



Model of care risk factors associated with tuberculosis in children

Model faktor risiko pengasuhan yang berhubungan dengan tuberkulosis pada anak

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Abstract

Mothers play an important role in reducing the risk factors for parenting related to the increased incidence of childhood tuberculosis (TB). This risk factors are very complex and need to be simplified in a model. The purpose of the study to determine the model of risk factors for parenting related to childhood TB. This cross-sectional study was conducted in 2014 in the Tambak Sari, Simokerto, and Kenjeran Districts, Surabaya city, Indonesia. A total of 39 mothers (total sample) whose family members had TB were interviewed about care related to the incidence of sick children. Their children's nutritional status was assessed. Furthermore, a simultaneous path analysis was conducted to determine the model. Result, the model of risk factors for caring for children with TB was appropriate ($\chi^2=6,02$, $df=10$, $p=0,8$), as was the model of risk factors for caring for children with TB and other infections ($\chi^2=7,68$, $df=10$, $p=0,66$). TB in children was influenced by their nutritional status ($\beta=0,42$). Children's nutritional status can be improved by improving mothers' ability to care for sick children (in both models, $\beta=0,16$). In conclusion, the ability to care for sick children forms a model for determining the incidence of TB in children through their nutritional status.

Keywords: Children, nutrition, risk factors for care, tuberculosis

Abstrak

Ibu memegang peranan penting dalam menurunkan faktor risiko pengasuhan terkait peningkatan kejadian tuberkulosis (TB) anak. Faktor risiko tersebut sangat kompleks dan perlu disederhanakan dalam suatu model. Tujuan penelitian untuk mendapatkan model faktor risiko pola asuh terkait TB anak. Metode, penelitian *cross-sectional* ini dilakukan pada tahun 2014 di Kecamatan Tambak Sari, Simokerto, dan Kenjeran, Kota Surabaya, Indonesia. Sebanyak 39 ibu (total sampel) yang anggota keluarganya menderita TB diwawancarai mengenai pengasuhan terkait kejadian anak sakit. Status gizi anak mereka dinilai. Selanjutnya dilakukan analisis jalur secara simultan untuk mengetahui modelnya. Hasil, model faktor risiko pengasuhan anak dengan TB sesuai ($\chi^2=6,02$, $df=10$, $p=0,8$), demikian pula model faktor risiko pengasuhan anak dengan TB dan infeksi lainnya ($\chi^2=7,68$, $df=10$, $p=0,66$). TB pada anak dipengaruhi oleh status gizi mereka ($\beta=0,42$). Status gizi anak dapat ditingkatkan dengan meningkatkan kemampuan ibu dalam merawat anak yang sakit (pada kedua model, $\beta=0,16$). Kesimpulan, kemampuan merawat anak yang sakit membentuk model untuk menentukan kejadian TB pada anak melalui status gizi mereka.

Kata Kunci: Anak-anak, gizi, faktor risiko pengasuhan, tuberkulosis

Introduction

Globally, it is estimated that 10,6 million (range 9,8-11,3 million) people are estimated to be infected with tuberculosis (TB), and

geographically, most TB cases occur in Southeast Asia (45,6%). Indonesia is the second largest country among the 10 countries, contributing two-thirds of the total TB cases after India (UNICEF, 2022; Kementerian

Kesehatan RI, 2023; WHO, 2023). More than 95% of patients with TB worldwide are from developing countries (Xia et al., 2024).

All age groups are at risk of developing TB, 1,2 million new cases worldwide are children (UNICEF, 2022). In Indonesia, by 2022, the incidence of TB in children was quite high, where notification of TB cases in children under 15 years of age was 15,3% of all TB cases, and as many as 40,976 cases were aged 15–19 years. Many factors cause a high incidence of TB in children, including the low coverage of the provision of Tuberculosis prevention therapy in household contacts, which is only 1,3% (18,081 children) and is still far from the target of 1,3 million children. Other causes include the high variation in the coverage of TB treatment in each province, the lack of findings on adult TB cases, and the potential for overdiagnosis of childhood TB (Ministry of Health of the Republic of Indonesia, 2023).

