Assessment of Knowledge and Preventive Practices on Latent Tuberculosis Infection among Nursing staff at a Tertiary Care Centre at Goa

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Abstract:

Introduction: Latent tuberculosis infection presents with no symptoms. All nursing staff who work closely with patients must possess the appropriate knowledge and follow the right preventive practices to avoid latent tuberculosis infection. This study was carried out to assess knowledge and preventive practices on latent TB which will help in making recommendations for the control of TB infection among nursing staffs. **Objective:** To assess knowledge and preventive practices regarding latent Tuberculosis infection and to assess infection controlpractices among the nursing staff. **Method:** This was a facility based cross sectional study conducted among nurses who works in Outpatient departments and wards of tertiary care centre. A complete list of the participants was made, and data from all nurses employed in every ward and outpatient department of the hospital was collected using a semi-structured self-administered questionnaire. A sample size of 384 nurses was calculated using Cochrane formula with p=50% and simple random sampling was used. **Results:** Out of 384 nurses, 376 (97.9%) were females and 8 (2.1%) were males. Regarding prevention of latent tuberculosis, 327 (85.1%) nurses answered wearing of mask, followed by regular sterilisation of hospitals which was 281 (73.1%) nurses. Out of 384 nurses, 298 (77.6%) of them wear a mask while dealing with coughing patients. In this, 242 (81.3%) reported usage of a surgical mask while N95 mask is only used by 56 (18.7%) of them. **Conclusion:** Overall knowledge regarding latent tuberculosis was satisfactory among the nurses. Practice on infection control was not satisfactory.

Keywords: Infection control, Knowledge, Latent tuberculosis, Nurses, Practice

Introduction:

Tuberculosis (TB) is a major public health problem.[1] The spread of TB within medical institutions, or nosocomial TB transmission, is a major global concern for healthcare workers (HCWs) especially nursing staffs. Health care workers have a greater frequency of TB disease than the general population, and there is well-documented evidence of an increased risk of nosocomial TB transmission among them.[2] Latent tuberculosis infections do not cause symptoms and do not spread. The percentage of individuals who contract TB and develop TB disease and symptoms is quite low. Children and babies are more vulnerable.

In 2022, TB claimed the lives of 1.3 million people, including 1,67,000 HIV-positive individuals.[3] Every age group and nation have some form of tuberculosis.

The National Strategic Plan's four main pillars Detect, Treat, Prevent, and Buildare being carried out through strategic interventions.[4] In order to significantly lower the incidence, mortality, and treatment costs that TB patients must bear, as well as to strengthen health systems, tuberculosis infection control is a crucial part of the WHO Stop TB strategy.[5] A three-level hierarchy of control measures, comprising the following, should form the foundation of the TB infection control program: 1. Administrative control, 2. Environmental control, 3. Respiratory protection. There is a significant danger of tuberculosis for any member of the medical staff who treats people with the disease. To preserve health and stop the spread of the disease, it is imperative that all healthcare professionals especially nurses, who spend a great deal of time with these patients have the appropriate knowledge and skills about workplace safety measures.[6]

Health Care Workers frequently lack awareness about Tuberculosis Infection Control and are practicing without receiving proper Infection Control (IC) training. This probably adds to the higher risk of nosocomial tuberculosis transmission.[7] Data on nurses' understanding and usage of TB IC can serve as a crucial foundation for National Tuberculosis Elimination Programme efforts to address TB IC. As a result, the study evaluated nurses practices and knowledge on TB infection control. This study is aimed to assess knowledge and preventive practices regarding latent Tuberculosis and infection control among the nurses.

Method:

Study design, setting, and population

This was a hospital based Cross sectional study conducted among nurses who works in Outpatient departments and wards of Goa Medical College. Nurses were of 20-60 years of age. The study site was a tertiary care hospital providing treatment and other services for patients which is situated at Bambolim, Goa, India.

Inclusion criteria: All nursing staffs working in all OPDs and wards with minimum 1 year of experience.

Exclusion criteria: Nursing staffs working in Casualties, Intensive care units, nursing staffs on long leaves were excluded from the study.

