

Hospital Admissions for Tuberculosis in an Indian Metropolitan City

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Abstract: Tuberculosis is one of the most common infectious disease among adults in India. This study aims to evaluate the various causes for hospital admissions in tuberculosis and to study the clinical profile of these patients. **Study design:** Observational study. **Methodology:** 100 consecutive patients admitted for tuberculosis in the chest ward of a tertiary care hospital were included in the study. **Clinical profile of the patients was recorded and analysed using SPSS, version no. 22 and Microsoft Excel 2013. Results:** 86% of the patients were in the age group of 15-64 yrs., average age being 40.5 yrs. and male: female ratio was 2:1. The indications for hospitalization were based on clinical evaluation of the patient, for investigations and further work-up, due to some adverse drug reactions, and for various socio- economic reasons. 43% of the patients were admitted at the time of initial diagnosis, 43% were admitted during the course of treatment for tuberculosis and 14% were admitted within two yrs. of completing treatment. A microbiological diagnosis of tuberculosis was established in 55% of the patients. HIV was a major co-morbidity in these patients. Lung cancer was one of the major causes of an initial false diagnosis of tuberculosis. Average length of hospital stay was 8.8 days, and mortality rate was 15%. **Conclusion:** It is necessary to take all the efforts possible to establish a microbiological or pathological diagnosis of tuberculosis in order to avoid false diagnoses.

Keywords: Tuberculosis, hospitalization, co-morbidities.

1. Introduction

Tuberculosis (TB) continues to be one of the major causes of morbidity and mortality, especially in the developing world. While national programmes, through the implementation of DOTS (Directly Observed Therapy Short-course) and the RNTCP (Revised National Tuberculosis Control Programme) in India provide a strong framework for the outpatient management of tuberculosis; not much literature is available on the burden of tuberculosis in hospitalized patients. Multiple factors including the clinical status and socio- economic reasons contribute to the burden of hospitalization in tuberculosis. This study aims to identify these causes in the setting of a chest medicine ward in a tertiary care hospital.

2. Aims & Objectives

- 2.1. To identify causes of hospitalization in tuberculosis.
- 2.2. To assess clinical profile & outcome of patients hospitalized for tuberculosis.

3. Methods and Materials

3.1. Inclusion criteria

- A. Tuberculosis suspect admitted in hospital and then confirmed as a case of tuberculosis.
- B. Diagnosed case of tuberculosis admitted in the hospital during the course of anti- tuberculosis treatment.
- C. Diagnosed case of tuberculosis who has completed treatment at any time in the past two years.

3.2. Exclusion criteria: None.

3.3. Study Design

- 3.3.1. Type of study: Observational study.

- 3.3.2. Duration of the study: 6 months.

- 3.3.3. No. of subjects: 100 consecutive patients admitted to the chest ward with a diagnosis of tuberculosis.

3.4. Study Setting

Chest & TB ward in a tertiary care hospital.

3.5. Materials & Methods:

Data was collected from the hospital records and stored in a tabular form in hard and soft copy. As this was an observational study where data was collected from the hospital records, and patient identity was not revealed in any manner whatsoever, written informed consent was not obtained.

3.6. Statistical Analysis:

The data thus collected was analysed using SPSS Software, version no. 22 and Microsoft Excel 2013.

4. Results

100 consecutive patients of tuberculosis admitted to the chest ward of a tertiary care hospital were included in this study.

This cohort of patients was predominantly in the age group of 15- 64 yrs. (86%), average age being 40.5 yrs.

Male: Female ratio was 2:1.

Table 1: Age wise distribution of study population

| | Age Group | Frequency | M | F |
|----|-----------|-----------|----|----|
| 1. | 0-14 yrs | 3 | 0 | 3 |
| 2. | 15-24 yrs | 6 | 3 | 3 |
| 3. | 25-34 yrs | 34 | 23 | 11 |
| 4. | 35-44 yrs | 23 | 16 | 7 |
| 5. | 45-54 yrs | 10 | 9 | 1 |
| 6. | 55-64 yrs | 13 | 8 | 5 |
| 7. | >= 65 yrs | 11 | 8 | 3 |
| | Total | 100 | 67 | 33 |

