International Journal of Medical and Health Research
ISSN: 2454-9142, Impact Factor: RJIF 5.54
www.medicalsciencejournal.com
Volume 3; Issue 8; August 2017; Page No. 74-76

Impact of intervention on incidence of tuberculosis among health care workers (HCWs) from tuberculosis speciality hospital, Mumbai, India

[1] Dr. Rajendra Nanavare, [*2] Dr. Dilip Kadam, [3] Dr. Lalit Anande

[1] Consultant International Union against TB & Lung Diseases, Ex- Medical Superintendent G.T.B. Hospitals, Sewri, Mumbai, Maharashtra, India

[2] Asst. Prof., Dept. of P.S.M., Seth G. S. Medical College, K.E.M. Hospital, Mumbai, Maharashtra, India

[3] Chief Medical Officer, G. T. B. Hospitals, Sewri, Mumbai, Maharashtra, India

Abstract

Introduction: Tuberculosis (TB) is a global public health problem, India has highest burden of TB cases in the world. Transmission of TB in health care settings is documented. The health care workers are exposed to TB cases directly. Number of Health Care Workers (HCWs) who acquired TB at Speciality TB hospital was 65 in 5 years. Therefore, prevention and control of TB among health care workers was a challenge. Various measures including surveillance and prompt treatment reduced the incidence of TB in HCWs.

Methodology: It is hospital based cohort study. Total 842 employees were followed up for duration of 5 years. HCWs were counselled to participate in the study. Routine clinical examination was done along with Lab investigations such as sputum smear for AFB, chest X-ray, Gene Xpert, and LPA & MGIT. Standard treatment protocol was observed at all stages of patient management. Data was collected in individual case record form & was entered in Excel sheet & analysed by SPSS software.

Results: 12.1% of HCW developed TB belonged to age group 49 – 58 yrs. (p=0.035). 11.9% of the HCW were male while 2.4% were females. The maximum no of TB cases were among labour staff (10.9%). The incidence of new cases of TB decreased from 2.1% to 1.1%.

Conclusion: Political, administrative & technical staff commitment helped to decrease the incidence of TB in HCWs.

Keywords: tuberculosis, health care workers, speciality TB hospital, prevalence of TB in HCWs

Introduction

In 1991, the World Health Assembly (WHA) resolution recognised Tuberculosis (TB) as a major global public health problem. Thereafter, in 1993, the World Health Organisation (WHO) recognised the lethal impact of this disease and declared it a "Global Emergency" [1]. India is the highest tuberculosis (TB) burden country accounting for a quarter (26%) of the global incidence [2]. And even today, two deaths occur every three minutes from TB [3].

TB is the cause of grave human and economic costs, leading to immense pain and suffering for both the individual patient and his or her family. TB primarily affects people in their most productive years of life, it is highly stigmatised leading to discrimination in community and workplace [4].

There is a worldwide concern on the risk of acquiring tuberculosis by health care workers looking after the patients suffering from an active infectious disease. This is so as TB is an airborne disease and presentation of disease is delayed [5]. Today physicians, nurses, and health care workers at several hospitals have been placed under difficult circumstances. They are treating more and more patients who have tuberculosis and many of them harbour multidrug- resistant strains [6, 7, 8]. It is important that health care workers should be educated about the disease, signs and preventive measures. They should use all precautionary measures while dealing with sputum positive cases. The problem of Tuberculosis in Health care workers has seldom been studied systematically in India. As a consequence, there are virtually no published studies on this topic from India. Thus all the available epidemiological data are from other parts of the world [9]. In USA, there was a nationwide fall in tuberculosis case rate, but case rate of tuberculosis in health care workers did not show similar trend. Tuberculosis came to be recognised as an occupationally acquired disease by court in the USA [10].

It is a time to start thinking about the health and well-being of the health care workers who shoulder the responsibility of the entire health system and without whose efforts and help, it would be impossible to wage war against diseases [9].

