

## ORIGINAL ARTICLE

# Prevalence of HIV Cases Among the Tuberculosis Deaths at Autopsy

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## Abstract:

Mortuary/Autopsy room is a relatively high risk workplace. Infections such as Tuberculosis (TB) and HIV pose a risk to the autopsy workers. These infections pose a greater risk since many times they are not even diagnosed until the autopsy is done in the mortuary itself. In this study, we intend to analyse the prevalence of HIV in TB infected bodies and also the risks in a mortuary and find ways to tackle the hazards of contracting infections in a mortuary. This is a retrospective case-based study where we consider 63 autopsy cases with TB during 2010-2015 conducted at District Wenlock Hospital, Mangalore, India and analysed them. A statistical software SPSS was used for data analysis. The study has established that there is a clear correlation between positive HIV and positive TB cases at the autopsy. Most of these cases were found to be during the rainy season and co-related to the occupation of manual labourers. Since these infections pose a hazard to autopsy workers, there is a requirement to strengthen their safety.

**Keywords:** Tuberculosis; Autopsy; Safety; HIV; Infection; Occupational hazards; Sustainable development goals; Autopsy workers; Mortuary.

## Introduction:

Mortuary/Autopsy room is a relatively high-risk workplace. The mortuary staff performs autopsy on various cases with a very wide spectrum of causes of death which also includes several serious and easily transmittable infectious diseases. This is inevitable since infectious disease are widely prevalent and attributed to most deaths in the developing countries. Consequentially, mortuary workers suffer several occupational hazards, some as serious as contraction of HIV or TB infections.

These infections pose a greater risk since many times they are not even diagnosed until the autopsy is done in the mortuary itself. On several occasions, unidentified cases are sent for autopsy with no prior history or background regarding the patient. Without history, determining the presence of infection or cause of death is difficult and yet autopsy procedure has to be performed on these cases. Situations like these can prove hazardous for the staff in case the body has infectious disease which can be transmitted to them during the autopsy procedure.

Infectious diseases such as HIV finds itself in the major mortality causing diseases list today and in fact in 2016,<sup>1</sup> 1 million people died because of this disease.<sup>2</sup> Opportunistic infections account for

most of the deaths in patients with AIDS. Tuberculosis (TB) is the leading cause in one of these opportunistic infections.<sup>3</sup> Post-mortem examinations provide important information and is more reliable in ascertaining the cause of death in medicolegal cases infected with HIV. The possibility of transmission of HIV to autopsy workers, therefore, is always of concern if proper precautions are not taken. The safety of the autopsy workers should be paramount and hence contraction of these diseases should not be taken lightly and all efforts must be put to minimize the transmission of such infections in a mortuary workplace.

Our study is a retrospective study which identifies prevalence of such undetected HIV cases in post-mortem studies of TB infected bodies and various factors which can be correlated to them. This study will provide a direction regarding various precautions to be taken by autopsy workers. The study assesses the safety of the mortuary staff and the risks that are posed to them in a mortuary. The study also discusses several suggestions which can be used to reduce the transmission of such infectious in a mortuary such as use of proper gear at the workplace, right procedures and proper infrastructure for the same.

## Materials and Methodology:

An autopsy based retrospective study was undertaken using post mortem reports. Post mortem reports of deaths due to TB related deaths referred to Wenlock District Government Hospital, Mangalore, India for medicolegal autopsy between January 1, 2010 to December 31, 2015, were considered. Of the total 5229 autopsy cases, 63 cases of TB related deaths were reported. The parameters considered in our study includes patients age, sex,

