About 100 districts in the country did not even introduce NTP
- c. Quality microscopy services, particularly in the PHIs, were not provided
- d. Our case detection remained less than the expected sputum positive per district per year 2000.
- e. Continuous and regular supply of all the anti-tuberculosis drugs, particularly (short course chemotherapy) SCC drugs in the PHIS, could not be ensured
- f. The recommended drug regimens of NTP were not prescribed, particularly in the teaching institutions
- g. Administrative and political support to various levels NTP was not provided
- h. Adequate budget required to run the programme, particularly anti-TB drugs, vehicles etc., was not provided.

- i. NGOs and private medical practitioners were not involved in the programme
- j. Health education for tuberculosis remained negligible compared to Malaria, Leprosy, Immunization, HIV and AIDS.
- k. Not given importance to the vaccine which has to be given for below 5 years of age children.

The net result of all the mentioned weakness was that, case finding in NTP was only about 30% of the expectation and treatment completion was about 35% with standard drug regimens and 45% to 50% with SCC.

## **Revised National TB Control Programme (RNTCP)**

As there was no significant change in the epidemiological situation in spite of having NTP in place for more than 30 years, and with increasing cases of drug resistance, compounded by the advent of HIV infection, the entire situation was revived at national level by an expert committee to improve National Tuberculosis programme, then the government of India revised National TB programme called Revised National Control Programme (RNTCP) in the year 1997. Under RNTCP, the responsibility of curing the patient is the hands of health provider and patient is the VIP of the program.

## **Objectives of RNTCP**

a. One of the objectives is to cure 85% of new sputum smear-positive cases. It means all identified TB patients has to be registered and all the registered cases treatment is provided until they are cured under direct

- observation treatment. Continuous drug supply and regular sputum examination also has to be carried out.
- b. Detect at least 70% of new sputum smear-positive cases. In this patients who has cough for >3 weeks and visits OPD by themselves will be examined by sputum test to diagnose TB

#### Classification of cases under RNTCP

Under RNTCP TB cases are classified as follows;

- a. New case A patient who has never has treatment for TB or has taken anti-tuberculosis drugs for less then one month.
- b. Relapse A patient declared cured of TB by a physician, but who reports back to the health service and is found to be bacteriologic ally positive
- c. Transferred in A patient who has been received into a TB unit/ district, after starting treatment in another unit where he has been recorded.
- d. Treatment after default A patient who received anti-tuberculosis treatment for one or more from any source and who returns to treatment after having defaulted, i.e. not taken anti TB drugs consecutively for 2 months or more.
- e. Failure case Smear positive patient who is smear positive at 5 months or more after starting treatment. Failure also includes a patient who was initially smear negative but becomes smear positive during treatment.

#### Exercise-6

- 21) A patient declared cured of TB by a physician, but reports back to the Health service and found to be bacteriologic ally positive. He is considered as
  - d) New case of TB
  - e) Old case of TB
  - f) Relapse of TB
  - d) Irregularity in treatment

- 22) A patient who is smear-positive at 5 months or more after starting treatment considered as
  - a) Failure
  - b) Relapse
  - c) Chronic
  - d) Acute
- 23) A patient who is initially smear-negative but becomes smear-positive during treatment called as
  - a) Failure
  - b) Relapse
  - c) Acute
  - d) Chronic
- 24) A patient who, at any time after registration, has not taken anti-TB drugs for 2 months or more called as
  - a) Failure
  - b) New case
  - c) Relapse
  - g) Defaulted
- 25) A patient who has never had treatment for TB or has taken anti-TB drugs for less than one month considered as
  - a) New case of TB
  - b) Old case of TB
  - c) Relapse of TB
  - d) Irregularity treatment

#### **CHAPTER-VII**

#### **DOTS** (Direct Observation treatment short course)

Direct observation treatment short course means each dose of medication administered to the patient is observed by the health staff to ensure it is taken and swallowed.

Under RNTCP, DOTS TB treatment is divided into two that is Intensive Phase-for 2-3 months and Continuous Phase for 4-5 months. Intensive phase means the first period of treatment when a combination of drugs are given to kill as many of the TB organism as possible, as quickly as possible, for a period of 2 –3 months. Continuous means the second period of treatment, after the initial phase, it is given next 4 to 5 months with a fewer drugs to eliminate most residual bacilli.

Under RNTCP, the anti-TB drugs are given weekly three times or alternative days for 2/3 months during an Intensive Phase. After this sputum examination has to be done, in that if there are no tubercle bacilli then continuous phase is started and patient is given anti TB drugs for one week in the form of blister pack and advised to take weekly three days and empty pack has to be returned to the health worker.

In continuous Phase after completion of 2 months and after completion of treatment sputum examination has to be done.

#### **Classification of DOTS**

Patients who are suffering from tuberculosis (pulmonary and extrapulmonary) are classified into three groups based on their treatment. They are category-I, category-II, and category-III.

For the purpose of DOTS therapy days are classified as follows In a year- 52 weeks. For the treatment purpose these weeks are classified as

- a. 2 months 8 weeks
- b. 3 months 12 weeks
- c. 4 months- 18 weeks
- d. 5 months- 22 weeks

To implement DOTS successfully above said weeks and months has to be followed strictly.

Cat	Duration (n			
egory	Intensive phase(IP)	Continuati on Phase (CP)	Total	
Cate gory- I	8 weeks (24 doses)	18 weeks (54 doses)	26 weeks (78 doses)	
Cate gory-II	12 weeks (36 doses)	22 weeks (66 doses)	34 weeks (102 doses)	
Cate gory- III	8 weeks (24 doses)	18 weeks (54 doses)	26 weeks (78 doses)	

## **Duration if sputum is positive at the end of Intensive phase**

		Duration (N	umber of doses)	Total
	Category	Intensive	Continua	
		Phase (IP)	tion Phase (CP)	
	Category-	12 weeks (36	18 weeks	26 weeks
I		doses)	(54 doses)	(90 doses)
	Category-	16 weeks (48	22 weeks	34 weeks
II		doses)	(66 doses)	(114 doses)

Note: Category-I – at the end of  $2^{nd}$  month and Category-II at the end of  $3^{rd}$  month sputum examination need to be done.

## **Category - I treatment**

The following patients, category-I treatment is given;

- a. New sputum smear-positive patients
- b. Seriously ill sputum smear-negative patients
- c. Seriously ill extra-pulmonary patients.

## Recommended regimen

**Intensive phase:** 2(HRZE) 3, i.e. Isoniazide, rifampicin, pyrazinamide and ethambutol in a blister pack, administered three times a

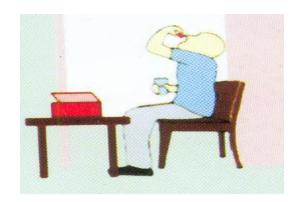
week for 2 months. The medication has to be taken by the patient under direct observation of the health workers. It means Monday, Wednesday and Friday or Tuesday, Thursday and Saturday. Same policy has to be followed in all centers for all tuberculosis patients.

The contents of medicine in blister pack are

Isoniazid e	Rifampic in	Pyrazina mide	Ethambu tol
600 mg	450mg	1500mg	1200mg
2 tablets	1capsule	2 tablets	2 tablets

Continuous Phase: In this phase, 4(HR) 3 i.e. Isoniazide and rifampicin are given three times a week for 4 months. The weekly blister pack for self administration contains the following drugs (to be taken three times a week) with pyridoxine 50mg (vitamins-B6) in the remaining days of the week to take (because isoniazide usually causes nerve weakness).

Isoniazide	Rifampicin
600mg	450mg
2tablets	1capsule



During the continuation phase the drugs are collected every week from the treatment center. The first dose must be administered under direct observation. One, weekly blister pack is given at a time to the patient for selfadministration. Only under exceptional circumstances drugs may be provided for a longer duration at the description of the medical officer in charge of the PHC. At the next collection the patient should return the empty blister packs.

If the patient remains sputum—positive at 3 months after start of intensive phase and is put on the continuation phase his sputum is repeated after 2 months i.e. month 5 and if the sputum is still positive the patient is categorized as a case of failure of treatment and started on the retreatment regimen afresh.

If a patient has negative sputum smears at 2 months but a positive sputum smear at 4 months, sputum smear should be done again at 5 months. If the patient be declared a failure of treatment and should be reregistered and started as a fresh case on the category II regimen.

## Category –II treatment

The following patient's category – II treatment is given

- a. Sputum smear positive relapse
- b. Sputum smear positive failure
- c. Sputum smear positive treatment after default

## **Recommended Regimen**

**Intensive Phase:** 2(HRZES) <sub>3/</sub>1(HRZE) 3, i.e. rifampicin combined with isoniazide, pyrazinamide and ethmbutol, supplemented with streptomycin for the first 2 months followed by the same drugs without streptomycin for one month given three times a week.



The initial intensive phase should be given for 3 months. The tablets are given in the same type of blister pack as for new smear-positive cases in category-I. Apart from 4 these anti-TB drugs streptomycin injection 0.75gms has to be administerd first 2 months of the same day in which patient takes oral medication.

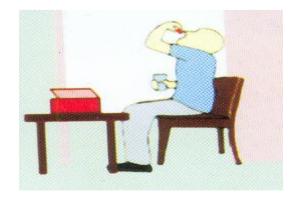
Isoniazide	Rifampici	Pyrazina	Ethambut	Strepto
	n	mide	ol	mycin
600 mg	450mg	1500mg	1200mg	0.75gm

				S
2 tablets	1 capsule	2 tablets	2 tablets	1
				injection

**Continuation phase**: 5(HRE) 3, i.e. 5 months of isoniazide, rifampicin and ethambutol three times a week. If the patient remains smear-positive after completion of the continuation phase he/she is no longer eligible for the retreatment regimen. The patient is managed as a chronic case.

Isoniazide	Rifampicin	Ethambutol
600mg	450mg	1200mg
2tablets	1capsule	2 tablets

**Note:** Chronic case – These are patients who remain smear-positive after completing the retreatment regimen. They are a low priority for treatment. They should be suspected of having combined isoniazide and rifampicin resistant disease and should be referred to a referral center for multi-drug resistant (MDR) tuberculosis. These cases have to be reviewed by the specialist. They will have very poor response to therapy. The management of chronic cases is presently not within the purview of the National Tuberculosis Control Programme.



## Category -III treatment

The following patient's category – III treatment is given

- a. New sputum smear negative, not seriously ill
- b. New extra Pulmonary, not seriously ill

## Recommended regimen

Intensive Phase: 2(HRZ) 3, i.e. isoniazide, rifampicin and pyrazinamide in the blister pack administered 3 times a week for 2 months. The medication has to be taken by the patient under observation of the health worker. When the patient has completed the initial intensive phase of 2 months and the sputum is negative for AFB, the continuation phase will start. If the sputum is smear positive at 2 months, the patient is categorized as a failure case and put afresh retreatment regimen.



The content of a blister pack is

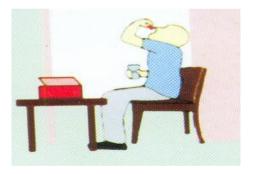
Isoniazide	Rifampicin	Pyrazinamide
600mg	450mg	1500mg
2 tablets	1 capsule	3 tablets

**Continuation Phase:** 4(HR) 3 i.e. isoniazide and rifampicin three times a week for 4 months. The weekly blister pack for self-administration contains

the following drugs to be taken 3 times a week (with vitamins in the remaining days of the week).

Isoniazide	Rifampicin
600mg	450mg
2 tablets	1 capsule

One such weekly blister pack is given at a time to the patient for self-administration. At the time of the next collection the patient should return the empty blister packs.



# Dosages for children

Drugs	Dosage(Thrice
	a week)
Isoniazde	10 – 15 mg/kg
Rifampicin	10 mg/kg

Pyrazinamide	35 mg/kg
Streptomycin	15 mg/kg
Ethambutol	30 mg/kg

## Chemo prophylaxis for Children:

Household contacts of smear-positive TB cases, especially those below 6 years of age, must be screened for symptoms of tuberculosis and the child should be given a full course of anti-TB treatment if she/he is diagnosed as a TB case. Or symptomatic children and those who are not found to be suffering from TB, chemoprophylaxis with isoniazide (5 mg/ kg body wt) should be administered daily for a period of six months. This is regardless of BCG vaccination status.

## **Treatment during Pregnant**

Pregnant women are treated with the same regimen as other but streptomycin must not be given. All other drugs are safe in pregnant and lactation. Ethambutol may be substituted for streptomycin. Postnatal women without fear can breast feed her child, if sputum smear is positive for AFB she has to cover her mouth with clean cloth and breast feed her child with precaution.

All women should be asked if they are pregnant before commencing treatment similarly they should be instructed to notify the TB clinic if they become pregnant during the course of TB treatment.

# Category of treatment, type of the patient and color of treatment box and its strength

Category / type of patient	Color of treatment box and its strength
<ul> <li>Category – I</li> <li>New sputum smear positive patient</li> <li>Seriously ill sputum smear negative patients</li> <li>Seriously ill extrapulmonary patient</li> </ul>	<ul> <li>Red colored treatment box</li> <li>2 months intensive phase treatment of 24 doses</li> <li>4 months continuous phase treatment of 18 weeks different blister pack medicines</li> </ul>
Category – II  Sputum smear positive patient relapse  Sputum smear positive failure  Sputum smear positive treatment after default	<ul> <li>Blue colored treatment box</li> <li>3 months intensive phase treatment of 36 doses</li> <li>5 months continuous phase treatment of 22 weeks different blister pack medicines</li> </ul>
Category – III  o Sputum smear – negative not	

seriously ill	o Green colored treatment box
<ul> <li>Extra pulmonary not</li> </ul>	o 2 months intensive phase
seriously ill	treatment of 24 doses
	o 4 months continuous phase
	treatment of 18 weeks different
	blister pack medicines

## Contact of smear positive index cases

Any person who has productive cough and is in contact with a smear positive case should have 3 sputum examinations as soon as possible. If the results are negative, they should be treated with antibiotics for 15 days, if symptoms persist patient should undergo a chest X-ray, if again the results are negative he should be followed up to 3 months if symptoms persist again sputum test to be done. Children who cannot produce sputum should be examined with other recommended investigations like chest X-ray and tuberculin testing.

#### Children under five years

A contact with a positive mantoux test (10 mm or more) is treated as a case if he is symptomatic, regardless of whether or not he has been given BCG vaccination in the past. If there are no signs and symptoms he should be evaluated promptly. If the symptoms appear he should be treated in consultation with a pediatrician. Indian Academy of Pediatrics recommends following DOTS as a strategy for treatment of all children with TB.

Produ ct code	Bod y weight/K. G.	Isoniazide mg	Rifam picin mg	Eth ambutol mg	Pyriz anamide mg
13	6- 10	75	75	200	250
14	11- 17	150	150	400	500
13+14	18-	75+150=22	75+150	200	250+

	25	5	=225	+400=600	500=750
14+14	26-	150+150=3	150+15	400	500+
	30	00	0=300	+400=800	5000=1000

For children as a product code as mentioned in above table, TB treatment is available based on the body weight and this also given weekly thrice. Apart from this product code 15 and 16 available for continuous phase.

**Non -DOTS in DOTS places:** 

Treatm ent	Classification of patient	Recom mended treatment
Recom	<ul><li>seriously ill new sputum smear positive</li></ul>	2 HSE
mended	o seriously ill new sputum smear negative	10 HE
treatment-1	<ul><li>seriously ill extra pulmonary TB</li></ul>	
Recom	a. sputum smear negative not seriously ill	12 HE
mended	b. extra pulmonary TB not seriously ill	
treatment-2		

**Recommended treatment-1-** It is 12 months treatment. Intensive phase treatment consists of isoniazide (300 mg) one tablet, streptomycin (0.75gm) and ethambutol (800 mg) one tablet will be given for 2 months followed by continuous phase of treatment isoniazide and ethambutol will be given for another 10months. This treatment patient takes daily at home where as for streptomycin injection patient has to visit daily to the health centre.