Sampling method and Sample size

A list of 738 nursing staffs was obtained from matrons office. From this, a sample size of 384 was calculated taking prevalence as 50% using the Cochrane formula($n=Z^2pq/d^2$). Simple random sampling was carried out. Each individual in the nursing staff list was assigned a unique identifier (ID number) from 1 to 738. A random number generator was used to randomly select 384 numbers corresponding to the nursing staff IDs.

Data collection tool

A semi structured questionnaire was administered by face-to-face interview to collect sociodemographic data, and their knowledge and preventive practice regarding latent Tuberculosis infection. A pilot study Was conducted among 30 nursing staffs using the same questionnaire. The questionnaire was made with reference to A guide to developing knowledge, attitude and practice surveys by WHO.[8]

Data collection procedure

The study was carried out after ethical clearance of the research proposal by the Institutional Ethics Committee of Goa medical college. Data were collected in March 2023. Before data collection, the participants were explained the purpose and nature of the study. They were informed that they had full authority to withdraw from the study without fear and explanation at any time during data collection. Then, informed written consent was obtained from the nurses and face to face interview was carried out using the semi structured questionnaire. The filled questionnaire was kept confidential using code to link the respondent to the questionnaire and the records were kept confidential. The data obtained were used only for research purposes.

Data analysis

Data was entered in Microsoft Excel and analyzed using SPSS software version 22. The result was expressed in frequency and percentage.

Operational definitions

1) **Latent TB infection:** Latent tuberculosis infection (LTBI) is defined as a state of persistent immune response to stimulation by *Mycobacterium tuberculosis* antigens without evidence of clinically manifested active tuberculosis (TB) disease.[9]

2) **Administrative control:** Administrative controls for TB IPC are interventions through institutional policies, protocols, education, and oversight to reduce or prevent both exposure and transmission of TB within a facility.[10]

3) **Environmental control:** Environmental controls are aimed at reducing the concentration of infectious droplet nuclei in the air.[11]

4) **Respiratory protection:** Reduces the risk of exposure in specific areas and circumstances.[12]

Results:

Demographic information

In Table 1, it was observed that among 384 nurses, 376 (97.9%) were females and 8 (2.1%) were males. In this study, 243 (63.2%) were of 20-39 age group and 141 (36.8%) were of 40 years and above. Duration of employment of the nurses ranged from less than 1 year to 10 years (192;50%), 10-19 years (122;31.7%) and 20 years and more (70;18.3%). Among the participants, 115 (30%) were unmarried and 269 (70%) were married. 204 (53.1%) nurses lives in urban area and 180 (46.9%) lives in rural area.

Discussion:

The study showed that overall knowledge and practices of nursing staffs on Tuberculosis Infection

Table 1: Sociodemographic Characteristics of Nurses (N=384)

Variables		n (%)
Age (years)	20-39	243 (63.2)
	≥40	141 (36.8)
Gender	Male	8 (2.1)
	Female	376 (97.9)
Marital status	Unmarried	115 (30)
	Married	269 (70)
Residence	Urban	204 (53.1)
	Rural	180 (46.9)
Years of work	Less than 10	192 (50)
	10-19	122 (31.7)
	≥20	70 (18.3)

Table 2: Knowledge of latent Tuberculosis Infection and Infection Control (N=384)

Knowledge questions	Correct response n (%)
Symptoms of latent TB	293 (76.3)
Investigations for latent TB	224 (58.3)
Treatment for latent TB	210 (54.6)
Progression of latent TB to active TB	305 (79.4)
What Infection Control measures can prevent LTBI	
Cough etiquette	202 (52.6)
Regular changing of bedsheets	142 (36.9)
Regular sterilisation of hospital	281 (73.1)
Wearing of mask	327 (85.1)

Table 3: Practices on Infection Control of Tuberculosis (N=384)

Practices	n (%)
IC measures practiced in hospital	
Administrative controls	311 (80.9)
Environmental controls	227 (59.1)
Personal respiratory protection	380 (98.9)
Wear mask while dealing with coughing patients	
Yes	298 (77.6)
No	86 (22.4)
Type of mask used	
N95	72 (18.7)
Surgical mask	312 (81.3)

Control were satisfactory which is contradictory with the study done by Shrestha et al[7] in Nepal. Latent Tuberculosis was well understood among nurses as the majority of them were aware of signs and symptoms oflatent TB, and its transmission. Treatment of latent tuberculosis was well understood by less nurses.

