Assessing the Occurrence of Tuberculosis Disease among Nurses of a Selected Tuberculosis Institute of Delhi

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Abstract

A structured interview was conducted among 100 randomly selected Nurses for descriptive survey to evaluate the occurrence of tuberculosis among nurses working in Institute of Pulmonary Medicine and Tuberculosis, Delhi. The findings of study revealed that 12 out of 100 nurses were having history of tuberculosis while working in the Institute. Out of these 12, most nurses were female i.e. 11 (91.67%) and 8 (66.67%) were immunised with BCG vaccine. When diagnosed with tuberculosis disease 9 (75%) of them were having less than 10 years of work experience, 2 (16.66%) having working experience of 21-30 years and 1 (8.33%) had working experience of 10-20 years, 11 (91.67%) nurses were working in TB ward and only 1 (8.33%) in MDR TB ward. Out of 12 only 6 (50%) suffered from pulmonary TB, 5 (41.67%) having extrapulmonary TB (3 lymph node tuberculosis + 2 abdominal Koch's) and 1 (8.33%) had MDR TB. 6 (50%) had taken treatment for 6 months, 4 (33.33%) had taken treatment of 8 months, 1 (8.33%) was having treatment for 1 year and 1 (8.33%) was on treatment for 2 years. Among these 11 (91.66%) had completed the treatment and were cured only and 1 (8.33%) had been on treatment.

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis that spreads from person to person through the air. TB usually affects the lungs, but it can also affect other parts of the body. TB is transmitted when a person with active pulmonary disease expels the organisms and susceptible person inhales the droplets and become infected. TB remains a major global health problem. It causes ill heath among millions of people each year and ranks as the second leading cause of death from an infectious disease worldwide, after the HIV. One fourth of the global incident TB cases occur in India annually. Globally10.4 million people fall ill from TB every year that comes to over 28,500 people every day; about 2.5 million cases were estimated to have occurred in India (WHO Global TB Report, 2016).

Occupational exposure to Mycobacterium tuberculosis constitutes a potential health hazard for health care workers (HCWs) worldwide. Recent reports from developing countries have shown that HCWs caring for patients with infectious TB are at high risk of acquiring M tuberculosis infection and disease. With the emergence of extensively drug resistance (XDR) strains of TB, there is growing concern about nosocomial transmission and a need to protect HCWs from TB. A recent review of several Indian studies showed that nosocomial transmission of TB is an important but poorly documented problem in India. The prevalence of LTBI and annual risk of TB infection appears to be high (about 5% per year, much higher than the national average of about 1.5%) among young HCWs and medical and nursing trainees suggesting an increased risk for acquiring TB in the hospital setting (Indian Journal of Tuberculosis, 2009).

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Guide: 1. Mrs Santosh Mehta, Ex Associate Professor; and 2. Dr Harindarjeet Goyal, Ex Vice-Principal RAK College of Nursing, Delhi).

Objectives

This study was undertaken to: (1) Assess the occurrence of tuberculosis disease among nurses working in Institute of Pulmonary Medicine and Tuberculosis; (2) Assess the type of tuberculosis common among nurses; (3) Assess the duration of treatment for TB taken by nurses.

Review of literature

A study was conducted by Aggarwal (2009) in PGI Chandigarh, India to assess the risk and incidence of active tuberculosis among resident doctors. The study had two groups. The first included 470 resident doctors. The second included 231 resident doctors freshly admitted to the institute over a one-year period. Tuberculosis was diagnosed based on history, radiology, laboratory workup, and response to treatment. In the first group, 9 doctors had tuberculosis while working in hospital, amounting to 11.2 new cases per 1000 people, 6 of them had extra pulmonary disease. In the second group, 4 doctors (2 junior and 2 senior residents) developed active tuberculosis in the first year of their work, amounting to an overall incidence of 17.3 per 1000.

Khyyam et al (2010) conducted a retrospective study, where all members of the staff working in LRS Institute of Respiratory Disease and Tuberculosis, Delhi, were interviewed regarding development of

tuberculosis after joining this institute. A total of 40 cases of tuberculosis were reported by the health care workers between March 1999 to March 2008 yielding an overall risk of 727 per 1,00,000 population per year which is four times higher than the reported national average. The overall risk of tuberculosis among HCWs was 727 cases per 100,000 population per year which is four times more than the reported incidence in general population (168 per 100,000 population).

Basavaraj et al (2016) conducted a retrospective study among HCWs in Pune in the state of Maharashtra, India and found that 26 (3.9%) cases of tuberculosis were reported among 662 medical trainees, representing an estimated incidence of 3,279 cases/100,000 person-years. Three of these infections were isoniazid-resistant, one was multidrug-resistant, and one occurred in a trainee who had fulminant hepatitis after starting treatment for TB.

Methodology

The research approach adopted was survey type. Research design was a descriptive survey. The study was set at Institute of Pulmonary Medicine and Tuberculosis, Delhi. The sample had 100 nurses by random selection. Structured Survey Interview Schedule was used, this consisted of 2 parts, section I (structured survey interview schedule for sample characteristics and occurrence rate of tuberculosis among 100 Nurses) and section II (structured survey interview schedule to assess the findings related to tuberculosis among 12 nurses).

