AJTEOH
Asian Journal of Toxicology, Environmental, and Occupational Health
AJTEOH 3(2): 165–179
ISSN 3025-3675

Institute for Advanced Science, Social and Sustainable Future
MORALITY BEFORE KNOWLEDGE

Correlation between family knowledge and preventive behaviors against pulmonary Tuberculosis transmission at regional hospital

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Received Date: November 3, 2025 Revised Date: December 15, 2025 Accepted Date: January 27, 2026

ABSTRACT

Background: West Kalimantan Province ranks 15th in tuberculosis case notification rates and has the highest rate among the 34 provinces in Indonesia. One of the contributing factors to the incidence of tuberculosis is the poor behavior and attitudes of families. Therefore, family knowledge regarding the prevention of pulmonary tuberculosis transmission is important to be studied further. **Methods:** This study employed a quantitative research method using a cross-sectional approach. Data were collected through questionnaires. The sample consisted of the entire population included in the study, totaling 22 respondents. Data were analyzed using univariate and bivariate analysis techniques. **Findings:** The study showed that most respondents had good knowledge about pulmonary tuberculosis. Furthermore, respondents demonstrated good preventive behaviors against tuberculosis transmission, which were influenced by their adequate knowledge. **Conclusion:** This study concludes that there is a significant relationship between family knowledge and preventive behaviors toward pulmonary tuberculosis transmission in the Infectious Disease Ward of Regional General Hospital. **Novelty/Originality of this article:** This research focuses on the family context in disease prevention and health promotion. In addition, the study uses the most recent data relevant to current public health needs, providing updated evidence that supports the continuity of tuberculosis prevention research.

KEYWORDS: tuberculosis; prevention; knowledge.

1. Introduction

Pulmonary tuberculosis (TB) is one of the communicable diseases caused by infection with *Mycobacterium tuberculosis*, a bacterium capable of causing serious illness. It primarily affects the lungs and is transmitted through airborne droplets, remaining a major public health problem worldwide. Most individuals with pulmonary TB remain asymptomatic because the bacteria can persist in a latent form within the body and may become active when the immune system is weakened. The primary source of TB transmission is patients with smear-positive pulmonary TB (acid-fast bacilli positive), who release infectious droplets into the air when coughing or sneezing Infection occurs when a person inhales these droplets into the respiratory tract (Kementerian Kesehatan Indonesia, 2022).

The bacteria enter the human body mainly through the lungs but can also invade through the skin, urinary tract, or digestive system. Tuberculosis can affect the lungs but

Cite This Article:
Manurung, T. P. M., Manurung, B. K., & Manurung, L. (2026). Correlation between family knowledge and preventive behaviors against pulmonary Tuberculosis transmission at regional hospital. *Asian Journal of Toxicology, Environmental, and Occupational Health*, *3*(2), 165-179. https://doi.org/10.61511/ajteoh.v3i2.2026.2458

may also attack nearly all parts of the body. It is a chronic and recurrent infectious disease that primarily involves the pulmonary organs(LeMone et al., 2016). Once inhaled, the bacteria accumulate in the lungs and proliferate particularly in individuals with weakened immune systems, spreading through the bloodstream or lymphatic system. Consequently, TB infection may affect various organs such as the lungs, gastrointestinal tract, bones, brain, kidneys, lymph nodes, and others.

Several factors contribute to tuberculosis infection, including decreased immunity and other supporting risk factors such as age, education level, smoking, alcohol consumption, malnutrition, diabetes, and adherence to treatment (Kuswandi et al., 2016). According to the World Health Organization (WHO) *Global TB Report* (2022), Indonesia ranks second globally after India in terms of TB burden, with an estimated 969,000 cases in 2021—an increase of 17% compared to 2020. Based on the Indonesian Health Profile data, the number of TB cases in Indonesia reached 360,565 in 2016 (Kementerian Kesehatan Indonesia, 2017), increased to 425,089 in 2017 (Kementerian Kesehatan Indonesia, 2018), and rose further to 566,623 in 2018 (Kementerian Kesehatan Indonesia, 2019). In 2019, there were 543,874 reported cases (Kementerian Kesehatan Indonesia, 2020).

The increasing number of pulmonary TB patients in Indonesia is associated with unhealthy behaviors, such as family members sharing eating and drinking utensils, poor indoor lighting, and patients spitting carelessly. Additionally, myths and misconceptions about TB transmission persist in many communities. For instance, some people believe that TB is not transmitted through direct contact with infectious patients but rather results from smoking, alcohol consumption, eating fried foods, sleeping on the floor, or staying up late. These misconceptions are largely attributed to poor family knowledge, which increases the risk of TB transmission (Sugion et al., 2022).

