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ORIGINAL ARTICLE

Preliminary Detection of Pulmonary Tuberculosis amid Patients Having Assorted Symptoms

Sakshita Agnihotri[1] and **Ritu Bhatnagar**[2]
1Ph.D. Scholar, Pacific Medical College and Hospital, Udaipur, Rajasthan (India).
2Professor and Head, Department of Microbiology, Pacific Medical College and Hospital, Udaipur, Rajasthan (India).
*Corresponding Author

ABSTRACT
Tuberculosis (TB) is an infection caused by Mycobacterium tuberculosis (MTB) and primarily affects the lungs. In general, pulmonary tuberculosis (TB) is thought to be the cause of approximately 85% of all tuberculosis cases, and extrapulmonary tuberculosis (EPTB) is the remaining 15%. To use CBNAAT to diagnose the proportion of individuals presenting with different symptoms of pulmonary tuberculosis. Sputum samples were obtained from 275 individuals with high levels of clinico-radiological suspicion and processed at diagnostic institutions in western Rajasthan with CBNAAT testing capability. We observed that 87.27% of patients had a chronic cough. Weight loss/loss of appetite was seen in 69.82% of patients. Fever was observed in 65.82% of patients, followed by chest discomfort in 55.64%, weakness in 49.09%, hemoptysis in 33.82%, myalgia in 20%, a TB contact history in 15.27%, and night sweats in 9.45%. Tuberculosis, although being a common illness, may not always appear with traditional signs and symptoms and smear positive. In these cases, we want a trustworthy technique of diagnosis that is universally accepted. The current study used CBNAAT as a potential test for TB identification.
Keywords: *CBNAAT techniques, cough, fever, Mycobacterium tuberculosis and TB symptoms.*

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INTRODUCTION

Tuberculosis (TB), caused by Mycobacterium tuberculosis (MTB), remains one of the deadliest epidemics in the world. The disease commonly affects the lungs (pulmonary tuberculosis) and is spread by airborne transmission from patients with pulmonary tuberculosis [1]. WHO estimates that between 2000 and 2020, about 1 billion people will become newly infected, 200 million will become ill, and 35 million will die from tuberculosis. The decline in tuberculosis deaths has increased each year since 2005, but the COVID-19 pandemic has reversed that number. On the other hand, the total number of deaths in 2020 was similar to the number of deaths in 2017. The same trend was evident in global tuberculosis mortality. (Annual number of deaths per 100,000 population)

The number of officially confirmed global deaths from tuberculosis in 2020 (1.3 million) will be almost double the number of deaths from HIV/AIDS (680,000), and the number of deaths from tuberculosis in 2020. Rates were surpassed by the COVID-19 pandemic, which had a greater impact than HIV/AIDS. In contrast to tuberculosis, HIV/AIDS deaths continued to decline from 2019 to 2020 [2]. HIV infection is now considered the greatest risk factor for developing latent tuberculosis infection to active tuberculosis. Co-infection with HIV and tuberculosis, especially in combination with drug resistance, has caused some increased mortality [3]. According to the latest data, approximately 7 million new and recurrent TB cases were recorded worldwide in 2018, with overall incidence rates of 10 million and 133 per 100,000 people, respectively. 100,000 each. In the same year, global deaths rose to 1.5 million, of which 251,000 were HIV-positive [4]. WHO's Sustainable Development Goals (SDGs) and End Tuberculosis Program aim to end the global tuberculosis epidemic with the goal o f reducing tuberculosis mortality by 95% and reducing tuberculosis cases. 90% reduction by 2035 [5].

Tuberculosis (TB) is an infection caused by Mycobacterium tuberculosis (MTB) and primarily affects the lungs. In general, pulmonary tuberculosis (TB) is thought to be the cause of approximately 85% of all tuberculosis cases, and extrapulmonary tuberculosis (EPTB) is the remaining 15% [6]. WHO TB statistics for India 2021, estimated incidence of 2.59 billion cases. This corresponds to a ratio of 188 per 100,000 inhabitants. Pulmonary tuberculosis accounts for 71% of all tuberculosis cases [2]. The most common signs of pulmonary tuberculosis include fever, anorexia or loss of appetite, weight loss, night sweats, anemia, and a persistent cough (lasting more than 14 days) with pus or bloody phlegm. Patients may complain of local chest discomfort caused by inflammation of the pleura. Patients with severe long-term lung disease may experience shortness of breath. In addition to these well-known clinical manifestations, many additional secondary systemic problems have also been associated, including: B. Increased oxidative stress and hyponatremia, hypocholesterolemia, glucose intolerance, hematologic manifestations, vitamin D deficiency, and changes in host microbiota [7].

