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## The Relationship Between The Level of Knowledge and Family Support, and Measures to Prevent Pulmonary Tuberculosis Transmission


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**ABSTRACT**

Pulmonary tuberculosis remains a global health problem with a significant burden, particularly in densely populated areas such as Jakarta. The occurrence of this disease is influenced not only by medical factors but also by the level of individual knowledge and family support in preventing its transmission. This study aims to analyze the relationship between knowledge level and family support with efforts to prevent the transmission of pulmonary tuberculosis in the working area of the Kemayoran Public Health Center, Central Jakarta. This study employed a quantitative approach with a cross-sectional design involving 75 respondents selected through a survey technique using a structured questionnaire. Data analysis was conducted using univariate analysis to describe variable distributions and bivariate analysis using Spearman's rho correlation test. The results showed a significant relationship between knowledge level and efforts to prevent the transmission of pulmonary tuberculosis, with a strong correlation. In addition, family support also demonstrated a very strong and significant relationship with prevention efforts. The majority of respondents had a moderate level of knowledge, tended to have low family support, and their prevention efforts were generally in the moderate to good category. In conclusion, this study highlights that improving knowledge and strengthening family support play an important role in enhancing preventive behaviors against pulmonary tuberculosis transmission. Therefore, continuous health education interventions and family empowerment are needed to reduce the transmission rate of pulmonary tuberculosis, particularly in urban areas.



**Keywords:** Pulmonary Tuberculosis, Knowledge Level, Family Support, Prevention Efforts.



**ABSTRAK**

Tuberkulosis paru masih menjadi masalah kesehatan global dengan beban yang signifikan, terutama di wilayah padat penduduk seperti Jakarta. Kejadian penyakit ini tidak hanya dipengaruhi oleh faktor medis, tetapi juga berkaitan dengan tingkat pengetahuan individu serta dukungan keluarga dalam upaya pencegahan penularan. Penelitian ini bertujuan untuk menganalisis hubungan antara tingkat pengetahuan dan dukungan keluarga dengan upaya pencegahan penularan tuberkulosis paru di wilayah kerja Puskesmas Kemayoran, Jakarta Pusat. Penelitian ini menggunakan pendekatan kuantitatif dengan desain cross-sectional terhadap 75 responden yang dipilih melalui teknik survei menggunakan kuesioner terstruktur. Analisis data dilakukan secara univariat untuk menggambarkan distribusi variabel dan secara bivariat menggunakan uji korelasi Spearman's rho. Hasil penelitian menunjukkan adanya hubungan yang signifikan antara tingkat pengetahuan dengan upaya pencegahan penularan tuberkulosis paru dengan kekuatan hubungan yang kuat. Selain itu, dukungan keluarga juga memiliki hubungan yang sangat kuat dan signifikan dengan upaya pencegahan penularan tuberkulosis paru. Mayoritas responden memiliki tingkat pengetahuan dalam kategori cukup, dukungan keluarga cenderung rendah, serta upaya pencegahan penularan berada pada kategori cukup hingga baik. Kesimpulan penelitian ini menegaskan bahwa peningkatan pengetahuan dan penguatan dukungan keluarga berperan penting dalam meningkatkan perilaku pencegahan penularan tuberkulosis paru. Oleh karena itu, diperlukan intervensi berupa edukasi kesehatan yang berkelanjutan serta pemberdayaan keluarga guna menekan angka penularan tuberkulosis paru, khususnya di wilayah perkotaan.