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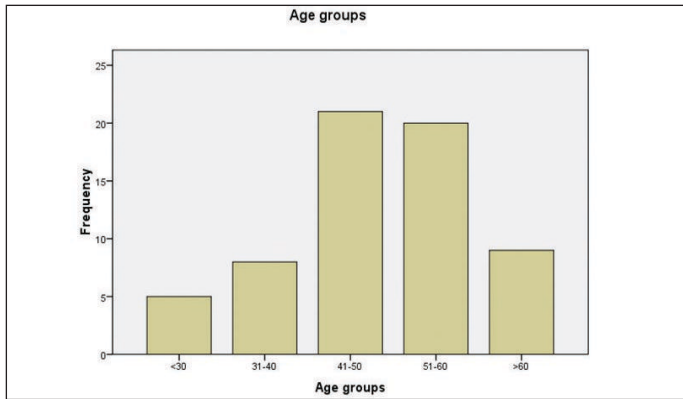


Figure 1. Age distribution among the TB cases.

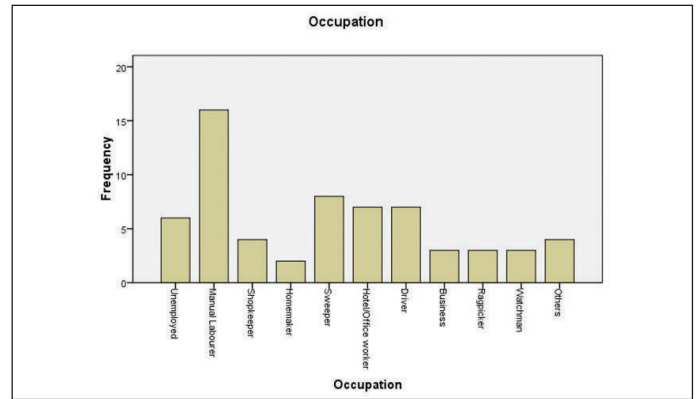


Figure 4. Distribution of occupation among the cases.

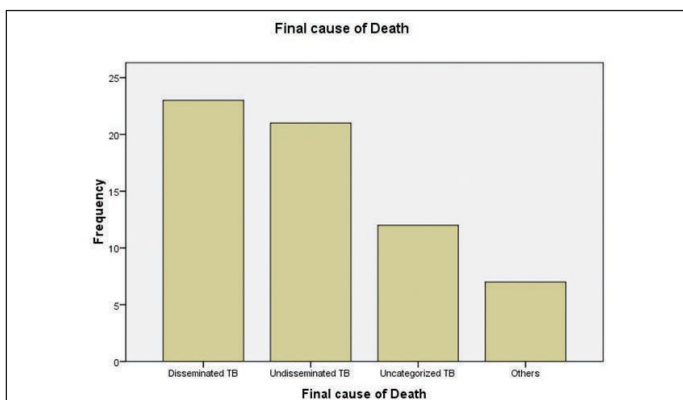


Figure 2. Distribution of cause of death among the victims.

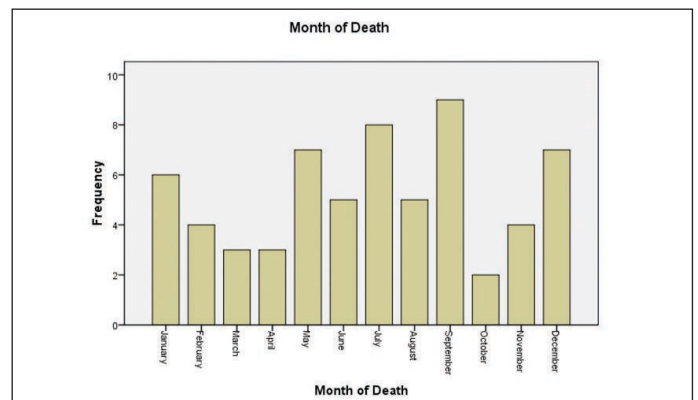


Figure 5. Distribution of the month of death of the cases.