Childhood TB continues to be a health problem in Indonesia if not treated immediately. Children are very susceptible to contracting TB, especially those who have close contact with patients with bacteriologically confirmed TB (Tchakounte Youngui et al., 2022). On the other hand, Wallgren in Tuberculosis in Infants and Children (Lamb & Starke, 2017) reported that, based on research in orphanages, he was the first to suggest that children with TB rarely, if ever, transmit the disease to other children. However, children can be a source of infection when they are adults because *Mycobacterium tuberculosis* bacteria that cause TB can be inactive for years. Adolescents with high mobility are susceptible to infection and at risk of transmitting it to the surrounding environment, as is the case with TB in adults (Ministry of Health of the Republic of Indonesia, 2023). Children who are sick and do not receive the right treatment will remain sick for a long time, causing disability and even death (Maphalle et al. 2022). Very complex impacts emerge in terms of medical, social, economic, and cultural aspects. Increasing attention to TB in children can increase the overall success of TB health services (Awaluddin et al., 2020; Ministry of Health of the Republic of Indonesia, 2023).

The high incidence of childhood TB shows that control through curative aspects is

not enough to solve the problem; therefore, it is necessary to try a new strategy, namely, control efforts through prevention aspects as an alternative approach. Prevention of tuberculosis infection and stopping the development of infection is important to reduce the incidence of TB to the expected level (WHO, 2022). Prevention can be interpreted as an action taken before a disease is suspected of occurring so that the disease can be avoided (to come before or precede, or anticipate, to make impossible by advance provision) by identifying and approaching its risk factors.

Malnutrition is the biggest risk factor for childhood tuberculosis (TB). Globally, in 2021, an estimated 2,2 million cases of TB were caused by malnutrition (WHO, 2022). The root cause of malnutrition in Indonesia is the lack of a mother's ability to maintain children's nutrition through care. The role of mothers is important in reducing the negative impact of nutritional problems; mothers must be sensitive and understand the risk factors in care that can cause malnutrition in children and must be able to avoid them as a form of approach to the risk of care (Umijati et al., 2021).

The relationship between TB and malnutrition is two-way; TB causes patients to experience malnutrition, and malnutrition increases the risk of developing active TB by 6 to 10 times. Improving individual nutrition greatly reduces tuberculosis. TB patients are very susceptible to malnutrition, and even causes of malnutrition that are very distant in the community become proximal causes for TB patients (Feleke et al., 2019; Ockenga et al., 2023).

There is evidence that child nutrition can affect the occurrence of TB in children, and the nutritional status of children is highly dependent on maternal care; therefore, it is necessary to know the risk factors for child care that also affect the occurrence of TB in children through their nutritional status. This approach is important to prevent the occurrence of TB in children. The risk factors for childcare related to the occurrence of TB are complex and need to be simplified into a model. How are the model of risk factors for care related to the occurrence of TB in children? This study aimed to develop a model of risk factors for care related to the occurrence of TB in children.

Methods

This cross-sectional study aimed to determine the relationship between the risk factors for parental care and the incidence of TB in children. This study was conducted in three poor subdistricts with the most TB sufferers in Surabaya City, East Java, Indonesia, namely Tambak Sari (in Central Surabaya), Simokerto (in West Surabaya), and Kenjeran (in North Surabaya). The sample in this study was all mothers (total sample), as many as 39 mothers with family members suffering from TB who participated in this study from March to September 2024. Mothers signed a consent form to participate in the study after receiving information regarding the study. Participants' anonymity was protected and all data were kept confidential.

TB in children was determined based on the diagnosis at the Community Health Center, while risk factors for caring for children were obtained from a questionnaire. The nutritional status of children as a risk factor for TB was determined by measuring their weight and height. Next, the 2006 WHO Health Organization Z-score was determined based on the body mass index for age. The incidence of TB in sick children is based on the theory, policy, and survey results, as shown in Figure 1.

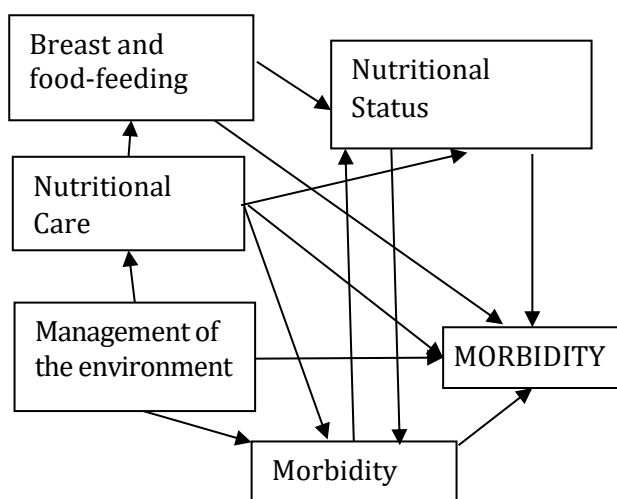


Figure 1. Risk factors for child morbidity

The variable risk factors for TB reflect the mother's problems caring for her child. The assessment of this variable was the total amount of the mother's ability (empowerment) in breast and food feeding, the mother's ability to care for

sick family members, including access to health services, the ability of mothers to maintain personal hygiene and cleanliness (sanitation) environment, and the ability of mothers to maintain their children's nutritional condition.