Intervention: After approval and ethical clearance the investigator administered the structured survey interview schedule to 100 randomly selected nurses (20 each day) for 5 days.

Results

Table 1 shows that:

- According to age, majority of sample (45%) belonged to the age group of 31-40 years, followed by age group of 41-50 years (29%), 18 percent in age group of above 50 years and only 8 percent belonged to age group of 21-30 years.
- Majority of sample (79%) were female and 21 percent of sample were male.
- As per professional qualification, none of the nurses were MSc in nursing and only 12 percent were having professional qualification of BSc Nursing. Majority of nurses (88%) were GNM.
- According to designation, majority of samples (83%) were nursing officer, and only 17 percent was senior nursing officer.
- As per total working experience in TB hospital, only 6 percent nurses had more than 30 years of experience, majority (36%) of nurses had 1-10 years of experience and 29 percent nurses had working experience of 11-20 years, 23 percent had 21-30 years and 6 percent have above 30 years of work experience.
- Majority of sample (79%) were working in various TB wards, 11 percent sample were working in emergency, 6 percent working in OPD, and 3 percent of samples were working in Bronchoscopy department and only 1 percent was from ultrasound room.
- As per BCG vaccination status majority of sample (69%) were immunised, 12 percent were not

Table 1: Frequency and percentage distribution of Nurses under study (N=100)

Sample characteristics	Frequency	Percentage
Age (years)		
21-30	8	8
31-40	45	45
41-50	29	29
Above 50	18	18
Gender		
Male	21	21
Female	79	79
Professional qualification		
GNM	88	88
BSc Nsg	12	12
MSc Nsg	0	0
Designation		
Nursing Officer	83	83
Senior Nursing Officer	17	17
Total work experience in TB Hospital		
Less than 1 year	6	6
1-10 years	36	36
11-20 years	29	29
21-30 years	23	23
Above 30 years	6	6
Department of posting		
Ward	79	79
OPD	6	6
Emergency	11	11
Bronchoscopy	3	3
Ultrasound room	1	1
BCG Vaccination		
Immunized	69	69
Not Immunised	12	12
Not known	19	19
Personal habits		
Smoking	1	1
Alcohol intake	4	4
Tobacco chewing	3	3
No such habits	92	92

Table 2: Occurrence of tuberculosis among nurses working in Institute of Pulmonary Medicine and Tuberculosis (N=100)

No. of samples	%	Sample having history of tuberculosis	%	Rate of occurrence
100	100	12	12	12%

Table 3: Frequency and percentage distribution of characteristics of nurses who with history of tuberculosis, assessed by structured interview survey (N=12)

Sample characteristics	Frequency	Percentage
Age (years)		
31-40	3	25
41-50	6	50
Above 50	3	25
Gender		
Male	1	8.33
Female	11	91.67
Professional qualification		
G.N.M	11	91.67
BSc. Nursing	1	8.33
Designation		
Nursing Officer	8	66.67
Senior Nursing Officer	4	33.33
BCG Vaccination		
Immunized	8	66.67
Not Immunized	4	33.33
Work Experience in TB Hospital when diagnosed with TB		
Less than10 years	9	75
10-20 years	1	8.33
21-30 years	2	16.66
Department of posting when diagnosed with TB		
TB Ward	11	91.67
MDR Ward	1	8.33

immunised and 19 percent of the sample were unaware of their BCG immunisation status.

- Data revealed that 1 percent of nurses had habit of smoking, 4 of nurses had the habit of alcohol intake and 3 percent of nurses had the habits of chewing tobacco.

Data in Table 2 revealed that the occurrence rate of tuberculosis among nurses in Institute of Pulmonary medicine and Tuberculosis was 12 percent and 88 percent nurses were not diagnosed or having history of tuberculosis.

Findings related to Nurses who were having history/ symptoms of tuberculosis

Data in Table 3 shows that

- According to age, majority of subject i.e. 6 (50%) belonged to the age group of 41-50 years, 3 (25%) belong to age group of 31-40 years and 3 (25%) were of age above 50 years.
- Majority of subjects 11 (91.67%) were female and only 1 (8.33%) male.
- As per professional qualification, only 1 (8.33%) was BSc Nursing and majority of subjects (11, 91.67%) were GNM.
- According to designation, majority i.e. 8 (66.67%) were nursing officers and 4 (33.33%) were senior nursing officer.
- As per BCG vaccination status, majority of subjects i.e. 8 (66.67%) were immunised and 4 (33.33%) were not immunised.
- As per working experience in TB hospital when diagnosed with TB, only 1 (8.33%) had 10-20 years of working experience, 2 (16.66%) have 21-30 years of experience and majority of nurses (n=9, 75%) had less than 10 years of experience.
- Majority of subjects 11 (91.67%) were working in various TB wards and only 1 (8.33%) was in MDR TB ward when diagnosed with TB.

