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Counseling on Pulmonary TB Overcoming and Healthy House Sanitation for Pulmonary TB Patients

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ABSTRACT

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis and spreads through the air when sufferers cough, sneeze or spit. TB is still a global health problem with 10 million cases in 2019 and 1.4 million deaths. Indonesia has a high TB incidence rate, with 316 per 100,000 population in 2018. Environmental factors such as ventilation, floor type and residential density greatly influence TB transmission. This research was conducted Community Health Center to measure the knowledge and sanitary conditions of TB patients' homes. The methods used include interviews, counseling and direct observation of house conditions. The results show an increase in knowledge about TB after the education, with 75% of houses not meeting ventilation requirements, 8.9% of houses not meeting floor type requirements, 7.1% of houses not meeting wall type requirements, and 39.3% of houses having low occupancy density. not eligible. Good knowledge of a healthy environment and behavior that supports TB prevention is very important to reduce the transmission of this disease.

***Keywords**: Tuberculosis, Knowledge, Healthy Home Sanitation*

INTRODUCTION

Tuberculosis (TB) is caused by the bacterium Mycobacterium tuberculosis which attacks the lungs. Tuberculosis spreads through the air when tuberculosis sufferers cough, sneeze or spit. Mycobacterium tuberculosis germs are pushed into the air and a person only needs to breathe air that has been contaminated by Mycobacterium tuberculosis germs to become infected, but tuberculosis can be cured and prevented(WHO, 2020). Tuberculosis is still a global health and public health problem in several countries(WHO, 2017).

In 2019 the World Health Organization (WHO) estimates that 10 million people suffer from tuberculosis worldwide, 5.6 million men, 3.2 million women and 1.2 million children suffer from tuberculosis. Tuberculosis sufferers who died in 2019 were 1.4 million people (including 208,000 people with HIV)(WHO, 2020). There are 30 countries with a high burden of Tuberculosis accounting for 87% of new cases.

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Eight countries account for two-thirds of the total number of tuberculosis sufferers, namely India, Indonesia, China, the Philippines, Pakistan, Nigeria, Bangladesh and South Africa.(WHO, 2020). Based on Indonesian health profile data, the incidence rate of tuberculosis in Indonesia in 2018 was 316 per 100,000 population and the death rate for tuberculosis sufferers was 40 per 100,000 population. In 2019, there were 543,874 tuberculosis cases, compared with all tuberculosis cases in 2018, there were 566,623 cases.

The highest number of cases of tuberculosis sufferers were reported from provinces with large populations, namely West Java, East Java, Central Java. Cases of tuberculosis sufferers in 3 provinces almost reach half of all cases of tuberculosis sufferers in Indonesia, namely 45%. Compared with women, the number of cases of tuberculosis in men is 1.4 times higher, which occurs in all provinces(RI Ministry of Health, 2020).

Data from the West Java Provincial Health Service: In 2019, 109,463 cases of tuberculosis were reported from the total number of suspected cases of tuberculosis of 341,948 cases, before 2018 there were 76,546 cases recorded. The incidence of tuberculosis cases between men and women is more likely than men to suffer from tuberculosis at 4.6%. In 2019, there were 109,463 reported cases of tuberculosis, a decrease of 30.07% compared to 76,546 cases in 2018, the highest cases of tuberculosis were in three regencies, namely Bogor Regency, Bekasi City and Bandung City, tuberculosis cases were in three regencies. -cities range between 7 – 14% of the number of new cases in West Java. The incidence of tuberculosis cases between men and women is more common among men with a ratio of 1.2(West Java Health Office, 2019).

In 2018, data from the Bintara Jaya Community Health Center UPTD recorded 17 diagnosed cases of pulmonary tuberculosis. In 2019, the number of diagnosed tuberculosis cases increased to 32, showing a rise compared to 2018. In 2020, 28 cases were reported, while in 2021, the number rose again to 42, indicating an increase from 2020 to 2021. Tuberculosis can affect anyone, regardless of age or gender. However, it is more prevalent among individuals in the productive age group, between 15 and 60 years old. Other contributing factors to tuberculosis transmission include humid environments, poorly ventilated rooms, and limited exposure to sunlight. These conditions are ideal for the growth of *Mycobacterium tuberculosis* bacteria, making it easy to infect individuals living in unhealthy environments (Jaya, 2019; WHO, 2023; CDC, 2023).