Care for sick children, whether for TB or other morbidities with symptoms similar to those of TB (fever, cough, and shortness of breath), was assessed based on the following indicators: procurement, administration of drugs, and their goals and treatment decisions; feeding children, the amount and time, and whether there is abstinence from food, medical assistance, and who pays for treatment. What mothers did with other family members who were not sick was keep the child away from the sick person, giving the child enough food and vitamins, and bringing the child to be immunized with knowledge about immunization and management of the sick person's sputum.

The Empowerment of mothers in breastfeeding and food feeding included exclusive breastfeeding and knowing the benefits of breastfeeding, breastfeeding duration, and colostrum. Providing food includes knowledge about a variety of foods. The Empowerment of mothers in maintaining children's nutritional status included knowledge of children's growth, causes of child growth disorders, signs of growing children, prevention of growth disorders, risks of growth disorders, possession of Health Cards, participation in Integrated Service Posts (*Posyandu*), objective weighing at *Posyandu*, weighing children's weight after passing the age of five, and regular weighing of children.

The Empowerment of mothers in environmental management was assessed based on the availability of glass tiles, knowledge of the benefits of glass tiles, having adequate windows and knowing the benefits of windows, availability of restrooms and their cleanliness, availability of soap, and ability to wash hands properly and dry hands after washing them with clean towels.

The difference in the number of children in each family is considered in terms of morbidity and nutritional status; therefore, this is considered when assessing children's morbidity and nutritional status. This assessment aimed to ensure that each child had the same value.

The policy of the Family Planning Program in Indonesia, namely, having two children, is sufficient to determine the assessment. Families with two children will achieve family welfare, and mothers and children will be healthy and well nourished. Based on the family planning program, healthy children were given a score of one, and sick children were given a score of two. In a family with one sick child, the illness score is two, and this is assumed to be a healthy child because the mother's ability to maintain the health of two healthy children is the same as caring for a sick child. In assessing TB and other illnesses, such as fever, cough, and shortness of breath, sick children received a score of nine or more, and healthy children received a score of than or equal to eight. The same assessment was performed to assess the nutritional status of the children.

Furthermore, each variable's value was categorized into two categories based on the Standard Deviation (SD): good and deficient, with the mean value limit minus one SD. Data processing was performed using the Statistical Program for Social Sciences (SPSS) to determine the relationships between variables. The model of risk factors for TB care in children was compiled based on the theory, policy, and survey results using the Lisrel-for-Student program version 9.1.

Result and Discussion

Caregiver Characteristics

Table 1 shows that the average number of children was two, with mothers having a low education; as many as 35,9% of mothers lived in their own houses and 43,6% of the mothers' houses used glass tiles, as many as 48,7% of mothers worked, 57,9% worked more than eight hours per day, and most (95,2%) aimed to increase family financial income. For working mothers, family members assisted parenting roles (32% of mothers).

Mother's Health and Nutritional Status

As many as 69,2% of the mothers were in good health, and their health was not related to children's TB morbidity ($p > 0,05$). Likewise, 64,1% of the mothers had family planning participants and actively brought their children to Posyandu.

Table 1. Caregiver characteristics (n = 39)

Mother Characteristics	Mean	SD	Min	Max
Age (years)	37,2	8,59	22	54
Formal education (years)	9,6	3,7	0	16
Number of children	1,77	1,11	1	5
Number of family members (people)	5,69	2,33	3	12
House area (m ²)	63,5	44,8	5	175

Good nutritional status was found in 48,7% of the mothers. Mothers with fewer than two children had good nutritional status, Maternal nutritional status was not associated with age ($p = 0,24$), number of children ($p = 0,66$), or educational level ($p = 0,52$).

Characteristics of Children

In this study, 63 children were aged between three months to 19 years old. As many as 53,97% of the participants were male. As many as 32,8% were children under five years, 26,87% were children aged 5-10 years, and others were aged 11-15 years.

