Evaluation of diagnostic tools used for TB diagnosis in Ibadan, Nigeria

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Objectives

- To evaluate smear microscopy and culture as diagnostic tools for TB diagnosis in a regional laboratory in Ibadan, Nigeria
- To provide a baseline data on laboratory diagnosis of pulmonary tuberculosis (PTB) in Nigeria

Methods 1

- This is a one year (April 2005-May 2006) laboratory-based study.
- Three sputum samples from new patients with PTB from various clinics within and outside University College Hospital, Ibadan were collected and processed for acid-fast bacilli (AFB) using hot Ziehl-Neelsen (Z-N) method.
- Known AFB slide and a slide made of egg-albumin were used as positive and negative controls.
- Results were read according to grading system of the International Union Against TB and Lung Diseases as -, scanty, +,++, or +++ AFB.
- One of the sputum samples was then cultured on Lowenstein-Jensen (L-J) slope incubated at 37^{o}C for six-eight weeks.

Methods 2

- *Mycobacterium tuberculosis* strain H37RV and sterile L-J slope were used as positive and negative controls respectively.
- Growth on L-J medium was identified as *M. tuberculosis* by a repeat Z-N staining and biochemical tests.

Results

- Of the 1,120 sputum samples processed, 80 (7.1%) were AFB positive while a lower percentage (5.0%) were positive for culture on LJ medium.
- The association between AFB positivity and culture positivity was not statistically significant ($p>0.05$).
- Sixteen (1.4%) of the specimens were AFB negative but positive for culture while eight (0.7%) were screened AFB positive but culture negative.
- Only 40 (3.6%) were AFB and culture positive while the majority 1,056 (94.3%) were negative for the two tests.
- Culture contamination rate was 8.8% (99 of the 1,120 specimens processed).

Discussion and Conclusions

- Nigeria ranks fourth on the World Health Organization's (WHO) list of TB high–burden countries globally and has the highest estimated number of new TB cases among African countries.
- Smear microscopy is WHO recommended diagnostic tool for detecting TB in poor resourced countries with high burden of the disease.
- From this study, 16 (1.4%) of the specimens processed were AFB negative but culture positive.
- This might be due to low numbers of AFB in the sputum which was not detected by smear microscopy.
- The resulting delay in diagnosis may lead to dissemination of the disease in the community especially in settings where microscopy is the only available diagnostic tool.
- The high contamination rate obtained in this study calls for a need for reference TB laboratory in Nigeria to be affiliated to one of the supranational laboratories to improve the standard of the tests through quality assessment and proficiency testing.

Future Perspectives

- The need is urgent to strengthen TB reference laboratories in Nigeria to perform quality assured smear microscopy, isolation of the organism in pure culture and to do drug sensitivity testing.
- This would be achieved through laboratory capacity strengthening planned by the National TB and Leprosy Control Program of the Federal Ministry of Health.
- The initiative will be funded through accessed TB grants of 5th round of the Global Fund for AIDS, TB and Malaria.