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Study on drug resistances detection in *Mycobacterium tuberculosis* patients using nitrate reductase test, GeneXpert MTB/RIF and line probe assay in Jos, Plateau State, Nigeria

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Background: Tuberculosis (TB) is a leading cause of mortality worldwide and one of the notable infectious disease of poverty with high prevalence in Africa and most developing countries. The prevalence of MDR-TB in most region in Nigeria is not well documented, so far, there is no report of the prevalence of MDR-TB among new and previously treated cases in the study area. This study compared the performance of three different methods; the nitrate reductase assay (NRA) with MTB/RIF Xpert (GX) and Genotype MDRTbplus (LPA) for direct detection of TB drug resistance using sputum specimen.

Methods: A cross-sectional study was carried out using a total of 126 expectorated sputum samples from patients with signs and symptoms suggestive of tuberculosis and referred to at APIN TB laboratory, Jos University Teaching Hospital from August 2016 to December 2016. The sample distribution was 60 samples from newly diagnosed patient and 66 samples from retreatment cases. A sputum sample was tested directly by the Ziehl-Neelsen method. All samples showing Positive AFB were used as study samples.

Results: Overall results showed that the prevalence of *M. tuberculosis* RIF resistance confirmed cases was 71.1% (86/126). RIF's resistance was higher in male 75.5% (65/86) than female 33.9% (29/86). A total of 13.5% (17/126) were sensitive to all the first line TB drugs while a higher percentage 86.5% (109/126) of study samples was resistant to one or more drugs was sensitive to all TB first-line drugs. RIF resistance was concordantly detected in 46.7% (28/60) in treatment naïve patients and 95.1% (58/61) in retreatment patients. Correlation of the test assays (GX, LPA and NRA) on RIF detection were all positive and significant (p-value<0.05). A higher proportion of RIF's resistance by 76.2% (96/126) was detected by NRA, 75.4% (95/126) detected by GeneXpert and 74.6% (94/100) was detected by LPA.

Conclusion: In conclusion, NRA assay demonstrated high sensitivity in detecting RIF resistance in sputum specimen compared to GeneXpert MTB/RIF and LPA assays. Based on these findings, it is evidence that NRA is suitable for the early detection of MDR-TB, especially with its advantage of detecting more than one drug resistance pattern in TB suspects.

Biography

Stanley C Onuoha is a Lecturer and Researcher with the Department of Biotechnology, Ebonyi State University, Nigeria. He earned his BSc and MSc degrees in Microbiology and PhD in Environmental and Public Health Microbiology from the University of Nigeria, Nsukka and Nnamdi Azikiwe University, Awka, Nigeria respectively. He is a recipient of several outstanding awards and fellowships and has won several research grants from various funding organizations such as Matsumae International Postdoctoral Fellowship (MIF) Award, Japan in 2016, DAAD Postdoctoral Fellowship Award in 2018, Society for Applied Microbiology (SFAM) President's Travel Grant Award to the Summer meeting, UK in 2016 and partial travel grant to participate on theoretical course 'RNA Structure and Function' Organized by the International Centre for Genetic Engineering and Biotechnology, Trieste, Italy in 2014. He has supervised a number of HND, BSc and MSc students. He has more than thirty publications on both national and international journals. He is also a reviewer to key journals in his area of research expertise. He is a member of the Nigeria Society for Microbiology, Biotechnology Society of Nigeria and American Society for Microbiology.

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