

Prevalence and treatment protocol of tuberculosis among poor socio-economy class: study of population of Karachi, Pakistan

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Abstract: Since last few years Tuberculosis (TB) has become most prevalent disease worldwide mainly in developing countries with predominance in both immuno-competent and immuno-compromised individuals. Ninety five tuberculosis patients from various tertiary care hospitals of Karachi were included in the study. Their demographic characteristics and treatment regimen were recorded from the inpatient medical record files. It was found that men and women are similarly suffering from the pulmonary tuberculosis as most prevalent type of TB. The common set of drugs as treatment regimen includes rifampicin, ethambutol, isoniazide, pyrazinamide for an initial 2 months. A follow up therapy consisting of rifampicin, ethambutol, isoniazid and pyrazinamide is recommended to the patients after completing initial course of therapy. TB has emerged as serious life threatening infectious disease causing a number of deaths per year worldwide. Pakistan is not an exception. TB is prevalent with no gender preference and it is declining the health and economic status of people. The treatment regimens are according to the guidelines of WHO and CDC but a noncompliance due to poor socio-economic reasons lead to incomplete course of therapy and thus result relapse of the disease.

Keywords: Tuberculosis, prevalence, low socio-economy class, Karachi, Pakistan.

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INTRODUCTION

Tuberculosis (TB) is second leading public health problem associated with high risk of morbidity and mortality. Mainly caused by bacteria *Mycobacterium tuberculosis*, the disease commonly affects lungs causing pulmonary tuberculosis¹ presented as latent TB infection (LTBI). However other organs may also be affected like intestinal tract (GIT), skin, genitourinary tract, and brain lymphatic system². World Health Organization (WHO) recognized TB as global emergence in 1993³. This disease is more prevalent in developing areas because of poor hygienic condition. Asia and sub-Saharan Africa are still particularly affected area for TB⁴ and China, India, Russia, Indonesia and together creating half of the global economic burden due to TB^{5,6}. It is also estimated that nearly 2 million people die annually due to TB at global level and Pakistan is ranked eighth in prevalence of TB with an estimate of 1.5 million tuberculosis patients⁶.

Occurrence of Tuberculosis primarily depends on the status of the patient's immune system. Primary pulmonary tuberculosis is often and radiographically silent. Extra-pulmonary TB may occur in immune-competent patients, but the risk increases in immune-suppressive individuals⁷. Symptoms of pulmonary TB include persistent cough with bloody discharge, breathlessness, and weight loss, lack of appetite, high temperature, and extreme tiredness. However; extra pulmonary TB shows additional symptoms like persistent painless

swelling of the lymph nodes, loss of movement with fractured bones (skeletal TB), abdominal pain and bleeding from anus (gastrointestinal TB), a burning sensation in urine with blood (genitourinary TB), headaches, confusion and blurred vision (central nervous system TB)⁸.

The treatment regimen for all infected individuals with previously untreated tuberculosis consists of a 2-month initial phase of therapy comprised of isoniazid, rifampin, pyrazinamide and ethambutol⁹. Ethambutol inhibits mycobacterial arabinosyl transferase in combination with isoniazid or rifampin. Pyrazinamide has bactericidal activity in a slight acidic pH¹⁰.

In continuation phase, isoniazid and rifampicin are given for further 4 months¹¹. Second and third line therapy includes aminoglycosides, polypeptides, fluoroquinolones, thioamides, terizidone, para aminosalicylic acid, oxazolidones and its analogues. The objective of this study is to determine the prevalence of TB and evaluate its treatment protocols practiced in Karachi, Pakistan according to WHO and CDC guidelines.

MATERIALS AND METHODS

Sample and sample size

Clinical investigation reports of one hundred and twenty (120) patients from three tertiary care hospitals were recorded from Hospital's clinical laboratory database. Ninety-five patients were currently under treatment in hospitals while rest of the patients had discontinued therapy and had left the hospital.

Study period and trainers

The data was collected by the trained persons, who were given proper guidance and training for two weeks to collect data and the patient profile of patients from three tertiary care hospitals was collected from March, 2013 till August, 2013.

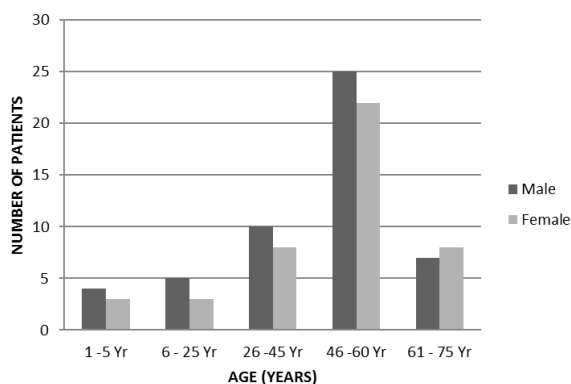
Analysis of data

Descriptive statistics was used to describe various variables of the study.

RESULTS

TB was prevalent in both males (53.7%) and females (46.3%) with majority in the age group of 46 – 60 years (Figure 1). The marked reasons for this prevalence were poor socio-economic conditions, improper hygiene, and poor sanitation of environment, illiteracy and closed contact with already affected patients. It was seen that the TB patients were mainly admitted with the complaints of high grade fever, chills, vomiting, weakness, loss of appetite and disturbed or abnormal sleep pattern (Table 1). The most common type of tuberculosis was found to be pulmonary tuberculosis (48.57%) followed by Meningital and peritoneal tuberculosis (11.42%). Other types of TB contributed a small proportion of the study population (Figure 2).

