

European Respiratory Society Annual Congress 2013

Abstract Number: 361

Publication Number: P4441

Abstract Group: 10.2. Tuberculosis

Keyword 1: Tuberculosis - diagnosis **Keyword 2:** Telemedicine **Keyword 3:** E-health

Title: Online method for diagnosing sputum smears negative TB cases in a developing country

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Body: Optimal use of human resources is a major concern for TB control. To diagnose sputum smear negative TB (SS-ve TB) specialists are not available at distant places. Objective: To compare the accuracy and efficiency of an electronic method of diagnosing SS-ve TB patients to the conventional face-to-face (F2F) method. Methods: Study was conducted on patients with suspected SS-ve TB in a rural town and an urban town. Digitized chest X-rays and clinical informations were emailed from remote centers to the e-TBDC (Radiologist and Pulmonologist) at Aga Khan University for expert consultation. The decisions of the e-TBDC were compared to the onsite "conventional F2F diagnostic decision" and with the Gold standards (AFB culture). The 2-month clinical follow up was also done to judge the accuracy of the original diagnosis. Results: 101 participants (56.4 % male, mean age 37.89 ±19.2 years) were enrolled. There was agreement in the decisions of 79 cases (78.2%) and disagreement on 22 (21.8%). The agreement of e-TBDC was higher with urban site (84.2%) as compared to rural site (70.5%). 42 (41.5%) were diagnosed online as SS-ve TB. Using AFB culture as gold standard results were almost similar in both arms (31.7% F2F and e-TBDC 29.6% positive). Validation with 2 month clinical follow-up showed more improvement in F2F (93%) as compared to e-TBDC (85.7%). However, e-TBDC decision were more specific in ensuring symptomatic improvement (73.5%) in patients diagnosed with NO TB as compared to F2F (65.3%). Conclusion: This pilot study provides an innovative technology solution to the distant area where consultants are not available, to address problems in the diagnosis of sputum smear negative TB through telehealth.