Morbidity in children includes fever, cough, shortness of breath, and tuberculosis (TB). Only two children had TB (the first child, aged 11 and 17 years). The first child in the toddler group became more sick than that in any other age group. Assessment of morbidity was carried out on all children, with a mean value of child morbidity of 5,05 and an SD of 3,53. Child morbidity was not related to age ($p = 0,62$).

Regarding the nutritional status of the children, the mean Z-score of BMI or BAZ was 3,36, and the SD was 2,1, with a minimum value of one and a maximum of 9. The greater the number of children, the more likely they were to experience malnutrition; the number of children and their sex were unrelated to their nutritional status ($p > 0,05$).

Mother's Care

Most mothers (65,8%) cared for their babies themselves to maintain their children's health and growth. They (43,3%) cared for the baby for 24 h. Mothers' ability to care for sick children based on parenting factors is presented in Table 2. As many as 92,3% of mothers still have a low capacity to provide breast milk and food for their children and to treat children's morbidities. Care for children greatly influences their health.

Parenting factors are interconnected to form a complex relationship; therefore, they need to be simplified into a parenting model. The results of this research obtained two parenting models,

namely the parenting model for children suffering from TB and the parenting model for children suffering from TB and other infectious diseases, such as cough, fever, and shortness of breath.

Table 2. Child care and frequency of child care empowerment in percent based on factors in caring for sick children

Factors in Caring for Sick Children	Mean	SD	Minimum value	Maximum value	Child Care Empowerment	
					Deficient	Good
Morbidity care	29,43	6,9	15	47	7,7	92,3
Breast and Food-feeding	28,13	9,08	17	52	92,3	7,7
Nutritional Care	23,49	6,9	7	35	20,9	79,1
Management of the environment	32,05	3,84	23	39	17,9	82,1

Table 3 shows the model of the risk factors for parenting TB in children. This model had a chi-square value of 6,2 with a degree of freedom value of 10 and a chi-square probability of 0,8, indicating that the model's relationship was fit. This model was supported by an RMSEA value of 0,00. The risk factors for appropriate care in children were supported by the significance of the path coefficient values tested using the T-test.

Children's nutritional status affected sick children either directly ($\beta=0,24$) or indirectly ($\beta=0,21$); thus, the influence was 0,45. Directly, the better the child's nutritional condition, the fewer the sick children. Indirectly, the nutritional status of children affects sick children through the mother's care in caring for sick children. The worse the child's nutritional condition, the better the mother cares for the sick child, even if the child becomes ill. This shows that mothers know that there is a relationship between a child's nutritional status

and the incidence of sick children. Mothers know that poor nutrition makes it easier for children to get sick; therefore, they improve their care. The value of indirect influence is smaller than that of direct influence; therefore, this indirect influence has no meaning.

Malnutrition and tuberculosis are often found in the most underdeveloped regions of the world. These two issues tend to interact. Malnutrition increases the risk of contracting TB (Balinda, 2019; WHO, 2024) or other infections from the family, thereby slowing healing (Engoru et al., 2024; WHO, 2024). Malnourished patients are twice as likely to die from TB as non-malnourished patients (WHO, 2024). In patients with TB, there is a decrease in appetite, impaired absorption of nutrients, and changes in metabolism, all of which cause malnutrition (Ma'rufi et al., 2020). The influence of poor nutrition on children with TB makes it difficult to diagnose TB using the tuberculin test (Siagian & Tanyadji, 2022).

Table 3. Child care risk model for TB morbidity in children

Variable Influences:	Path Coefficient Value (β)	T-Count Value (t)
Parenting Risk Factors and TB Morbidity		
Morbidity care \rightarrow Morbidity score	0,10	3,94
Nutritional status score \rightarrow Morbidity score	0,24	2,92
Nutritional status score \rightarrow Morbidity care	2,07	2,31
Morbidity care \rightarrow Nutritional status score	-0,16	-2,14
Breast and food feeding \rightarrow Nutritional status score	0,19	5

However, good nutrition can increase a child's body's resistance to infection and shorten the duration of treatment for sick children (Pecora et al., 2020). The patient's nutritional status improved during the tuberculosis treatment. The results of this study also show

that by increasing the mother's ability to care for sick children, the child's nutritional condition improves ($\beta=-0,16$). In good maternal care, 27,8% of the children had a good nutritional status. This figure is small, but it shows that the child's nutritional condition can be maintained

by preventing infections. Healthy individuals can use all of their nutritional intake to maintain their nutritional status.

