

AN OVERVIEW OF FAMILY KNOWLEDGE LEVELS REGARDING PULMONARY TUBERCULOSIS IN BANDENGAN VILLAGE, KENDAL SUB-DISTRICT

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ABSTRACT

Pulmonary Tuberculosis remains a major health problem in Indonesia. Family knowledge plays a crucial role as the primary foundation for making decisions regarding the care and treatment assistance of patients. This study aims to describe the level of family knowledge about Pulmonary Tuberculosis in Bandengan Village, Kendal District. The research design used was descriptive quantitative with a cross-sectional approach. The study population included all families in Bandengan Village, with a sample size of 3/4 respondents selected using the stratified cluster sampling technique. The research instrument consisted of a questionnaire that had been tested for validity and reliability. Data analysis involved the frequency distribution of the knowledge variable. Respondent characteristics were dominated by the productive group, with the majority having an elementary school education (34.1%). The results showed that most respondents had knowledge in the good category (51.5%), followed by the moderate category (31.7%), and a small portion in the poor category (16.8%). Respondents with a history of family members suffering from Tuberculosis showed a higher level of knowledge (90.9% in the good category) compared to healthy families (50.2% in the good category). In conclusion, the level of family knowledge about Pulmonary Tuberculosis in Bandengan Village is predominantly in the good category. However, strengthening education remains necessary regarding nutritional aspects, emotional support, and drug resistance understanding to enhance family independence in caring for patients at home.

Keywords: family; knowledge; pulmonary tuberculosis

INTRODUCTION

Pulmonary Tuberculosis remains a significant global health challenge as one of the leading causes of death from infectious agents. The World Health Organization estimates that millions of new cases emerge annually with high mortality rates, particularly in developing countries. This disease, caused by the bacterium *Mycobacterium Tuberculosis*, not only impairs physical health but also imposes a substantial economic and social burden. The control of Tuberculosis requires a multi-sectoral approach, as its transmission is heavily influenced by poor residential environmental conditions and community behaviors that do not yet support a healthy lifestyle (World Health Organization, 2023).

Indonesia currently ranks second highest in terms of Tuberculosis burden globally, indicating an emergency situation at the national level. The government has exerted efforts to reduce prevalence through various programs; however, challenges such as population density, poor nutritional status, and low awareness of early screening remain major impediments. The success of eliminating Tuberculosis by 2030 relies heavily on active case finding within communities and the effectiveness of complete, uninterrupted treatment. This strategy demands a strong commitment to ensure that every patient gains access to targeted health services (Kemenkes RI, 2023).

Central Java Province, particularly Kendal Regency, exhibits dynamic case detection rates, with Bandengan Village emerging as one of the areas of special concern. The characteristics of Bandengan as a coastal area with high residential density create a substantial transmission risk for the local community. Humid housing conditions coupled with a lack of natural lighting provide an ideal medium for the growth of Tuberculosis bacteria. This situation necessitates stringent surveillance and more specific environmental interventions from local health authorities to suppress the spread of cases (Dinas Kesehatan Kabupaten Kendal, 2023).

The family plays a central role as the smallest unit in the prevention and home care of Tuberculosis patients. The family health care function crucially determines the patient's medication adherence and prevents household infection among other members. Good knowledge regarding modes of transmission, symptoms, and the importance of home sanitation serves as the primary foundation for breaking the chain of disease transmission. Without adequate understanding, families will be unable to perform effectively as Medication Intake Supervisors (*Pengawas Minum Obat / PMO*), which risks triggering cases of Multi-Drug Resistant Tuberculosis (MDR-TB) (Notoatmodjo, 2014).

Information gaps persist in Bandengan Village, where a segment of the community still holds misconceptions regarding the causes of Tuberculosis, alongside a social stigma that hinders medical management. This descriptive quantitative study aims to determine the level of family knowledge in the area concerning the definition, symptoms, and prevention of Tuberculosis using a stratified cluster sampling technique. The findings of this study are expected to serve as a reference for health institutions and the Kendal Public Health Center (*Puskesmas Kendal*) in designing health promotion programs that are more persuasive, educational, and tailored to the real needs of the local community (Budiman & Riyanto, 2020).

