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COMPLEXITY OF THE TUBERCULOSIS CHAIN IN EXTENDED FAMILIES WITH COLLECTIVIST CULTURE: A CASE REPORT

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Abstract: Indonesia is a country with the second rank of new tuberculosis cases in the world. One of Indonesia cultural that is collectivist culture, which is one of its characteristics, is gathering in a large family (extended family) in one house can pose a risk of spreading infectious diseases such as tuberculosis. The purpose of this report was to analyze tuberculosis cases with family medicine approach. The method used a holistic examination, namely anamnesis, observation and examination using a family medicine approach (genogram, Family APGAR and SCREEM, also home environment). The location took place at Gatak Primary Health Care, Sukoharjo Regency, Province of Central Java, Indonesia in June 2023. The result, we examined a 7-month-old girl and it was found that other family members also had tuberculosis (grandparents had a history of tuberculosis with completed treatment, the patient cousin was being treated at a type A hospital). The patient home environment was usually exposed to cigarette smoke. The patient lived in a house with a family consisting of 4 generations (extended family). APGAR Family showed very functional. SCREEM Family showed that the house was often used as a meeting place for residents and the illness was not shared because it was still a taboo subject. The family was good in formal education and there was health workers in family members, but it was a bad habit that if a family member was sick, the house would be the place to take care of them. The home environment had lack in sanitation hygiene. Conclusion: The management of each patient can be different, to achieve disease eradication we cannot just give therapy without taking a family approach.

Keywords: tuberculosis, extended family, collectivist culture

Introduction

Tuberculosis is a contagious chronic infectious disease. This disease continues to pose a problem for global society. Indonesia ranks second worldwide in terms of the highest number of TB cases (Kemenkes RI, 2023). Tuberculosis is caused by the bacterium Mycobacterium tuberculosis. This bacterium primarily attacks the lungs, also known as pulmonary TB. However, there is also TB that affects other organs, known as extrapulmonary TB. In Indonesia, it was found that 92% of cases were pulmonary TB and 8% were extrapulmonary TB (Kemenkes RI, 2021). Tuberculosis in children

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occurs in the age group of 0-14 years. The prevalence of TB cases in toddlers is 22 cases of childhood TB per 10,000 toddlers. This prevalence is higher compared to the prevalence among children aged 5-12 years. In the year 2021, there was an increase of 6,011 cases of childhood TB in toddlers.

The incidence rate of TB cases in Indonesia is 354 TB patients per 100.000 population. The success rate of TB treatment in Indonesia is 85%. However, this achievement has not yet reached the global target of 90%. The coverage of TB detection is also insufficient. In 2022, the number of TB cases detected was 74%. The detection of cases and the success of treatment can have an impact on the emergence of new sources of TB transmission in the community, and TB patients can even develop resistance to treatment, making it more challenging to address (Kemenkes RI, 2023).

New cases and deaths from TB are frequently found in developing countries. This is in line with the epidemiological perspective that disease transmission in TB is influenced by the interaction of host, agent, and environment. Environmental conditions in developing countries, such as improper waste disposal, industrial processes, extended family living under one roof, and poor sanitation conditions, can contribute to the emergence of the disease. Developing countries often have low living standards. In Indonesia, the growth of TB is also supported by the tropical climate and uneven improvement of environmental conditions. According to static data from BPS in 2019, there is a regional disparity between the Eastern regions and the island of Java. The spread of TB originating from humans is also influenced by factors such as age, occupation, habits, socioeconomic status, and health issues such as HIV, malnutrition, diabetes mellitus, and smoking, which can make TB infection more likely to occur (Irwan,2017).

The increasing prevalence of TB in the community without maximal efforts to address it can lead to a further escalation in TB transmission. Comprehensive handling from all aspects, including biomedical and biopsychosocial approaches, is necessary to identify clinical issues in patients and problems related to family functioning, living environment, family nutrition, and to carry out health interventions and evaluate the outcomes of the interventions. This is crucial in resolving clinical issues for patients and their families, changing health behaviours, and breaking the chain of TB transmission.

