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Key Determinants of Tuberculosis Prevention Behaviors Among Families in Indonesia: A Cross-Sectional Study Analysis

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ABSTRACT

Introduction: Tuberculosis (TB) is one of the infectious diseases that is still a global health problem, including in Indonesia. TB prevention requires the active role of the family as the smallest unit of society to create a supportive environment. Studies of TB prevention behaviors in families are important to understand the factors influencing prevention success.
Objective: This study analyzes factors related to TB prevention behavior in families.
Methods: This study used a cross-sectional study design involving 129 families with family members with a history of TB in the Batunadua Health Center working area in Padangsidimpuan City, selected by purposive sampling. Data was collected through a structured questionnaire. Data analysis was conducted using the chi-square and logistic regression tests to see the relationship between the variables and the most meaningful variables.
Results: This study found that knowledge about TB (p=0.001), access to health services (p=0.001), social and cultural environment (p=0.001), and personal health experiences (p=0.001) were related to TB prevention behavior in families. Meanwhile, the variable most related to TB prevention behavior is knowledge about TB Exp (B) = 46.888.
Conclusion: This study concludes that TB prevention behavior in families is influenced by factors such as knowledge about TB, access to health services, social and cultural environment, and personal health experience, which have a significant relationship. Of the four variables, knowledge about TB is the most dominant factor influencing TB prevention behavior. Therefore, health education campaigns must be a priority, focusing on increasing family knowledge about TB through easily accessible media, such as counseling, social media, and pamphlets.

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INTRODUCTION

Tuberculosis (TB) is one of the infectious diseases that pose a global public health challenge, especially in low- and middle-income countries (1). Based on a report by the World Health Organization (WHO), around 10.6 million people are infected with tuberculosis every year, with a death rate of 1.5 million people in 2021(2). It is estimated that about a quarter of the world's population has been infected with Mycobacterium tuberculosis, with 5-10% of them at risk of developing tuberculosis throughout their lives. Efforts to prevent tuberculosis are one of the least utilized but fundamental aspects in controlling the epidemic of this disease (3). This disease not only impacts the health of individuals but also poses a significant social and economic burden (4).

According to Global TB Report 2023 data, Indonesia is currently ranked second in the world after India, with an estimated number of new cases of tuberculosis (TB) reaching 1,060,000 cases per year and a death rate of up to

134,000 cases per year. This figure shows an increase compared to previous years. The discovery of TB cases in Indonesia increased sharply in 2023, with 820,789 cases detected out of an estimated 1,060,000 cases. Previously, more than 724,000 new cases were discovered in 2022, which then increased to 809,000 cases in 2023. This number is much higher than before the pandemic, when the average case discovery was below 600,000 yearly (5.6). Based on the 2023 Ministry of Health's SITB Report, the discovery of TB cases in North Sumatera Province in 2024 is 26%, higher than West Sumatera's 25% (7.8). Based on data from the Padangsidimpuan City Health Profile in 2022 it shows that the prevalence of tuberculosis patients in Padangsidimpuan City is quite high, namely 690 cases, where almost all sub-districts have problems with tuberculosis based on gender.

Meanwhile, in 2022, there were 56 cases of tuberculosis in the work area of the Batunadua Health Center and 116 cases of suspected tuberculosis who received services according to standards, and in 2023, 27 cases of tuberculosis were found (9). In Indonesia, tuberculosis is one of the leading causes of death due to infectious diseases, with a high prevalence rate despite various control efforts (10). Families have an important role in TB prevention and control, especially in supporting patient care, implementing prevention practices, and breaking the chain of transmission in the household environment (11).