METHODS

This study utilized a descriptive quantitative design with a cross-sectional approach to provide an objective overview of family knowledge regarding Pulmonary Tuberculosis. The research population involved 1,700 heads of households in Bandengan Village, with a sample size of 314 respondents selected through a stratified cluster sampling technique based on the Cochran formula (with a 5% margin of error). The research instruments consisted of a Tuberculosis knowledge questionnaire (36 statements) adapted from Febriyanti's (2020) study with an r-calculated value of 0.376–0.964 and a Cronbach's Alpha of 0.956, as well as a home care questionnaire (13 statements) developed and self-tested by the researchers yielding an r-calculated value of 0.417–0.756 and a Cronbach's Alpha of 0.793. Data were analyzed using frequency distribution and item analysis. All procedures were conducted in strict adherence to research ethics principles, including informed consent, anonymity, and confidentiality (Sugiyono, 2019).

RESULT AND DISCUSSION

Characteristics Respondents

Table 1.
Characteristics of Respondents Based on Age (n=314)

Median	Min	Max	Standard Deviation	Kurtosis	Normality Test Skewness
37	23	71	12,48	3,121	0,967

Table 1 above indicates that the data are not normally distributed; therefore, utilizing the median value (37 years) provides a more accurate representation of the age profile for the majority of respondents. The standard deviation value signifies that the respondents' ages are highly varied (heterogeneous).

Table 2.
Description of Education, Occupation, Family Type, Information Exposure, Information Sources, and Medical History (n=314)

Characteristics	Frequency (f)	Percentage (p)
Education Level	54	17,2
No formal education	107	34,1
Primary school	81	25,8
Junior high school	57	18,2
Senior high school	15	4,8
Bachelor's degree		
Occupation		3,2
Domestic helper / Housemaid	10	1,9
Laborer	6	1,3
Janitor / Cleaning service worker	4	1,3
Teacher	4	47,8
Housewife	150	9,6
Private sector employee	30	22,3
Fisherman	70	9,6
Trader / Vendor	30	3,2
Farmer	10	
Family Type		22,3
Extended family	70	0,3
Dyad family	1	59,6
Nuclear family	187	17,8
Single-parent family	56	
Information Exposure		27,4
Exposed / Ever exposed	86	59,3
Health workers	51	12,8
Neighborhood / Environment	11	4,7
Print media	4	39,5
Social media	34	9,3
Electronic media	8	72,6
Unexposed / Never exposed	228	
History of Pulmonary Tuberculosis		3,5
Present / Yes	11	54,5
Defaulted from treatment / Lost to follow-up	6	45,5
Undergoing treatment / Completed treatment	5	18,2
Drug-resistant	2	81,8
Unaware of drug resistance	9	96,5
Absent / None	303	

Table 2 above demonstrates that the majority of families in Bandengan Village have a primary school (SD) education level, totaling 107 respondents (34.1%). Furthermore, 150 respondents (47.8%) are housewives, 187 (59.6%) belong to nuclear family types, and exposure to information is predominantly sourced from health workers, accounting for 51 respondents (59.3%). Among families with members suffering from Pulmonary Tuberculosis, the vast majority 9 respondents (81.8%) stated that they were unaware of drug resistance.

Family Knowledge Regarding Pulmonary Tuberculosis

Table 3.

Frequency Distribution of Family Knowledge Regarding Pulmonary Tuberculosis (n=314)

Family Knowledge Regarding Pulmonary Tuberculosis	Frequency (f)	Percentage (p)
Good	162	51,5
Moderate	99	31,7
Low	53	16,8

Table 3 above shows that the majority of respondents possess a good level of knowledge, totaling 162 respondents (51.5%). However, a significant portion of respondents provided incorrect answers regarding the indicators for causes and physical environment management.