Improving tuberculosis diagnosis is a global priority in tuberculosis control and requires early case detection, especially in the case of swab-negative disease, which is often associated with HIV co-infection and young age. The alarming increase in MDR-TB cases, the global emergence of widespread drug-resistant tuberculosis (XDR-TB), the observed institutional prevalence, and the increasing mortality of patients with MDR imperative for rapid diagnostic techniques is required for Co-infection with tuberculosis or XDR-TB and HIV [8].

Therefore, in December 2010, WHO recommended a cartridge-based nucleic acid amplification test (CB-NAAT), also known as his GeneXpert device, for the diagnosis of tuberculosis. The October 2013 WHO guidelines include a conditional recommendation of GeneXpert MTB/RIF as the first diagnostic test for all adults [9].

MATERIAL AND METHODS

Study Design: This is a prospective study conducted under the guidance of Department of Microbiology at the Pacific Medical College and Hospital in Udaipur, Rajasthan, India. After obtaining Ethical clearance and consent from the Institutional Ethical committee, the study was carried out from 2020 to 2022.

A total of 275 sputum samples were obtained.

Inclusion Criteria:

1. Clinical and radiological characteristics suggestive of pulmonary tuberculosis.
2. Two sputum smear samples from patients who had been clinically suspected of having tuberculosis.
3. Patients providing written informed consent.

Exclusion Criteria:

1. Patients between the ages of 18 and 75.
2. Patients who have received antitubercular therapy for more than one month in the previous six months.
3. HIV-positive individuals.
4. Women who were pregnant and lactating.
5. Suspected cases of extrapulmonary tuberculosis.
6. Patients with diseases related to bleeding disorders, history of myocardial infarction, signs of respiratory or cardiac failure.
7. Uncooperative patients.

Sample collection and examination: In terms of disease detection and containment, a good quality sputum is crucial. An excellent quality sputum sample is one that contains mucopurulent, and caseous material and is expelled from the lower respiratory tract. For this, a volume of 3-5 ml is adequate. The PTB patients who had given their consent and were clinically suspected were made to send two sputum samples each. Both the samples, which were obtained by the patient during his visit to the collection facility were processed for molecular detection of Tuberculosis by CBNAAT. As per the recommendations of the Revised National Tuberculosis Control Program (RNTCP), the samples were submitted for GeneXpert/CBNAAT testing to identify the presence of M. tuberculosis. The samples were taken in pre-sterilized Falcon tubes that were packed three layers deep for security. These were processed in accordance with the Central TB Division's Guidance Document for Use of CBNAAT under RNTCP and the GeneXpert Dx system operator manual.