**Kata Kunci:** TB Paru, Tingkat Pengetahuan, Dukungan Keluarga, Upaya Pencegahan Penularan.

## INTRODUCTION

Pulmonary tuberculosis is an infectious disease caused by Mycobacterium tuberculosis and remains a global health problem with a significant burden, particularly in developing countries including Indonesia. The disease can infect one-third of the world's population and is among the top ten leading causes of death globally, with an estimated 10.6 million cases annually (Sibua, 2021; Kementerian Kesehatan Republik Indonesia, 2022). In Indonesia, the prevalence of tuberculosis reaches 9.2%, with a higher proportion in males compared to females, at 57.9% and 42.1%, respectively (Kementerian Kesehatan Republik Indonesia, 2022). The risk factors for tuberculosis are not only related to medical aspects but are also influenced by sociodemographic factors such as age, education, occupation, and income, as well as environmental and behavioral factors including housing conditions, smoking habits, and comorbidities (Pralambang & Setiawan, 2021). Airborne droplet transmission makes this disease highly contagious, particularly in densely populated areas.

Clinically, pulmonary tuberculosis is characterized by symptoms such as persistent productive cough, hemoptysis, chest pain, fever, weight loss, and night sweats (Rokhmah, 2013). If not properly treated, the disease can progress into serious complications, both in early and advanced stages, including pleural effusion, lung parenchymal damage, acute respiratory distress syndrome (ARDS), and death due to massive hemoptysis (Pratiwi, 2020). Beyond its clinical impact, pulmonary tuberculosis also affects patients' quality of life, including physical, psychological, and social aspects (Nainggolan, 2022). Therefore, efforts to prevent transmission are a crucial component in controlling this disease, particularly within families and communities.

Efforts to prevent the transmission of pulmonary tuberculosis are strongly influenced by individual knowledge levels and family support. Adequate knowledge regarding the disease, its transmission, and treatment can enhance awareness and promote preventive behaviors (Lutfian, 2025). Meanwhile, family support, both emotional and instrumental, plays a significant role in improving patient adherence to treatment and healthy lifestyle behaviors. However, previous studies have shown inconsistent findings. Research by Hayati and Sulistiyowati (2024) indicated no significant relationship between knowledge level and preventive behavior, while a significant association was found between family support and tuberculosis prevention behavior (p-value = 0.009). These differing findings highlight a research gap that requires further investigation.

Epidemiologically, the DKI Jakarta region continues to experience a high burden of tuberculosis cases, with a total of 33.552 cases, of which Central Jakarta accounts for 5.008 cases (Badan Pusat Statistik Provinsi DKI Jakarta, 2021). Data from the Kemayoran Public Health Center show a significant increase in cases from 83 cases in 2023 to 303 cases in 2024. Preliminary study findings indicate low levels of patient knowledge regarding tuberculosis and insufficient family support, influenced by educational and economic factors. Additionally, high population density and unhealthy lifestyle behaviors such as smoking further exacerbate the risk of transmission. These conditions suggest that behavioral and social factors play a critical role in the increasing incidence of pulmonary tuberculosis in this area.

Although numerous studies have examined factors influencing pulmonary tuberculosis, most have focused on treatment adherence and therapeutic outcomes. Studies specifically analyzing the relationship between knowledge level and family support with transmission prevention efforts, particularly in densely populated urban settings such as Central Jakarta, remain limited. Furthermore, inconsistencies in previous findings indicate an empirical gap that needs to be addressed. Therefore, the novelty of this study lies in the simultaneous analysis of knowledge and family support factors in relation to tuberculosis transmission prevention efforts within a high-density urban community context. This study aims to analyze the relationship between knowledge level and family support with efforts to prevent the transmission of pulmonary tuberculosis in the working area of the Kemayoran Public Health Center, Central Jakarta.

## RESEARCH METHODS

This study is a quantitative study with a cross-sectional design aimed at analyzing the relationship between knowledge level and family support with efforts to prevent the transmission of pulmonary tuberculosis. The population in this study consisted of all pulmonary tuberculosis patients who were recorded and undergoing treatment in the working area of the Kemayoran

Public Health Center, Central Jakarta, totaling 75 individuals. The sampling technique used was total sampling; therefore, all members of the population who met the inclusion and exclusion criteria were included as research respondents.