Materials and Methods

The method used a holistic examination, namely anamnesis, observation and examination using a family medicine approach (genogram, Family APGAR and SCREEM, also home environment). The location took place at Gatak Primary Health Care, Sukoharjo Regency, Province of Central Java, Indonesia in June 2023.

Results and Discussion

Case Report

Anamnesis

The mother of patient K, a 7-month-old girl, came to the Posyandu (Integrated Health Postnatal) and complained that her daughter has had a loss of appetite for the past week. Based on the alloanamesis, her mother mention that K only eats twice a day, with a total of two tablespoons of food. The mother mentioned that currently, K does not have any other illnesses and there are no issues with her urination, bowel movements, and overall activities. The mother of patient K is concerned because her male cousin, who is 4 months old, and her great-grandmother, who is 85 years old, are currently undergoing treatment for pulmonary TB.

Patient K has a history of P1A0 childbirth, delivered via caesarean section at 40 weeks of gestation, with a birth weight of 3.5kg, a length of 51 cm, and a head circumference of 35 cm. The patient had an immediate crying response at birth and received complete vaccinations according to age. Currently, the patient is not experiencing any weight loss. In the past, patient K had a history of fever, cough, and cold for four days. The treatment given at that time was paracetamol and over-the-counter cough medicine. There are no other medical histories, and the patient denies having any allergies.

The patient's grandparents, who are from Jakarta, experienced prolonged coughing several months ago and were asked to stay with the patient's extended family. They were diagnosed with pulmonary TB and received anti-tuberculosis treatment from 2021 to 2022, and were declared cured before returning to Jakarta. In March 2023, the patient's great-grandmother received treatment for prolonged cough, loss of appetite, and weight loss. Due to shortness of breath, she was taken to a type A hospital for treatment and was diagnosed with pulmonary TB based on the TCM results. In June, the patient's male cousin tested positive for the Mantoux test and received anti-tuberculosis medication due to poor appetite, prolonged cough, weight loss, and a family history of pulmonary TB. After three days of TB treatment, the patient's male cousin was hospitalized due to shortness of breath.

Healthcare workers from Gatak Primary Health Care conducted a home visit to the patient's house to perform a holistic examination, including examining the sputum of all family members using the TCM test, performing the Mantoux test on the patient's family and the surrounding environment, conducting data collection and health checks, conducting an APGAR family assessment, creating a genogram, and analysing the behaviour of maintaining cleanliness and health in the household environment. Based on the Mantoux test results, patient K has been diagnosed as positive. However, the TCM sputum test results for other family members are negative.

Examinations

The physical examination results showed that the patient's general condition appeared healthy, with a fully conscious level (compos mentis). The blood pressure was difficult to assess, the heart rate was 82 beats per minute, respiratory rate was 18 breaths per minute, body temperature was 36.6°C, and the patient's weight was 7.5kg with a height of 68 cm. The nutritional status, assessed by dividing the length by the weight, was within the range of 2 standard deviations below the mean (good nutrition). The examination of the hair, eyes, ears, nose, and mouth showed no abnormalities. There was approximately ±2 cm enlargement of the lymph nodes in the neck (regio colli), which were palpable, mobile, and non-tender. No signs of retractions or accessory respiratory muscle use were observed. Chest movements were symmetrical, percussion sounds were resonant in both lung fields, and normal vesicular breath sounds were heard, with no rhonchi or wheezing.

Regarding the heart, the point of maximal impulse (PMI) was not visible. Heart sounds I and II were pure and regular, and no additional heart sounds were heard, indicating a normal heart. The abdomen was supple, without organ enlargement or ascites, and within normal limits. The extremities showed no oedema and were deemed normal. The musculoskeletal and neurological status were also within normal limits. The capillary rapid test was less than 2 seconds, and no oedema, diaper rash, or lumps were found on the labia minora and majora. In the supporting examination, the Mantoux test revealed an induration and expansion measuring more than 15mm.

Family Examination

Patient K is the only child of Mr. AD and Mrs. AU. Since birth, Patient K has been residing in the ancestral home of his father's family. The patient's father, Mr. AD, is a private sector employee engaged in crafting wooden household furniture within the premises of his residence. The patient's mother was previously employed in an office setting but has recently resigned after giving birth to assume the role of a homemaker while actively seeking new employment opportunities.

