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Knowledge-Based Innovation in Improving Tuberculosis Transmission Prevention Behavior among Pulmonary TB Patients at Arifin Achmad Regional Hospital, Riau Province

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ABSTRACT

Pulmonary tuberculosis (TB) spreads through patients' daily behaviors such as coughing, mask use, and environmental hygiene all of which depend on how well patients understand TB and its prevenhannya. This study examined the relationship between knowledge and TB transmission prevention behavior among pulmonary TB patients at Arifin Achmad Regional Hospital, Riau Province. A quantitative analytic correlation design with a cross-sectional approach was used. A total of 85 respondents were selected through consecutive sampling according to inclusion criteria. Data were collected via questionnaire from January 13–27, 2026, at the Pulmonary Clinic, then analyzed univariately and bivariately. The majority of respondents were female (51.8%), mostly working as housewives (36.5%), and nearly seven out of ten had only completed primary school (69.4%). Almost all had no family history of TB (98.8%) and had never received prior TB education (97.6%). Bivariate analysis showed a significant relationship between knowledge and TB transmission prevention behavior. The numbers speak for themselves: patients with low education and no formal education tend not to know what to do. A routine and structured education program in the hospital is not merely complementary — it is part of prevention itself.

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INTRODUCTION

Tuberculosis (TB) remains the leading cause of death from infectious diseases worldwide. *Mycobacterium tuberculosis* spreads through the air when an infected person coughs, sneezes, or even speaks, and transmission can occur very rapidly in crowded spaces with poor ventilation. The WHO notes that Southeast Asia bears 43% of global TB cases, with Indonesia ranking second after India. In Indonesia, the numbers are concrete: 824,000 cases and 93,000 deaths per year (Kementerian Kesehatan Republik Indonesia, 2021). Poverty, overcrowding, and limited access to health services worsen the situation. DOTS programs and health education have been implemented, but transmission remains uncontrolled.

Riau Province is no exception. Pekanbaru records the highest number of cases in the province, largely due to population density and high resident mobility (Dinas Kesehatan Provinsi Riau, 2022). As the primary referral hospital, Arifin Achmad Regional Hospital stands at the

forefront of managing these cases. Preventing transmission is actually straightforward: wear a mask, cover the mouth when coughing, maintain cleanliness, and take medication regularly. However, many patients are not yet doing so. Lack of information and minimal support from the surrounding environment are real barriers (Ramadhan, 2021). has long identified knowledge as the foundation of behavior. Patients who truly understand how TB works are more likely to act consistently. Those who do not understand tend to be careless, which is dangerous for those around them (Notoatmodjo, 2020). found the same result: knowledge and TB prevention behavior are closely related (Adiutama & Fauziah, 2022; Aja et al., 2021). This study tests that relationship at Arifin Achmad Regional Hospital, with the hope that the findings can serve as a basis for improving existing education programs.

METHODS

This study used a quantitative approach with a correlational analytic design and a *cross-sectional*, in which two variables were measured simultaneously without intervening on respondents (Notoatmodjo, 2020; Sugiyono, 2021). The independent variable was patient knowledge about TB, and the dependent variable was transmission prevention behavior.
The study was conducted at the Pulmonary Clinic of Arifin Achmad Regional Hospital, Riau Province, from January 13–27, 2026, with 85 respondents selected through *consecutive sampling* according to inclusion and exclusion criteria. Data were collected through a two-part questionnaire. The first part measured respondents' knowledge of TB: definitions, modes of transmission, symptoms, and prevention. The second part assessed daily prevention behaviors, such as mask use, coughing etiquette, and environmental hygiene. The questionnaire underwent validity and reliability testing before use (Notoatmodjo, 2020). Research ethics included informed consent, data confidentiality, and institutional approval (Hidayat, 2020). Data analysis was conducted in two stages: univariate analysis to examine the frequency distribution of respondent characteristics and each variable, and bivariate analysis to test the relationship between knowledge and prevention behavior using statistical tests adjusted for the scale and data distribution (Sugiyono, 2021).

RESULTS AND DISCUSSION

The results of this study found that the mean age of respondents was 49.20 years with a standard deviation of 10.056. The youngest respondent was 30 years old and the oldest was 83 years old. Other respondent characteristics can be seen in the following table.

