A Study to Assess Knowledge Regarding Tuberculosis Related to DOTS & DOTS Plus with Nursing Students of NNC, Jamuhar

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Abstract—Background: Background: Tuberculosis (TB) remains a significant global health challenge, especially in developing countries like India. Effective TB control relies heavily on following treatment protocols such as Directly Observed Treatment, Short-course (DOTS) and DOTS Plus, particularly for multidrug-resistant TB. Nursing students, as future healthcare providers, need to have a solid understanding of TB and its management to provide high-quality patient care.

Objective: This study aimed to evaluate the knowledge of nursing students at NNC, Jamuhar about TB, including the DOTS and DOTS Plus strategies, and to identify knowledge gaps to guide educational efforts.

Methods: A descriptive, cross-sectional research design was used involving undergraduate nursing students at NNC, Jamuhar. A structured and validated questionnaire was utilized to assess knowledge of TB causes, transmission, symptoms, DOTS treatment protocols, and DOTS Plus for multidrug-resistant TB. Sampling was conducted using stratified random methods, and data were analyzed with descriptive and inferential statistics.

Results: Most nursing students showed inadequate to moderate knowledge of TB. About 70% had inadequate knowledge, 25% had moderate knowledge, and only 5% had adequate knowledge of TB, DOTS, and DOTS Plus. Knowledge of basic TB concepts was fair, but there were significant gaps in understanding DOTS Plus protocols and managing multidrug-resistant TB. Academic progress and previous clinical experience positively influenced knowledge scores.

Conclusion: The study reveals important gaps in nursing students' knowledge about TB, especially in advanced treatment strategies like DOTS Plus. It emphasizes the urgent need to revise and strengthen the nursing curriculum and clinical training to enhance TB-related knowledge and better prepare students for effective patient care and TB control.

Index Terms—Tuberculosis, DOTS, DOTS Plus, Nursing Students, Knowledge Assessment, Multidrug-Resistant TB, Nursing Education.

I. INTRODUCTION

Background of the study: Tuberculosis (TB) remains a major public health problem in India, despite numerous control efforts. The Directly Observed Treatment Short-course (DOTS) strategy, launched by the Revised National Tuberculosis Control Programme (RNTCP), and its extended version, DOTS-Plus, for multidrug-resistant TB (MDR-TB), have been key interventions. As frontline healthcare providers, nursing students must possess adequate knowledge to ensure effective TB control and patient education. [1]

Tuberculosis (TB) continues to be a significant public health concern globally, with India bearing the highest burden. TB is a contagious disease caused by Mycobacterium tuberculosis, primarily affecting the lungs but also capable of involving other organs. To combat the epidemic, the Government of India implemented the Revised National Tuberculosis Control Programme (RNTCP), incorporating the

Directly Observed Treatment, Short-course (DOTS) strategy. DOTS ensures that patients adhere to a complete and supervised treatment regimen, reducing the risk of drug resistance. However, with the emergence of multidrug-resistant TB (MDR-TB), the DOTS-Plus strategy was introduced to provide a more intensive treatment approach. [2]

Nursing students, as future frontline healthcare workers, play a vital role in the early detection, treatment adherence, and education of TB patients. Adequate knowledge about TB, including its symptoms, transmission, and treatment under DOTS and DOTS-Plus, is essential for effective disease control. Despite integration of TB-related content into nursing curricula, studies suggest there are still knowledge gaps among students. This study aims to assess the level of knowledge regarding TB, DOTS, and DOTS-Plus among nursing students of NNC, Jamuhar. The findings will help identify areas needing improvement in nursing education and contribute to strengthening national TB control efforts. [3]

Need of the study: Tuberculosis (TB) remains one of the most prevalent infectious diseases in India, with a high burden in rural areas like Jamuhar. The success of national TB control programs, particularly DOTS and DOTS-Plus, largely depends on healthcare professionals' ability to manage, educate, and support patients throughout the treatment process. Nursing students, as future frontline health workers, must possess an in-depth understanding of TB diagnosis, treatment protocols, and adherence strategies to effectively combat the disease. [4]

While nursing curricula cover basic TB knowledge, there may be gaps in students' comprehension of advanced treatment regimens such as DOTS-Plus, especially for multidrug-resistant TB (MDR-TB). This study is essential to evaluate the knowledge of nursing students regarding TB-related strategies and identify areas requiring further educational attention. By assessing students' understanding, the study can help improve training programs, ensuring nursing students are better equipped to contribute to the national goal of TB elimination by 2025. [5]

The knowledge gaps among nursing students regarding TB and its treatment protocols, including DOTS and DOTS-Plus, can have a direct impact on patient outcomes. Misunderstanding the importance of treatment adherence or mismanagement of drug-resistant TB cases could lead to complications, relapse, or transmission of the disease. Nurses play a crucial role in patient education, drug administration, and ensuring compliance, making their training pivotal to effective TB control. With TB being a communicable disease, the lack of adequate training among nursing students may also contribute to increased stigma and misinformation within communities. [6]

Title of the study
A Study to Assess Knowledge Regarding Tuberculosis Related to DOTS & DOTS Plus with Nursing Students of NNC, Jamuhar.