The family's monthly income amounts to approximately 4,000,000 Indonesian Rupiahs, which is considered sufficient to meet their daily needs. They rely on the government-provided health insurance, BPJS, for their healthcare requirements. In case of any unexpected incidents that require additional funds, the patient's grandparents provide financial support. The patient's grandmother is a healthcare professional working at a Type A hospital, while the grandfather is the village head and owns the wooden furniture business where Patient K's father works.

This family is categorized as an extended family, consisting of four generations and five household heads. The family life cycle of Mr. AD based on Duvall's cycle is stage II, known as the childbearing family. Due to the grandmother's occupation as a healthcare professional and the grandfather's role as the village head, they feel a sense of responsibility towards their extended family members, and they provide care and support for any larger family members in need of medical attention by bringing them to the ancestral home. The patient's male family members are heavy smokers, while the women are passive smokers.

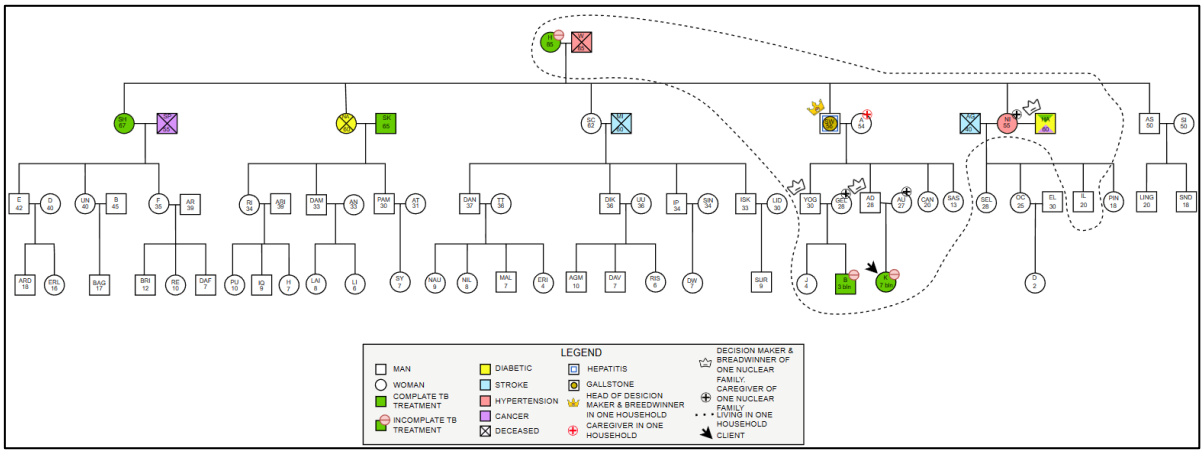

Figure 1. Family Genogram of Client

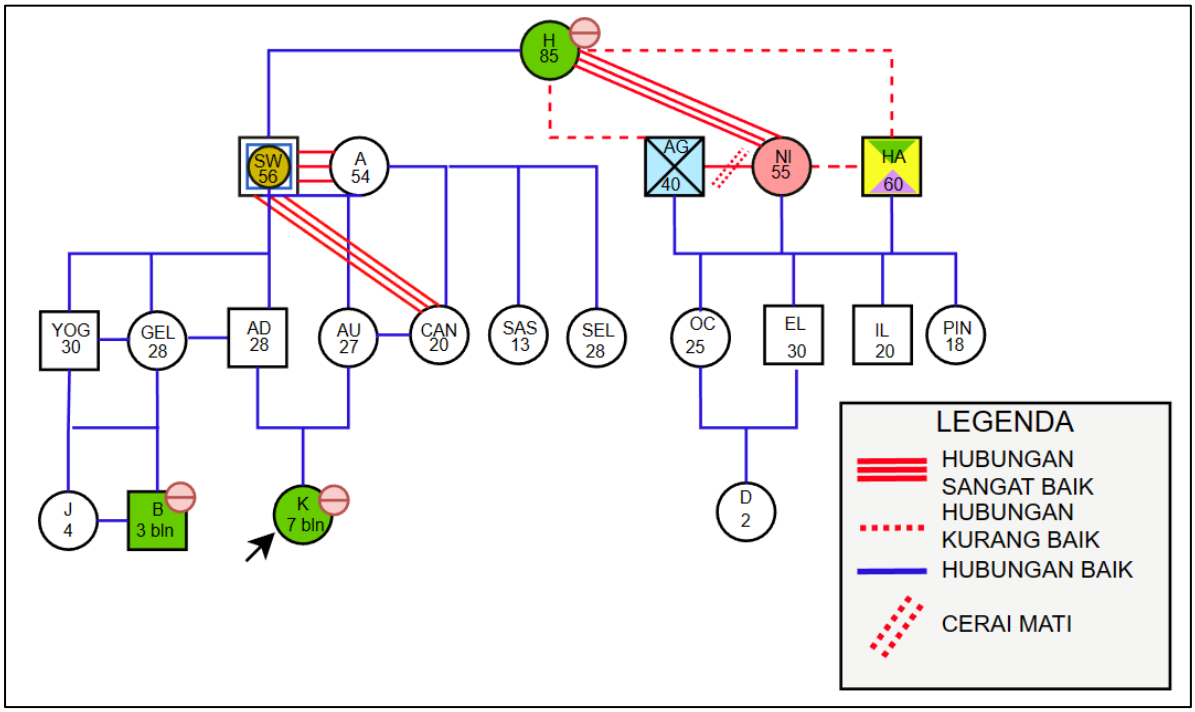

Figure 2. Family Interaction Relationship

Family APGAR

Family functioning assessment can be conducted by calculating the Family APGAR Score. There are five questions in the Family APGAR score, covering parameters of adaptation, partnership, growth, affection, and resolve. The score ranges from zero to two, where a score of 0 is given if family members never or almost never experience the described condition, and a score of 2 is given if they almost always experience it. The average total score taken from three family members of the client is 9.3, indicating that this patient's family is highly functional.

Family SCREEM