The results of this study indicate that the community in Bandengan Village possesses a sufficient understanding of Pulmonary Tuberculosis. The majority of the community has adequate knowledge, with the number exceeding half of the total research sample. The data distribution also notes that approximately one-third of the community falls into the moderate knowledge category, while a small remaining fraction is still within the poor knowledge category. Achieving a good knowledge score that exceeds half of the total population indicates that baseline information regarding the symptoms and transmission of Tuberculosis has been successfully communicated within the environment.

Based on the community data, the majority of respondents have an educational background of primary school (*SD/MI*) and senior high school (*SMA/SMK/MA*), where the distribution of this education level influences the pattern of the community's knowledge distribution, mostly falling into the good and sufficient categories. The dominance of primary and secondary education graduates presents a distinct challenge in health program dissemination efforts, as differences in educational levels will affect the speed of information reception. This aligns with the theory that education level is a fundamental factor shaping mindsets and the community's ability to absorb and understand information objectively (Nursalam, 2020). Furthermore, previous research states that education level has a positive correlation with literacy skills and decision-making within the community (Wulandari & Saputra, 2022).

Housewives and fishermen constitute the largest occupational groups. The majority of respondents working as housewives and private sector employees demonstrate knowledge levels in the good category, whereas in the fishermen and laborers groups, several individuals are still found with knowledge levels in the poor category. Daily activities as a housewife apparently do not hinder individuals from acquiring good knowledge, which is presumed to be due to the ease of accessing information through digital media within the family environment (Notoatmodjo, 2020). Supporting theory states that occupation is one of the factors influencing a person's experience and social interaction, which indirectly impacts the breadth of insights possessed (Nursalam, 2020). This finding is also consistent with research indicating that occupational characteristics correlate with individual awareness and knowledge levels (Handayani & Wijaya, 2023).

The family type characteristic of the community is dominated by the nuclear family structure, wherein individuals within a nuclear family mostly exhibit knowledge levels in the good and sufficient categories. The family type serves as the primary social unit that facilitates the process

of information exchange and education among its members (Nursalam, 2020). This is supported by the view that individuals in nuclear families tend to have a more intensive communication focus, allowing the delivery of health-related information to be carried out more effectively (Arikunto, 2019). This finding is in line with previous research stating that family structure and function significantly affect the literacy levels of family members (Ramadhan & Lestari, 2022).

The majority of respondents who had been exposed to information utilized health workers and social media as their primary reference sources and tended to have knowledge levels in the good category. The dominance of the health worker's role as an information source indicates that authority figures remain trusted references for the community in the area (Arikunto, 2019). Theoretically, exposure to information is an important stimulus underlying cognitive formation and behavioral changes within an individual (Nursalam, 2020). This finding is supported by previous research stating that information sources exert a significant influence on increasing public literacy.

Individuals with a history of Tuberculosis tend to show knowledge levels in the good category, whereas those without a history of Tuberculosis exhibit an evenly distributed knowledge pattern between the good and sufficient categories. The lower knowledge level in the population without a history of the disease is likely caused by low perceived susceptibility to the risk of transmission in the surrounding environment (Notoatmodjo, 2020). Literature indicates that a past medical history represents a form of direct experience that effectively increases an individual's attention and cognition toward health information (Nursalam, 2020). This finding is consistent with previous research stating that illness experience correlates significantly with improvements in an individual's health literacy (Pradana & Santoso, 2021).

The community's level of knowledge regarding Pulmonary Tuberculosis varies widely, with a tendency toward an excellent understanding of symptoms and prevention methods, where most of the community has understood that the Tuberculosis germ attacks the lungs and is aware of the importance of cough etiquette. The high level of public knowledge regarding clinical symptoms and cough etiquette is influenced by the success of massive health program socialization carried out at primary health care facilities (Arikunto, 2019). This finding is in line with previous research stating that the general public possesses good awareness of the main symptoms of Tuberculosis, and the use of Medication Intake Supervisors (*Pengawas Minum Obat / PMO*) has proven to be a primary supporting factor in treatment success (Putri & Wahyuni, 2021).