Although national and global programs for TB control have included a range of interventions, such as early detection and direct treatment with surveillance (DOTS), preventive behaviors at the family level are often overlooked (12). Many families do not know how to prevent TB transmission, such as the importance of good ventilation, wearing masks, and environmental hygiene (13). Lack of support and understanding from family members is also one of the main factors that cause non-adherence to treatment in TB patients (14). In addition, the stigma attached to the disease often hinders prevention and early detection efforts at the individual and community levels (15). Family behaviors, including maintaining hygiene, ensuring good ventilation, reducing exposure to infected individuals, and supporting treatment adherence, are essential to break the chain of TB transmission (16). However, these preventive behaviors are greatly influenced by family knowledge levels, socio-economic conditions, access to health services, and cultural beliefs (17). In many cases, a lack of understanding of TB prevention at the household level exacerbates the burden of the disease, especially in communities with limited access to information (18).

Social stigma against TB patients is also one of the main obstacles to the adoption of preventive measures (19). Many families are reluctant to take preventive measures because of shame or fear of being ostracized by their social environment (20,21). In addition, myths and misconceptions about how TB is transmitted often lead to behaviors that do not follow the principles of disease prevention (22). This shows the importance of understanding family behavior dynamics to design more targeted interventions (23). As drug-resistant strains of tuberculosis emerge, the importance of prevention at the family level has become even more urgent (24). In addition to ensuring the proper treatment for patients, families should also be involved in preventive measures such as using masks, maintaining distance, and supporting patients to complete their treatment therapy (25). Thus, the family's role is important in supporting the patient's healing and preventing the spread of the disease to other family members or the surrounding community (26).

In the related literature, although many studies have addressed TB risk factors, the effectiveness of treatment programs, and control strategies at the community level, few specifically explore preventive behaviors in the family setting (27,28). Research on social, cultural, and economic factors influencing family behavior toward TB prevention is also limited (29). This study is very relevant, considering that the family is the smallest social unit that plays a key role in breaking the chain of tuberculosis transmission (30). Understanding preventive behaviors at the family level can provide important insights into developing more effective intervention strategies in health counseling and public health policy (31). In addition, the findings of this study can help improve the theoretical understanding of family behavioral dynamics in the context of infectious disease prevention and provide practical input for more inclusive and community-based TB control programs. Thus, this study aims to analyze TB prevention behavior in families, including factors that support or inhibit the adoption of preventive measures.

METHOD

Research Design

This study uses a cross-sectional study design. The research was carried out in the working area of the Batunadua Health Center, Padangsidimpuan City. Data was collected for three months, from October to December 2024.

Population and Sample

This study's population is all families with family members with a history of tuberculosis in the study area. Samples were taken using purposive sampling techniques, with inclusion criteria: Families who have family members who have or are undergoing TB treatment, Willing to be a respondent and provide the required information, and Living in the study area for at least one year. The sample taken was 129 families, based on the calculation of the sample size using the Lemeshow formula with a confidence level of 95% and a margin of error of 5%.

Research Instruments

Data were collected using structured questionnaires. The questionnaire has been validated through validity and reliability tests with Cronbach's Alpha coefficient ≥ 0.7.

Data Collection

Data were collected through direct interviews with family heads or members who met the inclusion criteria. Interviews are conducted by trained enumerators, using questionnaires as a guide.

Data Analysis

The collected data is analyzed descriptively and inferentially. Descriptive analysis was carried out to describe the demographic distribution, knowledge, attitudes, and family practices. The inferential analysis uses the Chi-square test. Logistic regression tests determined the most dominant factors influencing TB prevention behavior.

Research Ethics

Informed consent was obtained from all respondents before the study began. The confidentiality of respondents' data is strictly maintained, and participation in the study is voluntary.

RESULTS

Table 1. Distribution of Family Characteristics in the Working Area of the Batunadua Health Center, Padangsidimpuan City

Family Characteristics	n	Percentage
Age Group (Years)		
25-30	6	4,7
31-36	15	11,6
37-42	37	28,7
43-48	25	19,4
49-54	23	17,8
55-60	23	17,8
Sum	129	100
Gender		
Male	78	60,5
Woman	51	39,5
Sum	129	100
Education Level		
Primary school	5	3,9
Junior High School	32	24,8

High School	83	64,3
Sarjana	9	7,0
Sum	129	100

Source: Primary Data, 2025

Table 1 shows that of the 129 families with the highest age group of 37-42 years old, as much as 28.7%, the highest male gender is 60.5%, and the highest high school education level is 64.3%.