**Recommended treatment-2-** It is also 12 months treatment. In this isoniazide one tablet (300mg) and ethambutol one tablet (800mg) will be given daily for 12 months.

Recommended non –DOTS treatment in DOTS places will be given to above mentioned TB patients

# To whom non-DOTS treatment will be given in DOTS places?

- > all jaundice patients
- > patients who does not like to come under DOTS

# Side effects of anti-TB drugs

Symptom	Drug (Abbrayation)	Action to be	
Gastrointe stinal upset	(Abbrevation)  Any oral medication	<ul> <li>ken</li> <li>Reassure the patient</li> <li>Give drugs with less water</li> <li>do not give drugs on empty stomach,</li> <li>if above fails</li> </ul>	
Itching	Isoniazide (H) other drugs also	<ul> <li>if above fails, refer to doctor</li> <li>Reassure patient</li> <li>If severe, stop all drugs and refer patient doctor</li> </ul>	
Burning in the hands and feet	Isoniazide (H)	<ul> <li>Reassure the patient</li> <li>If severe, stop all drugs and refer patient to doctor</li> </ul>	
Join pains	Pyrazina	➤ If severe, refer patient for evaluation	

	mide(Z)	
Impaired	Ethambut	> Stop ethambutol, refer patient for
vision	ol(E)	evaluation
Ringing in	Streptomy	> Stop streptomycin, refer patient for
the ears, loss of	cin(S)	evaluation
hearing,dizziness		
and loss of		
balance		
Jaundice	Isoniazide	> Stop all drugs, refer patient for
	(H)	evaluation.
	Rifampici	
	n(R)	
	Pyrazina	
	mide(Z)	

Note: If Jaundice is identified, stop medicine immediately and send to medical officer/ physician.

## Exercise -7

Seenappa 36 years old men comes to health centre and does 3 sputum examination, when this becomes negative, he takes 15 days antibiotics as per doctors prescription. But still his symptom persists, so his made to undergo X-

ray examination, this revealed Seenappa has Tuberculosis. As a Health worker which category of treatment Seenappa will be given? Describe.

#### 26) Under RNTCP treatment of TB is classified as

- e) Acute and chronic
- f) Intensive and continuous phase
- g) Acute and continuous phase
- h) Intensive and chronic phase

#### 27) Expansion of "DOTS" is

- e) Direct observed treatment service
- f) Direct observed treatment short-course
- g) Direct observed treatment supply
- h) Direct observed treatment status
- 28) Patient comes to the health center weekly once to collect tablets and gives back the empty strips to DOTS provider is known to be that he is in
  - e) Acute phase
  - f) Chronic phase
  - g) Intensive phase
  - h) Continuous phase

#### 29) Under RNTCP, treatment of TB is classified as

- e) Category-I, category-II and category-III
- f) Grade-I, grade-II and grade-III
- g) Stage-I, stage-II and stage-III
- h) Class-I, class-II and class-III
- 30) New sputum smear-positive case, seriously ill sputum smear-negative case and seriously ill extra-pulmonary cases are treated under
  - e) Category-I
  - f) Category-II

- g) Category-III
- h) Category-IV
- 31) Sputum smear-positive relapse, sputum smear-positive failure and sputum smear-Positive treatment after default are treated under
  - e) Category-I
  - f) Category-II
  - g) Category-III
  - h) Category-IV
- 32) TB patients with sputum smear-negative, not seriously ill and extra- Pulmonary, not seriously ill are treated under
  - e) Category-I
  - f) Category-II
  - g) Category-III
  - h) Category-IV
- 33) Combination of drugs used in category-I intensive phase are
  - e) Isoniazide, Rifampicin, Pyrazinamide & Ethambutol
  - f) Isoniazide, Rifampicin, Pyrazinamide Ethambutol & Streptomycin
  - g) Isoniazide, Rifampicin, Pyrazinamide
  - h) Isoniazide, Rifampicin
- 34) Combination of drugs used in category-I continuous phase are
  - e) Isoniazide, Rifampicin
  - f) Isoniazide, Rifampicin, Pyrazinamide
  - g) Isoniazide, Rifampicin, Ethambutol
  - h) Isoniazide, Pyrazinamide
- 35) Combination of drugs used in category-II intensive phase are
  - e) Isoniazide, Rifampicin, Pyrazinamide & Ethambutol
  - f) Isoniazide, Rifampicin, Pyrazinamide Ethambutol Streptomycin and Isoniazide,
     Rifampicin, Pyrazinamide & Ethambutol
  - g) Isoniazide, Rifampicin, Pyrazinamide

- h) Isoniazide, Rifampicin
- 36) Combination of drugs used in category-II continuous phase are
  - e) Isoniazide, Rifampicin
  - f) Isoniazide, Rifampicin, Ethambutol
  - g) Isoniazide, Rifampicin, Pyrazinamide
  - h) Isoniazide, Pyrazinamide
- 37) Combination of drugs used in category-III intensive phase are
  - e) Isoniazide, Rifampicin, Pyrazinamide & Ethambutol
  - f) Isoniazide, Rifampicin, Pyrazinamide, Ethambutol, Streptomycin
  - g) Isoniazide, Rifampicin, Pyrazinamide
  - h) Isoniazide, Rifampicin.
- 38) Combination of drugs used in category-III continuous phase are
  - a) Isoniazide, Rifampicin.
  - b) Isoniazide, Rifampicin, Pyrazinamide
  - c) Isoniazide, Rifampicin, Ethambutol
  - d) Isoniazide, Pyrazinamide
- 39) The duration of treatment in category-I intensive phase includes
  - e) Weekly thrice for 2 months
  - f) Daily for 6 months
  - g) Daily for 2 months
  - h) Weekly thrice for 3 months
- 40) The duration of treatment in category-I continuous phase includes
  - e) Daily for 2 months
  - f) Weekly thrice for 4 months
  - g) Daily for 6 months
  - h) Weekly thrice for 3 months
- 41) The duration of treatment in category-II intensive phase includes
  - e) HRZES for 2 months and HRZE for one month, weekly thrice
  - f) HRZES daily for 2 months and HRZE daily for one month

- g) HRZES weekly thrice for 2 months and HRZE once daily
- h) HRZES daily for 2 months and HRZE weekly thrice for one month
- 42) The duration of treatment in category-II continuous phase includes
  - e) Weekly thrice for 5 months
  - f) Weekly once for 5 months
  - g) Weekly twice for 5 months
  - h) Daily once for 6 months
- 43) The duration of treatment in category-III intensive phase includes
  - e) Weekly thrice for 2 months
  - f) Daily for 6 months
  - g) Daily for 2 months
  - h) Weekly thrice for 3 months
- 44) The duration of treatment in category-III continuous phase includes
  - e) Weekly thrice for 4 months
  - f) Weekly thrice for 3 months
  - g) Daily for 6 months
  - h) Daily for 2 months
- 45) Peripheral neuropathy is a common side effect of isoniazide therapy and the best option for treating this problem with
  - e) Ferrous sulfate 300mg TID for 3 months
  - f) Withdrawing isoniazide and replacing it with another drug
  - g) Pyridoxine (vit. B6) 50 mg for the duration of isoniazide therapy.
  - h) Calcium carbonates 300 mg TID for 3 months.
- 46) Side effects of Isoniazide is
  - e) Burning in the hands and feet
  - f) Impaired vision
  - g) Ringing/loss of hearing
  - h) Don't know

#### **CHAPTER-VIII**

#### **Multi-drug resistance TB**

Anti-tuberculosis (TB) drug resistance is a major public health problem that threatens the success of DOTS, the WHO-recommended treatment strategy for detection and cure of TB, as well as global tuberculosis control. XDR-TB is the abbreviation extensively used for drug-resistant tuberculosis (TB).

Multi-drug resistance means M.tuberculosis is resistance to two or more of the anti-tuberculosis drugs. The most important pattern of multi-drug resistance is resistance to both isoniazid and rifampicin. This combination has been associated with an overall cure rate of less than 60% in some reports, similarly to the rate of cure before the discovery of anti-tuberculosis drugs.

#### **Causes**

- a. No adherence to TB therapy
- b. Use of inadequate treatment regimen
- c. Administration of improper treatment regimens by health care workers
- d. Failure to ensure that patients complete the whole course of treatment.

If sputum smear is positive for AFB after taking 3 months of treatment in intensive phase, one more month will be continued with the same phase. Even though sputum is smear positive patient is put to continuous phase. After completion of 5 months if patient sputum smear positive, such patients are removed from category-II treatment and declared as chronic case.

Oroups at mercased fisk for drug-resistant tuberedrosis are

- a. Persons who have a history of treatment with anti-TB medications
- b. Contacts of persons who have known drug-resistant tuberculosis

- c. Foreign-born persons from areas with high prevalence of drug-resistant TB (e.g., Latin America, Asia, Africa)
- d. Persons whose smear or culture results remain positive after three months of therapy with anti-TB medications.

## Management

- Early detection of cases and initiation of DOTS is used in prevention
- ➤ Appropriate infection control measures are practiced
- ➤ Instruct the patient to cover their noses and mouth with a tissue while coughing.
- ➤ Potentially infectious patients should be placed in tuberculosis isolation room.
- ➤ Provide good ventilation to eliminate infectious droplet nuclei once they are released into the air.

## Exercise -8

- 47) Multi drug resistant TB (MDRTB) means, tuberculosis bacilli are resistant to
  - a) Anti TB drugs
  - b) INH and Refampicin
  - c) Streptomycin and Ethambutol
  - d) INH and Pyrazinamide.
- 48) The best way to prevent emergencies of multiple drug resistance is by
  - a) Implementing DOTS therapy to ensure compliance
  - b) Using a combination drug therapy
  - c) Including bacteriostatic antibiotic in the regimen
  - d) Administering once daily dosage of medications.

#### **CHAPTER-IX**

### **Prevention of TB**

Prevention of TB is by identifying the people who are the source of infection and making them non-infectious by treating them successfully.

- a. Smear positive pulmonary TB patients are the source of infection. Early diagnosis of TB in a patient is important.
- b. Rendering the identified pulmonary smear-positive patients non-infectious through directly observed treatment with short-course chemotherapy can break the chain of transmission
- c. Educating the general population about TB and letting them know that free facilities where TB can be diagnosed and cured easily are available, in areas under DOTS, will help to increase the number of patients coming for treatment.

## Role of BCG in prevention of TB

Bacilli Calmette Guerin (BCG) is the only available vaccine against tuberculosis. It is administered intradermally in a dose containing 0.1mg of the vaccine in 0.1ml of the reconstituted vaccine. In newborns, the skin being too thin only half the dose (0.05ml) is injected. The vaccine is administered in the upper arm at the insertion of the deltoid muscle. BCG gives better protection if given around the age of 3 months. But it can be given soon after birth in a hospital as the mother may not bring the child for it later on. The vaccine can be given at birth for institutional deliveries or when giving DPT and polio vaccine.

After the vaccination, explain that the reaction site will be small lump of papule which will appear in the third or fourth week and will form pus around

the sixth week. This is normal and requires no treatment. It should not be touched or scratched. At the end of 10 to 12 weeks, only a small scar should be visible.

The effectiveness of BCG is limited only to protect against severe forms (complications) of TB in children. It is not effective in preventing TB in adults or in controlling TB in the community.

BCG is not recommended for children with AIDS due to the risk of disseminated TB.

## Exercise -9

- 49) Vaccinating child for BCG helps
  - e) Prevent TB
  - f) Prevents complications of TB
  - g) To cure TB
  - h) To eradicate TB
- 50) TB vaccine to be effective it is to be administered
  - e) Soon after the birth
  - f) At the age of one month
  - g) At the age of one year
  - h) At the age of 10 years
- 51) TB vaccine is given
  - e) Intramuscularly
  - f) Intradermally
  - g) Orally
  - h) Intrathecally

### **CHAPTER-X**

# Role of Health worker and Anganwadi worker in prevention and control of TB

## **Prerequisites**

- a. Firstly visit the patient, verify his/her address then meet the concerned person/ relative/guardian and confirm his relationship with the patient whose name is recorded in the treatment card.
- b. Before starting DOTS, complete history of the patient needs to be collected otherwise chances for wrong treatment administration. Because of this instead of helping patient we may harm them. PHC where patient gets treatment card, from the same PHC patient has to get identity card also. The TB registration number should be entered on both treatment and identification card, so that by seeing the identification card, patient treatment card can be easily taken out.
- c. In which PHC health worker is responsible for writing treatment card, in that place she should see that she fills treatment card completely and clearly so that it can be identified easily.
- d. The DOTS provider has to maintain the treatment card daily and regularly
- e. The treatment card which received should be checked for TB number. The treatment cards need to be given for recording to senior TB treatment supervisor for transforming information.
- f. Once the patient is identified, he/ she has to be registered and see that until he/ she completes the treatment they will be under their coverage area.

g. According to the convenience of the patient, i.e. place and time has to be identified and verified. Based on that patient should be put on DOTS therapy.

## **Treatment of patient**



- a. During intensive phase and continuous phase based on category medicine is present in the drug box needs to be verified before starting DOTS therapy.
- b. DOTS provider should see that during an intensive phase, patient will swallow the medication in front of the DOTS provider only
- c. In continuous phase and after completion of treatment DOTS provider should see that patient has undergone compulsory sputum examination
- d. The DOTS provider should verify returned blister pack for emptiness then should give medicine to the patient for following week.
- e. All patients who completes intensive phase and going for continuous phase has to be demonstrated how to take medication from the blister pack and swallow and also needs to be informed the remaining medication intake at home. Inform the patient to return empty blister pack while coming for next week medication.



f. In **category-I** drugs are supplied in **red color box**. Intensive phase 2 months 24 doses and continuous phase drugs 4 months and 18 weeks medicines will be there in blister pack and these blister pack contains for intensive phase 2 months of 24 doses and continuous phase 4 months of 18 weeks medicine. For continuous phase each week blister pack contains 3 days of anti-TB drugs and 4 days of vitamin tablets.

- g. In **category-II** intensive phase anti-TB drugs are supplied in **blue colored box** for 3 months as 36 doses. For continuous phase, 5 months of 22 weeks daily medicines of various doses will be there. Out of these 3 days in a week anti-TB drugs and 4 days in a week vitamin tablets will be there.
- h. In **category-III** anti-TB drugs are supplied in **green color box** for 2 months as 24 doses. For continuous phase, 4 months, 18 weeks anti-TB drugs will be there in the blister packs. Each blister pack is for one week with 3 days of anti-TB drugs and 4 days of vitamin tablets.
- i. DOTS provider who is authorized to give streptomycin injection should use disposable syringes and only one prick.
- j. For the cure of the disease, DOTS provider should keep good relationship with the patient and must provide the fixed medicines until the course of treatment completes.
- k. Any person who comes in contact with smear positive patient should under go compulsory sputum examination and the results must be recorded in the treatment card
- 1. Teach the patient clearly about the medicines and its duration of treatment at the first visit.
- m. Sputum examination needs to be done step by step until the patient recovers completely.
- n. Identify patients who are not coming for treatment regularly and inform them clearly to restart medicines or come for medication. This type of identifying patients has to be started the next day of intensive phase and within one week of continuous phase.
- o. All patients who have symptoms of TB have to be sent near primary health center for sputum examination.

Provide health Education to patient

## **During initial contact:**

During your first contact with a patient, which is usually when you register him, you will give the patient essential information about his disease. Make sure he feels comfortable enough to ask you what he does not understand. Keep in mind that the patient is probably very sick and might still be feeling disturbed about having the disease. Ask the patient essential questions throughout the discussion to make sure he understands what is being said. During later discussions with the patient, you will explain more details.