One of the risk factors that influence tuberculosis is environmental factors or house sanitation factors where the condition of the house does not meet health requirements including ventilation, lighting, floor type, wall type, humidity, temperature and residential density.(Mathofani and Febriyanti, 2020). Based on Minister of Health Decree No. 892/Menkes/SK/VII/1999, the walls of the house must meet the requirements, namely the walls of the house must be watertight. If the walls of the house are not watertight, it will cause room humidity. According to Wahyusi's research results (2015) in Banyumas for the wall type variable, the results of the statistical analysis of the Chi-aquare test obtained a probability value (p value) = 0.004 (<0.05). This can indicate that there is a significant relationship between the type of wall and the incidence of Tuberculosis. , with a value of OR = 7.875, it can be stated that wall types that do not meet the requirements experience a risk 7 times greater than respondents with wall types that meet the requirements. Because walls that do not meet the requirements for walls that are not watertight will cause room humidity. (Wahyuni Tri, 2015). According to Dawile's research, the results of statistical analysis of house floor types using the Chi-suqare test obtained a probability value (p value) = 0.000 (<0.05).

This can indicate that there is a relationship between floor type and tuberculosis. With a value of OR = 21,000, it can be stated that respondents with floor types that do not meet the requirements experience a 21 times greater risk than respondents with house floor types that meet the requirements (Dawile Greis, 2013). Dwelling density has the potential to increase the risk of transmission of tuberculosis to the people living in it, the more crowded the house or the more occupants, the easier and faster transmission of disease, especially airborne infectious diseases, will be.

Residential density that does not meet the requirements has a risk of tuberculosis 16.15 times greater than residential density that meets the requirements(Mathofani and Febriyanti, 2020). Behavioral factors regarding the incidence of tuberculosis are the habit of opening windows, cough etiquette, smoking habits, sunbathing habits (mattresses, pillows, bolsters regularly).

The habit of opening windows is statistically significant, this shows that the risk of tuberculosis is 3,272 times greater than that of people who do not have the habit of opening windows.

The windows are always open in the morning and direct sunlight enters the room. Sunlight contains ultra violet which can kill Mycobacterium tuberculosis(Halim and Satria, 2017). Based on research by Berry et al., 2011 regarding respiratory hygiene in the general public, observations regarding cough etiquette showed that only 4.7% applied correct cough etiquette, 64.4% covered their nose and mouth with their hands, and 27.3% not covering your mouth and nose when coughing and sneezing.

Tuberculosis sufferers must have good and correct cough etiquette because the source of transmission of tuberculosis is the droplets expelled through the mouth when sneezing and coughing.(Barry et al., 2011). Surveys that have been carried out in the working area of the UPTD Puskesmas Bintara Jaya, some communities still have poor behavior such as ventilation, floor type and wall type because there are residents who build houses on land that does not belong to local residents, usually called cultivated land, many houses - houses that do not meet the requirements. Based on observations, 1 house is occupied by 3 heads of family and 1 contract house is occupied by 7 people. So researchers feel it is necessary to provide education regarding the management of TB disease in the UPTD work area of the Bintara Jaya Community Health Center.

METHODS

The method used in this community service activity is as follows:

1. The team conducted interviews with representatives of pulmonary TB sufferers' families regarding knowledge of pulmonary TB control and healthy home sanitation.
2. Conducting outreach regarding education on how to control pulmonary TB and healthy home sanitation
3. Measure the sanitation of a healthy house by looking at the ventilation area and bedroom area in the number of residences
4. Observe the sanitation of a healthy house, namely the type of floor and type of walls

RESULTS

1. Respondent Characteristics

The characteristics of respondents in this community service are all pulmonary TB sufferers who reside in the UPTD work area of the Bintara Jaya Community Health Center which are differentiated based on age, gender and job characteristics.

Table 1. Characteristics of Research Respondents in the Bintara Jaya Community Health Center UPTD Working Area

Respondent Characteristics	Amount (n)	Percentage (%)
Gender		
1. Boy	42	75.0
2. Female	14	25.0
Total	56	100.0
Age		
1. 20 - 30 Years	20	35.7
2. 31 - 40 Years	10	17.9
3. 41 - 60 Years	26	46.4
Total	56	100.0
Work		
Businessman	15	26.8
Private sector employee	31	55.4
Housewife	10	17.9
Total	56	100.0

Based on the data from the respondent characteristics table above, it shows that a greater number of male respondents filled out the questionnaire with 42 people (75.0%). Meanwhile, there were fewer female respondents, numbering 14 people (25.0%). The age group from the results of the table above has a more dominant figure, namely those aged 41-60, amounting to 26 people (46.4%).

The occupation or profession of the majority of respondents worked as private employees, 31 people (55.4%). The characteristics (gender, age, occupation) possessed by respondents will have an impact on knowledge, thought patterns and behavior in responding to information about preventing pulmonary TB transmission.