The inclusion criteria in this study were pulmonary tuberculosis patients registered at the Kemayoran Public Health Center, aged ≥18 years, and willing to participate as respondents by providing informed consent. Meanwhile, the exclusion criteria included patients with physical or mental conditions that made them unable to complete the questionnaire independently.

Data were collected using a structured questionnaire that had undergone validity and reliability testing to ensure the appropriateness of the instrument in measuring the research variables. The variables examined included knowledge level, family support, and efforts to prevent the transmission of pulmonary tuberculosis.

Data analysis was conducted using univariate analysis to describe the frequency distribution and characteristics of each research variable. Furthermore, bivariate analysis was performed using Spearman's rho correlation test to identify the relationship between knowledge level and family support with efforts to prevent the transmission of pulmonary tuberculosis. This study obtained ethical approval (ethical clearance) from the Health Research Ethics Committee with approval number No.1122/KEPK-FIK/V/2025 prior to data collection, ensuring that all research procedures complied with applicable ethical research principles.

## RESULTS

**Table 1.** Distribution of Respondent Characteristics Based on Age, Education Level, Occupation, and Gender among Pulmonary Tuberculosis Patients at Kemayoran Public Health Center (n = 75).

| Variable | Category | Frequency (n) | Percentage (%) |
|---|---|---|---|
| Age | ≤25 years | 42 | 56.0 |
| | >25 years | 33 | 44.0 |
| | Total | 75 | 100 |
| Education | No formal education | 8 | 10.7 |
| | Primary school | 4 | 5.3 |
| | Junior high school | 11 | 14.7 |
| | Senior high school | 29 | 38.7 |
| | Higher education | 23 | 30.7 |
| | Total | 75 | 100 |
| Occupation | Unemployed | 18 | 24.0 |
| | Government/Army/Police | 18 | 24.0 |
| | Housewife | 13 | 17.3 |
| | Self-employed | 15 | 20.0 |
| | Others | 11 | 14.7 |
| | Total | 75 | 100 |
| Gender | Male | 32 | 42.7 |
| | Female | 43 | 57.3 |
| | Total | 75 | 100 |

Based on Table 1, the majority of respondents were aged ≤25 years (56.0%), indicating that most participants were in the productive age group, which is generally associated with higher mobility and increased exposure to infectious diseases such as pulmonary tuberculosis. In terms of education, most respondents had completed senior high school (38.7%), followed by higher education (30.7%), while a smaller proportion had only basic education or no formal education. This variation suggests that educational background may influence health literacy and awareness regarding disease prevention. Regarding occupation, the largest proportions were government employees (24.0%) and unemployed individuals (24.0%), followed by self-employed workers (20.0%), indicating diverse socioeconomic conditions that may affect exposure risk and access to healthcare. In terms of gender, most respondents were female (57.3%), which may

reflect differences in healthcare-seeking behavior or exposure patterns in densely populated environments.

**Table 2.** Distribution of Knowledge Level among Respondents (n = 75).

| Knowledge Level | Frequency (n) | Percentage (%) |
|---|---|---|
| Poor | 24 | 32.0 |
| Moderate | 27 | 36.0 |
| Good | 24 | 32.0 |
| Total | 75 | 100 |

Table 2 shows that the majority of respondents had a moderate level of knowledge (36.0%), while equal proportions were observed in the poor and good categories (32.0% each). This indicates that although some respondents have adequate knowledge, a considerable proportion still lacks sufficient understanding of tuberculosis and its prevention.

**Table 3.** Distribution of Family Support among Respondents (n = 75).

| Family Support | Frequency (n) | Percentage (%) |
|---|---|---|
| Very Low | 15 | 20.0 |
| Low | 23 | 30.7 |
| Moderate | 13 | 17.3 |
| High | 12 | 16.0 |
| Very High | 12 | 16.0 |
| Total | 75 | 100 |

Table 3 indicates that most respondents reported low family support (30.7%), followed by very low support (20.0%). Only a small proportion experienced high or very high support. This finding suggests that family involvement in patient care and prevention efforts remains suboptimal, which may negatively influence treatment adherence and preventive behaviors.