West Kalimantan Province ranks 15th in TB case notification rates and has one of the highest notification rates among Indonesia's 34 provinces, with 123 cases per 100,000 population (Kementerian Kesehatan Indonesia, 2020). Data from the Pontianak City Health Office indicate that the highest number of pulmonary TB cases in West Kalimantan occurs in the Perumnas II Public Health Center area of West Pontianak District.

The incidence of tuberculosis is largely influenced by inadequate family behaviors and attitudes—for example, not using masks when in contact with TB patients, delayed BCG vaccination among uninfected individuals, and noncompliance with preventive therapy lasting 6–9 months. Poor family behavior is often caused by a lack of knowledge and awareness (Isminah, 2015).

A national survey conducted by the Directorate General of Communicable Disease Control and Environmental Health in 2011 found that the high prevalence of pulmonary TB in Indonesia is partly due to low levels of public knowledge. Only 8% of respondents correctly identified the mode of TB transmission, while 66% were aware of its signs and symptoms (Kementerian Kesehatan Indonesia, 2011).

The behavior of families of TB patients plays a crucial role in preventing TB transmission. The increasing number of TB patients in Indonesia is due to unhealthy behaviors, such as families sharing eating and drinking utensils, homes with poor lighting, and patients spitting in random places. Furthermore, many people still believe in myths related to TB transmission. For example, the public believes that direct contact with an infectious TB patient does not result in TB infection (Manari et al., 2011; Herawati et al., 2020). Family behavior plays a crucial role in preventing TB transmission. The increasing number of TB patients in Indonesia is partly due to unhealthy practices such as sharing eating utensils, living in poorly lit houses, and patients spitting indiscriminately.

Transmission of pulmonary TB can occur when healthy family members live in the same household as TB patients. Those living in close proximity have a higher risk of infection due to frequent contact and caregiving responsibilities. Studies have shown a significant relationship between family knowledge levels and preventive behaviors against TB transmission within households (Rahmawati et al., 2023). Knowledge forms the foundation of individual actions and serves as a stimulus for behavior. It comprises both positive and negative dimensions that shape attitudes; the more positive knowledge an

individual possesses about an object, the more positive their attitude and response toward it (Rahayu & Rahmadhani, 2024). According to Ekastuti, good preventive behavior is strongly influenced by adequate knowledge. Hence, the better an individual's understanding of pulmonary TB, the better their preventive behavior tends to be (Ekastuti, 2022). Knowledge-driven behaviors are generally more sustainable than those not based on understanding. However, good knowledge does not always guarantee good behavior, as behavior is also influenced by factors such as experience, beliefs, social facilities, and motivation.

Families play a critical role in preventing the transmission of pulmonary tuberculosis, especially among vulnerable groups such as children and the elderly with weak immune systems. One of the family's key functions is to care for members affected by TB and to prevent the spread of infection to healthy individuals. To reduce the transmission of pulmonary TB, family involvement in prevention and support is essential. Family members' knowledge regarding prevention and treatment, their efforts to avoid infection among household members, and the support they provide all constitute important components of TB prevention strategies (Nursia et al., 2022).

A preliminary survey conducted on July 10, 2024, at the Infectious Disease Ward of Dr. Soedarso Regional General Hospital, West Kalimantan Province, revealed that the number of smear-positive pulmonary TB cases increased from 167 cases in 2020 to 239 cases in 2021 and 448 cases in 2022. Between January and June 2023 alone, 177 cases were reported. Initial interviews showed that two family members of TB patients lacked basic knowledge about the disease, including its definition, symptoms, transmission modes, and preventive measures. Moreover, some family members were found to have been infected by the patient (Andriani & Sukardin, 2020).

This study aims to determine the relationship between family knowledge and preventive behavior toward pulmonary tuberculosis transmission in the Infectious Disease Ward of Dr. Soedarso Regional General Hospital, West Kalimantan Province, in 2024. Specifically, the objectives are to identify respondent characteristics, assess family knowledge regarding tuberculosis prevention, evaluate family preventive behaviors, and examine the correlation between knowledge and preventive actions among families of TB patients. Based on this background, the researcher is interested in conducting a study entitled "Correlation between family knowledge and preventive behaviors against pulmonary Tuberculosis transmission at regional hospital."