Objectives
- To assess the knowledge of nursing students regarding TB, DOTS, and DOTS-Plus.
- To determine the association between knowledge scores and selected demographic variables (e.g., age, year of study, previous clinical exposure to TB cases).
- To provide recommendations for improving curriculum or training modules.

Hypothesis
H_1: The nursing students of NNC, Jamuhar have inadequate knowledge regarding tuberculosis, DOTS, and DOTS Plus.
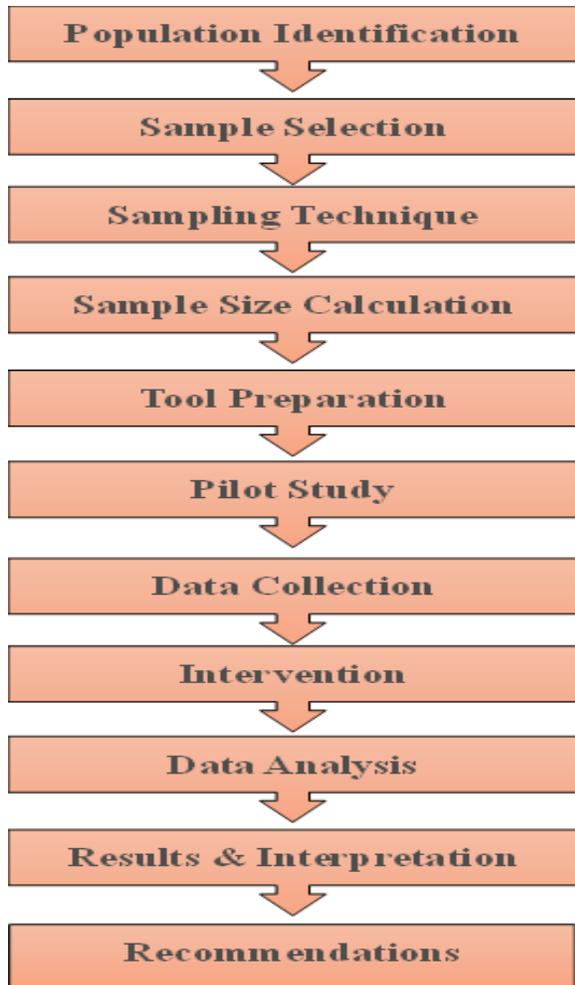H_2: There is a significant association between the knowledge scores of nursing students and selected demographic variables.

II METHODOLOGY

Research Approach: A quantitative research approach was adopted for this study, as it aims to measure the level of knowledge regarding Tuberculosis, DOTS, and DOTS Plus among nursing students.

Schematic representation of research design
The research design is represented schematically as a sequence of steps that begins with defining the population and sample, application of inclusion and exclusion criteria,

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choice of sampling technique, data collection using a validated tool, potential intervention, and analysis of results to identify knowledge gaps and suggest improvements.

Fig 2.1: Schematic representation of research design

Research Design: A descriptive, cross-sectional survey design.

Variables:

- Dependent Variable: The dependent variable is the knowledge level of nursing students about TB, DOTS, and DOTS Plus.
- Independent Variable: The independent variable is the educational and clinical exposure related to TB care received by the students.
- Sociodemographic Variables: Sociodemographic variables include age, gender, academic year, and previous clinical postings.
- Clinical Variables: Clinical variables relate to prior experience in managing or observing TB cases and participation in TB-related training.

Population

The study population includes all undergraduate nursing students enrolled at NNC, Jamuhar during the academic year of data collection.

Sample

A subset of nursing students, meeting the inclusion and exclusion criteria, will constitute the study sample.

Criteria for sample selection

- Inclusion criteria

Students currently enrolled in the nursing program, present during the data collection period, and who have given informed consent.

- Exclusion criteria

Students on long-term leave, those who have previously participated in similar TB knowledge assessments, or those who decline consent.

Sampling technique

A probability sampling method (such as stratified random sampling) will be employed to ensure representative inclusion across academic years and levels.

Sample size & sample calculation

The sample size will be calculated based on the prevalence rate of adequate TB knowledge among nursing students, using appropriate statistical formulae (for example, based on an expected proportion, confidence level, and precision). The final sample size will also account for a possible non-response rate.

Description of the intervention

If an interventional component is included, it will consist of an educational module or workshop on TB and DOTS protocols, delivered to the sample group, followed by a post-intervention assessment to measure changes in knowledge.