## The topics to be discussed initially with the patient are as follows;

#### a. What is tuberculosis?

Explain in simple terms what TB is and what type of TB the patient has (for example TB of the lungs). Reassure the patient that if the prescribed treatment is taken for the complete period, TB is a curable disease. While giving health education involve family members also.

#### b. Treatment of tuberculosis

Explain general information about the TB treatment, such as:

- a. duration of treatment
- b. frequency of the patients visits to the health unit for taking treatment
- c. where the patient will receive treatment
- d. Treatment is free of charge at government centers.

## c. Necessity of directly observed treatment (DOT)

Explain the importance of taking DOT. This means that the health worker watches the patient swallow all his drugs. Ensure that drugs, including streptomycin injections, are properly given. Explain that diet and rest have limited impact on outcome of treatment, but regular drug-taking is essential. Relapse of TB can be prevented by taking full course of DOTS only as per the prescription of medical officer. Health worker should also inform the patient that after completion of treatment patient can lead a normal life.

### d. How tuberculosis spreads

Explain in simple terms that TB can spread when a patient sneezes or coughs. People in close contact with the patient can become infected when they breathe in these germs (tubercle bacilli). Stress the importance of taking all family members exposed to the disease (contacts) and who have symptoms of TB to the closest health unit for screening of TB. In particular, children below 5 years of age should be screened because they are at risk of developing severe forms of the disease. Also explain how to prevent TB from spreading (for example covering the mouth when coughing and sneezing and avoiding spitting in public).

#### e. Looking for symptoms of tuberculosis

Describe the following symptoms of TB of the lungs to the patient so that he can recognize whether a family member might be a TB suspect;

A cough which lasts for 3 or more weeks. Usually, the person also has one or more of the symptoms listed below;

- weight loss
- > tiredness
- Fever, rise in temperature especially in the evening
- > night sweats
- > chest pain
- > shortness of breath
- > loss of appetite and
- > Coughing up of blood-stained sputum.

## f. Disposal of sputum

Health worker should inform the pulmonary TB patient not to spit where ever he prefers and teach methods of safe disposal of sputum like;

- > make a borehole put the sputum and cover the mud
- burn the sputum

## Role of health worker in prevention of Side effects of DOTS

- a. It is important to assess medication side effects because they are often a reason the patient fails to adhere to the prescribed medication. Efforts are made to reduce the side effects to increase the patient's willingness to take medications as prescribed.
- b. Instruct the patient to take medication either on an empty stomach or at least one hour before meals because food interferes with medication absorption (although taking medications on an empty stomach frequently results in gastrointestinal upset).
- c. Patient taking isoniazide should avoid foods containing old cheese, Soya sauce, eating these types of foods while taking isoniazide may result in headache, flushing, hypo tension, light-headedness, palpitation and diaphoresis.
- d. Warn the patient who is taking rifampicin, this drug temporarily make patient body secretions appear orange. So reassure that this effect is harmless and no need to worry. Rifampicin may discolor the contact lenses so inform patient to wear eyeglasses during treatment. Rifampicin decreases the efficiency of oral contraceptives; so increase the dosage of the oral contraceptive or inform women to switch to another method of contraception.
- e. Other side-effects of medications including hepatitis, neurological changes (hearing loss, neuritis), and rash, also needs to be monitored.
- f. Instruct the patient to use disposable specimen cup to collect the sputum. Then to dispose the sputum while burning the sputum cup or dig the mud and dispose the sputum and close it this prevents spread of infection.

#### Diet

- a. DOTS provider must intimate each patient to take proper diet with medicine like meat, fish poultry, eggs, milk, cheese, corn, peanuts, pea's Soya beans, nuts, cereals, ragi, green leafy vegetables carrots, whole grains, and spourted seeds. Because these foods helps to develop immunity in a patient.
- a. Inform the pulmonary TB patient and family not to share the food or eat together.
- b. If the patient is anorexic, urge him to eat small frequent meals and record body weight weekly.

- c. Patient with TB are often debilitated from a prolonged chronic illness and impaired nutritional status. So the patient's willingness to eat may be altered by asking him to take small frequent meals which he prefers.
- d. Good eating habits are important for controlling TB. The foods you choose can affect how well your body heals itself. Here are some tips for healthy eating:
  - ➤ Be generous with the food you eat. Your body needs extra energy for healing.
  - > Choose a variety of foods to be sure you are getting all the nutrients your body needs.
  - ➤ Avoid alcohol because alcohol has calories, but no other nutrients. It is also hard on liver, especially if one is taking isoniazid (INH), pyrazinamide (PZA) and rifampin (RMP).
  - > Choose foods high in protein such as meat, fish, milk and dried peas, beans and lentils



Intimate the TB patient to choose foods high in the following nutrients because these foods help to develop immunity in prevention of disease:

- a) Pyridoxine (vitamin B6) b) Vitamin A c) Vitamin C d) Iron e) Protein f) Calcium a) Foods high in vitamin B6 (pyridoxine): are liver, chicken, pork, beef, fish, dried fruit, dates, anjur, peanuts, peas, cauliflower, whole grain, cereals, milk, rice polishing bananas, soybeans and grapes. b) Foods high in vitamin A: are carrots, sweet potatoes, spinach and other dark green leafy vegetables, liver, dairy products, eggs, papaya, mango, pumpkin, jackfruit and also yellow co lour fruits and vegetables. c) Foods high in vitamin C: are tomato, lemon, amla, orange, sweet peppers, strawberries, cabbage, cauliflower and all citrus fruits and juices. Tip: The most amount of vitamin C from vegetables one will get from when the vegetables cooked with steam or in a small amount of water just until
  - d) Foods high in iron: are jagary, dry grapes, ragi, liver, kidney, cream of wheat, whole grain, cereals, meat like beef, pork, beans, dates, maize, oat,

tender-crisp.

Bengal gram, black gram, green leafy vegetables, red gram dhal, and soybean.

Tip: Iron is taken up by the body best when eaten with foods high in vitamin C.

e) High protein foods: are beef, pork, milk, cheese, chicken, Poultry, dried peas,

beans and eggs.

Tip: Add skim milk powder to soups, milk and casseroles.

f) Foods high in calcium: milk and milk products, Soya beans, cheeses, sea fish with bones, baked beans (canned).

#### **Exercises**

Teach deep breathing and coughing exercises to perform several times a day.

It has to be done in the following ways

Instruct the patient -

- > Place one hand on the abdomen and the other on the middle of the chest
- > Breathe slowly and deeply through the nose
- ➤ Breath out through pursed lips while tightening the abdominal muscles
- ➤ Inhale through the nose while counting to three and exhale slowly and evenly against pursed lips
- ➤ Count to seven while prolonging expiration through pursed lips
- ➤ Sit in a chair and fold arms over the abdomen, then inhale through the nose and exhale thorough pursed lips while bending forward.
- ➤ Inhale while walking two steps and exhale while walking four or five steps through pursed lips.

The above exercises specially thought to pulmonary TB patients to remove accumulated secretions and helps in easy breathing and this has to be performed several times a day. Apart from this instruct the patient to drink plenty of warm water which liquidity the secretions.

#### Exercise -9

Mangamma is health worker in kembodi PHC. At 10 a.m she begins to administer streptomycin injection after the patient has swalled the medication. After this she throws syringe and needle. Why mangamma thrown syringe and needle?

Four years old Shankar's mother had Tubercle bacilli in her sputum comes to Devaraya samudra PHC for treatment. Shankar's father brings Shankar to PHC for examination. After examination Doctor confirms that Shankar does not have tuberculosis. Here, after which examination doctor confirms that 4 year old Shankar does not have tuberculosis? Explain.

## Recording and Marking treatment card

Once the patient is diagnosed has having tuberculosis, medical officer fills the treatment card and a duplicate of it with the treatment box hand over to the health workers / Anganawadi workers and inform the patient to collect the medicine from them.

Tuberculosis Treatment card has shown in table 2. This has three columns for cat -I, cat -II, cat -III and it has 2 phases. A chart in front of the treatment card is used to indicate the days (1-31) on which a patient takes his drugs during intensive phase of treatment. A health worker ticks  $(\sqrt)$  the appropriate box on the chart after patient takes his drugs and streptomycin injections (if applicable) under direct observation. By chance patient takes medicine (DOTS) in front of you on  $9^{th}$  April 2007, you have to enter in  $9^{th}$  column and write  $9^{th}$  April. Next medicine dates  $11^{th}$  (Wednesday) and  $13^{th}$  (Friday) April needs to be entered. As per your convenience you can enter the dates for Sunday. After taking 22 doses of medicine patient is advised to undergo 2 times sputum examination. It means by the end of intensive phase 24 doses, 2 sputum examination results should be available. If results showed that patient is AFB negative then patient is given continuous phase of treatment.

Example if patient with cat-I intensive phase has to enter continuous phase on 4<sup>th</sup> June; patient sputum needs to be tested before 4<sup>th</sup>. Because soon after the completion of intensive phase, patient can start continuous phase of treatment on 4<sup>th</sup> itself. So patient need not stop the medicine in the middle.

On back of the treatment card there is a chart to indicate when a patient collects his drugs during continuation phase of treatment, all patients collect drugs once a designated collection day; their medicines are directly observed on third day and the next two doses are self administered. A health worker marks an 'X 'in the appropriate box to indicate the day the drugs are collected a horizontal line (-) is drawn to show the number of days for which supply was given. The details of treatment card will be explained by the senior supervisor when he visits to the health center / Anganawadi center.

#### Follow up:

Two sputum specimens are taken for follow-up sputum smear examinations at three specified intervals at the end of the intensive phase, two months into the continuation phase and at the end of treatment. Results must be available by the end of the intensive phase and end of the treatment.

- 1. If patient recovers, the medical officer has to enter in remarks column of the treatment card in the back.
- 2. All information like patient contact, X-ray result, biopsy result, default action etc to be entered in the remark column
- 3. Read the treatment card carefully, if you have any doubt clarify from the supervisor

#### Exercise -10

- 52) Disposal of infected person's sputum should be done by
  - e) pouring clean water on it
  - f) pouring tap water on it
  - g) burning it
  - h) throwing out.
- 53) Type of exercise required for pulmonary TB patients is
  - e) leg exercises
  - f) daily walking

- g) deep breathing and coughing exercises
- h) stomach exercises
- 54) Relapse of TB can be prevented by taking
  - e) adequate rest
  - f) adequate food
  - g) full course of DOTS
  - h) adequate exercise
- 55) After completion of treatment the patient with TB can lead a
  - a) poor quality of life
  - b) hospital life
  - c) normal life
  - d) isolated life

## Always health workers should learn the following steps to administer DOTS

NO.	PRACTICES	5	4	3	2	1
1	Identification of patient and treatment Initially a patient with TB or his representatives approaches; Invites the patient					
2	Identifies the patient by name					
3	Enquires about his/ her condition					
4	Checks the registration number					
5	Confirms the TB number from the treatment card					
6	Finds convenient time and place for DOTS administration					
7	Takes red / blue / green treatment box and confirms the patient name/ number.					
	Administration of medication					
8	to the patient Takes medicine from the blister pack and administers to the patient during intensive phase					
9	Observe the patient swallowing medicine with the help of water					
10	Demonstrate the patient how to take medicine from the blister pack and swallow, who are going to continuous phase					
12	Explains all those patients with continuous phase, the importance of taking remaining drugs at home  Informs the patient the purpose of returning empty blister pack to the DOTS provider during the					
13	next visit for medication					

14	Checks the returned blister pack for its emptiness before giving medicine for the immediate forth coming week.  After administration of medication records/ marks in the register  Informs the patient next coming day for treatment and her/ his availability timings			
16	Administration of medication to the patient Gives information to the patient, the type of medication the patient has to take			
17	Tells the patient about the duration of treatment			
18	Informs the patient to take treatment till the completion of treatment duration			
19	Educates the patient/ family about DOTS and the only choice of treatment to cure TB			
20	Motivates the patient / family who are in direct contact with sputum smear positive patient to get investigated for TB			
	Education to the patient /family			
21	about the disease and management Gives education on TB, early recognition of symptoms, availability of DOTS with free of cost and importance of treatment adherence			
22	Identify the patient who are irregular for treatment to come very next day of the intensive phase and within one week of continuous phase			
23	Intimates the health authority			

	who are not coming for treatment regularly			
24	Educate the patient to avoid irregular treatment to avoid drug resistant TB			
25	Motivate the patient to take diet rich in protein, iron, calcium and vitamin B6			
26	Follow-up of patient Makes it compulsory that the patient undergoes sputum examination after completion of two months of treatment in intensive phase and after completion of full course of treatment			
27	Makes follow up assessment of those patients under treatment in community			
28	Intimates health authority/ refer the patient to PHC if the patient complaints of any side effects related to DOTS			
	Maintaining records and			
29	reports Maintains treatment card properly			
30	Submits all the treatment cards to senior treatment supervisor to transfer the information into TB statistics register			
31	Records and reports the outcome of every patient put on treatment			
32	Maintains good rapport with the patient and medical authority in implementation of DOTS programme			

**Note:** Always -5, Most often -4, Sometimes -3, rarely -2, No time

## **IDENTITY CARD**

	ed National	Treatment Regimen
IDENTITY CARI		Initial Intensive Phase Continuation Phase
Complete Address:		
Sex M	TB No:  Category of Treatment  Category I  Category II  Category III	1. Keep your card safely. 2. You can be cured if you follow your treatment regimen by taking the prescribed drugs as Advised. 2. You man infect and advised.
Disease Classification Pulmonary Extra-Pulmonary Site:	Treatment Started on	Treatment outcome:

## REVISED NATIONAL TUBERCULOS1S CONTROL PROGRAMME

## **Treatment Card**

State :	e: City/District: Code Distric								ct/S	ub c	listi	rict:								_											
Name: Patient TB No										No:	:																				
Complete addres	s: :_										_				ŀ	Ieal	th (	Jnit	: _												
Sex M □ F □	A	ge:_																	Γ												
Name and address	SS O	f co	ntac	et Po	erso	n:_															Pu	<b>Dis</b>	ease nary	e Cl	assii	ficat	ion				
																					Ext	ra-p	ulmo	onar	у						
																				Sit	te:										
1. INITIAL INT	ΓNS	IVI	E PI	HAS	SE-	Pre	scri	bed	reg	ime	n ar	ıd d	osa	ges:	:				L												
Tick (✓)the app	ropi	iate	e Ca	ateg	gory	bel	low.													Г											
Category I □					C	Cate	gor	y II				Ca	tego	ory	III l										Tv	no e	of Pa	ıtioı			
(New Case)					(F	Retr	eatr	nen	t)			(Ne	ew (	Case	e)					ı	_	Nev	v		1 y	pc (	,116		n Rep	olace	,
(Pulmonary smea	ar-p	osit	ive)	)	(r	elap	se,	fail	ure,	)		(pı	ılm	ona	ry s	mea	ır-n	egat	ive,	, [		Tra		r in	l				Fai		
(seriously ill sme	ear-i	nega	ativo	e)	or	trea	tme	nt a	fter	· def	fault	) r	ot s	serio	ous	y il	l;) c	r		г	_	Т	.+	+	-ft-	1.	.£1	4 -	<b>∩</b> ₄1.	~~ / <b>(</b>	1
(seriously ill extr	a-p	ulm	ona	ry)							(	extr	a-p	ulm	ona	ry,	not	seri	ous	ly il	1)										
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day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	13	10	1 /	18	19	20	21	22	23	24	23	20	21	28 2	29 3	0 3.	