1.1 Definition and classification of knowledge

Knowledge is a crucial domain in shaping a person's overt behavior. Fundamentally, knowledge is closely related to the amount of information an individual possesses; the more information absorbed, the higher the level of knowledge (Notoatmodjo, 2015). Knowledge itself can be classified into four main types: factual knowledge, which covers the basic elements of a field of study; conceptual knowledge, which explains the relationships between these basic elements; procedural knowledge, which relates to understanding routine tasks; and metacognitive knowledge, which encompasses a general understanding of knowledge.

1.1.1 Levels of knowledge and factors influencing knowledge

Human knowledge is divided into six hierarchical levels. The first level is "know," defined as the ability to recall material that has been learned. Above this is the "comprehension" stage, where individuals not only recite information but also interpret, explain, provide examples, and draw correct conclusions about an object. Next is the "application" stage, which involves the ability to use learned material in real-world situations (Kasaluhe, 2021). At a more complex level, there is the analysis stage, which involves the ability to break down, separate, and identify relationships among the components of an object. The synthesis stage requires the ability to summarize or integrate

various components of knowledge into a cohesive whole. The highest level is evaluation, which represents the ability to assess or justify a specific object.

An individual's level of knowledge is influenced by two main factors: internal and external factors. Internal factors originate from within the individual and include educational background, type of work, and age. Meanwhile, external factors encompass influences from outside the individual, such as the living environment and the surrounding socio-cultural conditions.

1.2 Terminology and etiology of tuberculosis

Tuberculosis (TB) is a contagious infectious disease caused by the bacterium Mycobacterium tuberculosis (Bentham Science Publisher, 2006). Although this bacterium can affect various organs of the body, the most common clinical manifestations occur in the lung tissue. The bacterium that causes tuberculosis is highly susceptible to environmental conditions, so the spread of cases tends to be concentrated in areas with specific characteristics. Urban areas are highly susceptible to the spread of this bacterium, particularly in environments with high poverty rates and dense populations.

According to a review by Muttaqin (2012), a person infected with tuberculosis generally exhibits several clinical symptoms. These symptoms include a productive cough lasting more than three weeks, chest pain, and prolonged fever. Additionally, patients often experience drastic weight loss, frequent chills, and night sweats even without physical activity. Transmission of this disease occurs through the air when an infected person coughs or sneezes, causing the bacteria to spread in the form of sputum droplets or droplet nuclei . The risk of transmission increases significantly in enclosed spaces where these droplets can linger for extended periods. Mitigation efforts can be implemented by ensuring proper ventilation to reduce bacterial concentration and by allowing direct sunlight to enter, which can kill the bacteria. Furthermore, Saferi & Mariza (2017) identified several high-risk groups for infection, namely individuals in close contact with active TB patients, people with immunosuppressive conditions (such as the elderly and those with HIV/AIDS), individuals with chronic medical conditions (such as diabetes and kidney failure), and healthcare workers who interact directly with patients.

1.2.1 Tuberculosis prevention strategies

The primary focus of tuberculosis prevention is on breaking the chain of transmission through early detection of pulmonary TB patients and ensuring treatment is completed until full recovery. According to the Ministry of Health in 2011, several preventive measures can be implemented, including restricting patient mobility during the early stages of treatment, ensuring proper air circulation and room ventilation, and consistent mask usage. Other measures include avoiding spitting indiscriminately, administering BCG vaccination to infants aged 3–14 months, and maintaining environmental hygiene by exposing bedding to morning sunlight. Additionally, to prevent transmission within the household, personal items used by the patient should be kept separate from those of other family members. 2.4 Tuberculosis

1.2.2 Definition of tuberculosis

Tuberculosis (TB) is a contagious infectious disease caused by the bacterium Mycobacterium tuberculosis. Although this bacterium can affect various organs of the body, the most common clinical manifestation is in the lung tissue. The bacteria causing tuberculosis are highly susceptible to environmental conditions, so the spread of cases tends to be concentrated in areas with specific characteristics. Urban areas are highly vulnerable to the spread of this bacteria, particularly in environments with high poverty rates and dense populations.