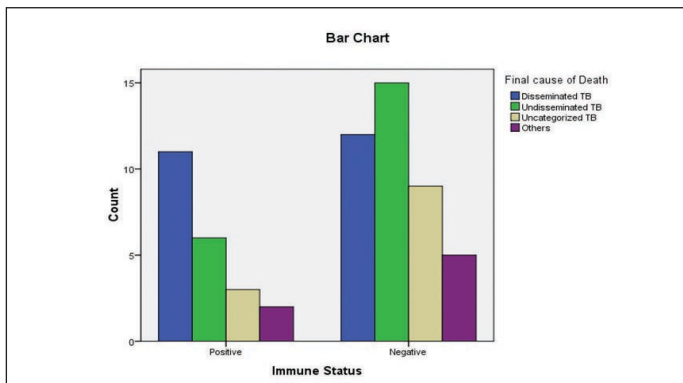


Figure 3. Immune status of the victims with their final cause of death.

HIV status, TB status, occupation, season/month of death, co-infections if any, if the body was unidentified or identified at the time of the autopsy, cause of death and if the same was confirmed or not at the end of the autopsy. HIV infections were identified by clinical correlation and as per therapeutic assessment. After obtaining the clearance from Institutional Ethics committee (IEC KMC MLR 02-2020/84) and Department of Forensic Science, KMC Mangalore, India, (Autopsy) Medico legal reports were studied to collect the data. This information retrieved from autopsy reports were extracted and maintained confidential. The data were entered in Excel sheet and our results were extracted using descriptive statistics. A statistical software “SPSS version 25.0” was used for analysis, obtain tables and draw relevant figures.

**Results:**

The total of 5229 autopsies were conducted over six years among which 522 were sudden death cases accounts to 9.98 %. Respiratory causes of these deaths accounted for 365 cases. Further 63 cases (17.2%) out of the respiratory causes of death were TB related. 59 patients were men while 4 cases comprised of women. The mean age of the among our cases was found to be 49.1. The majority of cases (39) were within the age group 41-60 (Figure 1). A similar trend of age distribution was found among the HIV positive cases as well with the age group of 41-60-year-olds accounting for majority of these cases. Among the 63 patients we considered, the mortality in 56 cases was due to TB. TB with HIV positive cases were 22. In 20 of these 22 cases, TB was attributed to the deaths in patients.

The study showed that among the final cause of death of the cases, disseminated TB was encountered in 23 cases while in 21 cases TB was not disseminated. In 12 cases the categorization of TB could not be made due to lack of specified information in the database considered (Figure 2).

The results showed a similar trend in HIV positive cases. Out of the 22 cases, disseminated TB was encountered in 11 of the cases and pulmonary TB, which was not disseminated in 6 cases. In 3 of these 22 cases, the categorization of TB could not be made due to lack of specified information in the database considered (Figure 3).

The results also studied the types of occupations and their

distribution among the HIV positive cases. 9 out of 22 HIV positive patients were manual laborers by profession. Manual labourers mostly being daily wage workers such as construction workers, factory workers, coolies etc. This was followed by sweepers accounting for 5 of the 22 HIV positive cases. Sweepers include janitors and all kinds of cleaning staff. The rest of the occupation types among HIV positive cases followed a fair uniform distribution with each occupation accounting for 0-2 cases. A similar trend was observed in the entire sample size of our study with manual laborers accounting for most of the cases followed by sweepers (Figure 4).

Out of the total 63 cases, 30 patients were identified at the time of autopsy while 33 were unidentified. However, in HIV positive cases a significant trend was observed. 14 of the 22 HIV positive cases were unidentified when brought for autopsy.

Out of the total 63 TB positive cases, 8 patients were also found to be infected with pneumonia which was the only other co-infection that arose in this study.

Most of the TB cases occurred in the rainy season of the city of Mangalore, India (May to September). A total of 34 causalities happened in this season (Figure 5).