Therefore this study was planned to understand the prevalence of TB among HCWs of speciality TB hospital and to decrease the incidence of TB among same workers.

Aim

To study the incidence and prevalence of Tuberculosis among Health Care Workers in speciality TB Hospital

Objectives

1. Assess the demographic profile of HCWs
2. Determine the incidence & prevalence of TB among HCWs
3. Assess the results after implementing the measures to prevent transmission of TB amongst HCWs
4. To suggest the suitable recommendations based on study findings.

Methodology

Place of study: The speciality Tuberculosis Hospital in Mumbai city. Type of study: This was a hospital based cohort

study. The duration of study: The employees working in the hospital were followed up for 5 years duration.

Sample selection method: Total 842 workers were enrolled in the study. Thus convenient sampling method was used for selecting the samples. The Health Care Workers gave their consent for their participation. The employees' OPD was used for the clinical and laboratory examinations.

Data collection tool: The data was collected using standard case record form. This data was obtained through personal interview method.

The Investigations: The investigation in symptomatic patients included sputum smear microscopy, chest radiograph, Gene Xpert, Line Probe Assay, Molecular technologies and Liquid culture(MGIT 960 were used to diagnose TB & MDR TB. Blood sugar estimation was done to rule out co- morbid condition like Diabetes.

Statistical Analysis: The collected data was entered in Microsoft Excel sheet and analysed by Statistical software (SPSS software).

Results and Discussion

Surveillance of HCWs was carried out during 2011 to 2015, we screened 845 HCWs each year in OPD designated for HCWs, and routine medical check-up was done along with laboratory investigations to confirm the diagnosis and rule out co morbid condition. Record of all HCWs was maintained in individual case record form.

All the data collected was analysed and presented in tables as given below.

Table 1: Age wise distribution of HCWs

Age group (years)	No. Of HCWs (842)	PTB cases	
		No.	%
18 – 28	076	04	5.3
29 - 38	277	22	7.9
39 - 48	290	15	5.2
49 - 58	199	24*	12.1

By Chi Square test, P = 0.001, *Significant

Table 1 shows that the maximum percentage of workers belonged to the age group of 39 to 48 years. The maximum percentage of patients (12.1%) suffering from Tuberculosis belonged to the age group of 49 to 58 years followed by 7.9% patients belonging to 29 to 38 years age group. The difference observed is statistically significant. Thus tuberculosis disease is seen in all age groups and is seen more common in elderly [11].

Table 2: Gender wise TB cases in health care workers

Gender	No. of cases (n = 842)	PTB cases	
		No.	%
Male	470	56*	11.9
Female	372	09	02.4

Chi Square test
P = 0.001, *Significant

More male workers were working in the hospital as compared to the female workers. Also more cases of tuberculosis were seen among male participants. The male preponderance of tuberculosis cases is also reported by WHO in its Global Report, 2005 [12] and similar studies [13, 14].

Table 3: Association between Site & Type of TB.

Site	Non MDR		MDR		Total. (n =65)	
	No.	(%)	No.	(%)	No.	(%)
Pulmonary	15	(33.3)	*30	(66.7)	45	(69.2)
Extra Pulmonary	12	(60.0)	08	(40.0)	20	(30.8)

Chi Square test
P = 0.001, *Significant

Table 3 shows that out of 45 pulmonary tuberculosis cases, 30 (66.7%) were MDR cases diagnosed by Gene Xpert machine and Liquid culture technique of MGIT 960 machine (Accredited by RNTCP). The extra pulmonary cases were more in non MDR category (60%). The prevalence of MDR tuberculosis cases in HCWs was more than the general population of previously treated for tuberculosis[15]. Thus the MDR TB among HCWs of Tuberculosis hospital is an occupational hazard [16].