2. Knowledge Level

Based on the results of data collection, it was found that there was a large increase in respondents' knowledge about pulmonary TB disease. Respondents were able to increase their knowledge scores after the counseling was carried out. The complete results can be seen in table 2

Table 2. Level of Knowledge of TB Sufferers in the Bintara Jaya Community Health Center UPTD Working Area

Enhancement	Amount (n)	Percentage (%)
1	14	25.0
2	25	44.6
3	13	23.2
Total	56	100.0

Based on data on the level of knowledge of respondents or pulmonary TB sufferers, it is known that there was an increase in knowledge after being given counseling about controlling pulmonary TB. The magnitude of the increase in knowledge of pulmonary TB control among respondents was 56 people (100%). This result is the number of respondents who were able to increase their knowledge value after the counseling was carried out.

Meanwhile, 14 people (25%) experienced a significant increase in respondents' knowledge after being given counseling. This is seen from knowledge about the question of how tuberculosis is transmitted, what the symptoms of tuberculosis are and what other symptoms of tuberculosis disease are. The majority of tuberculosis sufferers are adults, this is not in line with the existing theory that tuberculosis sufferers are elderly, the education of the majority of tuberculosis sufferers is basic education where education will influence a person's knowledge of preventing tuberculosis by modifying their home environment to avoid TB disease.(Ayakaka et al., 2024).

A person's knowledge about the environment that supports and does not support the prevention of pulmonary TB will be reflected in the availability of facilities and infrastructure that support prevention efforts, such as the availability of health facilities and counseling from health workers. Knowledge is an important factor that is very necessary in developing oneself, because the higher the knowledge, the easier it is to develop and receive information that comes from outside. Knowledge is a factor that really supports the need for health services(Rahmi, 2018).

3. Ventilation in the Bintara Jaya Community Health Center UPTD Working Area

The results of observations on ventilation of TB sufferers' houses in the Bintara Jaya Community Health Center UPTD Working Area. The higher ventilation conditions in the respondent's house did not meet the requirements, 42 people (75.0%), while 14 people (25.0%) met the requirements, presented in table 3 as follows:

Table 3. Ventilation in the Bintara Jaya Community Health Center UPTD Working Area

Ventilation	Amount (n)	Percentage (%)
Not eligible	42	75.0

Yes Eligible	14	25.0
Total	56	100.0

According to the Regulation of the Minister of Health of the Republic of Indonesia Number 67 of 2016 concerning Tuberculosis Control efforts to control tuberculosis, it is important to control the environment through ventilation, efforts to increase and regulate air flow or ventilation using simple technology to prevent the causes of germs and reduce or reduce the level of phlegm splashes in the air. This counter measure is carried out by channeling phlegm splashes in a certain direction (directional airflow) and adding ultraviolet radiation as a germicide. There are 3 types of ventilation systems, namely natural ventilation, mechanical ventilation and mixed ventilation(Ministry of Health, 2017).

4. Types of Floors in the Bintara Jaya Community Health Center UPTD Working Area

Based on observations made on the floor types of TB sufferers in the Bintara Jaya Community Health Center UPTD area. The condition of the higher floor type of the respondent's house met the requirements for 51 people (91.1%), while 5 people (8.9%) did not meet the requirements and are presented in table 3 as follows:

Table 4. Types of Floors in the Bintara Jaya Community Health Center UPTD Working

Floor Type	Amount (n)	Percentage (%)
Not eligible	5	8.9
Yes Eligible	51	91.1
Total	30	100.0

Based on the Decree of the Minister of Health of the Republic of Indonesia No. 829/Menkes/SK/VII/1999 concerning Housing Health Requirements, that the house requirements for floors must be watertight and easy to clean. Waterproof floors such as ceramics and tiles, while non-waterproof floors such as soil are not included in the requirements(Kepmekes, 1999). The type of floor in a healthy house is a waterproof floor that meets the requirements for a healthy house.

The materials used are ceramic/tile. House floors that are dusty, dirty and damp will make the house a nest for disease, so choosing house flooring materials is very important. The floor of the house is a factor influencing the incidence of tuberculosis, houses that are not ceramic/tiled are not easy to clean because even though they have been cleaned they are still dirty and sometimes there is water that pools so it becomes damp, which is like cement on the floor (Mathofani, PE, & Febriyanti, R., 2020).