**Table 4.** Distribution of Tuberculosis Transmission Prevention Efforts (n = 75).

| Prevention Efforts | Frequency (n) | Percentage (%) |
|---|---|---|
| Poor | 24 | 32.0 |
| Moderate | 27 | 36.0 |
| Good | 24 | 32.0 |
| Total | 75 | 100 |

Table 4 reveals that the majority of respondents demonstrated moderate prevention efforts (36.0%), while equal proportions were categorized as poor and good (32.0% each). This distribution indicates that preventive practices are not yet optimal and still vary widely among patients.

**Table 5.** Bivariate Analysis of the Relationship between Knowledge Level, Family Support, and Tuberculosis Transmission Prevention Efforts (n = 75)

| Variables | Correlation Coefficient (r) | p-value | Interpretation |
|---|---|---|---|
| Knowledge Level – Prevention Efforts | 0.682 | 0.001 | Strong correlation |
| Family Support – Prevention Efforts | 0.855 | 0.001 | Very strong correlation |

Table 5 shows the results of the bivariate analysis using Spearman's rho correlation test indicate that there is a statistically significant relationship between knowledge level and tuberculosis transmission prevention efforts ($p = 0.001$). The correlation coefficient ($r = 0.682$) shows a strong positive relationship, meaning that higher levels of knowledge are associated with better prevention practices among patients with pulmonary tuberculosis.

Furthermore, family support also demonstrates a statistically significant relationship with prevention efforts ($p = 0.001$). The correlation coefficient ($r = 0.855$) indicates a very strong

positive relationship, suggesting that patients who receive higher levels of family support are more likely to engage in effective tuberculosis transmission prevention behaviors.

## DISCUSSION

The characteristics of respondents in this study indicate that the majority were in the productive age group. This condition can be explained by the fact that individuals in this age group tend to have high levels of activity and mobility, thereby increasing their risk of exposure to Mycobacterium tuberculosis. In addition, work demands and intensive social activities may reduce immune function due to fatigue and lack of rest. These findings are consistent with previous studies indicating that the productive age group has a higher risk of pulmonary tuberculosis compared to other age groups (Sari et al., 2019; Susanti et al., 2024; Lauchan et al., 2025). Therefore, this age group should be a primary target for tuberculosis prevention programs, particularly through active screening and workplace- and community-based health education.

In terms of education, the majority of respondents had a secondary education level (senior high school). Education plays an important role in shaping an individual's ability to understand health-related information, including tuberculosis transmission and prevention. However, formal education does not always directly translate into preventive behavior if it is not supported by continuous and contextual health education. This finding is consistent with studies by Berhan et al. (2023) and Firmanda et al. (2025), which reported that high school graduates dominate tuberculosis patients but still require strengthened health education. This highlights that improving health literacy depends not only on formal education but also on sustained educational interventions.

Based on occupation, most respondents were categorized as unemployed. This condition is associated with economic limitations that may affect access to health information, healthcare services, and adequate living environments. Unemployed individuals also tend to spend more time in densely populated home environments, thereby increasing the risk of tuberculosis transmission (Andriani, Lestari, & Prasida, 2023). This finding is in line with studies by Hasnita et al. (2025) and Umar (2021), which indicate that unemployment is associated with an increased risk of pulmonary tuberculosis. However, it should be critically noted that employment status does not act independently but interacts with other factors such as education, housing conditions, and access to healthcare services.

In terms of gender, the majority of respondents were female. This reflects the social role of women within the family as primary caregivers and managers of household health, which increases their likelihood of exposure to infectious diseases such as tuberculosis. Additionally, women tend to be more proactive in accessing healthcare services compared to men. These findings are consistent with studies by Wulandari et al. (2020) and Guido et al. (2024). However, the predominance of female respondents may also indicate that men are more likely to delay seeking healthcare, potentially leading to underdiagnosis among male patients. Therefore, a gender-based approach should be considered in tuberculosis control programs.