Table 1. Frequency Distribution of Patients by Age

Variable	Mean	Min-max	St. Deviation
Age	49,20	30-83	10,056

Of the 85 respondents, the mean age was 49.20 years (SD 10.056), with a range of 30–83 years. Respondent characteristics including gender, education, occupation, family TB history, and TB education history, are presented in Table 2.

Table 2. Respondent Characteristics by Gender, Occupation, Last Education, Family TB History, and TB Education History among Pulmonary TB Patients

No	Variable		Frequency	%
1.	Gender	a. Male	41	48,2
		b. Female	44	51,8
2.	Occupation	a. Farmer	24	28,2
		b. Housewife	31	36,5
		c. Self-employed	7	8,2
		d. Teacher	1	1,2
		e. Trader	22	25,9
3.	Education	a. Primary School	59	69,4
		b. Junior High School	18	21,2
		c. Senior High School/Vocational	5	5,9
		d. Bachelor's Degree	3	3,5
4.	Family TB History	a. Yes	1	1,2
		b. No	84	98,8
5.	Education History	a. Yes	2	2,4
		b. No	83	97,6
	Total		85	100

The majority of respondents were female (44 people, 51.8%), working as housewives (31 people, 36.5%), and had only completed primary school (59 people, 69.4%). Almost all respondents had no family history of TB (84 people, 98.8%) and had never received TB education (83 people, 97.6%).

Tabel 1. Distribution Frequency Level Knowledge Regarding TB Prevention

Knowledge Level	Frequency (f)	Percentage (%)
a. Good	16	18,8
b. Moderate	50	58.8
c. Poor	19	22,4
Total	85	100

The majority of respondents had a moderate level of knowledge about TB prevention (50 people, 58.8%), followed by poor (19 people, 22.4%) and good (16 people, 18.8%).

Tabel **Error! No text of specified style in document.**. Distribution Frequency TB Transmission Prevention Behavior

Prevention Behavior	Frequency (f)	Percentage (%)
a. Good	6	7,1
b. Moderate	76	89,4
c. Poor	3	3,5
Total	85	100

Prevention behavior was mostly in the moderate category (76 people, 89.4%), with only 6 people (7.1%) in the good category and 3 people (3.5%) in the poor category.

Table 5. Relationship between Knowledge of TB Prevention and TB Prevention Behavior

Knowledge	Prevention Behavior				Total	*p-value*
	Good		Moderate and Poor			
	N	%	N	%		
Good	4	25.0	12	75,0	16	0,002
Moderate and Poor	2	2,9	67	97,1	69	
Total	6	7,1	79	92,9	85	

Of the 16 respondents with good knowledge, only 4 (25.0%) demonstrated good prevention behavior; the remaining 12 (75.0%) were in the moderate and poor categories. In the group with moderate and poor knowledge, only 2 out of 69 respondents (2.9%) showed good behavior. The Chi-Square test produced $p = 0.002$ ($p < 0.05$): there is a significant relationship between knowledge and TB transmission prevention behavior.

1. Age

The mean age of respondents was 49.20 years (SD 10.056), ranging from 30–83 years, with most falling in the adult to elderly group. According to (Notoatmodjo, 2020).age affects a person's capacity to absorb information and patterns of thinking, although in the elderly the ability to absorb new information tends to decline. The Indonesian Ministry of Health (2018) adds that the productive age group is more susceptible to pulmonary TB due to high mobility and intensity of social contact. This finding is consistent with Amelia et al. (2021) who reported a predominance of adult to elderly groups among pulmonary TB patients, and Fitria et al. (2020) who linked pulmonary TB incidence in those over 40 years to declining immunity.

2. Gender

Female respondents were slightly more numerous (44 people, 51.8%) than males (41 people, 48.2%). This nearly equal proportion indicates that pulmonary TB does not exclusively affect one gender. The WHO (2021) notes that globally, males are more frequently diagnosed with TB, but this pattern varies depending on population characteristics and socio-cultural conditions. Green and Kreuter (2005) identify gender as one of the predisposing factors for health behavior, including prevention of infectious diseases. Sari et al. (2022) reported similar findings: the gender distribution among pulmonary TB patients varies depending on the region and population characteristics.