Children's nutrition is highly dependent on the mother's ability to care for sick children, as well as the child's illness due to TB (directly $\beta=0,1$; indirectly $\beta=-0,04$). The influence of mothers' ability to care for sick children on the incidence of children getting sick with TB was indirectly smaller than directly; therefore, this indirect influence was not significant. Meanwhile, the direct effect showed that a mother's ability could not reduce the incidence of sick children. It can be concluded that the incidence of TB in children is highly dependent on the child's nutritional condition, which can be improved by increasing the mother's ability to care for sick children. Increasing the ability of mothers to care for sick children is a new approach for rapid systemic recovery in childhood TB.

In good care for sick children, mothers have the time, attention, ability, and family support to care for their children (Page et al., 2020). Mothers know how TB is transmitted, the symptoms, and early signs of sick children, which can prevent the occurrence of sick children by providing BCG immunization, improving or maintaining children's nutrition so that it remains optimal, keeping children from getting infected, maintaining hygiene and sanitation at home, or immediately bringing them to seek treatment so as not to worsen the condition of the disease or the emergence of complications.

Only 7,7% of the mothers lacked the ability to care for children with TB. Mothers' abilities can reduce the incidence of TB in children by improving their nutritional status. The risk of getting sick is classified as mild, moderate, or severe (Clarke, 2023). Care in the light-risk group means that when a mother cares for her child, the mother can detect the child's illness risk in the early stages of the illness as a non-urgent emergency, when there is still time for the mother to improve her care. Urgent emergencies were identified in the moderate risk group. A life-saving element must be immediately referred to as primary healthcare (Puskesmas). In contrast, in the severe risk group, the mother was unable to correctly diagnose the child's health and nutritional problems and required an immediate referral to

the hospital. The more precise the risk measurement, the clearer the service needs and the more influential the results will be.

Maternal care can handle only mild symptoms and signs of illness in children. Meanwhile, health workers in health facilities (Puskesmas or hospitals) can handle higher risks (i.e., more complex symptoms and signs of illness). TB in the children in this study was no longer a mild risk; therefore, treatment by health workers was needed. Therefore, in this study, the mothers' ability to care for sick children was insufficient to prevent the incidence of TB in children.

In general, TB is the primary form of TB in children. Primary TB occurs within the first five years after the first infection with *Mycobacterium tuberculosis* (primary infection). The onset of primary tuberculosis is usually difficult to detect clinically because the disease begins slowly (Luies, 2020). Tuberculosis is occasionally found in children without any complaints or symptoms of primary tuberculosis. It can also be a fever that goes up and down for 1-2 weeks with or without a cough and cold.

Several things have been done in caring for children with TB: as many as 50-75% of mothers keep their children away from TB contact, only 9% of mothers provide complementary foods with breast milk and vitamins, and as many as 50% of mothers provide immunization to children. Meanwhile, in processing the phlegm of TB sufferers, 87,2% of mothers disposed of their phlegm in toilets and bathrooms. Unfortunately, only 15,8% of the mothers clean the bathroom, toilets, and cans the right way. This situation shows that mothers still do not know how to care for sick children, even on a mild-risk scale.

The research results also showed that only 50% of the mothers took their children to the doctor for treatment. This situation shows that the mother does not understand the authority to care for a sick child. The research results also show that families cannot pay for sick children, with the majority (66,7%) being borne by their own families and only 28,2% using health cards.

Table 3 also shows that the indirect effect of food provision on sick children is $\beta=0,05$. The better the child's nutritional care, the sicker the child becomes. This finding indicates that mothers do not know and cannot feed their

children in sufficient quantities according to their needs when they are sick. There are still many incorrect opinions regarding food restrictions for children, especially if they are sick (Paintal, 2016). They provide various types of food not to make their children healthy but because they are healthy. On the other hand, when a child is sick, the food that the child needs is not given but must be taboo so that they recover from their illness. Incorrect perception of food can cause severe nutritional disorders (Fajriah, 2021). The situation is similar for breastfeeding among sick and healthy children.

This wrong opinion has been passed down from generation to generation by the mother's parents, including the handling of sick children (Mahmood et al., 2021). Likewise, the opinion is that illness is a disaster that God, religion, or people who have a grudge against them will so that sick behavior is wrong (Kahissay et al., 2017). However, little is known about healthy behaviors.

Those who were sick with TB were aged 11 and 17 years, and all mothers were given the same amount of food as if their children were not sick because they did not want to eat. The child complained that his mouth felt terrible and has no appetite. As many as 56,4% of mothers gave their children food restrictions to prevent them from contracting TB or other diseases, such as fever, coughing, and shortness of breath.