1.2.3 Signs and symptoms of tuberculosis

According to a review by Muttaqin (2012), a person infected with tuberculosis generally exhibits several clinical symptoms. These symptoms include a productive cough lasting more than three weeks, chest pain, and prolonged fever. Additionally, patients often experience drastic weight loss, frequent chills, and night sweats even without physical activity. Mechanism of tuberculosis transmission transmission of this disease occurs through the air when an infected person coughs or sneezes, causing the bacteria to spread in the form of sputum droplets or droplet nuclei. The risk of transmission increases significantly in enclosed spaces where these droplets can linger for extended periods. Mitigation efforts can be implemented by ensuring proper ventilation to reduce bacterial concentration and by allowing direct sunlight to enter, which can kill the bacteria. Furthermore, Saferi & Mariza (2017) identified several high-risk groups for infection, namely individuals in close contact with active TB patients, people with immunosuppressive conditions (such as the elderly and those with HIV/AIDS), individuals with chronic medical conditions (such as diabetes and kidney failure), and healthcare workers who are

2. Methods

This study uses a quantitative method with a cross-sectional study design. Cross-sectional research is a study to study risk factors and effects, by means of an approach, observation or data collection at one time simultaneously. This study will analyze the relationship between independent variables, namely Family Knowledge and Preventive Behaviors with the dependent variable, namely Pulmonary Tuberculosis Transmission.This research was conducted Dr. Soedarso Regional Hospital, West Kalimantan.

2.1 Research design

This study employed a quantitative research method using a cross-sectional approach. Cross sectional study aimed to determine the relationship between family knowledge and behavior in preventing transmission of pulmonary tuberculosis in the Infectious Diseases Building of Dr. Soedarso Regional General Hospital, West Kalimantan Province in 2024. This research was conducted at the Infectious Diseases Building of Dr. Soedarso Regional General Hospital, West Kalimantan Province, from May 2024 to December 2024.

A population is the totality of all research subjects in which the researcher is interested. A population can be an organism, a person or a group, a society, an organization, an object, an event, or a report, all of which have characteristics and must be specifically defined (Arikunto, 2016). The population in this study consisted of family representatives of pulmonary tuberculosis patients who visited Dr. Soedarso Regional General Hospital, West Kalimantan Province. Then in this research a sample is needed. Sample is a portion of the population's number and characteristics (Sugiyono, 2016). The sample included the entire population, totaling 22 respondents, all of whom were selected as research subjects. The sampling method employed in this study was the total population sampling method.

2.2 Research location

The research was conducted at Dr. Soedarso Regional General Hospital, Pontianak. This hospital is a Regional Public Service Agency (BLUD) hospital owned by the Regional Government of West Kalimantan Province, which was designated as a Class A hospital by the Ministry of Health in April 2022. Dr. Soedarso Regional General Hospital is located in Bangka Belitung Subdistrict, South Pontianak District, Pontianak City, with a land area of 26.6318 hectares.

The position of Dr. Soedarso Regional General Hospital is under the responsibility of the Regional Head through the Regional Secretary as the regional technical implementer. In

carrying out its main duties, the hospital has the following responsibilities Providing medical services, Providing medical support services, Providing nursing care services, Providing education and training, Managing general administration and finance. The healthcare facilities and infrastructure at Deli Serdang Regional General Hospital consist of Emergency Unit, Central Surgery Unit, Outpatient Unit, Inpatient Ward, and Supporting medical facilities and infrastructure such as pharmacy, nutrition services, X-ray, and others.

2.3 Data collection method

Data collection was conducted using a structured questionnaire. The data collected in this study includes primary data and secondary data. The primary data derived from a questionnaire containing the relationship between family knowledge and behavior in preventing pulmonary tuberculosis transmission in the Infectious Diseases Building of the Dr. Soedarso Regional General Hospital, West Kalimantan Province in 2024. The secondary data consist of the number of pulmonary tuberculosis patient data in the infectious disease building of Dr. Soedarso Regional General Hospital, West Kalimantan Province in 2024.

2.4 Variables and operational definitions

This research has two variables which are independent variables and dependent variables. Independent variable refers to the variable that influences or causes changes related to the emergence of the dependent variable. In this study, the independent variable is Family Knowledge. Dependent variable refers to the variable that is influenced by the independent variable. In this study, the dependent variable is Preventive Behavior Against Pulmonary Tuberculosis Transmission. An operational definition is a definition that limits the scope or meaning of the variables being observed or researched.