3. Occupation

Housewives dominated (31 people, 36.5%), followed by farmers (24 people, 28.2%), traders (22 people, 25.9%), self-employed (7 people, 8.2%), and teachers (1 person, 1.2%). The predominance of housewives is related to limited access to health information and low education levels. (Notoatmodjo, 2020).states that type of occupation determines the extent to which a person is exposed to relevant information, while (Noor, 2018).notes that low-income informal workers tend to have limited access to health services. (Hernawan & Lestari, 2022), found the same pattern: pulmonary TB is commonly found among informal workers with exposure to unhealthy environments.

4. Last Education

The majority of respondents had only completed primary school (59 people, 69.4%), followed by junior high school (18 people, 21.2%), senior high school/vocational school (5 people,

5.9%), and bachelor's degree (3 people, 3.5%). Low education levels affect the ability to understand and apply health information. (Bloom, 1956) states that formal education provides a cognitive foundation that determines a person's ability to analyze and use information. (Notoatmodjo, 2020).adds that higher education facilitates the acceptance of new information, including on TB prevention. (Lestari & Dewi, 2021) reported similar findings: the majority of pulmonary TB patients had low education levels, which limited their knowledge of prevention.

5. Family TB History

Almost all respondents had no family history of TB (84 people, 98.8%), indicating that transmission occurs more frequently through social contact, workplaces, or public places. (Widoyono, 2019) states that TB can be transmitted anywhere there is close contact with an undiagnosed patient or one who has not yet applied preventive measures (Crofton et al., 2009) adds that the risk of transmission is more determined by the intensity and duration of contact, not kinship. (Handayani et al., 2021) reported the same finding: sources of transmission more often come from a broader social environment.

6. Education History

A total of 97.6% of respondents (83 people) had never received education about TB. (World Health Organization, 2021) emphasizes that continuous education for TB patients is important to improve understanding of transmission and medication adherence. (Bastable, 2017) adds that effective education not only increases knowledge but also changes attitudes and promotes better behavior. (Rahmawati et al., 2021) noted the same: the lack of formal education is one of the factors contributing to low knowledge and prevention behavior among pulmonary TB patients.

The Chi-Square test produced $p = 0.002$ ($p < 0.05$), indicating a significant relationship between knowledge and TB transmission prevention behavior. This finding is consistent with (Notoatmodjo, 2020) which places knowledge as the cognitive domain that determines behavior. The Health Belief Model (Rosenstock, 1966) also states that perceptions of disease threats and the benefits of prevention are strongly influenced by individual knowledge.

Data show that good knowledge does not automatically produce good behavior: of the 16 respondents with good knowledge, only 4 (25.0%) demonstrated good behavior. (Green & Kreuter, 2005) explains this through three determinants of health behavior: predisposing (knowledge, attitude), enabling (availability of facilities), and reinforcing (social support and health workers). Knowledge alone is insufficient without all three factors working together. (Amelia et al., 2021; Sari & Rahmawati, 2022) found a similar relationship between knowledge and TB prevention behavior ($p < 0.05$). (Kementerian Kesehatan Republik Indonesia, 2023) also emphasizes the importance of improving public knowledge as a driver of behavioral change. Given that 97.6% of respondents had never received TB education, a structured and routine education program in hospitals needs to be prioritized. (Kemenkes RI)

CONCLUSION

This study proves a significant relationship between knowledge and TB transmission prevention behavior among pulmonary TB patients at Arifin Achmad Regional Hospital, Riau Province ($p = 0.002$). The majority of respondents had moderate knowledge (58.8%) with also moderate prevention behavior (89.4%). Only 18.8% had good knowledge, and only 7.1% demonstrated good behavior. What must be underlined is that 97.6% of respondents had never received health education about TB. It is understandable that their prevention behavior has not yet been adequate. Based on this, health workers at the Pulmonary Clinic of Arifin Achmad Regional

Hospital need to implement education programs routinely and consistently not just occasionally so that patient knowledge improves and TB transmission can be reduced.

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