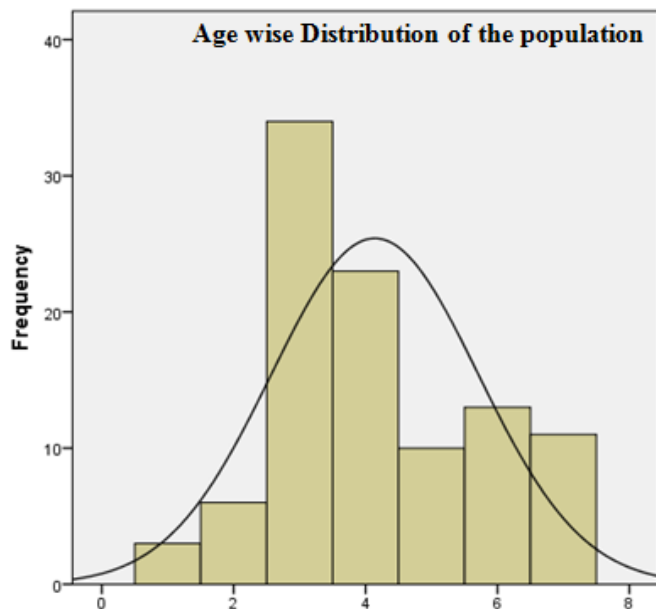


Figure 1: Age wise distribution of study population

4.1. Indications for hospitalization

It was observed that 67% of the patients were admitted by the attending physician based on symptomatology and clinical examination, 20% were admitted on the basis of certain investigations requiring further work-up, 6% patients experienced an adverse drug reaction (ADR) requiring hospitalization, and 7% were admitted due to prevailing socio-economic reasons. Adverse drug reactions requiring hospitalization included deranged liver enzymes in three, severe nausea in one, reaction to inj. Streptomycin in one, Rifampicin induced thrombocytopenia in one and severe skin rash in one patient.

4.2. Status at the time of admission:

43% of the patients were diagnosed as tuberculosis upon admission, 43% were admitted during the course of anti-tubercular drug therapy (including three patients who required re-admission), and 14% were admitted within two yrs. of completing treatment for tuberculosis.

Table 2: Status at the time of admission.

| Status at the time of admission | Frequency |
|--|-----------|
| Diagnosis at the time of admission | 43 |
| On anti- TB treatment at the time of admission | 43 |
| Completed ATT within last 2 yrs. | 14 |
| Total | 100 |

A microbiological diagnosis (AFB smear by ZN staining or culture or CBNAAT) was established in 55.1% of the patients, while the diagnosis of tuberculosis was established by radiological examination (CXR & CT scan) in 30.3%, pathological evidence on FNAC in 1%, fluid analysis (pleural fluid/ CSF) in 12.4% and visualization of endo-bronchial granulomas on Fibre-optic bronchoscopy in 1%. 31% of the patients had sputum smear positive for Acid fast bacilli at the time of hospitalization.

Criteria for the diagnosis of Tuberculosis

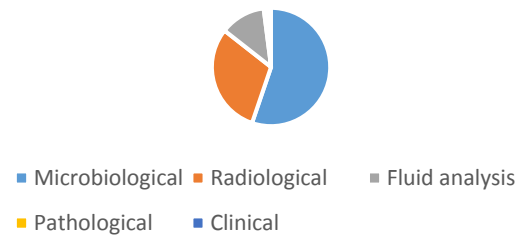


Figure 2: Criteria for the diagnosis of tuberculosis.

It was noted that amongst patients with a microbiological evidence of tuberculosis, 55% patients had a far advanced CXR, 50% had a moderately advanced CXR, 53.8% had minimal changes on CXR and 36.8% had a CXR suggestive of pleural involvement alone.

4.3. Co-morbidities

More than one fourth (26%) of the patients had concomitant HIV infection also. Of these, a microbiological diagnosis could be established in 42.3% (11) patients. 27% (7) of these patients ultimately died. Other co-morbid illnesses included Diabetes Mellitus (7%), underlying Obstructive Airways Disease (5%), Chronic Myeloid Leukaemia on treatment (1%), pancytopenia (4%), and seizure disorder (1%). Bacterial co-infection was detected in 14 patients by sputum Gram stain & culture and fungal co-infection by Candida was observed in one. Also, a high leucocyte count suggestive of bacterial co-infection was seen in 49% of the patients. On the other hand, a low leucocyte count (< 4000 cells/ cu.mm) was seen in 4% patients.