However, the majority of the community still misidentified the cause of the disease, assuming that Tuberculosis is caused by the *E. coli* virus and is a hereditary disease, as well as mistakenly understanding its transmission mode through sexual intercourse. Misconceptions regarding Tuberculosis as an inherited disease and its transmission through sexual intercourse carry a high risk of reinforcing social stigma against patients, which can ultimately hinder patient openness to seeking medical examinations (Mubarak, 2015). This is supported by literature mentioning that a lack of knowledge is often triggered by poor health literacy and the presence of myths developing in society that Tuberculosis is a cursed or hereditary illness (Pradana & Utami, 2023).

Knowledge levels remain low concerning organ complications and detailed treatment, where most of the community is still mistaken in understanding complications involving the heart, as well as the actions that must be taken if a drug dose is missed. The presence of significant errors regarding

treatment procedures indicates that the education received by the community is still superficial and has not addressed the aspects of pathophysiology and deep pharmacotherapy management (Nursalam, 2020). This finding is supported by research stating that understanding side effect management, medication storage, and drug mechanisms of action are frequently overlooked by the public (Rizki & Sari, 2022). Additionally, improper medication storage and a lack of understanding about side effects can reduce patient motivation to adhere to therapy (Hidayat & Kusuma, 2024).

The community's level of knowledge regarding home care for Pulmonary Tuberculosis reached its highest achievement in understanding the role of the Medication Intake Supervisor (PMO), where the majority of the community highly understands that the main task of the PMO is to ensure the patient swallows the medication every day according to the prescribed dose and schedule. This excellent understanding of the PMO's role reflects the effectiveness of procedural education provided by healthcare professionals during the initial phase of treatment. This finding aligns with previous research emphasizing that the family's role as a PMO is the main pillar in guaranteeing long-term treatment adherence (Suryani & Zulkifli, 2021).

Furthermore, most of the community highly understands the importance of air circulation by opening windows for patient recovery. This understanding of physical ventilation reflects the effectiveness of procedural education provided by healthcare workers during the early phase of treatment. However, other studies reveal that home environments with poor ventilation and natural lighting significantly increase the risk of transmission to other family members (Hasanah & Pratama, 2020).

Conversely, the lowest knowledge was found in the aspect of nutritional urgency, where a segment of the community still considers nutrition to be of minor importance as long as routine medication is consumed. Misconceptions regarding the importance of nutritional intake indicate that family health education remains focused solely on clinical compliance while neglecting holistic recovery-supportive aspects. Adequate nutritional support, particularly protein intake, is frequently ignored by families due to the primary focus being placed solely on medication availability, even though malnutrition can worsen the prognosis of Tuberculosis patients (Wulandari & Saputra, 2022).

A portion of the community also mistakenly understands the psychological impacts, such as decreased appetite and anxiety, considering them not to be a family concern. The community's error in assuming that the patient's psychological issues will resolve spontaneously reflects a lack of empathy and mental health literacy in chronic disease care. In fact, psychosocial and emotional support from the family has proven effective in lowering patient stress levels, which directly correlates with increased appetite and acceleration of the lung tissue recovery process (Nugroho & Lestari, 2023).

Although the majority of the community has understood the necessity of family motivation alongside high-calorie and high-protein nutritional intake for recovery, if families ignore nutritional aspects and emotional support, the risk of treatment failure due to decreased immune function and depression in patients will increase. Therefore, family education approaches must encompass both physical environment management and the fulfillment of the patient's basic biological and psychological needs (Ramadhan et al., 2021).

The highest level of understanding was found in the prevention aspect, where nearly the entire community understands preventive steps to avoid disease transmission. This high level of knowledge regarding prevention is influenced by the success of structured health education programs in the community, which typically focus on practical measures so that patients seek immediate treatment and do not transmit the disease. This finding is consistent with previous research stating that the public generally possesses high awareness regarding the symptoms and treatment of Tuberculosis (Wulandari & Saputra, 2022).