Table 2. The Relationship of Research Variables with Tuberculosis Prevention Behavior in Families in the Working Area of the Batunadua Health Center, Padangsidimpuan City

Research Variables	Tuberculosis Prevention Behavior				Sum	X^2 (p)
	Bad		Good			
	n	Percent	n	Percent		
Knowledge About TB						
Less	72	88,9	9	11,1	81	88,454 (0,001)
Good	2	4,2	46	95,8	48	
Sum	74	57,4	55	42,6	129	
Access to Healthcare						
Bad	73	82,0	16	18,0	89	71,355 (0,001)
Good	1	2,5	39	97,5	40	
Sum	74	57,4	55	42,6	129	
Social and Cultural Environment						
Anti-Prevention	62	89,9	7	10,1	69	64,031 (0,001)
Pro-Prevention	12	20,0	48	80,0	60	
Sum	74	57,4	55	42,6	129	
Personal Health Experience						
Never been exposed to or sick with tuberculosis	63	94,0	4	6,0	67	76,625 (0,001)
Have been exposed to or sick with tuberculosis	11	17,7	51	82,3	62	
Sum	74	57,4	55	42,6	129	

Source: Primary Data, 2025

Table 2 shows that of the 81 families with less knowledge, 88.9% of lousy prevention behaviors exist. Meanwhile, of the 48 families with good knowledge, 4.2% had destructive prevention behaviors. The results of statistical analysis were obtained that the value of X^2 counted (88.454) > X^2 table (3.841) or the value of p (0.001) < α (0.05). This means that knowledge about TB is related to TB prevention behavior. Of the 89 families who stated that access to health services was poor, 82.0% had destructive TB prevention behaviors. Meanwhile, of the 40 families who stated that access to health services was good, 2.5% had destructive TB prevention behaviors. The results of statistical analysis were obtained that the value of X^2 counted (71.355) > X^2 table (3.841) or the value of p (0.001) < α (0.05). This means that access to health services is related to TB prevention behavior. Of the 69 families that stated that the social and cultural environment was anti-prevention, there were 89.9% destructive TB prevention behaviors. Meanwhile, of the 60 families that stated that the social and cultural environment was pro-prevention, 20.0% had destructive TB prevention behaviors. The results of statistical analysis were obtained that the value of X^2 counted (64.031) > X^2 table (3.841) or the value of p (0.001) < α (0.05). This means that the social and cultural environment is related to TB prevention behavior. Of the 67 families who stated that they had never been exposed to or had TB

disease, there were 94.0% destructive TB prevention behaviors. Meanwhile, of the 60 families who stated that they had personal health experiences of being exposed to or sick with tuberculosis, there were 17.7 destructive TB prevention behaviors. The results of statistical analysis were obtained that the value of X^2 counted (76.625) > X^2 table (3.841) or the value of p (0.001) < α (0.05). This means that personal health experiences are related to TB prevention behaviors.

Table 3. Multivariate Analysis of Tuberculosis Prevention Behavior in Families in the Working Area of the Batunadua Health Center, Padangsidimpuan City

Variable	B	S.E	Sig	Exp (B)	95% C for EXP (B)	
					Lower	Upper
Knowledge About TB	3,848	0,977	0,000	46,888	6,909	318,196
Access to Healthcare	3,328	1,319	0,012	27,870	2,102	369,556
Social and Cultural Environment	0,891	1,289	0,489	2,437	0,196	30,298
Personal Health Experience	1,676	1,282	0,191	5,347	0,433	66,021
Constant	-13,319	2,426	0,000	0,000		

Source: Primary Data, 2025

Table 3 shows that knowledge about TB (p=0.000), access to health services (p=0.012), social and cultural environment (p=0.489), and personal health experiences (p=0.191) are related to TB prevention behaviors. Of the four variables, the most related to TB prevention behavior is knowledge about TB with an Exp value (B) = 46.888. This confirms that families with better knowledge about TB, including its causes, transmission, and prevention measures, are more likely to implement preventive behaviors consistently. Knowledge is the main foundation that shapes the perception of risk, the benefit of action, and the motivation to prevent disease.