Table 1. Operational definition

Variable	Definition	Measuring instrument	Scale	Score
Independent Variable Knowledge	Patient's family knowledge about tuberculosis	The questionnaire consists of 20 statements with the following answer options: Yes No	Ordinal	Good Less good
Independent Variables of Tuberculosis Prevention Behavior	Family behavior to prevent contracting pulmonary tuberculosis	The questionnaire consists of 18 statements with the following answer options: Yes No	Ordinal	Good Less good

The operational definitions of each variable are presented in Table 1. In this study, the questionnaire consisted of 38 questions, covering Knowledge and Behaviors related to Pulmonary Tuberculosis Prevention. First, knowledge was assessed based on statements. Researchers divided the questionnaire into two categories, good and poor. The Knowledge questionnaire contained 20 statements, using the Gutman scale (Arikunto, 2016). Data were measured by assigning a score to each questionnaire based on the respondent's answer. A "Yes" answer was given a score of 1, and a "No" answer was given a score of 0. Therefore, the Knowledge assessment in the Infectious Diseases Building of Dr. Soedarso Regional General Hospital, West Kalimantan Province was as follow, good >10 and poor <10. Second, Pulmonary Tuberculosis Prevention Behavior was assessed based on statements. Researchers divided the questionnaire into two categories, good and poor. The Pulmonary Tuberculosis Prevention Behavior questionnaire contained 18 statements, using the Gutman scale (Arikunto, 2016). Data measurement was carried out by giving a score to each questionnaire according to the observation results. For questions answered "Yes" was given a score of 1 and if answered "No" was given a score of 0. Therefore, the assessment of Pulmonary Tuberculosis prevention behavior in the Infectious Diseases Building of Dr.

Soedarso Regional General Hospital, West Kalimantan Province is as follows, good >9 and poor <9.

2.5 Data measurement method

Knowledge was assessed based on statements in the questionnaire. The researcher categorized knowledge into two levels: good and poor. The questionnaire on knowledge contained 20 items, using the Guttman scale (Arikunto, 2016). Data measurement was conducted by scoring each item according to the respondent's answers, a response of "Yes" was scored 1, and a response of "No" was scored 0. The assessment of knowledge at the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital, West Kalimantan Province, was classified as follows: good >10 and poor <10.

Preventive behavior was also assessed based on questionnaire statements. The researcher categorized behavior into two levels: good and poor. The questionnaire on preventive behavior contained 18 items, also using the Guttman scale (Arikunto, 2016). Data measurement was performed by scoring each item according to observations: a response of "Yes" was scored 1, and a response of "No" was scored 0. The assessment of preventive behavior against pulmonary tuberculosis at the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital, West Kalimantan Province, was classified as follows: good >9 and poor <9.

2.6 Data processing and analysis

Data processing in this study involved, editing the questionnaire results obtained or collected through the questionnaire must first be edited. If there are incomplete answers, if possible, re-collection of data is necessary to complete the answers. However, if this is not possible, the incomplete questions are not processed or included in the processing (missing data). Coding, after all questionnaires have been edited, coding is performed, converting data in the form of sentences or letters into numeric data. This coding is very useful for data entry. Data entry, data, namely the answers from each respondent in the form of codes (numbers or letters), is entered into a computer program or software. Data Cleaning: Once all data from each data source or respondent has been entered, it needs to be checked again for possible coding errors, incompleteness, and so on, and then corrected or corrected.

Data analysis was performed using univariate and bivariate analytical techniques. Univariate analysis is performed to examine each variable from the research results, which are presented in the form of frequency distributions with narrative explanations (Sastroasmoro & Ismael, 2010). In this study, the family's level of knowledge and preventive behavior against pulmonary tuberculosis transmission are presented as frequency distributions, including age, gender, education level, and occupational status.

Bivariate analysis is conducted to test the relationship between the independent and dependent variables using the chi-square (χ^2) statistical test to determine the significant relationship between each independent variable and the dependent variable. The chi-square test is performed using computer software with a significance level of $\alpha = 0.05$ (95% confidence level). The decision-making criterion is based on probability values. If the probability ≤ 0.05, Ho is rejected, indicating that there is a significant relationship between family knowledge and preventive behavior against pulmonary tuberculosis transmission at the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital, West Kalimantan Province.

3. Results and Discussion

3.1 Overview of the research location

Dr. Soedarso Regional General Hospital in Pontianak is a Regional Public Service Agency hospital owned by the West Kalimantan Provincial Government, which was

designated as a Class A hospital by the Ministry of Health in April 2022. Dr. Soedarso Regional General Hospital is located in Bangka Belitung Village, South Pontianak District, Pontianak City, on a 26.6318-hectare site. Dr. Soedarso General Regional Hospital operates under the responsibility of the Regional Head through the Regional Secretary as the technical administrator. In fulfilling this role, the hospital carries out its primary duties of providing medical services, medical support services, and nursing care. In addition to clinical aspects, Dr. Soedarso General Regional Hospital also functions as a center for education and training, as well as managing general administration and finance. These efforts are undertaken to realize the hospital's vision: "To Become the Best, Self-Reliant, and Professional Hospital." This vision is supported by a core mission encompassing the provision of high-quality, affordable care; human resource development through research and training; improved employee welfare; and revenue enhancement to support institutional self-reliance.

