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AN EPIDEMIOLOGICAL STUDY IN XDR-TB PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

BACKGROUND: *India with a major burden of multidrug-resistant tuberculosis (MDR-TB) does not have national level data on this hazardous disease. Since 2006, emergence of extensively drug-resistant TB (XDR-TB) is considered a serious threat to global TB control. This study highlights the demographic and other epidemiological factors associated with XDR-TB in Lucknow.*

METHODS: *The study was conducted for a period of one year. Sputum samples were cultured using rapid, automated liquid culture system (MGIT 960). Drug susceptibility testing (DST) for Rifampicin (RIF) and Isoniazid (INH) was performed for all positive M. tuberculosis (M.tb) cultures. All MDR-TB isolates were tested for sensitivity to second-line drugs.*

RESULTS/FINDINGS: *In the present study it was found that the patients were mainly males who were suffering from XDR-TB visiting our tertiary center. The age group ranged from 17-52 years and was not seen in the pediatric age group. The patients mainly had pulmonary form of tuberculosis as none of the patients had extra-pulmonary tuberculosis. Most of the patients who had XDR were malnourished and had the weight between 26-45 kilograms. In the study majority of patients were on standard treatment for XDR patients as per RNTCP guidelines. One patient was defaulter and two mortalities were seen in our study. Majority of patients were from the Lucknow district.*

CONCLUSIONS: *The actual incidence and prevalence rate of XDR-TB in India is not available, although some scattered data is available. This study raises a concern about existence of XDR-TB in India, though small, signaling a need to strengthen the TB control program for early diagnosis of both tuberculosis and drug resistance in order to break the chains of transmission*

KEYWORDS : Tuberculosis, XDR-TB, India

INTRODUCTION

Tuberculosis (TB) has existed for millennia and remains a major global health problem. It causes ill-health in millions of people each year and in 2015 was one of the top 10 causes of death worldwide, ranking above HIV/AIDS as one of the leading causes of death from an infectious disease. [1] The upward revisions to estimates of the burden of TB disease in India for the period 2000–2015 follow accumulating evidence that previous estimates are too low. This evidence comprisesof household surveys, a state-wide TB prevalence survey, studies of anti-TB drug sales in the private sector, notification data and new analysis of mortality data [2]. Globally, emergence of drug resistance is a dangerous alarm. An extremely worrisome aspect of tuberculosis is a recent rise to multi drug-resistant (MDR) and extremely drug-resistant (XDR) TB [3]. The increase in the incidence MDR and XDRtremendous challenges to the global efforts to battle tuberculosis. [4]

In 2015, there were an estimated 48,0000 new cases of multidrug-resistant TB (MDR-TB) and an additional 10,0000 people with rifampicin-resistant TB (RR-TB) who were also newly eligible for MDR-TB treatment [2]. However load of MDR-TB accounting for almost 50% of world total cases carry together by India and China alone.3 Due to their drug resistance, tuberculosis have emerged as a serious problem in the world. MDR-TB (defined as in vitro resistance to anti-tuberculous drugs, isoniazid and rifampicin) and XDR-TB (defined as in vitro resistance to isoniazid, rifampicin, any fluoroquinolones and at least one of three injectable second-line drugs) are now widely reported.The is difficult to cure and requires prolonged treatment with expensive and often toxic multidrug regimens[1].

Treatment outcomes have been significantly worse for patients with XDR TB than for patients with TB that is either drug-susceptible or

MDR tuberculosis [5–7]. In the first recognized outbreak of XDR TB, Gandhi et al [8] reported that 53 patients in KwaZulu-Natal, South Africa, who were co-infected with XDR TB and human immunodeficiency virus (HIV) survived for a median of only 16 days, with a mortality of 98%. Although some subsequent studies have reported better outcomes [9], therapeutic options for XDR TB are extremely limited because second-line drugs are less effective, more toxic, and more costly than are first-line therapies, and XDR TB strains are, by definition, resistant to the more potent of theSecond-line options. Although several new drugs are being evaluated for the treatment of XDR TB, none are currently available. Therefore the aim of current study is an attempt to find out the true prevalence of XDR-TB cases.

MATERIAL & METHODS

This observational study involved category II sputum positive pulmonary tuberculosis patients, aged 0 to 65 years. The cases were recruited for one year through the outdoor/indoor-patient who visited department of Respiratory Medicine,King George's Medical Sciences Lucknow,Uttar Pradesh.