DISCUSSION

Knowledge of Tuberculosis with Tuberculosis Prevention Behavior

The high rate of TB transmission shows that prevention efforts have not been optimally carried out, both at the individual and community levels (32). One of the key factors in TB prevention is family knowledge about the disease, which includes understanding the causes, symptoms, ways of transmission, and prevention measures (29). Unfortunately, a lack of understanding often leads to delays in diagnosis, incomplete treatment, and behaviors that do not support the prevention of transmission (33). This contributes to the continued increase in the burden of tuberculosis in Indonesia (34). The results showed a significant relationship between knowledge about TB and TB prevention behavior in families (p < 0.05). Families with high levels of knowledge are more likely to implement optimal preventive behaviors, such as maintaining home ventilation, practicing cough etiquette, wearing masks, and accessing health services (11). In contrast, families with low knowledge tend to be less consistent in carrying out prevention efforts. This shows that knowledge is one of the key factors in shaping TB prevention behavior (35).

Good knowledge of TB can be the foundation for shaping effective prevention behaviors. Individuals who understand how TB spreads are likelier to adopt healthy behaviors, such as covering their mouths when coughing, maintaining air circulation at home, and seeking treatment immediately when symptoms appear (36). However, research shows that knowledge alone is often insufficient without strong behavioral motivations. Other factors, such as trust, environmental support, and access to health services, also influence prevention success (33). Therefore, exploring the relationship between knowledge about TB and preventive behaviors is important to design more effective interventions for reducing TB incidence (37–39). These results align with research conducted by Alves et al. (2024), which found that knowledge about the causes and ways of TB transmission has a positive relationship

with TB prevention practices among patients' families in urban areas (40). The study highlights that families who understand the importance of maintaining environmental cleanliness and cough etiquette have a lower risk of transmission. Another study by Li et al. (2024) also supports these findings, where increased knowledge through community education programs significantly improves the implementation of TB prevention behaviors in families in rural areas (41). The study emphasizes the importance of easily accessible and relevant information in increasing public awareness (42). Theoretically, the Health Belief Model (HBM) explains the relationship between knowledge and behavior. According to HBM, knowledge of diseases and how to prevent them affects individuals' perceptions of disease threats (perceived severity and perceived susceptibility) as well as the benefits of preventive measures (perceived benefits) (43). In the context of tuberculosis, families with high knowledge will be more aware of the risk of disease, potential complications, and benefits of preventive measures, so they are more motivated to implement preventive behaviors (31).

However, while knowledge is important, preventive behavior is also influenced by other factors, such as attitudes, access to health facilities, and social support (33). The study found that although some families have good knowledge, they face barriers such as financial limitations or social stigma that prevent them from accessing health services. These findings are consistent with research by Didi et al. (2024), which shows that external factors, such as the support of health workers and health policies, also determine the success of implementing preventive behaviors (44). Overall, this study underscores the importance of knowledge as a first step in shaping TB prevention behavior. However, more comprehensive interventions involving continuing education, strengthening health services, and stigma reduction are needed to support more holistic and sustainable behavior change at the family level.

Access to Health Services with Tuberculosis Prevention Behaviors

Access to health services is important in preventing and controlling tuberculosis (TB). Easy-to-reach, affordable, and quality health services can facilitate early detection, appropriate treatment, and education that supports TB prevention behaviors (45). However, access to health services in Indonesia is still a significant problem. Geographical constraints, limited health facilities in remote areas, and medical costs are often barriers for people to get the care they need. As a result, many cases of TB go undiagnosed or do not receive adequate treatment, increasing the risk of transmission in the community (16). In addition, limited access to health services can affect people's prevention behavior. Individuals with limited access may lack accurate information on ways to prevent TB, such as the importance of cough etiquette, using masks, or ensuring that the home is well-ventilated. Furthermore, stigma against TB is also often exacerbated by the lack of education provided by health services, preventing people from seeking treatment and implementing preventive measures (46). The results showed a significant relationship between access to health services and TB prevention behavior in families ($p < 0.05$). Families with good access to health services are more likely to implement TB prevention behaviors, such as conducting routine checkups, getting education about cough ethics, and wearing masks. Conversely, families with limited access often do not implement preventive measures optimally. This indicates that access to health services is important in encouraging preventive behavior (47).