Table 2. characteristics of the respondents

Respondent Characteristics	Frequency (f)	Percentage (%)
Age		
<35	12	54.5
>35	10	45.5
Total	22	100
Gender		
Male	12	54.5
Female	10	45.5
Total	22	100
Occupation		
Homemake	5	22.7
Private Employee	7	31.8
Student	2	9.1
Farmer	1	4.5
Entrepreneur/Self-Employed	1	4.5
Unemployed	4	18.2
Independent Entrepreneur	2	9.1
Total	22	100
Education		
Elementary School	3	13.6
Junior High School/Equivalent	4	18.2
Senior High School/Equivalent	14	63.6
S1/DIV	1	4.5
Total	22	100

In carrying out its operations, Dr. Soedarso General Hospital firmly upholds the motto "CINTA" as the foundation of its service. This motto is an acronym for *Cepat* (Prompt), meaning service response within standard timeframes; *Inovasi* (Innovation), signifying change through creative ideas; *Nyaman* (Comfort), referring to hospitality and adequate facilities; *Terdepan* (Leading), prioritizing professionalism and cutting-edge technology; and Akuntabel (Accountable), reflecting integrity and disciplined accountability. To support all these services, the hospital is equipped with comprehensive facilities and infrastructure, ranging from the Emergency Department (ED), Central Surgical Unit, Outpatient Department, to Inpatient Care. Additionally, other medical support facilities are available, such as a pharmacy, nutrition unit, and X-ray services. The characteristics of the respondents, including age, gender, occupation, and education, are presented in the above. Based on Table 2, the frequency distribution of the data shows that among 22 respondents, the majority were under 35 years old, totaling 12 respondents (54.5%); 12 respondents were male (54.5%); the most common education level was senior high school or equivalent, with 14 respondents (63.6%); and the largest occupational group was private employees, with 7 respondents (31.8%).

Table 3. Distribution of respondents based on family knowledge level about pulmonary tuberculosis

Knowledge	Number	Percentage (%)
Good	15	31.8
Less good	7	68.2
Total	22	100

Table 3 presents the frequency distribution of family knowledge regarding pulmonary tuberculosis at the Infectious Disease Ward of Dr. Soedarso Regional General Hospital, showing that 15 respondents (31.8%) had poor knowledge, while 7 respondents (68.2%) demonstrated good knowledge. Table 4 shows the frequency distribution of preventive behaviors toward pulmonary tuberculosis transmission at the same hospital ward. The findings indicate that 18 respondents (68.8%) exhibited good preventive behavior, while 4 respondents (31.2%) demonstrated poor preventive behavior.

Table 4. Distribution of respondents based on behaviors to prevent pulmonary tuberculosis transmission

Preventive Behavior	Number	Percentage (%)
Good	18	68.8
Less good	4	31.2
Total	32	100

3.1.1 Bivariate analysis results

Table 5 shows that 15 respondents (68.2%) had good knowledge and demonstrated good preventive behavior. Meanwhile, 4 respondents (18.2%) had poor knowledge but good preventive behavior, and 3 respondents (13.6%) had poor knowledge and poor preventive behavior. The results of the statistical analysis using the Chi-square test obtained a *p*-value of 0.005, where $p \leq 0.05$. Therefore, it can be concluded that the alternative hypothesis (Ha) is accepted, indicating that there is a significant relationship between family knowledge and preventive behavior toward pulmonary tuberculosis transmission in the Infectious Disease Ward of Dr. Soedarso Regional General Hospital.