CONTINUATION PHASE
(See Guideline)
Prescribed regimen: Category I   Category II   Category III
(New Case) (Retreatment) (New Case)
(Pulmonary smear-positive) (Relapse, failure (Pulmonary smear-negative, not
seriously ill)
(Seriously ill smear-negative or treatment after default) or (extra-pulmonary, not
seriously ill)
Seriously ill extra-pulmonary)
Weige Name being Carlotte and a large in the borner below.
Write Number of tablets per dose in the boxes below:  3 times/ Week  3 times/ Week  3 times/ week
5 times/ week 5 times/ week 5 times/ week
Enter 'X' on date when the first dose of drugs has been swallowed under direct observation and draw
norizontal line (x) to indicate the period during which medicines will be self-administered.
nth
Remarks:
ACHURS.

## TREATMENT CATEGORIES AND SPUTUM EXAMINATION SCHEDULE

TRE	CATMENT REGIM	EN	SPUTUM EXAMINATION FOR PULMONARY TB								
Category of Treatment	Type of Patient	Regimen	Pre- treatment sputum	Test at month	IF result is	THEN:					
	New sputum smear positive				-	Start continuation phase, test sputum again at 4 and 6 months.					
Category-I		2(HRZE) 3	+	2	+	Continue intensive phase for 1 more month, test sputum again at 3,5, and 7 months					
	Seriously ill sputum smear negative	4(HR) 3			-	Start continuation phase, test sputum again at 6 months					
	Seriously ill extra pulmonary		-	2	+	Continue intensive phase for one more month, test sputum again at 3, 5, and 7 months					
Category - II	Sputum smear positive relapse Sputum smear positive failure	2(HRZES)3 1(HRZE)3		3	-	Start continuation phase, test sputum at 5 and 8 months					
	Sputum smear positive treatment after default	5(HRE)3	+	3	+	Continue intensive phase for 1 more month, test sputum again at 4, 6, and 9 months.					
Category - III	Sputum smear negative, not seriously ill Extra-pulmonary,	2(HRZ)3 4(HR)3	-	2	- +	Start continuation phase, test sputum again at 6 months  Re-register the patient and					
	not seriously ill	+(IIIC)3				begin category-II treatment					



This module is prepared with the guidance of Dr. K. Lalitha, Professor, NIMHANS, Bangalore and Dr. Kumaravelu, Professor and Head, Department of RNTCP, TB and Chest diseases, R.L. Jalappa hospital and research centre, Kolar for the purpose of getting Ph.D from Vinayaka Mission Deemed University, Salem.

☐ This module is prepared for the purpose of health workers and anganwadi workers.

☐ In implementation of DOTS programme effectively the health workers and anganwadi workers can make use of this module since this module is prepared in simple language.

☐ It has a comprehensive information on TB

As per my knowledge the information given in this module is correct.

If you require more information or detail on this module kindly visit to the following telephone or website.

Telephone : 9845651119

Email : gkvlshiv@rediffmail.com

# PÀë0iÀÄgÉÆÃUÀ ªÀÄvÀÄÛ qÁmii aQvÉi0iÀÄ CAUˣ˻Ár ªÀÄvÀÄÛ DgÉÆÃUÀå PÁ0iÀÄðPÀvÀðgÀ PÉʦr









# DÉÊ!, 1:A-À

1 : PÀë0iÀÄ gÉÆÃUÀzÀ ¥Áæ§®åvÉ

2 : PÀë0iÀÄgÉÆÃUÀ ªÀÄvÀÄÛ PÁgÀtUÀ¼ÀÄ

3 : ±Áé¸ÀPÉÆÃ±ÀzÀ PÀëOiÀĪÀ£ÀÄß

PÀAqÀÄ»r0iÀÄĪÀ «zsÁ£ÀUÀ¼ÀÄ

4 : ±Áé¸ÀPÉÆÃ±ÉÃvÀÛgÀ PÀë0iÀÄgÉÆÃUÀ

5 : ºÉZï.L.« - PÀë0iÀÄ

6 : g禅çÃ0iÀÄ PÀë0iÀÄgÉÆÃUÀ ¤0iÀÄAvÀæt

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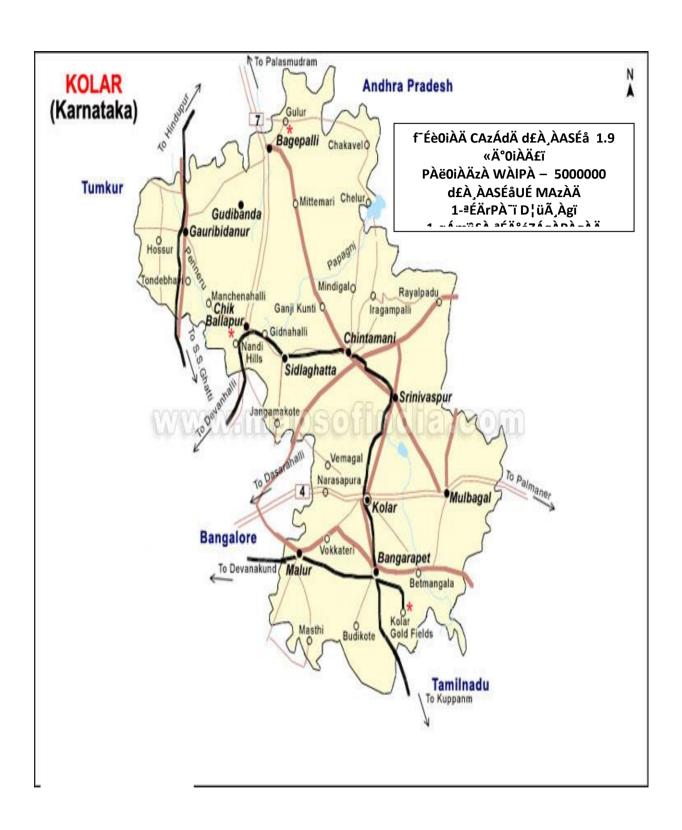
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PÀæªÀÄ

8 : §ºÀÄ OμÀ¢ü0iÀÄ «gÀÄzÀÝ

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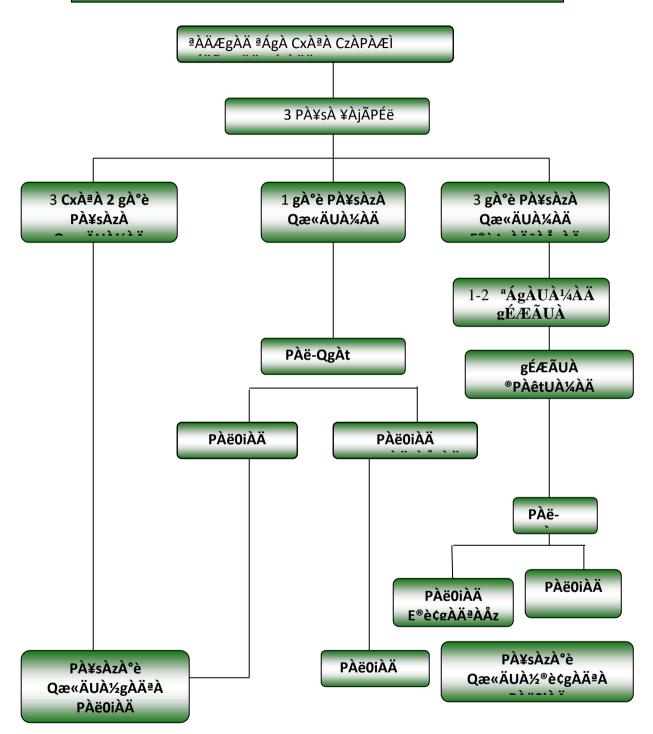


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PÀæªÀÄ	> > "	¥ÀÅlzÀ
¸ÀASÉå	«µÀ0iÀÄ	¸ÀASÉå
1.	PÉʦr0iÀÄ GzÉÝñÀ	1
2.	PÀë0iÀÄ gÉÆÃUÀzÀ ¥Á§®åvÉ	2
3.	PÀë0iÀÄ gÉÆÃUÀ ªÀÄvÀÄÛ PÁgÀtUÀ¼ÀÄ	4
4.	±Áé¸ÀPÉÆÃ±ÀzÀ PÀë0iÀĪÀ£ÀÄß PÀAqÀÄ»r0iÀÄĪÀ «zsÁ£ÀUÀ¼ÀÄ	12
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CAUÀ£ÀªÁr ªÀÄvÀÄÛ DgÉÆÃUÀå PÁ0iÀÄðPÀvÀðgÀ ¥ÁvÀæ	
PÁ0iÀÄðPÀvÀðgÀ ¥ÁvÀæ	

# gÉÆÃUÀ PÀAqÀÄ»r0iÀÄĪÀ ªÀÄvÀÄÛ



## "sÁUÀ - 1 PÀëAiÀÄ ªÀÄvÀÄÛ qÁmiî §UÉÎ w¼ÀĪÀ½PÉ ¥Àæ±ÁߪÀ½

## d£À¸ÀASÁå ªÀiÁ»w

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1. £ÉÆAzÀt ¸ÀASÉå	:	¢£ÁAPÀ:
2. ªÀAiÀĸÀÄì	:	
3. °AUÀ	:	
4. «zÁåºÀðvÉ	:	
5. GzÉÆåÃUÀ	:	
6. C£ÀĨsÀªÀ	:	
7. ¤ÃªÀÅ PÀëAiÀÄ gÉÆÃUÀ ªÀ	ÄvÀÄÛ qÁmïì£À AiÀiÁªÀÅzÉà PÀ°PÁ	
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ºËzÁzÀgÉ w½¹		
8. ¤ªÀÄUÉ PÀëAiÀÄ gÉÆÃUÀ ª	ÀÄvÀÄÛ qÁmiî §UÉÎ AiÀiÁªÀÅzÀgÀ ªÀ	ÄÆ®PÀ
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C) ¸ÀA¥ÀPÀð ªÀiÁzÀåªÀ D) DgÉÆÃUÀå ¹§âA¢¬ÄA E) EvÀgÉ	_	
9. ¤ÃªÀÅ qÁmiì aQvÉì PÉÆÃqÀĪÀª	ÀgÉà ? ºËzÁzÀgÉ K°è PÉÆqÀÄwÛgÀÄ«j? ¤ªÀä	iä
¸ÀA¥ÀQð¸À§ºÀÄzÁzÀ «¼Á¸À ªÀÄv	ÀÄÛ zÀÆgÀªÁt ¸ÀASÉå w½¹	

## "sÁUÀ - 2

## PÀëAiÀÄ ªÀÄvÀÄÛ qÁmiì §UÉÎ w¼ÀĪÀ½PÉ ¥Àæ±ÁߪÀ½

"SÁUÀ -I PÀËAiÀÄZÀ §UÉÎ ¸ÁªÀiÁ£Àå «µÀAiÀÄ 1. DZ˃ PÀËOiÀÄ gÉÆÃUÀ ¢£À ¥Àæw ªÀµÀð F ¢£ÀZÀAZÀÄ DZÀj¸À¯ÁUÀÄVÀÛZÉ

- C) 1£Éà r¸ÉA§gï
- D) 24£Éà ªÀiÁZïð

## E) 16£Éà DPÉÆÖçgï

- F) 7£Éà K¦æ⁻ï
- 2. DZˎ ¸ÀA¸ÉÜ PÀë0iÀÄ gÉÆÃUÀªÀÅ MAzÀÄ ¥Áæ¥ÀAaPÀ vÀÄvÀÄð ¸ÀªÀĸÉå JAzÀÄ WÉÆ¶¹zÀ ªÀµÀð
  - C) 1993
  - D) 1992
  - E) 1997
  - F) 1998

"SÁUÀ - II PÀËAiÀÄgÉÆÃUÀ ªÀÄvÀÄÛ PÁgÀtUÀ¼ÀÄ 3. PÀËAiÀÄ gÉÆÃUÀ MAZÀÄ

- C) C,ÁAPÁæ«ÄPÀ gÉÆÃUÀ
- D) fãÉnPï gÉÆÃUÀ

- E) DxÉÆæÃ¥ÉÇqï ¤AzÀ GAmÁzÀ 'ÁAPÁæ«ÄPÀ gÉÆÃUÀ
- F) ÁAPÁæ«ÄPÀ gÉÆÃUÀ
- 4. PÀëAiÀÄ AiÀiÁgÀ°è GAmÁUÀĪÀÅzÀÄ
  - C) J<sup>-</sup>Áè ªÀAiÀĹì£ÀªÀjUÀÆ
  - D) UÀAqÀ, ÀgÀ°è ªÀiÁvÀæ
  - E) ªÀÄPÀ̼À°è ªÀiÁvÀæ
  - F) ºÉAUÀ, ÀgÀ°è ªÀiÁvÀæ
- 5. gÉÆÃUÀªÀÅ PɼÀV£À gÉÆÃUÁtÄ«¤AzÀ□ GAmÁUÀĪÀÅzÀÄ

  D)ªÉÊgÀ¸ï
  - D) ªÉÄÊPÉÆ"ÁåQÖÃj0iÀiÁ
    - E) ¥ÀAUÀ,ï
      - F) ¥ÉÇæmÉÆÃeÉÆÃªÀ
- 6. PÀËAiÀÄ ¸ÁªÀiÁ£ÀåªÀV EªÀgÀ°È PÀAqÀħgÀÄvÀÛzÉ
  - C) zÉúÀzÀ°è ±ÀQÛ PÀÄA¢zÁUÀ
  - D) zÉÆqÀتÀjUÉ ªÀiÁvÀæ
  - E) ªÀÄPÀ̽UÉ ªÀiÁvÀæ
  - F) ªÀAiÀĸÁìzÀªÀjUÉ ªÀiÁvÀæ
- 7. ±Áé¸ÀPÉÆÃ±ÀzÀ PÀëAiÀÄ F jÃw ºÀgÀqÀÄvÀÛzÉ
  - C) QæÃ«ÄUÀ½AzÀ
  - D) GUÀĽ¤AzÀ
  - E) ÉÆ¼ÉîUÀ½AzÀ
  - F) E°UÀ½AzÀ
- 8. aQvÉì¥ÀqÉ0iÀÄzÀ ±Áé¸ÀPÉÆÃ±À PÀë0iÀÄzÀ M§âgÉÆÃV JμÀÄÖ ªÀÄA¢UÉ gÉÆÃUÀªÀ£ÀÄß
  - ºÀgÀqÀÄvÁÛ£É.

