Autopsy Studies in South African Miners with Tuberculosis

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Why does TB mortality matter so much and what is the role of the autopsy?
Incidence of TB by Severity of Silicosis in Black Gold Miners


### Silicosis rates in South African gold miners

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<th>Authors</th>
<th>Study design</th>
<th>Study period</th>
<th>Study Population</th>
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<td>Park et al. 2009</td>
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<td>Murray and Hnizdo 2005</td>
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<td>Nelson et al. 2010</td>
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<td>5.6 -13.4</td>
<td>17.5 - 20.1</td>
<td><strong>3.0 - 32.0</strong></td>
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</tbody>
</table>
PREVALENCE OF TB PER 100 000

SA Gold miners

SA population

WHO epidemic level

USA

USA

5

250

795

>3000
Active pulmonary tuberculosis in Black miners at autopsy, all commodities, 1975-2011

Data source: PATHAUT database, 21 January 2013
Pathology Division, National Institute for Occupational Health, Johannesburg
Risk factors for TB in gold miners

High background rate
Socio-economic factors
Latent TB
Previous TB
Ageing workforce
Housing
HIV
Silica dust
Migrancy
Compensation for occupational lung diseases in the mining industry

Miners’ Phthisis Allowances Act, 1911

Occupational Disease in Mines and Works Act, 1973

In life (benefit examinations)
In death (autopsies)
Who does this Act cover?

Anyone who has ever been exposed to risk work on a mine regardless of the clinical cause of death.

Diseases

Pneumoconioses – silicosis, asbestosis etc

Tuberculosis

Lung cancer

Obstructive lung disease - emphysema

Asbestos related diseases

Systemic sclerosis

Combinations of above
Proportion with compensable disease - 28%

IN LIFE

1/3

AT AUTOPSY

2/3

Clinico-pathological correlation

- 1,858 autopsies
- 350 study subjects
- HIV positive
- low CD4 counts

The proportion of TB diagnosed at autopsy which was missed in life

Clinico-pathological correlation

The proportion of TB diagnosed at autopsy which was missed in life

- 62% Diagnosed during life
- 38% Not diagnosed during life
“What the patient died of and what he is said to have died of are not always one and the same thing”
Philip R, 1918. Inaugural address delivered on the institution of the chair of tuberculosis in the University of Edinburgh.

Tuberculosis undiagnosed at death in the United States: Reider et al

Failure of diagnosis as a factor in TB mortality: Enarson et al

Active Tuberculosis unrecognised until necropsy: Edlin

“Won’t get fooled again” by TB: Ashkin

“Doctors failed girl who died of TB”: Sky news 2012
64% had visited a medical facility

HCWs failed to:

- obtain appropriate and timeous clinical histories
- perform adequate physical examinations
- request diagnostic tests for TB
TB missed in life: Autopsy findings

Pneumonia
Cryptococcal pneumonia
Pneumocystis carinii pneumonia
Aspergillus

Lung carcinoma
Metastatic carcinoma
Lymphoma
Kaposi’s sarcoma

Silicosis
Lymphoid interstitial pneumonia
Quantifying errors in the estimation of tuberculosis mortality in a population of South African miners

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SUMMARY

BACKGROUND: All-cause mortality, based on national tuberculosis programme (NTP) register deaths, may under- or overestimate tuberculosis (TB) specific mortality in the population.

OBJECTIVE: To assess the factors influencing this measurement in a single large population with high TB prevalence and mortality.

METHODS: Routinely collected data on TB cases and treatment outcomes were linked to population data from a cohort of South African miners from 1995 to 2008. Vital status and cause of death were determined from multiple sources, including the TB programme, death register and autopsy.

RESULTS: The TB mortality rate, based on 430 deaths on the TB register, was 192/100000 person-years (py). Many of these deaths (57%) were not caused by TB, and 483 TB deaths were identified outside the programme. Overall, there were 674 TB-specific deaths; the TB-specific mortality rate was 302/100000 py. These deaths included 191 (28%) on the TB register, 23 (3%) among defaulters/transfers, 153 (23%) after antituberculosis treatment and 307 (46%) in men who had never been on the programme.

CONCLUSIONS: This study highlights methodological issues in estimating TB mortality. In this population, a method using the product of TB incidence and case fatality consistently underestimated TB mortality. Accurate estimates of TB-specific mortality are crucial for the proper evaluation of TB control programmes.

KEY WORDS: tuberculosis; mortality; autopsy; treatment outcome; cause of death