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Letter to Editor

Use of GeneXpert for the diagnosis of multidrug resistant pulmonary tuberculosis among smear negative suspected tuberculosis cases in Nepal

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Dear editor,

Tuberculosis (TB) presents as a significant public health problem mainly in low income countries. In 2010, around 8.8 million incident cases of TB, with 1.1 million deaths among HIV-negative population and 0.35 million deaths among HIV-positive population were reported globally [1]. Recently, drug resistance among TB bacilli has become a serious issue for the management of the TB cases and increased numbers of patients are being diagnosed to be suffering from multi-drug resistant tuberculosis (MDR-TB). Worldwide, 5.4% of the total TB cases in 2010, were found to be MDR-TB and the rate of MDR-TB was high in India and China, which are countries neighboring Nepal [1]. In Nepal there were 35,438 TB cases in 2012 among which 8,367 (23.61%) were smear negative [2].

According to the latest drug resistance surveillance, in Nepal the prevalence of MDR-TB was 2.6% among new and 17.6% among previously treated cases [3]. MDR-TB has been declared to be a global health emergency by the World Health Organization (WHO) [4] and rapid and accurate detection of cases is required for its effective control. GeneXpert is one of the best methods for rapid detection of the MDR-TB cases with high sensitivity. Xpert MTB/RIF assay is a molecular test which detects the DNA of *Mycobacterium tuberculosis* (MTB) [5]. It is a highly sensitive and rapid test which can diagnose TB along with the MDR-TB cases directly from sputum sample in less than two hours [5].

Due to the need for less manipulation of the samples in comparison to other conventional diagnostic methods, this test possesses minimal biosafety risk [5]. Because of the high sensitivity of the Xpert MTB/RIF assay, the test is used to diagnose the cases of smear negative TB. The GeneXpert test is a rapid and new test for the diagnosis of TB and to determine the resistance of the TB bacilli to rifampicin. The test is available in many government hospitals all over Nepal, where it is done free of cost. GeneXpert helps in early

detection of the tuberculosis cases along with MDR-TB cases preventing the further spread of the tuberculosis by starting treatment as soon as possible.

The collected sputum is mixed with the reagent in a cartridge and then the cartridge is loaded into GeneXpert machine. The result is shown in less than 2 hours after fully automated processing. Due to the rapidity of the test with high sensitivity in comparison to other methods, it is more reliable than other tests.

In the present study a total of 208 smear (Ziehl-Neelsen stain) negative, clinically suspected pulmonary TB patients (having symptoms like chest pain, breathing difficulty, productive cough with or without blood, fatigue, fever, loss of appetite, weight loss and sweating mainly at night) visiting tuberculosis reference laboratory, German Nepal Tuberculosis Project (a project that focuses on researches and surveillance activities related to tuberculosis of national and international levels), Kathmandu during February 2014 to August 2014 were enrolled.

Informed consent was taken from all the participants. In this study, we diagnosed the smear negative tuberculosis cases by GeneXpert and we also determined the prevalence of MDR-TB among them. Smear negative tuberculosis cases are very difficult to diagnose promptly, creating challenges in providing timely and proper treatment in resource limited countries like Nepal. In Nepal, Ziehl-Neelsen stain is widely used for the diagnosis of tuberculosis because of its low cost. Among the total of 208 patients, 60 (28.85%) were TB positive of which 44 (73.33%) were males and 16 (26.67%) were females. Of 60 tuberculosis positive cases, 2 (3.33%) were MDR-TB cases. However, higher rate of MDR pulmonary tuberculosis was reported by Thapa et al. (15.6 %) [6]. This may be because of including only smear negative suspected tuberculosis cases in our study. The highest rate of tuberculosis positivity was found among the age group >60 years (36%) followed by the age group 21-40 years (28.86%) (Table no. 1). Tuberculosis is endemic in Nepal and around 45% of the population of Nepal is infected with TB bacilli and active TB may be seen whenever the immune system weakens. So the weakening immune system of the elderly may be the reason for highest rate of pulmonary tuberculosis in the age group >60 years seen in our study.

Table 1: Age wise distribution of tuberculosis positive cases diagnosed by Xpert MTB/RIF assay

Age groups	Number of patients	Positive (%)
≤20	14	2 (14.28%)
21-40	97	28 (28.86%)
41-60	47	12 (25.53%)
>60	50	18 (36%)

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AUTHOR'S CONTRIBUTION

SS- collected samples, performed laboratory work, collected and analyzed data**; NDP**-collected samples, performed laboratory work, collected and analyzed data and prepared final manuscript**; NA**, **UTS**, **BS**-**monitored the study.

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