Family function assessment is conducted by observing the family SCREEM. In this family, there are social resources in the form of good family relationships with neighbours, and the patient's family is respected by the neighbours. Culturally, the patient's family belongs to the Javanese ethnic group, capable of adapting and being hospitable to their neighbours. From a religious perspective, the patient's family is devout Muslims. The majority of the family members are educated, with some even working in the healthcare sector, which is considered positive. The family's economic situation is good, and they are able to meet their daily needs. The patient has a BPJS card for access to national health insurance.

The family's pathology side in the social aspect, where the patient's house is often used as a gathering place for villagers due to the patient's grandfather being the village head. Additionally, contagious diseases are still considered taboo in the patient's community, causing the family to conceal the patient's illness and continue their activities as usual, without wearing masks and still going out, even for work. Culturally, the Javanese norms lead the patient's family to feel reluctant to refuse neighbours from gathering at their home, even when there are two toddlers and an elderly person with TB who are currently sick.

The family's level of education is considered good, but their understanding of contagious diseases and the implementation of healthy behaviours still need improvement. The patient's family often invites sick family members from other cities to be treated at their home due to a sense of obligation and responsibility towards family members. In terms of treatment, since there are healthcare professionals in the family, the patient often self-examines and self-medicates. This has led to primary health services not being aware of the current condition and the extent of treatment that has been administered. As a result, the patient may recover, but the disease can still be transmitted to other healthy family members, particularly vulnerable due to age factors.

