50.020
Impact of Education and Income on Pulmonary Tuberculosis (PTB) Among Adult Tea Garden Workers of Assam

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Background: Pulmonary tuberculosis (PTB) is a major public health problem among socio-economically poor tea garden workers of Indian Assam province. Information regarding impact of socio-economic indicators on PTB among them is very scant. Hence, the study was designed with the research question: what was the impact of education and income on PTB among them?

Methods: A community based cross sectional study was conducted in eight randomly selected tea gardens of Assam in the age group > 15 years. Patients with sputum specimens positive for acid-fast bacilli by microscopy and/or radiographic abnormalities consistent with PTB were considered as a case of PTB. Odds ratios were estimated by performing multiple logistic regression analysis to assess the independent effect of education and income on PTB.

Results: The survey covered a total of 2264 adult workers (male-1033; Female-1231). More than 73% were illiterate and only 14.7% had more than 5 years of education. Out of total, 37 individuals (16/1,000) were considered as having PTB. Crude odds ratio suggest that, illiterate tea garden workers were 3.1 times more likely to suffer from PTB as compared to highest educated group (more than 5 years of education). Similarly, those who had 1–5 years of education were 3 times more likely to suffer from PTB compared to highest educated group. The influence of education remained stronger even after adjustment for other factors like age, sex and income. In the adjusted analysis illiterate (OR = 3.3) were found to be most vulnerable group for PTB. However, no much variation in odds ratios across the income quintiles have been observed indicating poor association between income and PTB in the study.

Conclusion: Tea garden workers with lower education were more vulnerable to PTB. However, income was not associated with PTB, which could be due to less variation between highest and lowest income groups.

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50.021
One Member of Beijing Genotype Associated with Multi-Drug Resistance and Increased Transmissibility in Rural Chinese Populations

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Emergence of drug-resistant tuberculosis (TB) has become a threatening concern for global health, and occurs predominantly in resource-limited countries. Drug resistance among rural population with culture-confirmed tuberculosis provides an accurate indicator of transmitted drug resistance in China. A population-based epidemiological study was conducted from April 2004 through June 2005 in two DOTS covered rural counties of eastern China, Deqing and Guanyuan. 351 Mycobacterium tuberculosis (MTB) isolates were collected for drug susceptibility testing and molecular characterization by MIRU, spoligotyping, IS6110 RFLP, and sequencing for drug resistance-related genes. 223 isolates (63.5%) were resistant to at least one of 1st anti-TB drugs, including 53 (15.1%) multi-drug resistant (MDR) isolates. Spoligotyping identified 243 isolates (69.2%) with Beijing family genotype. A major subgroup of the Beijing family, Shandong cluster (MIRU genotype 22323517353) accounted for 15.6% of Beijing family isolates. Cluster analysis with MIRU plus IS6110 RFLP genotyping defined 80 (22.8%) isolates in 31 clusters. MDR-TB isolates were more likely to be clustered compared with pan-susceptible isolates (47.2% vs. 14.1%; odds ratio [OR], 4.72; 95% confidence interval [CI], 2.08–10.72), and overrepresented in the Beijing family compared with non-Being family isolates (18.5% vs. 7.4%; OR, 3.02; 95% CI, 1.35–6.73). Compared with other Beijing family isolates, Shandong cluster isolates showed higher possibility to acquire multi-drug resistance (44.7% vs. 15.1%; OR, 6.18; 95% CI, 2.68–14.23), katG and rpoB mutations (36.8% vs. 8.8%; OR, 5.08; 95% CI, 2.41–13.94), and clustering (60.5% vs. 21.0%; OR, 6.14; 95% CI, 2.82–13.37). The overrepresentation and association with MDR-TB of Beijing genotype and its Shandong cluster in rural China suggested their contribution to the transmitted drug resistance and their potential importance in the emergent drug-resistant TB epidemic in China.

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50.022
An Epidemiological Study of Tuberculosis among Health Care Workers in Taiwan

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Background: The health care workers (HCW) are full of hazards for tuberculosis exposure and infection when they care for patients. In Taiwan, an area with moderate incidence of tuberculosis, HCW are at increased risk for tuberculosis. The study examined data for evaluation of epidemiological characteristics of tuberculosis between HCW in Taiwan.

Methods: From the computerized registry of Taiwan-CDC, confirmed tuberculosis patients who were HCW from January 1, 2002 to December 31, 2006 were enrolled. The χ² test and χ² test for trend in proportion were used.