Content validity

The questionnaire's content validity will be established through review and approval by a panel of subject experts in TB and nursing education.

Reliability

The reliability of the tool will be determined using statistical tests such as Cronbach's alpha to assess internal consistency during a pilot test.

Pilot study

A pilot study was conducted on 10% of the sample to test the feasibility and reliability of the tool and intervention. Necessary modifications were made based on feedback.

Method of data collection

Data was collected in three phases—pre-test knowledge assessment, administration of the planned teaching program, and post-test knowledge assessment after one week.

Protocol for selected nursing intervention

The intervention protocol included structured lectures, group discussions, and visual aids to enhance students' understanding of DOTS and DOTS Plus.

Completion of Protocol (end of skills)

The completion of the educational protocol will be assessed through a combination of post-intervention knowledge testing and skills demonstration, as applicable.

Plan for data analysis

Collected data will be coded and entered into statistical software. Descriptive statistics (frequency, percentage, mean, standard deviation) will describe the sample and knowledge levels. Inferential statistics (such as chi-square or t-tests) will identify associations between knowledge and variables like demographic factors and clinical exposure.

This complete narrative covers each specified point in your list, based on established research methodologies used in nursing knowledge and KAP (knowledge, attitude, practice) studies.

III. RESULT

Observation and Results

This study involved 100 nursing students from NNC, Jamuhar. Its purpose was to evaluate their knowledge about Tuberculosis (TB), DOTS, and DOTS Plus before and after implementing a Planned Teaching Program. The researchers analyzed the data using descriptive and inferential statistics. The findings are organized according to the study objectives.

Distribution of Demographic Variables

The demographic data of the participants included age, gender, year of study, course enrolled, and prior exposure to information about TB and DOTS. The results showed that most participants were in the 20 to 22 age group (50%), followed by 23 to 25 years (25%). About 20% were aged 17 to 19 years, and only 5% were older than 25 years. A large majority of the respondents were female (85%), which reflects the typical gender distribution in nursing schools.

In terms of academic details, most students were in their 2nd or 3rd years, comprising 30% and 35% respectively. Additionally, 25% were in their final

year, and 10% were in their 1st year. Regarding their courses, 50% were pursuing B.Sc. Nursing, 40% were in GNM, and 10% were in Post Basic B.Sc. Nursing. When asked about prior knowledge of TB and DOTS, 85% of students reported having some previous knowledge, while 15% did not. The main sources of information included textbooks (30%), teachers (25%), health programs (20%), media (15%), and other sources (10%). These results indicate that most students had some theoretical exposure to TB control programs, but they lacked practical understanding.

Pre-Test Knowledge Score

In the pre-test assessment, the level of knowledge regarding TB, DOTS, and DOTS Plus was generally low among participants. The analysis revealed that 70% of students had inadequate knowledge (scores between 0 and 33%), 25% had moderately adequate knowledge (scores between 34 and 66%), and only 5% had adequate knowledge (scores between 67 and 100%). The mean pre-test knowledge score was 12.4, with a standard deviation of 3.2. This outcome indicates that most students lacked a solid awareness of TB management and the national treatment guidelines. This finding demonstrates the need for improved educational interventions to build students' knowledge before they enter clinical practice.
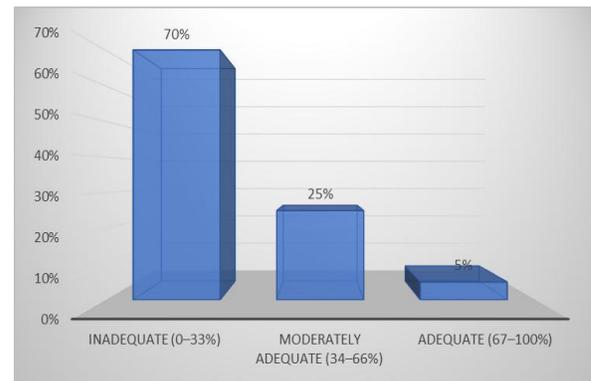

Fig 4.7: Comparison of the Frequency and Percentage of Pre-Test

Post-Test Knowledge Score

Following the Planned Teaching Program, there was a noticeable improvement in students' knowledge levels. The percentage of students with adequate knowledge increased significantly from 5% in the pre-test to 80% in the post-test. Approximately 18% showed moderately adequate knowledge, and only 2% remained in the inadequate category. The mean post-

test knowledge score rose to 24.8, with a standard deviation of 2.9, clearly showing the effectiveness of the teaching intervention in enhancing students' understanding of TB control measures, DOTS, and DOTS Plus protocols.
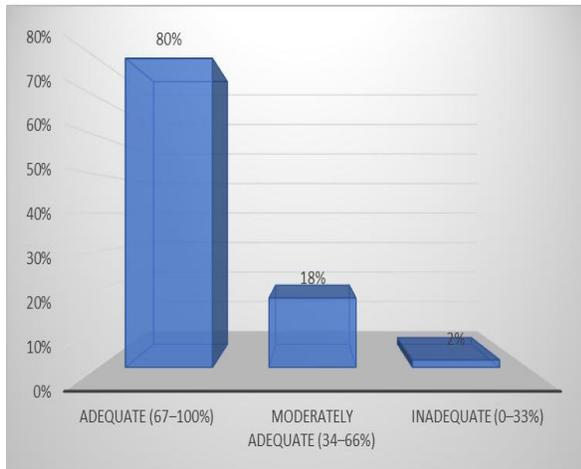