5. Types of Walls in the Bintara Jaya Community Health Center UPTD Working Area

The results of observations on Wall ventilation for TB sufferers' houses in the Bintara Jaya Community Health Center UPTD area can be seen that the condition of the higher wall type of

respondents' houses met the requirements for 52 people (92.9%), while 4 people (7.1%) did not meet the requirements. This data can be presented in the form of table 4 as follows:

Table 5. Types of Walls in the Bintara Jaya Community Health Center UPTD Working Area

Wall Type	Amount (n)	Percentage (%)
Not eligible	4	7.1
Yes Eligible	52	92.9
Total	56	100.0

The type of walls in the house should be permanent and watertight or not damp, made of plastered walls or bricks. House walls that are not damp or watertight function to support the roof, protect the house from wind or rain and protect against heat and dust(Pradita et al., 2018).

6. Residential Density in the Bintara Jaya Community Health Center UPTD Working Area

Based on data collection carried out on the residential density of TB sufferers in the UPTD Puskesmas Bintara Jaya Work Area, it can be seen that the condition of the higher residential density of respondents' houses met the requirements of 34 people (60.7%), while those who did not meet the requirements were 22 people (39, 3%). Data can be presented in the form of table 5 as follows:

Table 6. Residential Density in the Bintara Jaya Community Health Center UPTD Working Area

Residential Density	Amount (n)	Percentage (%)
Not eligible	22	39.3
Yes Meets the requirements	34	60.7
Total	56	100.0

Based on Minister of Health Decree no.892/Menkes/SK/VII/1999Concerning Health Requirements for housing, namely the residential density of a minimum bedroom area of 8 m2 and it is also recommended that no more than 2 people sleep (Kepmenkes, 1999). Residential density is an influence on the process of transmission of diseases, the more crowded the house is or the more occupants there are, the more infectious diseases, especially airborne infectious diseases, will be in the room, the more humidity in the room will increase due to water vapor both from breathing and sweat coming out of the body (Mathofani, PE, & Febriyanti, R., 2020).

CONCLUSIONS

Based on research conducted in the UPTD Puskesmas Bintara Jaya work area, it can be concluded that there was a significant increase in knowledge about TB control after being provided

with counseling. This shows that education and health education are very effective in increasing public awareness and knowledge about TB and how to prevent it. The majority of TB sufferers' homes do not meet the specified sanitation requirements. As many as 75% of houses have inadequate ventilation, 8.9% have inappropriate floor types, and 7.1% have wall types that do not meet health requirements. Residential density is also a factor that influences TB transmission. As many as 39.3% of houses do not meet residential density requirements, which can increase the risk of spreading disease. This research emphasizes the importance of community-based interventions, improving health facilities, and ongoing education in TB control efforts in the UPTD Puskesmas Bintara Jaya working area.

DISCUSSION

The results of this study highlight the significant role of counseling and education in increasing public knowledge regarding pulmonary tuberculosis (TB) and the importance of healthy home sanitation. The marked improvement in knowledge among respondents after educational interventions confirms findings from previous research that health education is a powerful tool for changing health behavior (Rahmi, 2018; Ayakaka et al., 2024).

The study found that 75% of TB patients' homes did not meet proper ventilation standards. This is consistent with the findings of Halim and Satria (2017), who emphasized that inadequate ventilation contributes to a higher risk of airborne infections, including TB. Mycobacterium tuberculosis thrives in humid, poorly ventilated spaces, making environmental control crucial for prevention (WHO, 2023).

Similarly, residential density was another major concern, with 39.3% of households exceeding recommended limits. Overcrowded living conditions increase the risk of disease transmission, aligning with Mathofani and Febriyanti's (2020) findings that dense housing leads to a 16-fold increased TB risk. While the majority of homes had adequate floor and wall types (91.1% and 92.9% respectively), the small percentage of substandard housing still presents a significant risk, given the increased susceptibility in these environments (Greis, 2013; Wahyuni, 2015).

Behavioral factors such as window-opening habits and proper cough etiquette were indirectly discussed, but these remain critical elements in preventing TB spread. Previous studies (Barry et al., 2011; Halim & Satria, 2017) have shown that lack of awareness and poor hygienic behavior contribute to sustained transmission in both public and private spaces.

This study underscores the importance of integrating environmental health education with disease control programs, particularly in high-burden areas like West Java. Counseling not only improves knowledge but can motivate behavioral change when coupled with actionable guidelines and community support. Interventions should therefore be holistic—targeting knowledge, infrastructure, and behavioral practices.

Future research should explore longitudinal outcomes of such counseling programs, evaluate changes in housing conditions over time, and measure actual reductions in TB incidence. Furthermore, more in-depth qualitative studies could reveal sociocultural barriers that prevent communities from adopting healthier living environments.

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Based on the research results that have been obtained, it is hoped that the community will take action against TB disease and implement healthy home sanitation for the community to avoid pulmonary TB disease.

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