Household Environmental Data

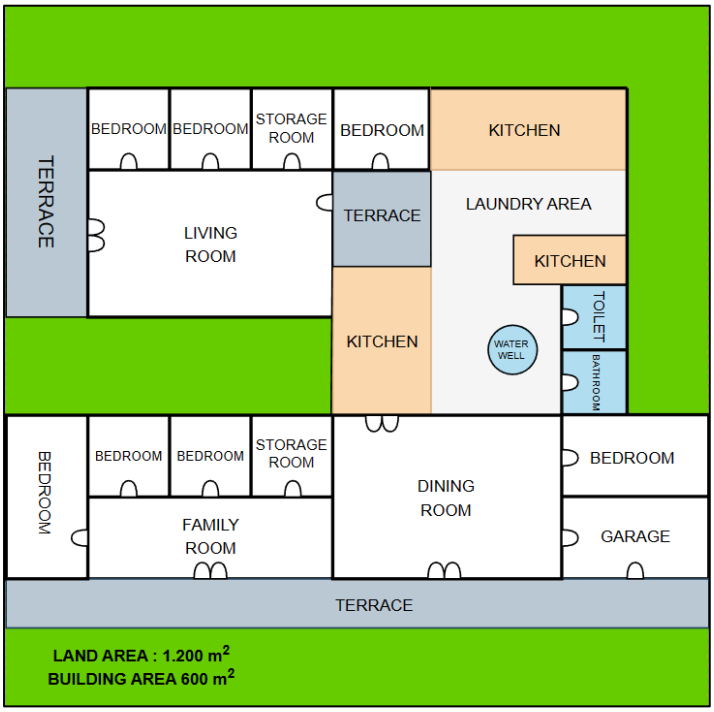

Figure 3. House Map

The patient lives with his father's family. One house consists of five households, comprising fifteen individuals. The distance between each house is relatively far, as they are separated by land. The patient's house is located in the middle of a residential area, far from the main road. The land area is 1,200 square meters with a building size of 600 square meters. Each bedroom measures 3x3 meters, total 7 bedrooms. The house is constructed with cement walls, ceramic flooring, and the patient's house roof is partly made of ceiling materials and partly bordered by tiles.

There are three kitchens, two for cooking and one for storage of utensils. There is a laundry area, two bathrooms, and one well. However, the family usually only uses one bathroom; the other bathroom is reserved for the patient's great-grandparent. The ventilation and lighting in the house are insufficient due to the patient rarely opening windows and doors. When opened, the incoming light is obstructed by trees in front of the house and piled-up furniture. The number of windows and doors is inadequate compared to the number of rooms and occupants residing in the place.

The patient's grandfather has several employees who work with wood and these employees eat and drink at the house and frequently pass by. There is one helper responsible for cooking and doing laundry. Patient K and his male cousin B are left with their neighbours every morning and picked up by their parents in the evening. The patient's male family members are heavy smokers, while the women are passive smokers.

Treatment

Based on the paediatric TB score chart, the patient obtained a total score of 7, indicating the need for anti-tuberculosis drug treatment. The patient had contact with a family suffering from pulmonary TB with acid-fast bacteria positive. There was a positive Mantoux test with an induration >10 mm, and enlargement of the right colli lymph nodes > 1 cm. However, the patient has not undergone a chest X-ray, so it cannot be evaluated at this point. For the medication management, the patient will undergo the initial phase of treatment with anti-tuberculosis drugs for children, which consists of rifampicin 75mg, isoniazid 50mg, and pyrazinamide 150mg, taken once daily for two months. We also recommend of vitamin B6 syrup to be taken once daily.

For comprehensive non-medication management, the patient's family is provided with knowledge about maintaining a clean and healthy lifestyle. This includes engaging in physical activity for a minimum of 30 minutes daily, sun-drying frequently used items such as mattresses, and advising family members who smoke to reduce smoking. If they do smoke, they should do so outdoors and change clothes before re-entering the house. The patient's family is also given guidance on preparing food for a 7-month-old child, with a total daily intake of four tablespoons or 60 ml, consisting of three tablespoons of carbohydrates, a medium-sized piece of protein, two tablespoons of vegetables, and four teaspoons of fats. Additionally, the patient's family is directed to maintain good air circulation by opening windows, separating towels and eating utensils from the patient, wearing masks when meeting others or the patient, and undergoing preventive tuberculosis treatment for family members who are healthy and not infected with TB.

After this treatment was conducted, the patient's family stated that the patient is now able to eat well and has become more active in daily activities. The patient's family has been educated and no longer worries about the illness, being cohesive in following the treatment plan. The patient's home is also more organized and visually pleasing. Initially, neighbours who were hesitant about contagious diseases like TB now understand and accept the situation, no longer holding any reservations about organizing activities at the patient's family home.