Table 5. Correlation Between Family Knowledge Level and Behavior in Preventing Pulmonary Tuberculosis Transmission

Variable	Prevention Behavior						*p-Value*
Family	Poor		ood		Total		
Knowledge	N	%	N	%	N	%	
Poor	4	18.2	3	13.6	7	31.8	
Good	0	0	15	68.2	15	68.2	0,005
Total	4	18.2	18	81.8	22	100	

3.2 Family knowledge about pulmonary tuberculosis

Based on Table 3, it can be seen that among families of pulmonary tuberculosis patients at the Infectious Disease Ward of Dr. Soedarso Regional General Hospital, 7 respondents (31.8%) had poor knowledge, while 15 respondents (68.2%) had good knowledge. These findings indicate that most respondents possessed good knowledge regarding pulmonary tuberculosis. In this study, good knowledge refers to the respondents' understanding of pulmonary tuberculosis, including its definition, causes, modes of transmission, signs and symptoms, complications, risk factors, and preventive measures (Budiman & Riyanto, 2013). Conversely, poor knowledge refers to respondents having limited awareness and understanding of these aspects. Knowledge represents a crucial domain in shaping an individual's behavior (overt behavior). Knowledge is closely related to the amount of information an individual possesses—the more information a person has, the higher their level of knowledge (Notoatmodjo, 2015).

Based on field observations, insufficient knowledge among family members hinders their ability to effectively prevent the transmission of pulmonary tuberculosis in the Infectious Disease Ward of Dr. Soedarso Regional General Hospital. This occurs because families lack adequate understanding of the disease and its preventive measures. The lack of knowledge among respondents may be attributed to their low educational background, limited openness of patients' families regarding the illness of their relatives—both to healthcare workers and to the surrounding community—and the social stigma that leads many people to feel ashamed when others know that a family member has tuberculosis.

This finding is consistent with a study by Insana Maria (2020), which found that 26 respondents (87.7%) had good knowledge and 4 respondents (13.3%) had moderate knowledge. However, the result of this study contrasts with research conducted by Egayaka (2023) on the knowledge, attitudes, and actions of pulmonary TB patients toward preventive behaviors. That study reported that 70.3% of respondents had poor knowledge regarding tuberculosis prevention. This study is inconsistent with research conducted by Egayaka (2023) on the knowledge, attitudes, and actions of pulmonary TB patients regarding behaviors to prevent the transmission of pulmonary TB. The results showed that 70.3% of respondents lacked knowledge regarding pulmonary TB prevention.

3.3 Prevention and transmission behavior of pulmonary tuberculosis

The primary goal of tuberculosis (TB) prevention is to interrupt the chain of disease transmission by identifying pulmonary tuberculosis patients and treating them until full recovery (Astuti, 2013; Hudoyo et al., 2017). Transmission of tuberculosis from patients to others can occur when the bacteria from TB patients are inhaled by other individuals. The inhaled bacteria are contained in "droplets," which are tiny saliva particles dispersed in the air. These airborne droplets are produced when coughing or sneezing; therefore, TB patients are required to cover their mouths during coughing or sneezing.

Based on Table 4, out of 22 respondents, 18 respondents (81.8%) demonstrated good preventive behaviors, while 4 respondents (18.2%) exhibited inadequate preventive behaviors. This is influenced by the respondents' good level of knowledge. Preventive behaviors against tuberculosis transmission include wearing masks when interacting with TB patients, using separate eating utensils for TB patients within the family, consuming nutritious food, maintaining environmental hygiene, and so forth (Prabhakara, 2010).

The results of this study are consistent with the research conducted by Tonsisius Jehaman, regarding the Relationship Between Knowledge Level, Attitude, and Behavior in TB Transmission Prevention, which showed that 21 individuals (63.6%) engaged in TB transmission preventive behaviors, while 12 individuals (36.4%) did not (Jehaman, 2021). However, this study is not consistent with the research conducted by Offi Miranda M. and Arfiza Ridwan, which reported that 41 individuals (47.1%) had high-level efforts in preventing pulmonary tuberculosis transmission, while 46 individuals (52.9%) had low-level preventive efforts (Anjelina et al., 2022).

3.4 Correlation between family knowledge and behaviors for the prevention and transmission of pulmonary tuberculosis

Based on Table 5, the relationship between family knowledge and preventive behavior against pulmonary tuberculosis (TB) transmission at the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital in 2024 is explained as follows: respondents with good knowledge and good preventive behavior were 15 individuals (68.2%). Respondents with poor knowledge but good preventive behavior were 4 individuals (18.2%), while respondents with poor knowledge and poor preventive behavior were 3 individuals (13.6%). Statistical analysis using the chi-square test yielded a p-value of 0.005. Since $p \leq 0.05$, it can be concluded that the alternative hypothesis (Ha) is accepted, indicating a significant relationship between family knowledge and preventive behavior against

pulmonary tuberculosis transmission at the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital

This finding aligns with the studies of Eka Rustia Purnama Sari and Doni Setiyawan, where chi-square analysis produced a p-value of 0.000, which is less than α (0.05), indicating a significant relationship between knowledge and preventive behavior in the transmission of pulmonary tuberculosis among family members of TB patients (Sari & Setiyawan, 2020). However, this study does not align with the research conducted by Ayurti, which reported no significant relationship between family knowledge and preventive behavior against tuberculosis transmission, with a probability value of 0.204 > 0.05 (Ayurti et al., 2016).