In this study only 77.6% respondents reported using a mask while dealing with coughing patients whereas in a study conducted by Baral et al, all the nurses reported using a mask while dealing with coughing patients.[13]

The majority of respondents knew that separating coughing and non-coughing patients in the facility would help to prevent the spread of Tuberculosis. Knowledge regarding Personal protective equipment were reportedly better than administrative measures and environmental infection control. The majority of respondents indicated cough etiquette as the main measure for Tuberculosis Infection Control.

Majority of the respondents practiced wearing of surgical masks or N95 masks while dealing with patients compared to a study by Baral MA et al[13] where nurses used cloth mask while dealing with patients.

Limitation of the study:

The study was conducted in a single setting so cannot be generalized. The responses to the knowledge questionnaire are based on the recall of learned facts and information, so there is a chance of recall bias.

Conclusion:

Overall knowledge regarding Latent Tuberculosis was adequate among nurses. Knowledge on Tuberculosis Infection Control were also adequate among the nurses but practices regarding infection control for Tuberculosis needs improvement.

References:

1. CDC. Tuberculosis (TB) [Internet]. Tuberculosis (TB). 2024. Available From: Https://Www.Cdc.Gov/Tb/Index.Html

2. Daniel TM. The Occupational Tuberculosis Risk Of Health Care Workers.

3. Tuberculosis | The Union! [Internet]. Theunion.Org. Available From: Https://Theunion.Org/Our-Work/Tuberculosis

4. Data.Gov.In [Internet]. Data.Gov.In. Available From: Https://Data.Gov.In/

5. World Health Organization. The End TB Strategy [Internet]. Www.Who.Int. 2015. Available From: Https://Www.Who.Int/ Teams/Global-Tuberculosis-Programme/The-End-Tb-Strategy

6. Vaismoradi M, Tella S, A. Logan P, Khakurel J, Vizcaya-Moreno F. Nurses' Adherence To Patient Safety Principles: A Systematic Review. International Journal Of Environmental Research And Public Health. 2020 Mar;17(6):2028.

7. Shrestha A, Bhattarai D, Thapa B, Basel P, Wagle RR. Health Care Workers' Knowledge, Attitudes And Practices On Tuberculosis Infection Control, Nepal. BMC Infectious Diseases. 2017 Dec;17:1-7..

8. Advocacy, Communication And Social Mobilization For TB Control: A Guide To Developing Knowledge, Attitude And Practice Surveys [Internet]. Www.Who.Int. Available From: Https://Www.Who.Int/Publications/I/Item/9789241596176

9. Kiazyk S, Ball TB. Tuberculosis (TB): Latent Tuberculosis Infection: An Overview. Canada Communicable Disease Report. 2017 Mar 3;43(3-4):62.

10. Tuberculosis Infection Control: A Practical Manual For Preventing Tb 2022 Updates Administrative Controls [Internet]. [Cited 2024 Sep 17]. Available From: Https://Www.Currytbcenter.Ucsf.Edu/Sites/Default/Files/2022-12/Ic_2022_Admin_December_2022.Pdf

11. Lee JY. Tuberculosis Infection Control In Health-Care Facilities: Environmental Control And Personal Protection. Tuberculosis And Respiratory Diseases [Internet]. 2016 Oct 1;79(4):234–40. Available From: Https://Www.Ncbi.Nlm. Nih.Gov/Pmc/Articles/PMC5077726/

12. Reducing Exposure – Respiratory Protection – BC Wildfire Service [Internet]. Gov.Bc.Ca. 2024 [Cited 2024 Sep 17]. Available From: Https://Blog.Gov.Bc.Ca/Bcwildfire/ Reducing-Exposure-Respiratory-Protection/

13. Baral MA, Koirala S. Knowledge And Practice On Prevention And Control Of Tuberculosis Among Nurses Working In A Regional Hospital, Nepal. Frontiers In Medicine. 2022 Feb 4;8:788833.