Research by Taylor et al. (2024) supports these findings. Their study showed that ease of access to health centers, both in terms of distance and cost, significantly increased family compliance to take TB prevention measures. They highlight that families who can easily access health services are more likely to be educated about TB and more quickly deal with the early symptoms of the disease in family members (48). Another study by Jacob et al. (2024) in rural areas also found that families with limited access, such as long distances to health facilities or high transportation costs, tended to have lower prevention practices. This shows that physical and financial access plays a significant role in preventive behavior (49). In addition, the importance of access to health services is also relevant to the *Health Belief Model* (HBM). According to HBM, a person's perception of their ability to access health services (perceived barriers) can affect preventive measures. Individuals tend to delay or avoid precautions when access is perceived as complex. In this study, families who felt health services were easily accessible had fewer barriers to implementing TB prevention behaviors (50).

However, access to health services includes not only geographical and financial factors but also the availability of competent health workers and friendly services. The study found that families who received direct education from health workers had higher rates of implementing preventive behaviors. Research by Gogichadze et al. (2024) reinforces these findings by showing that good interpersonal communication between healthcare workers and

patients' families increases family knowledge, motivation, and trust in health services (51). Another factor to consider is the quality of health services. A study by Forse et al. (2024) found that even though physical access is available, the low quality of services, such as the lack of availability of medications or health workers, can hinder families from making optimal use of these services. This is relevant to the findings of this study, where some families with good geographical access continue to report low implementation of preventive behaviors because they feel that health services do not provide adequate solutions (52).

Another impact of limited access to health services is the increased risk of stigma and disinformation. Families who rarely interact with health facilities tend to rely on information from uncredible sources, which can reinforce the stigma associated with tuberculosis. The study found that families with low access often feel embarrassed to seek medical help because of the social stigma attached to tuberculosis. Therefore, increasing access to health services, especially in areas with high TB burdens, is a strategic step to support better prevention behaviors in the community (28). Thus, access to health services plays a central role in facilitating the implementation of TB prevention behaviors. The results of this study emphasize the importance of strengthening physical, financial, and quality access to health services, as well as the need for community-based interventions that involve intensive education. Combining these strategies can increase the effectiveness of TB prevention efforts at the family level. This is relevant to the long-term goal of reducing TB prevalence and improving the community's quality of life.

Social and Cultural Environment with Tuberculosis Prevention Behavior

The social and cultural environment has a significant role in shaping tuberculosis (TB) prevention behavior. Social norms, cultural values, and patterns of interaction in society can influence how individuals understand and act on the risk of TB transmission (22). In some communities, for example, the stigma against people with tuberculosis is still strong, making individuals reluctant to disclose their health status or seek treatment. Misguided cultural views, such as thinking of TB as the result of certain curses or behaviors, can also hinder the implementation of preventive measures. This condition is exacerbated by the low level of health literacy in the community, which leads to a limited understanding of the importance of TB prevention, such as maintaining hygiene, using masks, and increasing ventilation at home (53). In addition, social support from family and community plays an important role in determining the success of TB prevention efforts. A supportive social environment can motivate individuals to seek treatment, follow health programs, and implement preventive measures. Conversely, a lack of support or negative social pressure can hinder healthy behaviors, such as hiding illnesses out of shame or avoiding health facilities (54).