Fig 4.8: Comparison of the Frequency and Percentage of Post-Test

Comparison of Pre-Test and Post-Test Knowledge Scores

To evaluate the statistical significance of the observed improvement, a paired *t*-test was performed. The results indicated a highly significant difference ($p < 0.001$) between pre-test and post-test mean scores. This finding shows that the Planned Teaching Program positively impacted participants' knowledge. The difference between the mean pre-test score (12.4) and the mean post-test score (24.8) confirms substantial learning gains following the educational intervention.

Association Between Knowledge and Demographic Variables

The relationship between knowledge scores and specific demographic variables was assessed using the Chi-square test. The results revealed a significant association between post-test knowledge scores and two factors: year of study ($\chi^2 = 9.45$, $p = 0.024$) and prior knowledge of TB/DOTS ($\chi^2 = 7.82$, $p = 0.005$). This means that higher-year students and those with prior exposure to TB-related topics performed better after the intervention. No significant association was found with other demographic factors such as age, gender, course enrolled, or source of information.

Demographic Variable	df	Chi-Square Value	p-value
Age	3	2.56	0.464(NS)
Gender	1	0.34	0.559(NS)
Year of Study	3	9.45	0.024*
Course Enrolled	2	4.67	0.097(NS)
Prior TB Info (Yes/No)	1	7.82	0.005*
Source of Information	4	5.93	0.204(NS)

Table 4.3: Association Between Knowledge Score and Demographic Variables (Chi-Square Test)

Interpretation of Results

The overall findings of the study show that nursing students initially had limited knowledge about TB, DOTS, and DOTS Plus. However, the structured teaching intervention effectively improved their understanding. More than half of the students (55%) reached moderate knowledge levels, while 30% achieved good knowledge after the program. The increase in post-test scores underscores the importance of educational strategies in reinforcing vital concepts of communicable disease control in nursing programs.

V. SUMARY & DISCUSSION

This study examined the knowledge of nursing students about Tuberculosis (TB), DOTS, and DOTS Plus at NNC, Jamuhar. A total of 100 students from various academic years and programs took part through purposive sampling. The main goal was to assess their knowledge level and explore connections with selected demographic factors.

Most participants were aged 20 to 22 years (50%) and female (85%). The majority were enrolled in B.Sc. Nursing (50%) and were in their 2nd or 3rd year of study (30% and 35%, respectively). About 85% had prior knowledge of TB, mainly from textbooks (30%) and teachers (25%).

The findings showed that 55% of students had moderate knowledge, 30% had good knowledge, and 15% had poor knowledge. The mean score was 18.6 ± 4.8, indicating that most students had an average understanding of TB and DOTS protocols. These findings partially support Hypothesis 1, which

suggested that students would have insufficient knowledge.

Chi-square analysis found a significant link between knowledge and year of study ($\chi^2 = 9.45$, p = 0.024) as well as prior information about TB ($\chi^2 = 7.82$, p = 0.005), supporting Hypothesis 2. No significant relationships were noted for age, gender, or course.

Overall, the results highlight the need to enhance TB education in nursing programs through structured teaching, clinical exposure, and regular assessments to ensure better skills in TB control and prevention.

VI. CONCLUSION

The current study aimed to evaluate nursing students' knowledge about Tuberculosis, DOTS, and DOTS Plus at NNC, Jamuhar. The findings showed that most students had a moderate understanding of TB and its treatment, but there were clear gaps in their overall knowledge. The average score for knowledge was 18.6 ± 4.8, indicating a satisfactory but not ideal level of awareness.

Most participants were female and aged 20 to 22 years. Many had previously learned about TB from textbooks and classroom instruction. However, the study found that just having this theoretical knowledge was not enough for a deep understanding or practical use. There was a significant link between knowledge levels and both the year of study and prior exposure to TB-related information. This suggests that academic progress and targeted learning experiences can lead to better knowledge outcomes.

These results emphasize the need to strengthen TB education in nursing programs through organized teaching sessions, clinical demonstrations, and regular assessments. Nursing students, as future healthcare providers, have an important role in efforts to control and eliminate TB. Improving their knowledge and skills about DOTS and DOTS Plus can greatly aid in disease prevention and management within the community.

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