- C) M§âjAzÀ E£ÉÆß§âjUÉ
- D) 2 jAzÀ 5 ªÀÄA¢UÉ
- E) 25 jAzÀ 10 ªÀÄA¢UÉ
- F) 10 jAzÀ 15 ªÀÄA¢UÉ
- 9. PÀËAIÀÄ gÉÆÃUÀªÀÅ F PɼÀV£À "SÁUÀUÀ¼À°È PÀAQÀħgÀÄVÀÛZÉ
  - C) ±Áé ÀPÉÆÃ±ÀPÉÌ ªÀiÁvÀæ
- D) ªÀÄÆ¼É ªÀÄvÀÄÛ QîÄUÀ½UÉ ªÀiÁvÀæ
- E) ªÉÄzÀļÀÄ ªÀÄvÀÄÛ QîÄUÀ½UÉ ªÀiÁvÀæ

## zÉúÀzÀ OiÀiÁªÀÅzÉà "ÁUÀUÀ½UÉ

- 10. PÀëAiÀÄ £ÀªÀÄä ±ÀjÃgÀzÀ ±Áé¸ÀPÉÆÃ±ÀzÀ°è GAmÁzÁUÀ CzÀ£ÀÄß
  - C) ºÀÈzÀAiÀÄ PÀëAiÀÄ
  - D) ±Áé ÀPÉÆÃ±ÀzÀ PÀëAiÀÄ
  - E) gÀ ÀUÀ & AYUÀ ¼À PÀ ËA İÄÄ
  - F) ±Áé, ÀPÉÆÃ±ÉvÀgÀ PÀËAiÀÄ
- 11. PÀËAIÀÄ £ÀªÀÄÄ ±ÀjÃgÀzÀ ªÉÄzÀ¼ÀÄ gÀ¸ÀUÀæAy, ºÉÆmÉÖ, d£À£ÉA¢æAiÀÄ ªÀÄÆ¼É
  ªÀÄvÀÄÛ ZÀªÀÄðUÀ½UÉ

GAMÁZÁUÀ CZÀ£ÀÄß

- C) ºÀÈzÀAiÀÄ PÀëAiÀÄ
- D) ±Áé¸ÀPÉÆÃ±ÀzÀ PàëAiÀÄ
- E) gà, ÀUÀ æAy UÀ ¼À PÀ ë Ai ÀÄ
- F) ±Áé¸ÀPÉÆÃ±ÉÃvÀgÀ PÀëAiÀÄ
- "sÁUÀ ±Áé¸ÀPÉÆÃ±À PÀëAiÀÄgÉÆÃUÀzÀ ®PàëtUÀ¼ÀÄ

- 12. PÀë0iÀĪÀŸÁªÀiÁ£ÀåªÁV F PɼÀV£À gÉÆÃV0iÀİè ºÉZÁÑV PÀAqÀħgÀÄvÀÛz
  - C)@ÀįÉÃjOiÀÄ
  - D) PÀĵÀÖgÉÆÃV
  - E) PÁ®gÀ
  - F) Kqïì
- 13. ±Áé, ÀPÉÆÃ±ÀzÀ PÀËAiÀÄzÀ, ÁªÀiÁ£Àå ®PàËtUÀ¼ÀÄ
- C) ªÀÄÆgÀÄ CxÀªÀ CzÀQÌAvÀ ªÉÄîàIÄÖ PɪÀÄÄä, ±ÀjÃgÀzÀ vÀÆPÀzÀ°È E½vÀ, gÁwæAiÀİÈ dégÀ
  - D) P稀 £ÉÆÃªÀÅ vÀ⁻ɣɯêÀÅ
  - E) dégÀ ªÁAw ªÁPÀ½PÉ
  - F) "sÉâ, PÁªÀiÁ¯É, PÀgÀ¼ÀÄ"ÉãÉ

"SÁUÀ - IV ±Áé¸ÀPÉÆÃ±ÀzÀ vÉÆqÀPÀÄUÀ¼ÀÄ 14. ±Áé¸ÀPÉÆÃ±ÀzÀ PÀëAiÀÄ gÉÆÃUÀ¢AzÀ GAmÁUÀĪÀ vÉÆqÀPÀÄUÀ¼ÀÄ

## C) PÉ«ÄäzÁUÀ gÀPÀÛ §gÀĪÀÅzÀÄ, ±Áé¸ÀPÉÆÃ±ÀzÀ ¥ÉÇÃgÉAiÀİè ¤ÃgÀÄ §gÀĪÀÅzÀÄ

- D) PÁªÀiÁ¯É, PÁå£Àìgï
- E) Kqiì ¸Á¸ið dégÀ
- F) QîÄ £ÉÆÃªÀÅ PÀgÀļÀÄ "ÉãÉ

"SÁUÀ - V ±Áé¸ÀPÉÆÃ±À PÀËAiÀÄgÉÆÃUÀzÀ ®PàËtUÀ¼ÀÄ 15. ±Áé¸ÀPÉÆÃ±À PÀËAiÀÄ gÉÆÃUÀ ºÀgÀqÀĪÀ jÃw

C) ÉÊAVPÀ QæÃAiÉÄ ªÀÄvÀÄÛ ªÀÄÄİÄÖªÀÅzÀÄ (¸Àé±Àð)

- D) PÉ«ÄäzÁUÀ CxÀªÀ ¹Ã¤zÁUÀ
- E) E° PÀrvÀ ¸ÉƼÉî PÀrvÀ

gÀPÀÛzÁ£À, gÀPÀÛ £Á¼ÀzÀ°è UÀÆèPÉÆÃ¸ï PÉÆqÀĪÀåzÀjAzÀ

16. ±Áé¸ÀPÉÆÃ±À PÀëAiÀÄzÀ gÉÆÃVAiÀİÈ Qæ«ÄUÀ¼ÀÄ CªÀ£À ±ÀjÃgÀzÀ F CA±ÀzÀ°È EgÀÄvÉÛ.

## C) ªÀÄÆvÀæ

## D) GUÀļÀÄ

- E) gÀPÀÛ
- F) ªÀÄ®

"SÁUÀ - VI gÉÆÃUÀ PÀAqÀÄ»rAiÀÄĪÀ «zsÁ£À

- 17. Dgï.J£ï.n.¹.¦. ¥ÀæPÁgÀ PÀ¥sÀ ¥ÀjÃPÉëAiÀİè PÀëAiÀÄ gÉÆÃUÀ PÀAqÀÄ»rAiÀÄĪÀ «zsÁ£ÀªÀÅ
  - C) ¸ÀܼÀzÀ¯Éèà MAzÀÄ ¸ÁåA¥À¯ï PÀ¥sÀ ¥ÀjÃPÉË
  - D) ¸ÀܼÀzÀ¯Éèà JgÀqÀÄ ¸ÁåA¥À¯ï ¥ÀjÃPÉë, ªÀÄvÀÄÛ ¨É½UÉÎ ºÉÆvÀÄÛ MAzÀÄ ¸ÁåA¥À¯ï.

## E) JgÀqÀÄ 'ÁåA¥À¯ï 'ÀܼÀzÀ¯Éèà ªÀÄvÉÛ E£ÉÆßAzÀÄ ¢£À

F) MAzÀÄ ¸ÁåA¥À¯ï ¨É½UÉÎ.

- 18. ±Áé¸ÀPÉÆÃ±ÀzÀ PÀëAiÀĪÀ£ÀÄß PÀAqÀÄ»rAiÀÄ®Ä §¼À¸ÀĪÀ ªÀÄÄRå

  ¥ÀjÃPÉëAiÀÄ «zsÁ£À.
  - C) PÀË QgÀt
  - D) gÉÆÃVAiÀÄ »£É߯É ZÀjvÉæ

## E) ÁÌ÷å¤AUï

- F) ªÀiÁAmÁPïì ¥ÀjÃPÉë
- 19. gÉÆÃUÀªÀ£ÀÄß PÀAqÀÄ»rAiÀÄĪÀ°È ªÀiÁAmÁPïì mɸïÖ F PɼÀPÀAqÀªÀjUÉ ¸ÀÆa¸À¯ÁVzÉ
  - C) ªÀAiÀĸÀÌgÀ°è
  - D) gÉÆÃVAiÀÄ »£Éß-É ZÀjvÉæ
  - E) 50 ªÀµÀð ªÉÄ®àlÖªÀgÀ°è
  - F) 5 ªÀµÀð PɼÀV£À ªÀÄPÀ̼À°è
- 20. ªÀiÁAmÁPïì ¥ÀjÃPÉË C£ÀÄß JμÀÄÖ CªÀ¢üAiÉÆ¼ÀUÉ CzsÀåAiÀÄ£À ªÀiÁqÀ"ÉÃPÀÄ.
  - C) 10-12 WÀAmÉ
  - D) 12-24 WÀAmÉ
  - E) 24-48 WÀAmÉ
  - F) 48-72 WÀAmÉ

"sÁUÀ - VII ºÉZï.L.«.Kaïì

- 21. Kqiì SÁ-Ä-É OiÀiÁªÀ gÉÆÃUÁtÄ«¤AzÀ §gÀÄvÀÛzÉ?
  - C) JZï.L.«
  - D) ©.1.f
  - E) "ÁåQÖÃj0iÀiÁ
  - F) ¥ÀAUÀ¸ï
- 22. PÀë0iÀÄ¢AzÀ Kqïì gÉÆÃV0iÀÄ ªÉÄïÉ 0iÀiÁªÀ ¥Àæ"sÁªÀ ©gÀÄvÀÛzÉ?
  - C) ¸ÁªÀ£ÀÄß GAIĪÀiÁqÀÄvÀÛzÉ
  - D) vÀÆPÀ PÀ¼ÉzÀÄPÉÆ¼ÀÄîvÁÛgÉ
  - E) ¸ÀĸÀÛ£ÀÄß GAlĪÀiÁqÀÄvÀÛzÉ
  - F) 0iÀiÁªÀ ¥Àæ"sÁªÀªÀÅ ©gÀĪÀÅ¢®è

## "SÁUÀ - VIII gÉÆÃVAiÀÄ£Àäß «AUÀr¸ÀÄ«PÉ

23. ªÉÊzsÀågÀÄ M§â gÉÆÃVAiÀÄ£ÀÄß PàëAiÀÄ¢AzÀ UÀÄt ºÉÆA¢zÁÝ£É

JAzÀÄ WÉÆÃ¶¹zÀ £ÀAvÀgÀ CzÉÃ

gÉÆÃVAiÀÄ DgÉÆÃUÀå PÉÃAZÀæPÉÌ §AZÀÄ ¥ÀjÃQë¹ZÁUÀ CªÀ£À PÀ¥sÀZÀ°È PÀë÷AiÀÄZÀ Qæ«ÄUÀ½ZÀÝgÉ CAVÀºÀ

gÉÆÃVAiÀÄ£ÀÄß FUÉAzÀÄ PÀgÉAiÀÄÄvÁÛgÉ

- C) PÀëAiÀÄzÀ ºÉÆ À PÉà ÀÄ
- D) PÀËAIÀÄZÀ ºÀ¼Éà PÉøÀÄ
- E) PÀËAIÀÄ gÉÆÃUÀ ¥ÀÅ£ÀgÁªÀvÀð£É aQvÉìAiÀÄè ¯ÉÆÃ¥À
- 24. PÀËAIÀÄ gÉÆÃVUÉ ªÉÆZÀ®Ä PÀ¥SÀZÀ°È Qæ«ÄUÀ½ZÀÄÝ, aQvÉì ªÀiÁrzÀ 5 wAUÀ¼À £ÀAvÀgÀªÀÇ

PÀ¥sÀzÀ°è Qæ«ÄUÀ½zÀÝgÉ CzÀPÉÌ

- C) Ǵs˨vÉ
- D) ¥ÀÅ£ÀgÁªÀvÀð£É
- E) PÁ¬Ä¯ÉAiÀÄ ªÀÄlÖ CwAiÀiÁV
- F) eÁ¹ÛAiÀiÁzÀ PÀëAiÀÄ
- 25. PÀËAIÀÄ gÉÆÃVUÉ ªÉÆZÀ®Ä PÀ¥sÀZÀ°È Qæ«ÄUÀ½®ÈZÉ £ÀAVÀgÀ aQvÉì ¸ÀªÀÄAIÀÄZÀ°È PÀ¥sÀZÀ°È

Qæ«ÄUÀ¼ÀÄ PÁt¹PÉÆAqÁUÀ FUÉ£ÀÄßvÁÛgÉ.

- C) Ǵ˨vÉ
- D) ¥ÀÅ£ÀgÁªÀvÀð£É
- E) ©ÃPÀgÀ
- F) PÁ¬Ä¯ÉAiÀÄ ªÀÄlÖ Cw
- 26. gÉÆÃV £ÉÆAzÀt DzÀ £ÀAvÀgÀ PÀËAiÀÄPÉÌ ªÁ¹ ªÀiÁqÀĪÀ Ομὰ¢üUÀ¼À£ÀÆß JgÀqÀÄ wAUÀ¼À PÁ®

Cx˻Á CzÀQÌAvÀ ºÉZÀÄÑ ¢£À vÉUÉzÀÄPÉÆ¼ÀîzÉà EzÀÝgÉ

C) Ǵs˨vÉ

- D) ºÉƸÀ PÉøÀÄ
- E) ¥ÀÅ£ÀgÁªÀvÀð£É
- F) vÀ¦àzÀ WÀI£É

# 27. gÉÆÃV PÀËAIÀÄPÉÌ aQvÉì vÉUÉZÀÄPÉÆ¼ÀÎZÉà EZÀÄÝ CXÀªÁ MAZÀÄ WAUÀ½VAVÀ PÀrªÉÄ CªÀ¢Ü PÀËAIÀÄ

ªÁ¹ ªÀiÁqÉÆÃ OµÀ¢ü vÉUÉzÀÄPÉÆArzÀÝgÉ.

- C) ºÉƸÀ PÀËAIÀÄZÀ PÉøÀÄ
- D) ºÀ¼Éà PÀËAIÀÄZÀ PÉøÀÄ
- E) gÉÆÃUÀzÀ ªÀÄgÀÄPÁtÂ,ÀÄ«PÉ
- F) aQvÉìAiÀÄè ¯ÉÆÃ¥À

"SÁUÀ - IX Dgï.J£ï.n.¹.¦ ªÀÄvÀÄÛ qÁmïì 28. Dgï.J£ï.n.¹.¦ aQvÉì ¥ÀæPÁgÀ PÀëAiÀÄ gÉÆÃUÀªÀ£ÀÄß AiÀiÁªÀ jÃw «AUÀr,À<sup>-</sup>ÁVzÉ

- C) «¥ÀjvÀ aQvÁì ºÀAvÀ ªÀÄvÀÄÛ ¢WÀð aQvÁì ºÀAvÀ
- D) wêÀæªÁzÀ aQvÁìºÀAvÀ ªÀÄvÀÄÛ ªÀÄÄAzÀĪÀjzÀ aQvÁìºÀAvÀ

# E) «¥ÀjÃvÀ aQvÁìºÀAvÀ ªÀÄvÀÄÛ ªÀÄÄAzÀĪÀjzÀ

# aQv瓼ÀAvÀ

29. qÁmïì «¸ÀÛj¹

- C) £ÉÃgÀ CzsÀåAiÀÄ£À aQvÉì
- D) £ÉÃgÀ ¤UÁªÀºÀuÉ ªÉÄðÉZÁgÀuÉAiÀÄ C¯ÁàªÀ¢üAiÀÄ aQvÉì
- E) £ÉÃgÀ ¥ÀjÃPÉË aQvÉì ¸À¥ÉÈ

## £ÉÃgÀ CzsÀåAiÀÄ£À aQvÉì

30. gÉÆÃVAiÀÄÄ ªÁgÀPÉÆÌªÉÄä MAzÀÄ OμÀ¢ ªÀiÁvÉæ vÉUÉzÀÄPÉÆAqÀÄ DgÉÆÃUÀå PÁAiÀÄðPÀvÀðjUÉ SÁ°

#### ªÀiÁvÉæUÀ¼À PÁA© ¥ÁåPï£ÀÄß »AwgÀÄV¸ÀĪÀÅzÀÄ

- C) «¥ÀjvÀ aQvÁì ºÀAvÀ
- D) ¢WÀð aQvÁì ºÀAvÀ
- E) wêÀæªÁzÀ aQvÁìºÀAvÀ
- F) ªÀÄÄAzÀĪÀjzÀ aQvÁìºÀAvÀ

31. Dgï.J£ï.n.¹.¦ ¥ÀæPÁgÀ PÀëAiÀÄ gÉÆÃUÀzÀ OμÀzsÉÆ¥ÀZÁgÀªÀ£ÀÄß F PɼÀPÀAqÀ jÃwAiÀİè

«AUÀr,À<sup>-</sup>ÁVzÉ

- C) ªÀUÀð I, ªÀUÀð II, ªÀUÀð III
- C) UÉæÃqï I, UÉæÃqï II, ªÀÄvÀÄÛ UÉæÃqï III
- E) śloñei I, śloñei II, alavalaû śloñei DIII
- F) PÁè ï I, zÀeÉð II, ªÀÄvÀÄÛ zÀeÉð III

"sÁUÀ - X qámiì Craiàä°è gÉÆÃVUÀ¼À «AUÀqàuÉ

32. PÀ¥sÀzÀ°è QæÃ«ÄUÀ½gÀĪÀ ºÉƸÀgÉÆÃVUÀ¼ÀÄ G®âtUÉÆAqÀ

PÀ¥sÀzÀ°è QæÃ«ÄUÀ½®èzÀ gÉÆÃVUÀ¼ÀÄ ªÀÄvÀÄÛ G®âtUÉÆArgÀĪÀ

±Áé¸ÀPÉÆÃ±ÉÃvÀgÀ PÀëAiÀÄ gÉÆÃVUÀ¼À£ÀÄß F PɼÀV£À aQvÉìUÉ

M¼À¥Àr¸ÀÄvÁÛgÉ.