History of alcohol addiction was noted in 22%, smoking in 14% and tobacco use in 8% patients. One patient was found to have Non-Tubercular Mycobacteria growth on culture, and three were diagnosed as Drug Resistant TB. 28% patients had history of previous treatment for tuberculosis.

4.4. Outcome Analysis

Average length of hospital stay was 8.8 days. While 50% of the patients were admitted for 2- 10 days, 23% were admitted for a single day only for the purpose of certain investigations.

Table 3: Length of hospital stay

| Length of hospital stay | Frequency |
|-------------------------|-----------|
| 1 day | 23 |
| 2-10 days | 50 |
| 11-20 days | 16 |
| >20 days | 11 |
| Total | 100 |

Presence of an underlying malignancy was one of the major factors which led to an increased duration of hospital stay. 75% patients were discharged, deaths recorded were 15% (5%- sputum positive & 10%- sputum negative), while 10% patients were discharged against medical advice.

Significantly, the diagnosis had to be revised in 10% of the patients admitted with a prior diagnosis of tuberculosis and taking anti-tubercular treatment. (Lung malignancy in 8% and post TB sequel in 2%). The diagnosis of lung malignancy was delayed by 1-9 months (average 3 months) due to an initial false diagnosis of tuberculosis.

5. Discussion

Tuberculosis is a disease having significant impact on the patient and the society as a whole. Hospital admissions for tuberculosis can occur due to various reasons such as hemodynamic instability, hypoxia, severe forms of tuberculosis, adverse drug reactions to anti-tuberculosis drugs, for the purpose of certain investigations and also for various socio-economic reasons such as homelessness, insufficient social support, etc.

Overall, HIV-TB co-infection is observed in 5% of the tuberculosis patients in India (2012) [1]. In the present study, HIV co-infection accounted for 26% of the hospital admissions for tuberculosis. This may be attributed to the fact that patients with HIV-TB co-infection may be suffering from more severe forms of the disease, may experience greater no. of drug reactions and adverse effects, and may face more social problems also.

A microbiological diagnosis of tuberculosis could be established only in 55% of the patients, in spite of all efforts being made to achieve the same. Similar finding was observed in a study conducted by Sandra Aparecida Ribeiro and Thaís Nemoto Matsui [2].

The diagnosis of tuberculosis had to be revised in a significant 10% of the patients after further work-up in the hospital. It was found that 8% of the patients had an underlying lung malignancy while one patient had co-existent TB and lung cancer. These patients had been started on anti-tuberculosis drugs previously on the basis of chest X-ray. A diagnostic delay of around 3 months was noted in these patients. In another study conducted at the All India Institute of Medical Sciences, New Delhi, it was observed that 14 out of 70 patients with lung cancer had received an initial trial of anti-TB treatment, leading to an average delay of 4.46 \pm 3.15 months in the diagnosis of lung cancer [3]. In countries with a high prevalence of tuberculosis, it is not uncommon to start patients on anti-tuberculosis treatment without a microbiological confirmation of the disease. However, this data indicates the need to keep other differential diagnoses such as lung cancer in mind when starting a patient on anti-TB treatment on the basis of chest X-ray alone.

An earlier study conducted in Japan showed the average length of hospitalization to be approximately 63 days [4]. In the Indian scenario, emphasis is laid on the out-patient management of tuberculosis. Hence the average length of hospital stay was found to be much shorter (~ 8.8 days). In the U.S., it was observed that the average length of hospitalization was 9-17 days, with 83% admissions taking place at the time of diagnosis and 17% during treatment for tuberculosis [5].

In this study, though the primary aim was not to evaluate the costs of hospitalization, it was observed that 86% of the admissions were in the economically productive age group, with a male: female ratio of 2:1. In addition to the cost of hospitalization, prolonged hospital stays leading to loss of income contribute further to the economic burden of tuberculosis on the individual and the society as a whole.

6. Conclusion

This study points towards the need to take maximum efforts to reach the microbiological or pathological diagnosis of tuberculosis. Differential diagnoses like Lung malignancy and Post tuberculosis sequel should be kept in mind while starting anti-tuberculosis treatment based on clinical and radiological findings. HIV is one of the major co-morbidities requiring hospitalisation in tuberculosis.

7. List of Abbreviations

1. ZN: Ziehl-Neelsen
2. CB-NAAT: Cartridge Based Nucleic Acid Amplification Test

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