The results showed that the social and cultural environment had a significant relationship with TB prevention behavior ($p < 0.05$). A supportive social environment, such as a community active in health programs and cultural norms that do not hinder, encourages families to more consistently implement preventive behaviors, such as maintaining home cleanliness, mask use, and cough etiquette. In contrast, in less supportive social settings, especially those affected by stigma against TB patients, preventive behaviors are often overlooked (55). These findings are consistent with research by Hussain et al. (2020), which suggests that social support from extended families and communities has an important role in building TB prevention behaviors. The study found that families who received support, either in the form of information, motivation, or material assistance, were better able to face the challenges of TB prevention (56). Other research by Van Der Zwan et al. (2024) also suggests that certain cultural norms, such as the belief that TB is a curse or the result of sin, discourage families from seeking treatment and implementing preventive measures. These cultural norms reinforce stigma, impacting the low implementation of preventive behaviors (57). In this study, families in an environment with cultural norms that supported health were more motivated to practice preventive behaviors. Conversely, inhibiting cultural norms, such as the notion that TB does not need to be treated or is not contagious, becomes a barrier (58).

An unsupportive social environment also has the potential to increase stigma against TB patients, which negatively impacts prevention behavior. This study found that families who feel stigmatized tend to withdraw from the community, avoid interaction with health workers, and are less consistent in maintaining environmental cleanliness (59). This finding is in line with a study by Polat et al. (2024), which showed that stigma in the community increases shame and reduces family motivation to engage in TB prevention programs (60). In addition to stigma, the study also notes that certain cultural norms can be barriers. An example is people's habit of not wearing masks at home because it is considered impolite or unusual. This indicates that health education needs to consider cultural aspects to receive the message well (61).

Another factor that contributes is the role of community and religious leaders. This study found that families exposed to health information through community or religious leaders tended to have better preventive behaviors. This is consistent with a study by Spruijt et al. (2020), which showed that community leaders can be effective agents of change in introducing preventive behaviors in communities, especially in regions with strong cultural influences (62). Therefore, a deep understanding of social and cultural dynamics in society is essential for designing appropriate and effective interventions. By integrating social and cultural approaches in the TB prevention program, it is hoped that community prevention behavior can be improved to reduce the disease transmission rate. With a holistic approach, the negative influence of cultural norms and a less supportive social environment can be minimized so that TB prevention behavior at the family level can be significantly improved.

Personal Health Experience with Tuberculosis Prevention Behaviors

Personal health experience is one-factor affecting tuberculosis (TB) prevention behavior. Individuals who have had direct or indirect experience with TB, such as having been diagnosed, undergoing treatment, or witnessing a family member suffering from TB, tend to have a better understanding of the disease (63). These experiences often shape perceptions of the risks and importance of prevention, which ultimately encourages applying preventive behaviors, such as maintaining hygiene, avoiding direct exposure to active patients, or wearing masks (64). However, not all experiences result in a positive response. In some cases, bad experiences with health services or social stigma can hinder individuals from being proactive in prevention (55). In addition, positive personal experiences, such as successful treatment or support from family, can reinforce beliefs about the importance of TB prevention. Individuals with this experience are more likely to share knowledge and encourage others to undergo screening or treatment. Conversely, negative experiences, such as ineffective treatment or discrimination, can lower trust in the health system and reduce motivation to implement preventive behaviors (65).

This study showed that personal health experiences had a significant relationship with TB prevention behavior ($p < 0.05$). Families who have members with a history of tuberculosis, both as patients and close contacts, tend to be more aware of the importance of preventive measures. They are more consistent in maintaining house ventilation, practicing cough etiquette, using masks, and following routine checks. In contrast, families who do not have direct experience with TB often show lower awareness of the risks and lack of implementation of preventive behaviors. Research by Harrison et al. (2022) supports these findings by stating that previous health experiences can drive preventive behavior. The study showed that individuals who had had TB or cared for a family member with TB had a higher rate of adherence to preventive measures compared to individuals who did not have similar experiences. The experience provides a first-hand understanding of the impact of disease and raises awareness of the importance of preventive measures (66).