Results: A total of 564 subjects (109 males and 455 females) were enrolled, with the annual incidence increasing from 63 in 2002 to 149 in 2006, with 73% of the individuals less than 40 years of age. By geographic distribution, there was the largest number of cases in Taipei City. Of the 564 subjects, 204 were open tuberculosis cases. The average accomplished rates of chest radiography, and sputum smear and culture were 90.4%, 88.1% and 71.1%, respectively. The majority of these individuals were nurses or physicians.
Departmental distribution varied widely, with many cases hired in the general wards. The incidence rates of tuberculosis in nurses and physicians were 80.7 and 86.0 per 100,000 in the Taipei region.

**Conclusion:** Tuberculosis occurs in HCW, which is obviously younger, compared to the general population. This might be due to the juniority of first-line HCW. The male-to-female ratio for tuberculosis cases in the general Taiwan population is 2:1, which differs significantly from the corresponding gender distribution for HCW in this study. This probably is due to the fact that most of the HCW providing first-line primary care in Taiwan are female nurses. The incidence of tuberculosis between HCW is higher compared to the general population. Prevention of tuberculosis infection in these professionals remains an important issue in Taiwan.

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50.023
Clinical Presentation and Mortality of Mycobacterium avium Complex Disease in a Public Sector Hospital, South Africa

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**Background:** Mycobacterium avium complex (MAC) remains an important opportunistic infection in HIV-infected individuals despite the introduction highly active antiretroviral therapy (HAART). There are also concerns that high mortality from MAC occurs as part of an immune reconstitution inflammatory syndrome (IRIS) after initiation of HAART. Additionally, in patients receiving HAART, there is concern that the presentation of MAC may be atypical, leading to delayed or missed diagnoses.

**Methods:** A retrospective record review was conducted of laboratory-confirmed MAC cases at a public-sector hospital in Johannesburg, South Africa between January 2005 and August 2007 to determine presenting clinical features and HIV status at MAC diagnosis, and estimate mortality after MAC diagnosis.

**Results:** A total of 74 laboratory-confirmed cases of MAC were identified. All except one patient out of the 51 that had HIV test results were HIV positive and 50% of these were receiving HAART at MAC diagnosis. The median CD4 count at diagnosis of MAC was 34 cells/mm3 (IQR 12–73 cells/mm3). Only 75% of the 74 MAC cases had records of receiving treatment for MAC while 44% were receiving TB treatment when MAC was diagnosed. There were no differences in presenting symptoms between those who were HAART-naive at time of MAC diagnosis and those who were receiving HAART. There were 12 confirmed deaths out of the 29 individuals with outcomes recorded at the end of the study period (41%) and the median time to death after diagnosis of MAC was 147 days (IQR 64–275 days). However there was no decrease in survival time for patients with MAC as part of an IRIS compared to the non-IRIS MAC cases.

**Conclusions:** Clinical presentation of MAC is not confused by treatment with HAART. Mortality from MAC remains high, regardless of IRIS and delaying HAART in HIV co-infected individuals does not improve survival.

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50.024
Discription of the Diversity and Historic Origin of Mycobacterium tuberculosis Strains Collected from the Free State, South Africa

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**Background:** South Africa is extremely diverse in populations and topography but molecular epidemiological data describing the diversity of Mycobacterium tuberculosis (MTB) mainly focus on a high-incidence area in the Western Cape, KwaZulu-Natal and sporadic studies elsewhere where the well documented Beijing lineage is the most prominent strain as in many countries worldwide. Each geographic area additionally to the well documented lineages typically reports strains unique to the population. Free State (FS) studies recently reported restriction fragment length polymorphism (RFLP) typing of strains suggesting a limited numbers of the Beijing family in this province. We implemented spoligotyping to determine the historic origin of the strains reported on from the Free State.

**Methods:** A total of 69 FS strains were analysed using a commercially available spoligotyping kit for MTB. Data was entered into an Excel spreadsheet in a binary format and compared to other strains in the world captured in the spolDB3.0 database. Results were compared with RFLP dendrogram patterns derived using the GelComparII unweighted pair-group analyses with UPGMA arithmetic averages.

**Results:** No spoligotypes identical to strains existing in the spolDB3 database were found. Predominant families with high similarity (76%–99.9%) to spolDB3 strains include: the Modern type T1-T4 (30%) with T1 the most prominent group 17%. LAM 15%, X strains 13%, EAI strains 10%, and S type 7%. Only 3 strains represented the Beijing family. One M. bovis and one M. africanum strain were found. Agreement with RFLP dendrogram data was low probable since the spolDB3 database probabilities were not taken into account. Strains with low copy numbers found in the Van Dijk study belonged to the X spolDB3 group as suggested in publications. Findings agree with the hypothesis of Van Dijk et al that the Beijing family does not occur in grave numbers in the FS.

**Conclusion:** The FS definitely has a different population of tuberculosis strains and is worth investigating further.

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