After the subject provided informed consent, an interview was conducted to collect demographic, epidemiologic, and clinical information. Patients' medical records were abstracted to collect detailed information about comorbidities and treatment history. Patients were observed monthly until the completion of the prescribed treatment regimen. Treatment outcome definitions for cure, failure, relapse and default followed the guidelines of the World Health Organization.

Definitions:

- **Cure:** MDR-TB patient who has completed treatment according to programme protocol and has at least five consecutive negative cultures from samples collected at least 30 days apart in the final 12 months of treatment. If only one positive culture is reported during that time, and there is no concomitant clinical evidence of deterioration, a patient may still be considered cured, provided that this positive culture is followed by a minimum of three consecutive negative cultures taken at least 30 days apart.

- **Completed:** MDR-TB patient who has completed treatment according to programme protocol but does not meet the definition for cure because of lack of bacteriological results (i.e. fewer than five cultures were performed in the final 12 months of treatment).

- **Died:** MDR-TB patient who dies for any reason during the course of MDR-TB treatment.

- **Failed:** Treatment will be considered to have failed if two or more of the five cultures recorded in the final 12 months of therapy are positive, or if any one of the final three cultures is positive. (Treatment will also be considered to have failed if a clinical decision has been made to terminate treatment early because of poor clinical or radiological response or adverse events.

- **Default:** MDR-TB patient whose treatment was interrupted for two or more consecutive months for any reason without medical approval.

- **Transfer out:** MDR-TB patient who has been transferred to another reporting and recording unit and for whom the treatment outcome is unknown.

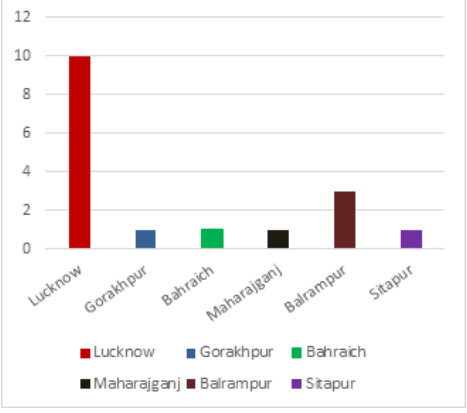
All patients were subjected to sputum-smear microscopy for acid-fast bacillus (AFB) and chest radiography at the time of enrollment in category II treatment for the study. All sputum specimens were subjected to culture on MGIT. The positive cultures were evaluated pattern for mycobacterial culture and drug susceptibility testing (DST).Drug susceptibility testing (DST) for Rifampicin (RIF) and Isoniazid (INH) was performed for all positive M. tuberculosis (M.tb) cultures. All MDR-TB isolates were tested for sensitivity to second-line drugs [Amikacin (AMK), Capreomycin (CAP), Ofloxacin (OFX), Ethionamide (ETA)]. The sensitivity tests were set up with inoculum prepared from the growth of selected positive culture. The standard reference strain H37Rv was tested in addition with each batch of tests.

PARAMETERS		TOTAL
Sex	Males	13
	Females	4
Age	Range (Years)	17-52
	Average(Years)	30.24
Site of Disease	Pulmonary	17
	Extra-pulmonary	0
Weight	<26Kgs	0
	26-45Kgs	12
	>45Kgs	5
Outcome	On-Treatment	14
	Default	1
	Expired	2

RESULTS

CLINICO-EPIDEMIOLOGICAL PARAMETERS IN PATIENTS WITH XDR-TB

DISTRICT-WISE DISTRIBUTION OF PATIENTS WITH XDR-TB



DISCUSSION

XDR-TB is a serious global health threat. The emergence of XDR TB reflects a failure to implement the measures recommended in the WHO's Stop TB strategy.In the present study it was found that the patients were mainly males who were suffering from XDR-TB visiting our tertiary center. The age group ranged from 17-52 years and was not seen in the pediatric age group. The patients mainly had pulmonary form of tuberculosis as none of the patients had extra-pulmonary tuberculosis. Most of the patients who had XDR were malnourished and had the weight between 26-45 kilograms. In the study majority of patients were on standard treatment for XDR patients as per RNTCP guidelines. One patient was defaulter and two mortalities were seen in our study. Majority of patients were from the Lucknow district.

CONCLUSIONS

Extensively drug-resistant tuberculosis (XDR-TB) is a known serious health hazard in India and sub-tropical countries. There is urgent need for strengthening the clinic-epidemiological surveillance so that the diseases can be curtailed. The laboratory diagnosis is cumbersome in the XDR TB patients and laboratories must be strengthened across the country so that the early detection and timely treatment can be done.

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