- C) ªÀUÀð I, ªÀUÀð II, ªÀUÀð III
- C) UÉæÃqï I, UÉæÃqï II, ªÀÄvÀÄÛ UÉæÃqï III
- E) ŚCŐÃeÏ I, ŚCŐÃeÏ II, AÄÄVÄÄÛ ŚCŐÃeÏ DIII
- F) PÁè, ï I, zÀeÉð II, ªÀÄvÀÄÛ zÀeÉð III

- 33. PÀ¥sÀzÀ°è Qæ«ÄUÀ½gÀĪÀ ºÉƸÀ gÉÆVUÀ¼ÀÄ G®âtUÉÆAqÀ PÀ¥sÀzÀ°è Qæ«ÄUÀ½®èzÀ gÉÆÃVUÀ¼ÀÄ ªÀÄvÀÄÛ G®âtUÉÆArgÀĪÀ ±Áé¸ÀPÉÆÃ±ÉvÀgÀ PÀëAiÀÄgÉÆÃVUÀ¼À£ÀÄß F PɼÀV£À aQvÉìUÉ M¼À¥Àr¸ÀÄvÁÛgÉ
  - C) ªÀUÀð I, ªÀUÀð II, ªÀUÀð III
  - C) UÉæÃqï I, UÉæÃqï II, ªÀÄvÀÄÛ UÉæÃqï III
  - E) ÉÖÃeï I, ÉÖÃeï II, AÄÄVÄÄÛ ÉÖÃeï DIII
  - F) PÁÈ ¡¡, zÀeÉð II, ªÀÄvÀÄÛ zÀeÉð III
- 34. PÀ¥sÀzÀ°è PÀëAiÀÄ gÉÆÃUÀ QæÃ«ÄUÀ½®èzÀ, G®âtUÉÆ¼ÀîzÀ
  ±Áé¸ÀPÉÆÃ±ÀzÀ ºÉƸÀ PÀëAiÀÄ gÉÆÃVUÀ¼ÀÄ ªÀivÀÄÛ G®âtUÉÆ¼ÀîzÀ
  ±Áé¸ÀPÉÆÃ±ÉÃvÀgÀ ºÉƸÀ PÀëAiÀÄ gÉÆÃVUÀ¼À£ÀÄß F PɼÀV£À AiÀiÁªÀ
  aQvÉìUÉ M¼À¥Àr¸ÀÄvÁÛgÉ.
  - C) ªÀUÀð I, ªÀUÀð II, ªÀUÀð III
  - C) UÉæÃqï I, UÉæÃqï II, ªÀÄvÀÄÛ UÉæÃqï III
  - E) ¸ÉÖÃeï I, ¸ÉÖÃeï II, ªÀÄvÀÄÛ ¸ÉÖÃeï DIII
  - F) PÁÈ ¡ï I, zÀeÉð II, ªÀÄvÀÄÛ zÀeÉð III

"sÁUÀ - XI gÁmiì aQvÉì

- 35. ¸ÀAAiÉÆÃfvÀ OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-1, wêÀæ aQvÁì ºÀAvÀzÀ°è F PɼÀPÀAqÀ
  OμÀ¢UÀ¼À£ÀÄß G¥ÀAiÉÆV¸À¯ÁUÀÄvÀÛzÉ
  - C) L ÉÆÃ¤AiÀiÁeÉqï (dqï) , j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï, ExÁA§ÄmÁ⁻ï
- D) L,ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï, ExÁA§ÄmÁ⁻ï,ÉÖç¥ÉÇÖêÉʹ£ï
  - E) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï
- F) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï

- 36. ¸ÀAAiÉÆÃfvÀ OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-1, ªÀÄÄAzÀĪÀjzÀ aQvÁì ºÀAvÀzÀ°è F PɼÀPÀAqÀ OμÀ¢UÀ¼À£ÀÄß G¥ÀAiÉÆV¸À¯ÁUÀÄvÀÛzÉ
  - C) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï
  - D) L,ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï,¥ÁågÁeÉ£ïªÉÄÊqï
  - E) L ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ExÁA§ÄmÁ¯ï
  - F) L¸ÉÆÃ¤AiÀiÁeÉqï, ¥ÁågÁeÉ£ïªÉÄÊqï
- 37. ¸ÀAAiÉÆÃfvÀ OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-2 gÀ°è ªÀÄÄAzÀĪÀjzÀ wêÀæ aQvÁì ºÀAvÀzÀ°è F PɼÀPÀAqÀ OμÀ¢UÀ¼À£ÀÄß G¥ÀAiÉÆV¸À¯ÁUÀÄvÀÛzÉ
  - C) L ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï, ExÁA§ÄmÁ⁻ï
  - D) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï, ExÁA§ÄmÁ¯ï, ExÁA§ÄmÁ¯ï¸ÉÖç¥ÉÇÖêÉʹ£ï ªÀÄvÀÄÛ L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï, ExÁA§ÄmÁ¯ï
  - E) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï
  - F) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï
- 38. ¸ÀAAiÉÆÃfvÀ OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-2 gÀ°è ªÀÄÄAzÀĪÀjzÀ aQvÁì ºÀAvÀzÀ°è F PɼÀPÀAqÀ OμÀ¢UÀ¼À£ÀÄß G¥ÀAiÉÆV¸À¯ÁUÀÄvÀÛzÉ
  - C) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï
  - D) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ExÁA§ÄmÁ⁻ï
  - E) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï
  - F) L¸ÉÆÃ¤AiÀiÁeÉqï, ¥ÁågÁeÉ£ïªÉÄÊqï,
- 39. ¸ÀAAiÉÆÃfvÀ OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-3 gÀ°è wêÀæ aQvÁì ºÀAvÀzÀ°è F PɼÀPÀAqÀ OμÀ¢UÀ¼À£ÄÄß G¥ÀAiÉÆV¸À¯ÁUÀÄvÀÛzÉ
  - C) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï, ExÁA§ÄmÁ¯ï
  - D) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ¥ÁågÁeÉ£ïªÉÄÊqï, ExÁA§ÄmÁ¯ï, ¸ÉÖç¥ÉÇÖêÉʹ£ï
  - E) L,ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï,¥ÁågÁeÉ£ïªÉÄÊqï

- F) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï
- 40. ¸ÀAAiÉÆÃfvÀ OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-3 gÀ°è ªÀÄÄAzÀĪÀjzÀ aQvÁì WÀIÖzÀ°è F PɼÀPÀAqÀ OμÀ¢UÀ¼À£ÀÄß G¥ÀAiÉÆV¸À¯ÁUÀÄvÀÛzÉ
  - C) L ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï
  - D) L,ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï,¥ÁågÁeÉ£ïªÉÄÊqï
  - E) L¸ÉÆÃ¤AiÀiÁeÉqï, j¥ÁA¦¹£ï, ExÁA§ÄmÁ⁻ï
  - F) L¸ÉÆÃ¤AiÀiÁeÉqï, ¥ÁågÁeÉ£ïªÉÄÊqï
- 41. ¸ÀAAiÉÆÃfvÀ OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-1 wêÀæ aQvÉìAiÀÄ CªÀ¢üAiÀİè F PɼÀPÀAqÀAvÉ EgÀÄvÀÛzÉ
  - C) ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ JgÀqÀÄ wAUÀ¼ÀÄ
  - D) ¢£À MAzÀgÀAvÉ DgÀÄ wAUÀ¼ÀÄ
  - E) ¢£Á MAzÀgÀAvÉ JgÀqÀÄ wAUÀ¼ÀÄ
  - F) ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ ªÀÄÆgÀÄ wAUÀ¼ÀÄ
- 42. OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-1 gÀ ªÀÄÄAzÀĪÀjzÀ aQvÁì ºÀAvÀzÀ°è aQvÉì F PɼÀPÀAqÀAvÉ EgÀÄvÀÛzÉ
  - C) ¢£À MAzÀgÀAvÉ JgÀqÀÄ wAUÀ¼ÀÄ
  - D) ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ £Á®ÄÌ wAUÀ¼ÀÄ
  - E) ¢£À MAzÀgÀAvÉ DgÀÄ wAUÀ¼ÀÄ
  - F) ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ ªÀÄÆgÀÄ wAUÀ¼ÀÄ
- 43. OμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-2 gÀ wêÀæ aQvÁì ºÀAvÀ F PɼÀPÀAqÀ MAzÀÄ jÃw EgÀÄvÀÛzÉ
  - C) ºÉZï.Dgï.eÉqï, E,J¸ï,-JgÀqÀÄ wAUÀ¼ÀÄ ªÀÄvÀÄÛ ºÉZï.Dgï.eÉqï-E ¥Àæw wAUÀ¼ÀÄ ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ
  - D) ºÉZï.Dgï.eÉqï, E,J¸ï,- ¥Àæw ¢£À JgÀqÀÄ wAUÀ¼ÀÄ ªÀÄvÀÄÛ ºÉZï.Dgï.eÉqï-E ¥Àæw ¢£Á MAzÀÄ wAUÀ¼ÀÄ
  - E) ºÉZï.Dgï.eÉqï, E,J¸ï ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ JgÀqÀÄ wAUÀ¼ÀÄ

- F) ºÉZï.Dgï.eÉqï, E,J¸ï,- ¥Àæw ¢£À JgÀqÀÄ wAUÀ¼ÀÄ ªÀÄvÀÄÛ
  ºÉZï.Dgï.eÉqï-E ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ MAzÀÄ wAUÀ¼ÀÄ
  44. OµÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-2 gÀ ªÀÄÄAzÀĪÀjzÀ ºÀAvÀzÀ°è aQvÉìAiÀÄ
  PÁ¯ÁªÀ¢ü F PɼÀPÀAqÀAvÉ EgÀÄvÀÛzÉ
  - C) ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ LzÀÄ wAUÀ¼ÀÄ
  - D) ªÁgÀPÉÌ MAzÀÄ "ÁjAiÀÄAvÉ LzÀÄ wAUÀ¼ÀÄ
  - E) ªÁgÀPÉÌ JgÀqÀÄ "ÁjAiÀÄAvÉ LzÀÄ wAUÀ¼ÀÄ
- F) ¥Àæw ¢£À MAzÀÄ "ÁjAiÀÄAvÉ DgÀÄ wAUÀ¼ÀÄ
  45. ΟμÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-3 wêÀæ aQvÉì ºÀAvÀzÀ PÁ¯ÁªÀ¢ü F
  PɼÀPÀAgÀAvÉ EgÀÄvÀÛzÉ
  - C) ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ JgÀqÀÄ wAUÀ¼ÀÄ
  - D) ¥Àæw ¢£À MAzÀÄ "ÁjAiÀÄAvÉ DgÀÄ wAUÀ¼ÀÄ
  - E) ¥Àæw ¢£À MAzÀÄ "ÁjAiÀÄAvÉ JgÀqÀÄ wAUÀ¼ÀÄ
- F) ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ ªÀÄÆgÀÄ wAUÀ¼ÀÄ

  46. OµÀzsÉÆÃ¥ÀZÁgÀ ªÀUÀð-3 ªÀÄÄAzÀĪÀjzÀ aQvÉì ºÀAvÀzÀ PÁ¯ÁªÀ¢ü F
  PɼÀPÀAgÀAvÉ EgÀÄvÀÛzÉ
  - C) ªÁgÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ £Á®ÄÌ wAUÀ¼ÀÄ
  - D) ªÁgÀPÉÌ ªÀÄÆgÀÄ "Áj
  - E) ¥Àæw ¢£À MAzÀÄ "ÁjAiÀÄAvÉ DgÀÄ wAUÀ¼ÀÄ
  - F) ¥Àæw ¢£À MAzÀÄ "ÁjAiÀÄAvÉ JgÀqÀÄ wAUÀ¼ÀÄ

"SÁUÀ - X II qámiì£à zàĵààjuáªàÄUà¼àÄ 47. L¸ÉÆÃ¤eÉqï, FªÀiÁvÉæUà½Azà ¸ÁªÀiÁ£ÀåªÁV £ÀgÀUÀ¼À z˧ð®å GAmÁUÀÄvÀÛzÉ CzÀ£ÀÄß vÀqÉUÀIÖ®Äè FPɼÀV£À aQvÉìAiÀÄ£ÀÄß ¤ÃqÀ"ÉÃPÁUÀÄvÀÛzÉ

C) ¥ÉgÁ¸ï ¸À¯ÉáÃmï 300 JA.f ¢£ÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ ªÀÄÆgÀÄ wAUÀ¼ÀÄ

- D) L¸ÉÆÃ¤AiÀiÁ eÉqï ªÀiÁvÉæUÀ¼À£ÀÄß ¤°è¹, CzÀgÀ §zÀ°UÉ "ÉÃgÉ ªÀiÁvÉæUÀ¼ÀÄ
- E) L¸ÉÆÃ¤AiÀiÁ eÉqï ªÀiÁvÉæUÀ¼À£ÀÄß vÉUÉzÀÄPÉÆ¼ÀÄîªÀ ¸ÀAzsÀ"sÀðzÀ°è ¦jqÁQì£ï («I«Ä£ï ©6) 50 JA.f
- F) ªÀÄÆgÀÄ wAUÀ¼À PÁ® PÁå°ìAiÀÄA PÁ"sÉÆðãÉmï 300 JA.f ¢£ÀPÉÌ ªÀÄÆgÀÄ "ÁjAiÀÄAvÉ wAUÀ¼ÀÄ

#### 48. L¸ÉÆÃ¤AiÀÄdqï£À zÀĵÀàjuÁªÀÄ

- C) PÉÊ ªÀÄvÀÄÛ PÁ®Ä Gj
- D) zÀȶÖ PÀ¼ÉzÀÄPÉÆ¼ÀÄîªÀÅzÀÄ
- E) Q« PÉüÀ¢gÀĪÀÅzÀÄ
- F) UÉÆwÛ®è

"SÁUÀ - XIII PÀËAIÀÄ vÀqÉUÀIÄÖ«PÉ 49. PÀËAIÀÄgÉÆÃVAIÀÄÄ vÀ£Àß ªÀÄUÀÄ«UÉ JzÉ ºÁ®£ÀÄß PÀÄr¸À§ºÀÄzÀÄ

- C) JZÀÑ¡PÉ ªÀ»1
- D) JZÀÑ¡PÉ ªÀ» ÀzÉ
- E) ºÁ®ÄtÂÚ¸ÀĪÀ CªÀ¢ü PÀrvÀUÉÆ½¸ÀĪÀÅzÀÄ
- F) ºÁ®Ät¸ÀzÉ EgÀĪÀÅzÀÄ

## 50. ªÀÄPÀ̽UÉ ©¹f ®¹PÉ ºÁPÀĪÀÅzÀjAzÀ G¥ÀAiÉÆUÀ

- C) PÀëAiÀÄgÉÆÃUÀ ¤ÃAiÀÄAvÀæt
- D) G®âuÁªÀ¸ÉÜAiÀÄ PÀë AiÀÄ §gÀzÀAvÉ vÀqÉUÀIÄÖvÀÛzÉ
- E) PÀËAiÀÄ gÉÆÃUÀªÀ£ÀÄß ªÁ¹ªÀiÁqÀĪÀÅzÀÄ
- F) PÀË AIÀÄ gÉÆÃUÀªÀ£ÀÄß ¤ªÀÄÆð®£É ªÀIÁqÀĪÀÅzÀÄ
- 51. PÀëAiÀÄ gÉÆÃUÀzÀ ®¹PÉAiÀÄ£ÀÄß AiÀiÁªÁUÀ ºÁPÀÄwÛj
  - C) ºÀÄnÖzÀ PÀÆgÀ⁻É
  - D) MAzÀÄ wAUÀ¼À ªÀAiÀĹì£À°è

