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Delay in Diagnosis of Pulmonary Tuberculosis in Low- and Middle- Income Settings: Systematic Review and Meta-Analysis

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Assessment of time delays in diagnosis of tuberculosis is essential to evaluate effectiveness of control programs, and identify programmatic impediments. Thus, we have reviewed recent studies to summarize patient, health system and total delays in diagnosis of pulmonary tuberculosis and associated factors with it in low- and middle- income countries. The review was done following standard procedures of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement and checklist. Web-based databases were searched to retrieve relevant studies from 2007 to 2015 including Springer link, Pubmed, Hinari and Google scholar. Searching terms were *pulmonary tuberculosis, diagnostic delay, patient delay, health system delay, provider delay, doctor delay, health care seeking and health care seeking behavior*. Retrieved studies were summarized by systematic review and meta-analysis using comprehensive meta-analysis software. Forty studies involving 18,975 patients qualified for systematic review and 14 of them for meta-analysis. The reported median total delay ranges from 30 to 366.5 days; with a relatively more for patient delay (4 to 199 days) compared to health system delay (2 to 128.5 days). The key determinants of patient delay were poor literacy, long distance to the nearest health facilities, evil/bad luck perception as cause, poor knowledge, first care seeking from informal providers, self-medication, pulmonary co-morbidity and mild severity of illness among others. Likewise, good functional status, unusual symptoms, first care seeking at private and low level facilities, normal chest X-ray and smear negative results were key determinants of health system delay. The meta-analysis showed 42% of pulmonary tuberculosis patients delayed seeking care by a month or more; uneducated patients [pooled OR=1.5, 95%CI=1.1-1.9] and those who sought initial care from informal providers [pooled OR=3, 95%CI=2.3-3.9] had higher odds of patient delay.

Conclusion: Delay in diagnosis is still a major challenge of tuberculosis control and prevention programs in low- and middle-income settings. Efforts to develop new strategies for better case-finding and improving patients' care seeking behavior need to be intensified.

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