The level of knowledge among respondents was predominantly in the moderate category, indicating that information about tuberculosis has been received but not fully understood or optimally applied. Incomplete knowledge may limit individuals' ability to identify transmission risks and consistently implement preventive behaviors. This finding aligns with studies by Fikri, Pelawi, & Deniati (2024), which highlight the gap between information exposure and public understanding of tuberculosis. This supports health behavior theory, which suggests that knowledge is a prerequisite but not sufficient to drive behavioral change without the support of other factors.

Family support in this study varied, with a tendency toward low to moderate levels. This indicates that family involvement in supporting tuberculosis patients is not yet optimal. In fact, family support, both emotional and instrumental, plays a crucial role in improving treatment adherence and the implementation of preventive behaviors. These findings are consistent with studies by Fawwaz (2022), which emphasize the importance of family support in tuberculosis control. Theoretically, this finding reinforces the social ecological approach, which positions the family as a key factor in shaping individual health behaviors (Sari, 2023).

The prevention efforts for tuberculosis transmission in this study were mostly categorized as moderate, indicating that preventive practices have been implemented but are not yet optimal. This suggests the presence of barriers to consistently applying preventive behaviors, despite the availability of information. Factors such as stigma, lifestyle habits, and densely populated living conditions are major obstacles to tuberculosis prevention (Darliana, 2011). Therefore, prevention strategies should adopt a comprehensive approach that considers individual, social, and environmental factors.

The results of the bivariate analysis showed a significant relationship between knowledge level and family support with tuberculosis prevention efforts. The correlation between knowledge level and prevention efforts was categorized as strong, while the relationship between family support and prevention efforts was categorized as very strong. These findings indicate that individual and social factors complement each other in shaping preventive behaviors. Notably, family support was found to have a stronger influence than knowledge level in improving prevention efforts. This suggests that interventions focusing solely on increasing knowledge may not be sufficient without involving the immediate social environment, particularly the family.

These findings highlight that both knowledge level and family support play important roles in improving tuberculosis prevention efforts. However, family support appears to have a stronger influence compared to knowledge level. This emphasizes the importance of involving family members in tuberculosis control programs, alongside enhancing patient education to promote optimal preventive behaviors. Therefore, tuberculosis control programs should be designed holistically by integrating health education and family empowerment as a unified intervention strategy.

This study has several limitations that should be considered when interpreting the findings. First, the study was conducted only in the Kemayoran Public Health Center area, limiting the generalizability of the results to other regions with different characteristics. Second, the cross-sectional design does not allow for the establishment of causal relationships. Third, data collection using questionnaires may introduce subjective bias from respondents. Therefore, future studies are recommended to use longitudinal designs and include additional variables such as environmental and cultural factors to provide a more comprehensive analysis.

## CONCLUSION

Based on the results of this study, it can be concluded that knowledge level and family support play a significant role in efforts to prevent the transmission of pulmonary tuberculosis in the working area of the Kemayoran Public Health Center, Central Jakarta. The majority of respondents had a moderate level of knowledge; however, this understanding has not been consistently implemented in daily behavior. On the other hand, family support tended to be low, indicating that family involvement in supporting treatment and disease prevention remains suboptimal, influenced by limited knowledge, economic conditions, and persistent social stigma within the community.

Nevertheless, respondents demonstrated prevention efforts at a moderate to good level, such as maintaining proper home ventilation, practicing cough etiquette, and seeking health information. The results of the bivariate analysis showed a significant relationship between knowledge level and family support with prevention efforts, with family support exhibiting a stronger correlation compared to knowledge level.

Therefore, comprehensive interventions are needed, not only focusing on improving individual knowledge through continuous health education but also on strengthening the role of the family as the primary support system for patients. Family empowerment is expected to enhance the consistency of preventive behaviors, improve treatment adherence, and reduce the transmission rate of pulmonary tuberculosis, particularly in densely populated areas such as Kemayoran.

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