According to the researcher's assumption, there is a meaningful relationship between knowledge and preventive behavior in pulmonary tuberculosis transmission. Knowledge, or cognitive domain, is a critical factor in shaping an individual's actions (overt behavior). Good knowledge, if not accompanied by a positive attitude, may not influence behavior, as behavior encompasses knowledge, attitude, and action (Setiadi, 2013; Notoatmodjo, 2015). The higher the family's level of knowledge, the more positive their preventive behaviors toward pulmonary tuberculosis transmission; conversely, lower knowledge levels are associated with negative attitudes and behaviors. In this study, good knowledge refers to the respondent's understanding of tuberculosis, including its definition, causes, transmission, signs and symptoms, complications, risk factors, and preventive measures. Poor knowledge refers to limited understanding of these aspects. Knowledge is related to the amount of information a person possesses; the more information an individual has, the higher their knowledge level (Notoatmodjo, 2015). Field observations indicated that insufficient knowledge hinders families from implementing preventive measures against pulmonary tuberculosis transmission at the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital because the family lacks adequate understanding of pulmonary tuberculosis.

4. Conclusions

Based on the results of the study titled "Correlation between family knowledge and preventive behaviors against pulmonary Tuberculosis transmission at regional hospital," the following conclusions can be drawn. The frequency distribution of characteristics among the 22 respondents shows that the largest age group was those under 35 years old, comprising 12 respondents (54.5%); 12 respondents (54.5%) were male, the most common educational level was high school or equivalent (14 respondents, 63.6%), and 7 respondents (31.8%) were private-sector employees. The frequency distribution of family knowledge regarding Pulmonary Tuberculosis at the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital showed that 7 respondents (31.8%) had poor knowledge, while 15 respondents (68.2%) had good knowledge.

The frequency distribution of preventive behaviors against the transmission of pulmonary tuberculosis at the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital showed that 18 respondents (81.8%) exhibited good preventive behaviors, while 4 respondents (18.2%) exhibited poor preventive behaviors. There is a Relationship Between Family Knowledge and Behavior Regarding the Prevention of Pulmonary Tuberculosis Transmission in the Infectious Diseases Ward of Dr. Soedarso Regional General Hospital. For the hospital, the results of this study can serve as input for the hospital to be more active in health promotion efforts regarding tuberculosis, particularly through direct education for patients. For the Dr. Soedarso Regional General Hospital Training Center, the results of this study can serve as library reference material and provide input regarding the relationship between knowledge and behavior regarding the prevention of pulmonary tuberculosis transmission, as well as serve as input for other similar studies. For the Community. The community, families, and patients with pulmonary tuberculosis are encouraged to enhance their knowledge of pulmonary tuberculosis and adopt preventive behaviors against its transmission by attending tuberculosis education sessions organized

by healthcare workers, asking questions frequently, and reading materials related to the disease.

Acknowledgement
The author gratefully acknowledges all forms of support and assistance received throughout the completion of this research.

Author Contribution
T.P.M.M., B.K.M., & L.M., contributed fully to all stages of the research, including the formulation of the research idea and objectives, data collection and analysis, and preparation of the final manuscript. The author has read, reviewed, and approved this manuscript for publication.

Funding
This research did not receive any funding from any institution, organization, or funding source, whether public, commercial, or nonprofit.

Ethical Review Board Statement
This research does not require approval from a research ethics committee because it does not involve human or animal subjects and does not pose any ethical risks. All procedures were conducted in accordance with the applicable research ethics principles at Gadjah Mada University.

Informed Consent Statement
This research does not directly involve human participants and therefore does not require informed consent.

Data Availability Statement
All data used and/or analyzed in this research are openly available and can be accessed through the corresponding author upon reasonable request.

Conflicts of Interest
The author declares that they have no conflicts of interest that could influence the research results, data interpretation, or conclusions presented in this article.

Declaration of Generative AI Use
The author declares that generative artificial intelligence (such as ChatGPT) was used solely to assist with language editing and stylistic refinement, without affecting the scientific content, data analysis, or conclusions of the study. The authors are fully responsible for the entire content and originality of this manuscript.

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