Discussion

Tuberculosis occurs due to several factors. Based on age factors, toddlers are more vulnerable to TB compared to individuals in the productive age group of 15-34 years, while individuals above 55 years or the elderly are also more susceptible to TB. This is because in toddlers, their immune system is not fully developed yet, and they are still growing and developing their organs and bodies. On the other hand, in the elderly, there is a decline in organ function and immunity, making them more susceptible to diseases.

Regarding the area of residence, urban areas tend to have a higher incidence of TB compared to rural areas. This is not determined by natural geographical regions, but rather by the population density in those areas. Regions with high population density, such as Java, make the community more susceptible to infectious diseases. For example, West Java has 91,368 cases, while North Kalimantan has 995 cases (Kemenkes, 2021).

Education level also influences a person's knowledge, including knowledge about healthy behaviours. Individuals with lower levels of education are more susceptible to TB (Nurjana, 2015). Although in this study, the majority of family members are graduates, the implementation of health knowledge in their daily lives is insufficient. While the patient's family answered basic questions about TB and healthy living practices well, they have yet to fully implement them. The house's environment, lacking good ventilation, cleanliness, circulation, and sanitation criteria, can lead to the rapid development of TB bacteria. Mycobacterium tuberculosis can survive in the air for up to 2 hours and can be killed by UV light. The optimal growth of TB bacteria occurs in rooms with temperatures of 31-37 degrees Celsius. Adequate light entering the house should be at least 15-20% of the floor area (Fitri et al, 2022).

Living with a TB patient puts an individual at 1.8 times higher risk of contracting TB compared to someone who has never lived with a TB patient. A person with acid-fast bacteria positive has a 17% higher chance of transmitting TB to at least 10-15 other individuals (Fitriani, 2014). TB patients and non-TB patients who practice proper cough etiquette and use masks have a lower infectious rate compared to those who do not apply such practices (Oktavia et al, 2016).

In Indonesia, TB cases are 1.5 times higher in males compared to females. This is attributed to lifestyle, gender roles, and differences in exposure risks (Azhar, 2014). Most males have a habit of smoking, making them more susceptible to TB in the lungs (Ruswanto, 2010). Based on the Indonesian Basic Health Research (2018), the percentage of male smokers (65%) is higher than female smokers (3.5%). The substances in cigarettes can cause structural changes in Mycobacterium exposure. Smoking also affects the innate and acquired immunity, impacting the effectiveness of macrophages and leukocytes in maintaining the body's immunity (Chuang et al, 2015).

For paediatric TB cases, IDAI (Indonesian Paediatrician Association) recommends using a scoring system for diagnosing TB in children. However, some primary healthcare facilities in Indonesia lack the necessary equipment and resources to support chest X-rays. Implementing a proper TB diagnosis using the scoring system is crucial for diagnosing symptomatic and asymptomatic TB in children, including those not in direct contact with TB patients (Farisda, 2020). Additionally, a child's nutritional status also affects the success of treatment. Malnutrition increases the risk of death in

children with TB. Children with TB need high protein and carbohydrate intake, and their nutrition should be evaluated every 2 weeks to a month for assessment (Kemenkes, 2014).

Considering the complex causes of TB, a family medicine approach is essential for guiding and intervening with patients and their families. We provided guidance through four home visits. The first visit was conducted on June 8, 2023. We analysed personal, clinical, internal, and external factors, as well as functional levels. These visits also included evaluating family APGAR, family SCREEM, and determining the paediatric TB score.

Conclusion

The occurrence of TB is influenced by various factors such as age, gender, education level, habits, household environment, and region. Hence, a family medicine approach is necessary to detect new TB cases, provide medication support, and prevent drug-resistant TB. Raising awareness about healthy living and implementing steps for TB management and prevention is crucial for the community. Holistic and comprehensive healthcare services can contribute to the successful eradication of TB.

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Declaration of Interest Statement

The authors declare that they have no conflict of interests.

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