SCIENTIFIC LETTER - PUBLIC HEALTH

CHEST X-RAY INTERPRETATION: AGREEMENT BETWEEN SPECIALIST IN TERTIARY CARE AND MEDICAL OFFICERS FROM PRIMARY HEALTH CENTRES IN THE STATE TB SURVEY IN TAMIL NADU

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Abstract

ABSTRACT: The state-wide TB prevalence survey in Tamil Nadu was conducted in 2021- 2022. The Chest X-rays (CXR) used for screening were read by independently field level medical officers deputed from primary health centres (PHCs) and by a central panel of pulmonologists at the each district. The survey showed a very good agreement between the field medical officers and the expert panel in terms of reporting the CXR. The adjusted kappa (95% CI) was 83.4% (83.0 - 83.7) Medical officers from the PHCs can be trained to read and report survey/ ACF survey CXRs to get earlier and reliable results for further action at field level, considering the availability of resources especially in remote areas.
KEYWORDS : Chest X –ray; TB survey; Agreement; Tamil Nadu

MAIN CONTENT

CHEST X-RAY INTERPRETATION: AGREEMENT BETWEEN PULMONOLOGIST AND FIELD MEDICAL OFFICER IN THE STATE TB SURVEY IN TAMIL NADU: The state-wide TB prevalence survey was conducted in the general population in Tamil Nadu during 2021-2022 with the primary objectives of estimating the prevalence of microbiologically confirmed pulmonary TB (MCPTB) disease among individuals 15 years and above. A door-to-door census was conducted within the selected cluster and all eligible and above who stayed there for more than a month were included. All eligible participants (except pregnant women) underwent digital chest x-ray (CXR) in the mobile X-ray unit. The survey warranted trained medical officer in the field to read the CXR in real time in the field to classify them into "normal" and "abnormal" in each cluster (village/ward). Those with abnormal CXR were eligible for sputum testing. The medical officers were deputed from the nearby primary health centres for the survey activities form the department of public health. Online trainings were conducted by ICMR- National institute for research in Tuberculosis for the medical officers to read and classify the CXRs. In addition, trainings were provided by the local District TB officers/ pulmonologist. For Quality assurance, the digital CXRs were uploaded to the server and were also read by a panel consisting of two pulmonologists at the district level and if there were any discrepancy then a third umpire reading was done within 48 to 72 hrs to capture abnormality and thereby decide on the sputum eligibility. X rays classified as "abnormal" by either the medical officer or the expert panel were eligible for sputum examination in addition to eligibility by symptom screening. The observed agreement (95%CI) between the field medical officers and the expert panel in terms of reporting the X-ray was very good [91.7% (91.5 - 91.8)] in the survey (Table). The prevalence adjusted, bias adjusted kappa (95% CI) was 83.4 (83.0 - 83.7) indicating a strong agreement between the pulmonologist and field medical officer.

Timely reporting of X-ray reading is a crucial factor for good conduct of any TB survey. Many surveys across the world have reported major challenges in CXR reading and have a lot of incomplete reporting due to lack of expertize in CXR reading.[1,2] Some countries were able to make radiologist read only specific categories of X-rays and in some surveys they had a huge backlog of X-rays which had to be completed after the survey operations.[3,4] TB surveys as well as active case findings largely rely on CXR screening. The survey also reported various challenges in CXR reading by the expert panel in the district level.[5] Despite, these challenges,

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we successfully completed all CXR readings within 48 to 72 hours. Due to the delay in CXR reporting by a few days, the survey team faced many challenges with sputum collection because some participants had travelled out of town. Relying on CXR readers at the local level can avert such issues provided the local medical officers are trained in that aspect. Of late, artificial intelligence are in place to report CXR in active case finding activities, but this is not available throughout the state. Considering the availability of the resources, the survey results adds evidence that it is possible to implement quality assured CXR reporting in the field by doctors in the primary care similar to the expert pulmonologist in tertiary care with proper training.

Table 1: Agreement between the Chest X-ray Reading by the Field Medical officer with the Readers panel

MO	Readers Panel		Total
	Normal	Abnormal	
Normal	114000 (90.6)	1769 (1.4)	115769 (92)
Abnormal	8709 (6.9)	1410 (1.1)	10119 (8)
Total	122709 (97.5)	3179 (2.5)	125888 (100)

The Agreement calculation is based on the observation with valid(i.e. Normal or Abnormal) from both the readers

Observed Agreement 91.7% (91.5 - 91.8)

PABAK Prevalence Adjusted, Bias Adjusted Kappa Agreement

83.4 (83.0 - 83.7)

ACKNOWLEDGEMENT

The authors like to acknowledge all the DDHS, DTOs and Medical officers who were involved in X-ray reading for the survey.

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