Another study by Sebothoma et al. (2024) also found that families with TB-related health experiences tended to have more in-depth knowledge of the disease. They are more sensitive to early symptoms and are quicker to take action, such as checking themselves at a health facility. The study also highlights that personal experiences can trigger proactive behaviors, such as participating in public health education programs or being agents of change in the community (36). Theoretically, these findings can be explained through *the Health Belief Model* (HBM). In HBM, personal experience influences an individual's perceived susceptibility and severity of a disease. Individuals directly exposed to the effects of diseases, such as tuberculosis, are more likely to understand the risks and the importance of preventive measures. This experience reinforces their perception of preventive measures' benefits while reducing perceived barriers because they already know practical steps to prevent disease (67). In addition, *Bandura's social learning theory is* relevant in this context. Direct experience or observation of family members exposed to TB can be a powerful social learning. Families learn from the experience and internalize the importance of behavior change to protect the health of other family members. In this case, personal experience motivates one to adopt better preventive behaviors (68).

However, not all personal health experiences positively affect preventive behavior. The study noted that families who face negative experiences, such as social stigma or lack of support from health workers, sometimes show distrust of the health system and become reluctant to seek help. This aligns with research by Lourenço et al. (2023), which showed that negative experiences, such as discriminatory treatment in health facilities, can demotivate families to implement TB prevention measures (69). On the other hand, personal health experiences can reinforce the sustainability of preventive behaviors. The study found that families who successfully overcome TB through

consistent preventive measures are more likely to share their knowledge and experiences with the community, creating a widespread positive effect. These findings are consistent with research by Addo et al. (2022), which shows that successful experiences in managing chronic diseases are a key motivator for maintaining long-term health (58). Therefore, understanding personal health experiences and their impact on TB prevention behavior is essential for designing more empathetic and individual needs-based interventions. This can also help improve the quality of health services and reduce the obstacles experienced by the community in dealing with this disease. Public health programs should also consider individual health experiences as the basis for developing more personalized and effective intervention strategies.

Limitations and Cautions

This research has several limitations that need to be considered. First, the sample in this study uses a purposive sampling technique that focuses on families with members with a history of tuberculosis. This may limit the generalization of findings to a broader population, especially families with no direct experience of tuberculosis. Research with a more representative sampling method is needed for a more general picture. Second, the study did not explore psychosocial factors, such as individual motivation and trust in health services, which may significantly affect preventive behavior. Qualitative research or mixed approaches can provide richer insights into these dynamics. These limitations serve as a basis for the development of future research, which is expected to enrich the understanding of TB prevention behaviors and provide more comprehensive recommendations for public health policies.

CONCLUSION

This study shows that various factors, such as knowledge, access to health services, social and cultural environment, and personal health experiences, influence TB prevention behavior in families. Families with good knowledge of the causes, transmission, and prevention of TB tend to be more consistent in implementing preventive measures. Ease of access to health services, both physically and financially, also plays a significant role in supporting preventive behavior. In addition, social support from communities and cultural norms that support health provide a positive boost, while stigma and mistaken cultural beliefs are significant barriers. Personal health experiences, both as patients and caregivers, help increase awareness and motivation for families to take precautions. However, some barriers, such as stigma, limited access to quality services, and the influence of certain cultural norms, are still challenges in optimizing TB prevention behavior. With this strategy, TB prevention behavior at the family level is expected to be significantly improved, thereby supporting global efforts to reduce the prevalence and impact of TB disease.

AUTHOR'S CONTRIBUTION STATEMENT

Author 1 (Hapiz Arlanda Sani) conceptualized the study, designed the methodology, and supervised the data collection process. Author 2 (Anto J. Hadi) performed the data analysis and interpreted the results and was responsible for drafting the manuscript and managing references. Author 3 (Herman Hatta) provided critical revisions and contributed to the discussion section. All authors participated in the review process, approved the final manuscript, and agree to be accountable for all aspects of the work.

CONFLICT OF INTEREST STATEMENT

The authors declare no potential conflict of interest concerning this article's research, authorship, and/or publication.

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