Figure 1: Prevalence of tuberculosis in different age groups.



Patients were treated by combination therapy of rifampicin, ethambutol, isoniazid and pyrazinamide for 2 months with often addition of streptomycin. Out of 95 patients, streptomycin was given to 6 patients (Table 2). Culture Sensitivity and Acid-Fast Bacilli lab tests were done only in few patients. Cases of relapse were also reported due to discontinuation of previous therapy.

DISCUSSION

TB is a contagious bacterial infection that mainly involves lungs and may also spread to other organs. It is a growing international health concern

focusing as one of the leading infectious cause of death in the world today. The World Health Organization estimates that about eight to ten million new TB cases occur annually worldwide¹². More than 90% of global TB cases and deaths occur in the developing countries, where 75% of cases are in the most economically productive age group (15-54 years)¹³.

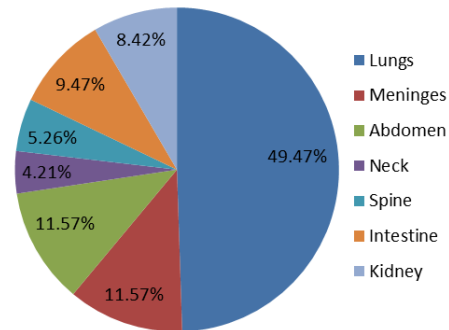
Table 1: Sign and symptoms of tuberculosis.

Symptom of TB	Number of patients	(%)
High grade fever	35	36.8
Chills	27	28.4
Dry cough	24	25.2
Weakness	21	22.1
Vomiting	21	22.1
Loss of appetite	16	16.8
Abnormal sleep	14	14.7
Abdominal pain	11	11.5
Headache	08	8.42
Burning micturation	08	8.42
Weight loss	08	8.42
Constipation	08	8.42
Cough with sputum	05	5.26
Pain in lumber area	05	5.26

Table 2: Regimen given to patients.

Therapeutic Agents	No. of Prescriptions (N=95)	Prescription (%)
Rifampicin	86	90.52%
Isoniazid	70	73.6%
Pyridoxine	51	53.68%
Ethambutol	51	53.68%
Pyrazinamide	50	52.63%
Streptomycin	8	8.42%

Figure 2: Occurrence of TB in different organs of the human body.



At the same time, multi drug resistance has also become a serious concern in many countries around the world¹⁴. The objective was to determine the prevalence, and treatment regimen of tuberculosis in a tertiary care hospital of Karachi, Pakistan.

The treatment regimens prescribed to in-patient were observed and compared with those recommended by WHO and CDC guidelines. It was found that all the treatment regimens prescribed for initial phase (2 months) complied with the CDC and WHO guidelines while the treatment regimens indicated for continuation phase (4 months) in some patients were not according to the standard guidelines. Most frequent follow up regimen was rifampicin, ethambutol, isoniazid and pyrazinamide for 2 months. Pyridoxine was also given in some treatment along with the above mentioned drugs.

According to CDC guidelines, the efficacy of streptomycin and ethambutol are similar in the initial phase of treatment, however; unfortunately the growing resistance against streptomycin has made it less useful. Hence streptomycin and ethambutol are not interchangeable unless the organism is known to be susceptible to the drug or the patient is from a population in which streptomycin resistance is unlikely. It was noticed in two patients that streptomycin and ethambutol were prescribed simultaneously. According to CDC guidelines, isoniazid and rifampicin are indicated for continuation phase, but it was seen in few regimens that rifampicin was prescribed in combination with pyridoxine rather than isoniazid. Most frequent symptoms observed in patients were high grade fever, chills, vomiting, weakness, decreased/or abnormal sleep, and others as mentioned in table 1. Rifampicin (90.5%) was the most frequently prescribed anti-tubercular drug and utilization of other drugs is given in table 2.

It was found that pulmonary tuberculosis was the most prevalent type of tuberculosis, while tuberculosis of other organs is shown in figure 2. Another important finding was that individuals belonging to low socio-economic class were more prone to tubercular infection than individuals of high socio-economic class however; there was no gender discrimination for the prevalence of tuberculosis in local population of Karachi. It was mentioned by the physicians, involved in treatment that main causes of tuberculosis in local population of Karachi were seemed to be poor sanitation, unhygienic conditions, un-awareness, illiteracy. In addition, non-adherence to the prescribed regimen caused relapse of tuberculosis in patients.

Overall, the treatment regimen prescribed for the treatment of tuberculosis of different organ sites is according to the treatment guidelines given by WHO and CDC. However there is a change in continuation phase of therapy. Moreover there is a need to bring attention of medical professionals for diagnosis, treatment and prevention to make TB

control more effective. The same practice has been initiated by the international community. They increase investment in TB research¹⁵.

CONCLUSION

It is concluded that tuberculosis still prevalent in our society. It is almost equally prevalent in males and females. People belong to lower socio-economic population were more susceptible to tuberculosis than population belong to higher socio-economic class. So, it is a need of time to develop awareness among the population through conducting different health promotional programs, seminars, counseling about the therapy and continuation of regimen. Vaccination or immunization must be done to prevent this disease.

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