- E) MAzÀÄ ªÀµÀð ªÀAiÀĹì£À°è
  - F) ºÀvÀÄÛ ªÀµÀðzÀ ªÀAiÀĹì£À°è
- 52. PÀëAiÀÄ gÉÆÃUÀzÀ ®¹PÉAiÀÄ£ÀÄß AiÀiÁªÀ "sÁUÀzÀ°è ¤ÃqÀ§ºÀÄzÀÄ
  - C) ªÀiÁA,À RAQÀUÀ½UÉ
  - D) Z˻ÀÄðPÉÌ
  - E) "Á¬ÄAiÀİè
  - F) gÀPÀÛ £Á¼ÀUÀ½UÉ

"SÁUÀ - X IV PÀËAIÀÄ gÉÆÃUÀZÀ DgÉÊPÉ

- 53. PÀËAiÀÄ gÉÆÃUÀZÀ ªÀåQÛAiÀÄ PÀ¥SÀªÀ£ÀÄß AiÀiÁªÀ «zsÁ£À¢AZÀ ºÉÆgÀ ºÁPÀ§ºÀÄZÀÄ
  - C) ±ÀÄzÀݪÁzÀ ¤Ãj¤AzÀ vÉÆÃ¼ÉAiÀÄĪÀÅzÀÄ
  - D) ©¹ ¤Ãj¤AzÀ vÉÆÃ¼ÉAiÀÄĪÀÅzÀÄ
  - E) ¸ÀÄqÀĪÀÅzÀÄ
  - F) ºÉÆgÀUÉ © ÁqÀĪÀÅzÀÄ
- 54. AiÀiÁªÀ vÀgÀºÀzÀ ªÁåAiÀiÁªÀÄ ªÀiÁqÀĪÀÅzÀjAzÀ ±Áé¸ÀPÉÆÃ±ÀzÀ PÀëAiÀÄ gÉÆÃVUÀ½UÉ

C£ÀÄPÀÆ®ªÁUÀĪÀÅzÀÄ

- C) P硣À ªÁåAiÀiÁªÀÄ
- D) ¢£À ¤vÀå £ÀqÉAiÀÄĪÀÅzÀÄ
- E) ¢ÃWÀð G¹gÁqÀĪÀÅzÀÄ
- F) ºÉÆmÉÖ ªÁåAiÀiÁªÀÄ
- 55. ±Áé¸ÀPÉÆÃ±ÀzÀ PàëAiÀÄzÀ ªÀåQÛAiÀÄ PÀÄIÄA§zÀ ¸ÀzÀ¸ÀåjUÉ ªÀÄÆgÀÄ ªÁgÀQÌAvÀ ºÉZÁÑV PɪÀÄÄä EzÀݰè
  - CªÀgÀÄ PÀqÁØAiÀĪÁV F PɼÀPÀAqÀ vÀ¥Á¸ÀuÉUÉ M¼ÀUÁUÀ¨ÉÃPÀÄ

    C) PÀtÄÚ ¥ÀjÃPÉË

- D) gÀPÀÛ ¥ÀjÃPÉë
- E) ªÀÄÆvÀæ ¥ÀjÃPÉë
- F) PÀ¥sÀ ¥ÀjÃPÉë

56. PÀëAiÀÄ ªÀÄgÀÄPÀ½¸ÀĪÀÅzÀ£ÀÄß vÀqÉUÀIÄÖªÀ «zsÁ£À

- C) ¥ÀÇtð «±ÁæAw
- D) ¥ÀÇtð DºÁgÀ
- E) qÁmïì£À aQvÉì
- F) ¸ÀjAiÀiÁzÀ ªÁåAiÀiÁªÀÄ

57. PÀËAiÀÄ gÉÆÃVAiÀÄ fêÀ£À ¸ÀA¥ÀÇtð aQvÉì ¥ÀqÉzÀ £ÀAvÀgÀ F jÃw EgÀÄvÀÛzÉ

- C) PÀrªÉÄ fêÀ£ÀzÀ ªÀÄIÖ
- D) D¸ÀévÉæAiÀÄ fêÀ£À
- E) 'ÁzÁgÀt fêÀ£À
  - F) MAn fêÀ£À

#### IDENTITY CARD

Revised N	ation <u>al</u>	Treatment Regimen
IDENTITY CARD	Progr	Initial Intensive Phase Continuation Phase
Name:		
Complete Address:		REMEMBER
Sex M □ F □ Age:	TB No: Category of Treatment	1. Keep your card safely. 2. You can be cured if you follow your treatment regimen by taking the prescribed drugs as Advised. 3. You may infect your near and dear ones if
□ New □ Relapse □ Transfer in □ Other	☐ Category II☐ Category III☐	APPOINTMENT DATES
Disease Classification □ Pulmonary □ Extra-Pulmonary	Treatment Started on	
Site:		Treatment outcome:

#### REVISED NATIONAL TUBERCULOS1S CONTROL PROGRAMME

#### **Treatment Card**

State :	_ City/District:	Code District/Sub	distr	ict:				
Name:		Patient TB No:						
Complete address: :		Health Unit:						
Sex M □ F □ Age:		_						
Name and address of contact Pe	erson:				<b>Disease</b> Imonary		fication	
					ra-pulme			
						-		
1. INITIAL INTNSIVE PHAS	SE-Prescribed regimen a	and dosages:						
Tick (✓)the appropriate Category	ory below.							
Category I □	Category II □	Category III □			Туре	e of Pa	tient	
(New Case)	(Retreatment)	(New Case)		New			□ Repl	ace
(Pulmonary smear-positive)	(relapse, failure,)	(pulmonary smear-negative,		Transfer			□ Failu	
(seriously ill smear-negative)	or treatment <i>after</i> defau	ilt) not seriously ill;) or		Tanatanaa	t often	d a f a 14	□ Otha	- (C-aife)
(seriously ill extra-pulmonary)		(extra-pulmonary, not seriously	ill )					
Write Number of tablets or dose				Month	Date	Lab No	Smear Result	Weight
3 times/ week	3 times/ Week	3 times/ week		0				
				2/3 4/5/6				
H R Z E	H R Z	E S H R Z		6/7/8/9				
H : Isoniazid R : Rifa		ide E: Ethambutol S: Streptom	nycin					
Tick(✓)appropriate date when the	he drugs have been swa	illowed under direct observation						

Month	day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

## II CONTINUATION PHASE

(See Guideline)

Prescribed	regimen:	Cat	ego	ory	ΙC	]		C	at	ego	ory	II				(	Cat	eg	ory	ΙI	Ι											
(New C	(ase)							(]	Re	tre	atr	nei	nt)			(	(Ne	ew	Ca	ase	)											
(Pulmo	onary sme	ear-p	oosi	itiv	e)		(I	Rel	ap	se,	fa	ilu	re			(Pu	ılm	on	ary	/ S1	ne	ar-	ne	gat	ive	, n	ot	sei	iou	ısly	y il	l)
(Serious	ly ill sme	ear-i	nega	ativ	e c	or		tre	atı	me	nt	aft	er	def	fau	ılt)		or	(e:	xtr	a-p	oul	mo	na	ry,	no	ot s	eri	ous	sly	ill)	
Serious	ly ill extr	a-pı	ılm	ona	ary)	)																										
Write Num	ber of tal	olets	pe:	r do	ose	in	the	e b	ΟX	es	be	lov	v:																			
			3	3 tir	nes	s/ <b>V</b>	We	ek						3 t	im	nes/	W	ee]	k							3	tiı	me	s/ v	vee	ek	
					$\neg$				]						T												$\neg$					
Enter 'X' o	n date v	vher	ı th	ie 1	firs	t d	los	e o	of	dr	ug	s h	ıas	be	eer	ı sv	wal	llov	we	dι	uno	der	d	ire	ct	obs	ser	vai	tior	ı a	ınd	draw a
horizontal l											_																					
	Month																						1		1					20	21	
	day	1 2	3	4	5	6	/	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
			+	H	_																										$\vdash$	
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			<u></u>																								<u> </u>	<u> </u>			Ш	
Remarks:																																
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"SÁUÀ - 3
DgÉÆÃUÀå PÁAiÀÄðPÀvÀðgÀÄ qÁmïì aQvÉì PÉÆqÀĪÁUÀ
AiÀiÁªÁUÀ®Æ F PɼÀUÉ ¸ÀÆa¹gÀĪÀ C"sÁå¸ÀUÀ¼À£ÀÄß
ªÀiÁqÀ"ÉÃPÀÄ

PÀæ.¸ÀA	C"sÁå¸ÀUÀ¼ÀÄ	5	4	3	2	1
	gÉÆÃV ªÀÄvÀÄÛ ΟμÀ¢üAiÀÄ£ÀÄß					
	UÀÄgÀÄw¸ÀĪÀÅzÀÄ.					
1	¥ÀæxÀªÀĪÁV PÀëAiÀÄzÀ gÉÆÃV					
	CxÀªÁ CªÀgÀ ¸ÀA§A¢üPÀgÀÄ §AzÁUÀ					
	CªÀgÀ£ÀÄß ¸ÁéUÀw¸ÀĪÀgÀÄ.					
2	gÉÆÃVAiÀÄ£ÀÄߺɸÀj£ÀªÀÄÆ®PÀ					
	UÀÄgÀÄw¸ÀĪÀgÀÄ.					
3	CªÀgÀ DgÉÆÃUÀåzÀ §UÉÎ					
	«ZÁj¸ÀĪÀgÀÄ.					
4	CªÀgÀ zÁR⁻Áw ¸ÀASÉåAiÀÄ£ÀÄß					
	UÀÄgÀÄw¸ÀĪÀgÀÄ.					
5	aQvÁì PÁrð¤AzÀ CªÀgÀ PÀëAiÀÄzÀ					
	¸ÀASÉåAiÀÄ£ÀÄß UÀÄgÀÄw¸ÀĪÀÅzÀÄ.					
6	qÁmïì PÉÆqÀ®Ä ¸ÀjAiÀiÁzÀ ¸ÀªÀÄAiÀÄ					
	ªÀÄvÀÄÛ eÁUÀªÀ£ÀÄß					
	UÀÄgÀÄw¸ÀĪÀÅzÀÄ.					
7	PÉA¥ÀÄà/¤Ã°/ºÀ¹gÀÄ aQvÁì					
	¥ÁPÉÃmï£ÀÄß vÉUÉzÀÄPÉÆAqÀÄ					
	PÀëAiÀÄzÀ gÉÆÃVAiÀÄ ºÉ¸ÀgÀÄ					
	ªÀÄvÀÄÛ ¸ÀASÉåAiÀÄ£ÀÄß					
	UÀÄgÀÄw¸ÀĪÀgÀÄ.					
	OμÀ¢üAiÀÄ£ÀÄß gÉÆÃVUÉ					

	<b>¤ÃqÀĪÀÅzÀÄ</b>			
8	wêÀæ aPÀvÁì ºÀAvÀzÀ°è ©èè¸ÀÖgï			
	¥ÁåPÉÃmï¤AzÀ OµÀ¢üAiÀÄ£ÀÄß			
	vÉUÉZÀÄPÉÆAqÀÄ gÉÆÃVUÉ			
	PÉÆqÀĪÀÅzÀÄ.			
9	gÉÆÃVAiÀÄÄ ¤Ãj£À ¸ÀºÁAiÀÄ¢AzÀ			
	<sup>a</sup> ÀiÁvÉæUÀ¼À£ÀÄß			
	£ÀÄAUÀĪÀÅzÀ£ÀÄß			
	UÀªÀĤ¸ÀÄvÁÛgÉ.			
10	AiÀiÁªÀ gÉÆÃV ªÀÄÄAzÀĪÀgÉzÀ aQvÁì			
	ºÀAvÀPÉÌ ºÉÆÃUÀĪÀgÉÆÃ CªÀjUÉ			
	AiÀiÁªÀ jÃw ªÀiÁvÉæUÀ¼À£ÀÄß			
	©è¸ÀÖgï ¥ÁåPï¤AzÀ vÉUÉzÀÄ			
	£ÀÄAUÀĪÀÅzÀ£ÀÄß			
	vÉÆÃj¹PÉÆqÀĪÀÅzÀÄ.			

11	ªÀÄÄAzÀĪÀgÉzÀ aQvÁì ºÀAvÀzÀ°ègÀĪÀ			
	gÉÆÃVUÀ½UÉ ªÀÄ£ÉAiÀÄ°è «ÄPÀÌ			
	ªÀiÁvÉæUÀ¼À£ÀÄß vÉUÉzÀÄPÉÆ¼ÀÄîªÀ			
	¥ÁæªÀÄÄRåvÉAiÀÄ §UÉÎ w½			
	ºÉüÀÄvÁÛgÉ.			
12	ªÀÄvÉÆÛªÉÄä OµÀ¢üAiÀÄ£ÀÄß			
	¥ÀqÉAiÀÄ®Ä gÉÆÃVAiÀÄÄ §AzÁUÀ			
	PÁ°AiÀiÁzÀ ªÀiÁvÉæUÀ¼À PÁA©			
	¥ÁåPï£ÀÄß vÀ¥ÀàzÉÃ			
	»AwgÀÄV¸À¨ÉÃPÉAzÀÄ w½ ºÉüÀĪÀgÀÄ.			
13	qÁmiì PÁAiÀÄðPÀvÀðgÀÄ ªÀÄÄA¢£À			
	ªÁgÀPÉÌ ªÀiÁvÉæ PÉÆqÀĪÀ ªÀÄÄÉÀß			
	gÉÆÃV vÀAzÀ PÁA© ¥ÁåPï PÁ° EzÉ			
	JA§ÄzÀ£ÀÄß RavÀ¥Àr¹PÉÆ¼ÀÄîvÁÛgÉ.			
14	ªÀiÁvÉæ PÉÆIÖ £ÀAvÀgÀ aQvÁì PÁqïð£À°è			
	£ÉÆAzÁ¬Ä¸ÀĪÀÅzÀÄ.			
15	ªÀÄÄA¢£À OµÀ¢ü ¢£À ªÀÄvÀÄÛ AiÀiÁªÀ			
	¸ÀªÀÄAiÀÄzÀ°è qÁmïì PÁAiÀÄðPÀvÀðgÀÄ			
	EgÀĪÀgÀÄ JA§ÄzÀgÀ §UÉÎ gÉÆÃVUÉ			
	w½¸ÀĪÀÅzÀÄ.			
	OμÀ¢üAiÀÄ §UÉÎ w¼ÀĪÀ½PÉ			
16	OμÀ¢üAiÀÄ£ÀÄß vÉUÉzÀÄPÉÆ¼ÀÄîªÀ			
	§UÉÎ gÉÆÃVUÉ ºÉüÀĪÀÅzÀÄ.			
17	JμÀÄÖ ¢£ÀUÀ¼À ªÀgÉUÉ OμÀ¢ü			
	vÉUÉzÀÄPÉÆ¼ÀÄîªÀÅzÀÄ JA§ÄzÀ£ÀÄß			
	w½¸ÀĪÀÅzÀÄ			