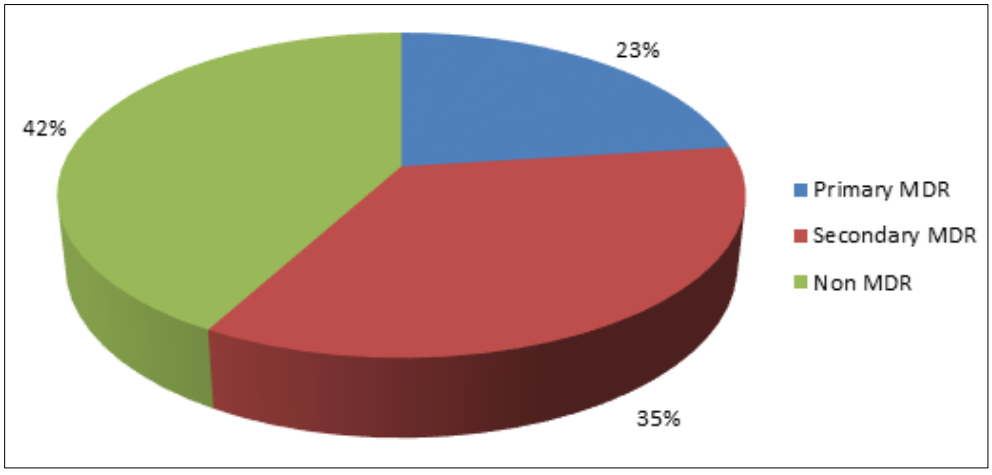

Fig 1: Profile of TB cases among HCWs

Above figure shows the profile of tuberculosis cases among health care workers of TB Hospital. Non MDR cases contributed 42%, Primary MDR cases contributed 23% while 35% cases were due to secondary MDR Tuberculosis (N=65).

These percentages of primary and secondary MDR cases are far more than those cited by WHO i.e. 3% and 20% respectively [16]. Such a high prevalence of MDR tuberculosis among HCWs of TB hospital who suffered from TB is an alarming situation.

Table 4: Incidence of TB among HCWs screened

Year	No. Of cases screened	Old cases.		New cases (Incidence)		Total. (Prevalence)	
		No.	%	No.	%	No.	%
2011	840	06	0.7	01	0.1	07	0.8
2012	838	07	0.8	12	1.4	19	2.3
2013	850	19	2.2	25	2.9	44	5.2
2014	847	44	5.2	12	1.4	56	6.6
2015	837	56	6.7	09	1.1	65	7.8

The above table shows the prevalence of tuberculosis among HCWs over the 5 years duration. The sudden peak of tuberculosis cases in 2013 were due to special drive started in 2012 for HCWs by the authorities which included training of all employees in TB disease, Personal protective equipment's to all employees, periodic screening of employees for tuberculosis and special diet to all employees on duty. Special leave was sanctioned to employees taking anti –TB drugs for the total duration of treatment. These worker friendly measures attracted all HCWs suffering from TB to take treatment from hospital regularly. The dividends of these efforts were seen in subsequent years in form of decreasing incidence and deaths due to TB among HCWs.

Conclusion

Tuberculosis is a public health problem and more severe in hospital settings like TB hospital. Special efforts are needed to curb the severity of tuberculosis among health care workers in form administrative decisions for facilities, early clinical diagnosis and treatment initiation and surveillance for emergence of MDR TB among HCWs helped to decrease the incidence of new pulmonary as well as extra-pulmonary cases.

Recommendations

1. The ongoing training programme on Tuberculosis for HCWs help decrease the apprehension against the disease.
2. The regular surveillance for tuberculosis among HCWs can diagnose TB cases early.
3. Air borne infection control measures and good quality masks (N95 respirator) play vital role in decreasing the transmission of TB bacilli.
4. Adherence to anti TB drugs along with nutritious diet will help in early cure of patients. The role of counselling cannot be undermined for favourable outcome of MDR TB treatment.

Acknowledgement

The authors are thankful to The Municipal Commissioner, Additional Commissioner, The Executive Health Officer and Dy. Health Officer (RNTCP) for allowing conducting this study.

Conflict of interest: None.

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