RESULT

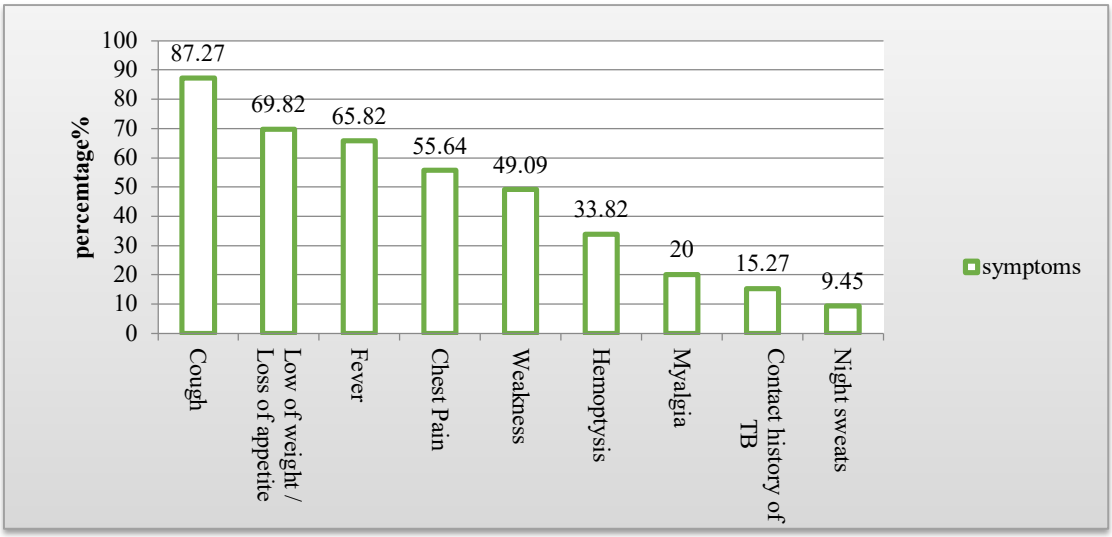
A total of 275 patients participated in the study. 262 patients with clinical and radiological evidence of pulmonary tuberculosis were proven positive by CBNAAT test and were timely qualified. The clinical symptoms observed in all the patients were as shown in Table 1.

Table 1:- Distribution of cases according to the following symptoms

Symptoms	Number	Percentage%
Cough	240	87.27
Low of weight / Loss of appetite	192	69.82
Fever	181	65.82
Chest Pain	153	55.64
Weakness	135	49.09
Hemoptysis	93	33.82
Myalgia	55	20
Contact history of TB	42	15.27
Night sweats	26	9.45

We found that 87.27% of cases complained of persistent cough, followed by weight loss/loss of appetite in 69.82% of cases. 65.82% of the cases complained of fever, 55.64% of chest pain, 49.09% of weakness, 33.82% of hemoptysis, 20% of myalgia, 15.27% of history of tuberculosis, and 9.45% of night sweats.

Graph No. 1:- Distribution of cases according to the following symptoms



DISCUSSION

Coughing is a complicated physiological event that serves as both a symptom and a defence mechanism against respiratory infections. Cough is a characteristic symptom of pulmonary tuberculosis and is clinically monitored throughout the TB care continuum. According to the study of Elina et al., 49.5% of patients had a cough and 46% had a fever; these symptoms were chronic (lasting 10 days) in roughly 20% of patients [10]. Which is similar to our study. Turner R. D [11], Field SK et al [12] and Huddart et al [13] noted persistent cough as the predominant symptom of patients in their research and advocated screening of such patients for TB in impacted countries, which is consistent with our findings.

While many TB screening programmes utilise cough duration and symptoms to decide whether TB testing is necessary, this kind of symptom screening is insensitive. Because triage technologies such as chest X-rays are not available in low-resource settings, peripheral health centres, and communities, symptom-based screening remains the sole available method for identifying persons with tuberculosis [14].

Fever is a common symptom in TB patients, occurring in 60-85% of PTB cases and 30-55% of EPTB cases [15-17]. This was similar to our findings. PTB is easily identified by usual symptoms such as a persistent cough, fever, weight loss, and abnormal chest X-ray results. Lawn SD et al. (2011)[18] supported our findings. Luies L. et al. [19] said in their study that the prevalence of TB symptoms such as cough observed in persons ranging from 42% to 89% and fever found in individuals ranging from 23% to 68% might be ascribed to the diverse individual study groups employed in the various studies.

The successful management of mycobacterial infection depends on an accurate and prompt diagnosis. The CBNAAT technique was shown to be a useful tool in the current research for MTBC diagnosis. Given that it takes little time and is inexpensive, it may be very helpful in developing nations for regular rapid diagnosis. Iram et al [20] and zeka et al [21] shared the same thought as us.

CONCLUSION

Although TB is a prevalent illness, typical signs and symptoms and smear positive are not always present. In these instances, we require a reliable and well acknowledged diagnostic procedure.

The CBNAAT was employed as a possible test for early identification of tuberculosis in the current study. In the current investigation, individuals with single or multiple symptoms who would otherwise have been ignored were able to begin the CBNAAT test, which was shown to be positive in more than 95% of the instances.

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