

Tuberculosis diagnosis using Artificial Intelligence:

A field study to evaluate the effectiveness of TB-AI diagnostic machine.

Category: **Innovation and transformation in healthcare**

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INTRODUCTION

Tuberculosis has a high burden in Eastern Mediterranean region, it's a low strata disease. Failure to combat TB is misdiagnosis, delay in diagnosis, shortage of HR, inappropriate drug regimens, poor follow-up for high-risk populations. Tuberculosis is a leading cause of death in South Africa as well, about 450,000 people develop the disease every year 270,000 of those are also living with HIV. Ten people die from it every hour. KwaZulu-Natal province has the highest rate of TB in the country at 737 per 100,000 population.

RESULTS/FINDINGS

TB-AI can provide quick results and error free results which are not influenced by external factors like temperature ceiling, electrical supply, cartridge shelf-life, calibration crisis. Hence there is reduction in the number misdiagnosis, replaces the human expertise. Also this has saved us from monthly or quarterly of cartridge or module upgradation like CADx and Genexpert and can be easily used on mobile units or anywhere.

ANALYSIS

The z-test and CI for sample N shows results from TB-AI as 292 positives with a p-value of 0.5 and from Genexpert as 300 positives (which later become 292 by testing on different Genexpert machine) with a p-value of 0.6 indicates that TB-AI efficacy is better than Genexpert as external factors are not influencing the results and overcoming the problem of misdiagnosis.

OBJECTIVE

TB-AI is a diagnostic machine that work on Artificial Neural Network Model algorithm based upon ML: Machine Learning, via image processing can provide quick diagnostic results, reduce error rate and misdiagnosis and can solve the problem of shortage of HR.

METHODOLOGY

This machine has been taught through machine learning over 500 AFB positive and 500 AFB negative pre prepared and diagnosed slides. The learnt machine prototype were allowed to test 500 suspected cases out of which 208 samples came negative and 292 came positive. When these same samples were tested on Genexpert 300 samples came positive and 200 negative and those two positive cases were re-tested at five different Genexpert machines with different technicians came out to be negative as well later on, conditions like shelf life of cartridge, electrical supply, recalibration and temperature ceiling can often results in misdiagnosis.