Data in Table 4 shows that:

- Out of total 12 TB cases, 6 cases were those of pulmonary TB (50%) and 5 cases of extrapulmonary (41.67%) and 1 case was MDR TB (8.33%).
- Out of 5 cases of extrapulmonary TB, 2 cases were abdominal Koch's (40%) and 3 cases were of lymph node TB (60%).
- According to category of treatment, maximum 10 (83.33%) subjects fell under category I, 1 (8.33%) in category II and 1 (8.33%) had suffered from MDR tuberculosis.
- As per duration of treatment majority of subjects i.e. 6 (50%) had taken treatment for 6 months, 4 (33.33%) for 8 months, 1 (8.33%) had taken treatment for 1 year and 1 (8.33%) was treated for 2 years.
- According to data 11 (91.67%) subjects completed their treatment and got cured and 1 (8.33%) had been on treatment and not cured.

Discussion

The present study revealed 12 percent occurrence rate of tuberculosis among the nurses working in Institute of Pulmonary medicine and Tuberculosis, Delhi. Findings of the present study were consistent with those of a cross sectional study conducted by Aggarwal (2009), to assess the prevalence of tuberculosis among health workers in which researcher concluded that nurses and nursing students showed higher prevalence of tuberculosis.

Findings of the present study were also consistent with the retrospective survey to assess the tuberculosis among health care worker conducted by Khayyam

Table 4: Frequency and percentages of types of tuberculosis disease, investigation, treatment, duration of treatment and response to treatment among nurses with history of tuberculosis (N-12)

Sample characteristics	Frequency	Percentage
Types of tuberculosis		
• Pulmonary	6	50
• Extrapulmonary	5 (2 Abd Koch's + 3 lymph node TB)	41.67 (16.66 + 25%)
• MDR	1	8.33
Investigation done		
1. Chest X-ray	11	91.67
Result:		
Tuberculosis	7	63.64
No tuberculosis	4	36.36
2. Sputum For AFB	7	58.33
Result: Positive	7	100
3. FNAC	3	25
4. ELISA	3	25
5. Culture and Sensitivity	1	8.33
6. CT scan	1	8.33
Categories of treatment		
• Category I	10	83.33
• Category II	1	8.33
• MDR	1	8.33
Duration of treatment		
• 6 Months	6	50
• 8 Months	4	33.33
• 1 Year	1	8.33
• 2 Years	1	8.33
Response of treatment		
• Cured	11	91.66
• Not-cured	1	8.33
Response of treatment		
• Completed	11	91.66
• Not completed	1	8.33

et al (2010), who found that risk of tuberculosis among nurses is 544 per 1,00,000 population per year is much higher than that of the general population.

The occurrence rate of tuberculosis was 12 percent among nurses working in Institute of Pulmonary Medicine and Tuberculosis, Delhi. Out of 12 Nurses majority of subjects i.e. 11 (91.67%) were female, 8 (66.67%) were Nursing officers, 11 (91.67%) had education qualification of GNM and 8 (66.67%) were immunised with BCG vaccine. While diagnosed with tuberculosis majority of subjects 11 (91.67%) were working in various TB wards and only 1 (8.33%) was from MDR TB ward and 9 (75%) nurses had less than 10 years of experience. Six (50%) had pulmonary TB, 5 (41.67%) had extrapulmonary and 1 (8.33%) case was MDR TB, 6 (50%) had taken treatment for 6 months and 11 (91.67%) subjects were cured and completed treatment while 1 (8.33%) was on treatment.

Implications

Nursing practice: In the scenario of MDR and XDR TB and overcrowded hospital it become utmost important for the Nurses to prevent and control tuberculosis among themselves. At the clinical area where large numbers of TB patients are coming nurses must use triage and take initiatives to spread awareness regarding prevention of tuberculosis.

Nursing administration and management: Nursing administration plays an important role in providing safe working environment for nurses. There is a need to sensitise the nurse administrators towards the prevention and control of tuberculosis among nurses.

Nursing education: Even though the care of patients with tuberculosis present in the nursing syllabus, educator should provide adequate learning experiences to the student to work and prevent air-borne infection. It is in the student life where the foundation of student is built. So Nurse Educator should make them aware of air borne infection, universal precaution and proper use of PPE.

Nursing research: Findings of the study, if communicated through a journal and/or other media will encourage the nursing personnel to follow good practice of prevention and control of tuberculosis among themselves and findings of the study serve as a basis for professionals and students to conduct further studies to generalise the findings.

Recommendations: A similar study can be undertaken on a large sample thereby findings can be generalised and a comparative study can be conducted to identify the occurrence of tuberculosis among nurses working in institute of pulmonary medicine and tuberculosis and nurses working in general hospital.

Conclusion

The occurrence rate of tuberculosis was 12 percent among nurses working in Institute of Pulmonary Medicine and Tuberculosis, Delhi which is much higher than the risk among general public. It is seen that majority of Nurses become infected within first 10 years of job and in our study, out of 12, 6 suffered from pulmonary TB, 5 suffered from extra pulmonary TB and 1 from MDR TB. During the era of MDR and XDR TB and overcrowded hospitals nosocomial transmission is of concern because it affects not only patients but healthcare workers, which could adversely affect health-services over time.

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