18	aQvÁì ºÀAvÀ ªÀÄÄVAiÀÄĪÀªÀgÉUÀÆ			
	ªÀiÁvÉæUÀ¼À£ÀÄß vÀ¥ÀàzÉÃ			
	¸Éë¸À¨ÉÃPÀÄ JAzÀÄ gÉÆÃVUÉ			
	ºÉüÀÄvÁÛgÉ.			
19	PÀëAiÀÄ¢AzÀ UÀÄt ºÉÆAzÀ®Ä qÁmïî¤AzÀ			
	ªÀiÁvÀæ ¸ÁzsÀåªÉAzÀÄ gÉÆÃV CxÀªÁ			
	CªÀgÀ ªÀÄ£ÉAiÀĪÀjUÉ w½ºÉüÀÄvÁÛgÉ.			
20	±Áé¸ÀPÉÆÃ±ÀzÀ Qæ«ÄUÀ½gÀĪÀ			
	gÉÆÃVAiÉÆA¢UÉ ¸ÀA¥ÀPÀð«gÀĪÀ			
	ªÀÄ£ÉAiÀĪÀgÉAiÀÄ®èjUÀÆ PÀëAiÀÄ			
	gÉÆÃUÀPÉÌ vÀ¥Á¸ÀuÉUÁV vÀ¥ÀàzÉÃ			
	D¸ÀàvÉæUÉ ºÉÆÃUÀ®Ä GvÉÛÃf¸À¨ÉÃPÀÄ.			
	PÀËAIÀÄ gÉÆÃVAIÀÄ DgÉÊPÉ §UÉÎ gÉÆÃV ªÀÄvÀÄÛ CªÀgÀ ªÀÄ£ÉAIÀĪÀjUÉ w¼ÀĪÀ½PÉ			
21	PÀëAiÀÄ gÉÆÃUÀ, CzÀgÀ aºÉßUÀ¼ÀÄ, qÁmiì aQvÉì GavÀªÁV¹UÀĪÀ §UÉÎ ªÀÄvÀÄÛ OµÀ¢üAiÀÄ£ÀÄß vÀ¥ÀàzÉà ¸Éë¸ÀĪÀÅzÀgÀ §UÉÎ w¼ÀĪÀ½PÉ PÉÆqÀÄvÁÛgÉ.			
22	AiÀiÁªÀ gÉÆÃV OμÀ¢ü vÉUÉzÀÄPÉÆ¼Àî®Ä			
	§gÀĪÀÅ¢®èªÉÇà CAvÀºÀªÀgÀ£ÀÄß			
	wêÀæ ºÀAvÀzÀ aQvÉìAiÀÄ			
	ªÀÄgÀÄ¢£ÀªÉà ªÀÄvÀÄÛ			
	ªÀÄÄAzÀĪÀgÉzÀ aQvÁì ºÀAvÀzÀ			
	MAzÀĪÁgÀzÉÆ¼ÀUÉ			
	UÀÄgÀÄw¸ÀÄvÁÛgÉ.			
23	AiÀiÁªÀ gÉÆÃV OμÀ¢ü vÉUÉzÀÄPÉÆ¼Àî®Ä			
	¸ÀjAiÀiÁV §gÀĪÀÅ¢®èªÉÇà CªÀgÀ §UÉÎ			

	D¸ÀàvÉæAiÀÄ C¢üPÁjUÀ½UÉ		
	w½¸ÀÄvÁÛgÉ.		
24	PÀëAiÀÄ gÉÆÃVAiÀÄÄ ΟμÀ¢üAiÀÄ£ÀÄß		
	¸ÀjAiÀiÁV vÀ¥ÀàzÉÃ		
	vÉUÉzÀÄPÉÆ¼Àî"ÉÃPÀÄ. E®è¢zÀÝgÉ		
	gÉÆÃVAiÀÄÄ OµÀ¢üAiÀÄ «gÀÄzÀÞ		
	¥ÀæwgÉÆÃzsÀPÀ ±ÀQÛ ºÉÆAzÀÄvÁÛ£É		
	JAzÀÄ w½¸ÀÄvÁÛgÉ.		
25	gÉÆÃVAiÀÄÄ DºÁgÀzÀ°È ºÉZÀÄÑ		
	¥ÉÆæÃn£ï, PÀ§âuÁA±À, PÁå°²AiÀÄA		
	ªÀÄvÀÄÛ «I«Ä£ï © <sub>6</sub> EgÀĪÀ		
	¥ÀzÁxÀðUÀ¼À£ÀÄß §¼À¸À®Ä		
	w½¸ÀÄvÁÛgÉ.		
	gÉÆÃVAiÀÄ C£ÀĸÀgÀuÉ		
26	gÉÆÃVAiÀÄÄ vÀ¥ÀàzÉà wêÀæºÀAvÀzÀ		
	aQvÁì PÀæªÀÄzÀ JgÀqÀÄ wAUÀ¼À		
	£ÀAvÀgÀ ªÀÄvÀÄÛ ªÀÄÄAzÀĪÀgÉzÀ		
	aPÀvÁì ºÀAvÀ ¥ÀÆtðªÁV ªÀÄÄVzÀ		
	£ÀAvÀgÀ PÀ¥sÁ ¥ÀjÃPÉëUÉ		
	M¼À¥Àr¸ÀÄvÁÛgÉ.		
27	vÀ£Àß ªÁå¦ÛUÉ M¼À¥ÀqÀĪÀ		
	gÉÆÃVAiÀÄ C£ÀĸÀgÀuÉ ªÀiÁqÀĪÀgÀÄ		
28	gÉÆÃVUÉ qÁmiî¤AzÀ		
	zÀĵÁàjuÁªÀÄUÀ¼ÀÄ GAmÁzÀgÉ		
	DgÉÆÃUÀå PÉÃAzÀæzÀ ªÉÊzÀåjUÉ		
	w½¸ÀĪÀÅzÀÄ.		

	aQvÁì PÁrð£À ¤ªÀðºÀuÉ			
29	aPÀvÁì PÁqïð£ÀÄß ¸ÀjAiÀiÁzÀ jÃwAiÀİè			
	EqÀĪÀÅzÀÄ.			
30	qÁmïì£À ªÉÄðéZÁgÀPÀgÀÄ §AzÁUÀ aQvÁì			
	PÁrð£À ªÀiÁ»wAiÀÄ£ÀÄß PÉÆqÀĪÀgÀÄ.			
31	gÉÆÃVAiÀÄ aQvÉì ªÀÄvÀÄÛ zÁR¯ÁwUÀ¼À			
	«ªÀgÀªÀ£ÀÄß ¸ÀA¥ÀÆtðªÁV aQvÁì			
	PÁrð£À°è £ÉÆAzÁ¬Ä¸ÀĪÀÅzÀÄ.			
32	DgÉÆÃUÁå¢üPÁjUÀ¼ÀÄ ªÀÄvÀÄÛ			
	gÉÆÃVAiÀÄ £ÀqÀÄªÉ M¼ÉîAiÀÄ			
	¸ÀA§AzsÀªÀ£ÀÄß ¨É¼É¹PÉÆ¼ÀÄîªÀgÀÄ.			

**'ÀÆZÀ£É**: AiÀiÁªÀUÀ®Æ – 5, ¥ÀzÉÃ¥ÀzÉà – 4, AiÀiÁªÀUÀ¯ÁzÀgÀÆ -3, «gÀ¼À -2, ¸ÀªÀÄAiÀÄ«®è-1.

# aQvÁì ªÀVðPÀgÀt ªÀÄvÀÄÛ PÀ¥sÀzÀ ¥ÀjÃPÉë0iÀÄ «ªÀgÀ

C£ÀÄªÉÆ¢ü	¸À®àlÖ ΟμÀzsÉÆÃ¥ÀZÁgÀ		±Áé¸ÀPÉÆÃ±	À PÀë0iÀÄPÉÌ PÀ	A¥sÀ ¥ÀjÃPÉë	
aQvÁì ªÀUÀð	gÉÆÃVUÀ¼À ªÀVðPÀgÀt	C£ÀÄªÉÆ¢ü¸À®àlÖ aQvÉì	aQvÁì ªÀÄÄAa£À PÀ¥sÀ	PÀ¥sÀ ¥ÀjÃPÉë0iÀÄ wAUÀ¼ÀÄ	¥À°vÁA±À EzÀÝ ¥ÀPÀëzÀ°è	DUÀ
	PÀ¥sÀzÀ°è Qæ«ÄUÀ½gÀĪÀ ºÉƸÀ gÉÆÃUÉ				-	ªÀÄÄAzÀĪÀgÉzÀ aQvÉì¥ÁægÀA©¹4 ªÀÄvÀÄÛ 5 £ÉÃ wAUÀ¼ÀÄ PÀ¥sÀ ¥ÀjÃQë¹
ªÀUÀð- I		2 ( ºÀZï.Dgï.eÉqï.E)3 4 (ºÉZï.Dgï)3	+	2	+	ªÄÄÄAzÀĪÀjzÀ aQvÉì ªÀÄvÉÆÛAzÀÄ wAUÀ¼ÀÄ ªÀÄÄAzÀĪÀj¹ £ÀAvÀgÀ 3,5 ªÀÄvÀÄÛ 7 £Éà wAUÀ¼ÀÄ ªÀÄvÉÛ PÀ¥sÀ ¥ÀjÃQë¹
	PÀ¥sÀzÀ°è Qæ«ÄUÀ½®èzÀ G®â£ÀUÉÆAqÀ gÉÆÃUÉ				-	ªÁÄÄAzÀĪÀjzÀ aQvÉì ¥ÁægÀA©¹ 6 £ÉÃ wAUÀ¼ÀÄ ªÀÄvÉÛ PÀ¥sÀ ¥ÀjÃQê¹
	G®âtUÉÆAqÀ ±Áé¸ÀPÉÆÃ±ÉÃvÀgÀ PÀë0iÀÄ		-	2	+	ªÀÄÄAzÄĪÀjzÀ aQvÉì ªÀÄvÉÆÛAzÀÄ wAUÀ¼ÀÄ ªÀÄÄAzÀĪÀj¹ £ÀAvÀgÀ 3,5 ªÀÄvÀÄÛ 7£Éà wAUÀ¼ÀÄ PÀ¥sÀ ¥ÀjÃQë¹

ªÀUÀð- II	PÀ¥sÀzÀ°è  Qæ«ÄUÀ½gÀĪÀ  ªÀÄgÀÄPÀ½¹zÀ gÉÆÃVUÀ¼ÄÄ  PÀ¥sÀzÀ°è PÀëOiÀÄ  Qæ«ÄUÀ½gÀĪÀ  OμÀ¢üUÀ½UÉ «¥sÀ®UÉÆAqÀ gÉÆÃVUÀ¼ÄÄ  PÀ¥sÀzÀ°è PÀëOiÀÄ  Qæ«ÄUÀ½zÄÄÝ aQvÉìUÉ ¸ÀjOiÀiÁV  ¨ÁgÀzÉ EgÀĪÀ gÉÆÃVUÀ¼ÄÄ	2 (ºÀZï.Dgï.eÉqï.E.J¸ï)- 3 1 (ºÀZï.Dgï.eÉqï.E)3 5 (ºÉZï.Dgï.E)3	+	3	+	ªÀÄÄAzÀĪÀjzÀ aQvÉì ¥ÁægÀA©¹ ªÀÄvÉÛ 5 ªÀÄvÀÄÛ 8£Éà WAUÀ¼ÀÄ PÀ¥sÀ ¥ÀjÃQë¹ WêÀæ aQvÁì ºÀAvÀªÀ£ÀÄß ªÀÄvÉÆÛAzÀÄ WAUÀ¼À ªÀÄnÖUÉ ªÀÄÄAzÀĪÀj¹, 4,6 ªÀÄvÀÄÛ 9£ÉÃ WAUÀ¼ÀÄ ªÀÄvÉÛ PÀ¥sÀ ¥ÀjÃQë¹
ªÀUÀð_ III	PÀ¥sÀzÀ°è PÀëOiÀÄ Qæ«ÄUÀ½®èzÀ G®âtUÉÆ¼ÀîzÀ ±Áé¸ÀPÉÆÃ±ÀzÀºÉƸÀ PÀëOiÀÄ gÉÆÃVUÀ¼ÀÄ G®âÀtUÉÆ¼ÀîzÀ ±Áé¸ÀPÉÆÃ±ÉÃvÀgÀ ºÉƸÀ PÀëOiÀÄ gÉÆÃVUÀ¼ÄÄ	2 ( ºÀZï.Dgï.eÉqï)3 4 (ºÉZï.Dgï)3	-	2	+	ªÀÄÄAzÀĪÀjzÀ aQvÉì ¥ÁægÀA©¹ ªÀÄvÉÛ 6£ÉÃ wAUÀ¼ÀÄ PÀ¥sÀ ¥ÀjÃQë¹ gÉÆÃVOiÀÄ£ÀÄß ªÀÄvÉÛ £ÉÆAzÁ¬Ä¹ ªÀÄvÄÜ ªÀUÀÕ II gÀ aQvÉì ¥ÁægÁA©¹



F PÉʦrAiÀÄ£ÀÄß «£ÁAiÀÄPÀ «ÄµÀ£Ï rªÀIÏØ AiÉÆ¤ªÀ¹ðnAiÀİè ¦.ºÉZÏ.r ¥ÀqÉAiÀÄĪÀ ¸À®ÄªÁV qÁ.PÉ. ®°vÀ ºÉZÀÄѪÀJ G¥À£Áå¸ÀPÀgÀÄ ¤ªÀiÁí£ĨÌ "ÉAUÀ¼ÀÆgÀÄ ªÀÄvÀÄÛ qÁ.PÀĪÀiÁgÀªÉîÄ G¥À£Áå¸ÀPÀgÀÄ ªÀÄvÀÄÛ ªÀÄÄRå¸ÀÜgÀÄ Dgï.J£Ï.n.¹.¦ ªÀÄvÀÄÛ PÀëAiÀÄ gÉÆÃUÀUÀ¼À «"sÁUÀ Dgï.J¯Ï.eÁ®¥Àà D¸ÀévÉæ ªÀÄvÀÄÛ ¸ÀA±ÉÆÃzsÀ£Á PÉÃAzÀæ, PÉÆÃ¯ÁgÀ EªÀgÀ ªÀiÁUÀðzÀ±ÀðPÀJUÉAzÉ ¹zÀÝ¥Àr¸À¯ÁVzÉ.

- F PÉʦr CAUÀ£ÀªÁr ªÀÄvÀÄÛ DgÉÆÃUÀå PÁAiÀÄðPÀvÀðjUÉAzÉ ¹zÀÝ¥Àr¸À⁻ÁVzÉ.
- CAUˣ˻Ár ªÀÄvÀÄÛ DgÉÆÃUÀå PÁAiÀÄðPÀvÀðgÀÄ qÁmïî PÁAiÀÄðPÀæªÀÄzÀ°è CªÀgÀ PÉ®¸ÀªÀ£ÀÄß ¸ÀªÀÄ¥ÀðPÀªÁV ¤ªÀð»¸À®Ä F PÉʦr ¸ÀgÀ¼ÀªÁzÀ "sÁµÉAiÀİè ¹zÀÝ¥Àr¸À¯ÁVzÉ.
- EzÀgÀ°è PÀëAiÀÄzÀ §UÉÎ ¸ÀA¥ÀÇtð ªÀiÁ»w EgÀÄvÀÛzÉ
  F PÉʦrAiÀİègÀĪÀ ªÀiÁ»wAiÀÄÄ £À£Àß ¥ÀæPÁgÀ ¸ÀªÀÄ¥ÀðPÀªÁV
  EzÉ JAzÀÄ ¸ÀªÀÄyð¹PÉÆ¼ÀÄîwÛzÉÝ£É.

F PÉʦrAiÀÄ §UÉÎ ºÉaÑ£À ªÀiÁ»w CxÀªÀ «ªÀgÀUÀ¼ÀÄ ¨ÉÃPÁzÀ°È F PɼÀV£À zÀÆgÀªÁt CxÀªÀ ªÉ¨ï¸ÉÊI£ÀÄß ¸ÀA¥ÀQð¹.

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