#### Discussion:

In our study, we targeted a single opportunistic infection, i.e. TB and its correlation with HIV positive and non-immuno-compromised patients and modelled our safety procedures in correspondence to the results derived from the data. We considered 63 cases of TB related mortality and in 56 of them, after the final autopsy procedure tuberculosis was assigned as the final and main cause of the demise. TB is a well-known and commonly encountered opportunistic infection in HIV positive patients. In our study, among the HIV positive cases, TB remains the leading cause of death which is in cohort with other similar studies done worldwide.<sup>4</sup>

Among the 'TB related death' cases in the present study, pulmonary TB and disseminated TB were almost equally prevalent. However, disseminated TB was observed to be more frequent among the HIV positive cases, resulting in 10 out of 22 fatalities in this category. This is in conformity with other studies conducted elsewhere.<sup>5</sup> This is evident from the fact that HIV positive patients will suffer from higher grades of TB due to low immunity levels and dissemination of TB is more obvious and logical in these patients.

As we analysed our data, it was found that manual labourers and sweepers accounted for more than one third of the total cases where TB was prime cause of the demise. However, correlation of any sort between occupation and cause of death being TB is hard to make as manual labourers and sweepers were the most common occupations of the cases considered in our study. More than half of these TB related fatalities occurred in the rainy season (May - September) of the city of Mangalore which are also the coldest months of the year here. Studies have shown that Tuberculosis infection is more likely in people with low levels of Vit D, and associated with reduced exposure to the sunlight, cooler weather, staying in at home and having other seasonal infections.<sup>6,7</sup> Although not statistically documented in our study,

all these factors are the most prevalent in the rainy season of the city and hence the co-relation.

The present study showed that a high percentage of patients that were HIV positive were also unidentified at the time of the autopsy, which makes sense as unidentified cases normally come from the economically weaker strata of the society and are more likely to have infectious diseases prevalent among them. It is also very common for these infections to be undiagnosed and under diagnosed in the poorer sections of our society. In our findings, most of the TB cases have been documented amongst the 41–60-year-olds. This can be attributed to the fact that this is the most active and mobile working-class group of people. This makes them susceptible to these infections. This finding is in the direct correlation with other studies done.<sup>8</sup>

Suggestions: Active infections have implications on health professionals working inside the workplace like mortuaries. The mortuary room architecture and ventilation also play a major role in prevention of infectious diseases and safety of workers. Recommendation to use protective gadgets and standardized instrument usage care as per effective public health guidelines. Preventive strategies comprise of estimation of contracting the infection, timely diagnosis with gross and microscopic findings, lab investigations, using of techniques and technology to reduce generation of air droplets and protect against the infection during post-mortem examination.

Anyone that may come in the immediate vicinity of a mortuary or products originating from there should be encouraged seek tuberculosis vaccine. Proper protective gear (i.e., a headcap, eye glasses, face mask, surgical shirt and trousers, water-resistant shoes, a full body gown, a water-resistant apron and at least one pair of gloves) should be always worn at all times when performing an autopsy. The instruments should be used carefully and scrupulously to reduce the chances of any cuts or needle stick injuries during autopsy.

Necessary measures should be taken to nullify aerosol formation during an autopsy as TB is an airborne infection. Proper air circulation systems should be installed in the mortuary area. Aerosol formation can be minimized by minimizing the use of saw and opening of the intestines submerged in water. While washing or handling organs, special attention should be given to prevent aerosol formation. Use of equipment utilised in the process of post-mortem should be minimised and provided a dedicated station so as to keep them in clear view. Instruments (especially sharps) should be carefully handled by the staff. It should also be ensured that safe sharp practices be always followed. In cases where the patient has been diagnosed of HIV, chances that the patient has TB should be considered as a strong probability rather than a possibility. Effective training of staff and periodic screenings are a must to ensure necessary standards. Awareness of associated hazards are also important for reducing the risk of exposure among these health professionals specially at their workplace.

**Consent for publication-** Institutional ethical clearance (IEC KMC MLR 02-2020/84) was taken.

**Conflict of Interest:** None.

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