A child can be infected with TB without becoming sick if there is a positive tuberculin test result and without any clinical, radiological, or laboratory abnormalities. Therefore, it is necessary to develop a model for the care of sick children with TB. The Chi-Square value of the risk model for caring for children with TB and non-TB disease was 7,68, Degrees of Freedom was 10, Globality Chi-Square was 0,66, and the RMSEA value was 0,00, indicating that the model is in accordance with the theory. The results of the model are presented in Table 4.

Table 4. Child Care Risk Model for TB and Other Morbidities

Variable Influences:	Path Coefficient Value (β)	T Value (t)
Parenting Risk Factors and Child Morbidity		
Morbidity care \rightarrow Morbidity score	0,56	4,15
Nutrition care \rightarrow Morbidity score	0,32	2,37
Nutritional status score \rightarrow Morbidity care	2,07	2,31
Morbidity care \rightarrow Nutritional status score	-0,16	-2,14
Breast and food feeding \rightarrow Nutritional status score	0,19	5

In the model, there was no direct relationship between the nutritional value of the children and the incidence of sick children. However, there was an indirect relationship with caring for sick children, with a path coefficient of 1,16. These influences indicate that the characteristics of the correlation coefficient between the observed variables (observable variables) are high (multicollinearity). The predictive power of the independent variables was unreliable and unstable. The influence of children's nutritional value on morbidity was not statistically significant.

The incidence of TB and other infections was directly influenced by children's nutritional care at $\beta=0,32$ and care for sick children at $\beta=0,56$. The influence of caring for sick children on their incidence of sick children can be discussed in the model of caring for children with TB. As many as 20,9% of the mothers lacked the power to care for their children's

nutrition. The value of maternal empowerment regarding excellent or poor nutritional care for children did not have a different effect on the incidence of childhood illnesses.

The effect of children's nutritional care on their morbidity is inverse, which shows that nutritional care, which consists of providing food, processing and availability of children's food, knowledge of children's nutrition, Posyandu visits, and activities including the provision and knowledge of vitamin A, cannot reduce the number of sick children.

Mothers are not yet able to provide and prepare food for sick children, or do not know the link between malnutrition and illness. Mothers also do not know the function of Posyandu as a function of monitoring children's growth, which can be an early detection tool for children's failure to grow, as an indicator of a decrease in the child's immune system, making it easier for children to become infected. Only

42,9% of the mothers had taken their children to Posyandu in the last three months to monitor their children's growth. The older the child gets, the less often the mother takes posyandu.

The low participation of mothers visiting Posyandu, supported by mothers' low knowledge about children's growth and development, delays the detection of children's growth disorders, late detection of children's nutritional disorders (Eze et al., 2017), late detection of a decrease in the child's immune system, and ultimately, children get sick easily (Urlacher et al., 2018).

In the model, receiving care for a sick child can influence the child's nutritional condition by $\beta = -0,16$. The same is true for the TB care model. Children's nutritional status is also directly influenced by nutritional care, with an inverse effect. Feeding care by the mother has not been able to improve the child's nutritional condition, as discussed in the child-TB care model.

Conclusion

This study found a model of parenting risk factors associated with childhood tuberculosis (TB) incidence, emphasizing the important role of maternal parenting skills in influencing children's nutritional status, and consequently, TB risk. In addition, improving maternal parenting skills directly affects children's nutritional health, which is a protective factor against childhood TB.

The parenting model suggests that empowering mothers to detect and address early health issues in their children, including signs of impaired growth and symptoms of illness, can significantly reduce TB risk of TB. By addressing these parenting gaps, mothers can play an active role in breaking the cycle of poor nutritional status and TB susceptibility in their children.

Based on these findings, practical efforts should focus on empowering mothers through targeted educational and training programs that improve their caregiving abilities, particularly in recognizing and addressing signs of malnutrition and early symptoms of illness in children. Community Health Centers can organize regular smart mother classes to teach mothers how to detect growth and developmental disorders, identify early signs of TB or other infections, and implement proper hygiene and sanitation

practices at home. These classes should also provide practical guidance for improving children's diets and managing the environmental risk factors for TB. Additionally, establishing a clear and accessible referral system can enable mothers to promptly seek professional medical assistance when their caregiving capacity is exceeded. Empowered mothers will not only enhance their children's health outcomes, but also contribute to reducing the overall burden of childhood TB within the community.

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