Nevertheless, a significant knowledge gap persists in the indicators for the cause of the disease, where the majority of the community still provided incorrect answers. The low level of understanding regarding the etiology indicates that strong misconceptions still exist within the community, such as the assumption that Tuberculosis is caused by non-medical factors or biological agents other than the *Mycobacterium Tuberculosis* bacterium. This is in line with the statement that communities often fail to accurately identify microbiological causes, whereas reinforcing literacy regarding etiology is highly necessary to eradicate social stigma (Hidayat & Kusuma, 2024).

Adequate knowledge is observed in the aspects of treatment, signs, and symptoms of the disease. The high level of knowledge regarding these clinical aspects is influenced by a focus on practical education aimed at enabling the community to recognize warning signs early. Good knowledge concerning signs and symptoms serves as an essential modality for the community to conduct early detection and seek medical assistance independently (Susilowati & Handayani, 2021). Conversely, a low level of community understanding was found in the indicators for modes of transmission and a deep comprehension of pathogenic characteristics. Ignorance regarding specific transmission mechanisms carries a high risk of triggering stigmatizing behaviors toward patients, as well as the neglect of health protocols in certain situations perceived as low-risk. The existence of this knowledge gap in the aspect of transmission is frequently caused by confusing information or prevailing local myths (Pradana & Utami, 2023).

The highest achievement in community knowledge regarding home care lies within the indicator for Medication Intake Supervisors (*Pengawas Menelan Obat / PMO*), where nearly all respondents understand the primary task of ensuring the regularity of the patient's medication consumption. The dominance of knowledge in this aspect stems from the focus of health education, which has thus far emphasized medical aspects and treatment compliance or curative care. This finding aligns with previous research stating that family knowledge regarding the role of the PMO is typically higher than that of environmental care aspects because these instructions are repeatedly reinforced by healthcare workers (Susilowati & Handayani, 2021).

However, the majority of the community still provided incorrect answers regarding the aspects of residential physical environment management. The community tends to assume that recovery from Tuberculosis depends solely on medication compliance, causing aspects such as air circulation and solar lighting to be frequently overlooked. Low literacy regarding home sanitation and ventilation remains a major obstacle, as dark and humid environments support the persistence of the *Mycobacterium Tuberculosis* bacterium (Prabowo & Rahayu, 2022).

The analysis results indicate a low level of community understanding regarding the nutritional fulfillment of patients. Misconceptions concerning nutritional indicators suggest that the

community is not yet fully aware of the relationship between high protein intake and the regeneration of damaged lung tissue. Poor nutritional support for Tuberculosis patients is often caused by a lack of family understanding in planning affordable high-calorie, high-protein (*Tinggi Kalori Tinggi Protein / TKTP*) diets (Zulkifli & Maryam, 2023).

Conversely, a good level of knowledge is observed in the psychosocial aspects, which include providing emotional support and motivation for patients. This knowledge is crucial because the integration of psychosocial support and an understanding of a healthy environment has been proven to significantly accelerate sputum conversion to negative and improve the patient's quality of life. Overall, accurate informational support regarding all aspects of the disease serves as a key factor in ensuring successful treatment and prevention within the community (Ramadhan et al., 2021).

CONCLUSIONS

Based on the results of the research conducted among the community in Bandengan Village, Kendal District, it can be concluded that the majority of families possess a good level of knowledge regarding Pulmonary Tuberculosis. This finding indicates that most of the community has accurately understood the basic concepts of the disease, transmission mechanisms, clinical signs and symptoms, and the preventive measures required to minimize the risk of infection within the household. This high level of knowledge is influenced by the characteristics of the community, which is predominantly within the productive age range, as well as the active role of families in seeking health information factors which are theoretically primary predisposing factors in the formation of positive health behaviors. Nevertheless, maintaining this understanding still requires sustained support from healthcare professionals through persuasive education to ensure that this high level of knowledge transforms into consistent and permanent preventive actions within the community.

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