

Contact Investigation and Preventive Therapy of Tuberculosis in Children Under Five in Jambi City

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ABSTRACT

Tuberculosis Prevention Therapy (TPT) is recommended to prevent transmission of TB to children under five who have household contact or close contact with TB patients. Contact investigations are carried out as an entry point for administering TPT to contact children under five. Based on the initial survey, the scope of contact investigations and provision of TPT to children under five has not reached the target. Research was carried out in Jambi City in 2023 to explore the implementation of contact investigations and providing TPT to children under five by looking at the input components including facilities and methods. Qualitative research methods were used in this study with 20 informants from the Health Service and Community Health Center in Jambi City, Penabulu-STPI Community, and parents who had children under five in contact with TB patients. The results of the qualitative analysis on input components: there are no supporting policies, there is still a lack of human resources for contact investigations, there is a lack of capacity of health workers in procedures for administering TPT, the availability of tuberculin and TPT drugs is still lacking, unavailability of child-friendly TPT medication, and there is a lack of standard operational procedures and guidelines.

Keywords: Contact Investigation, Tuberculosis Prevention Therapy, Toddlers, Policy Implementation

INTRODUCTION

Tuberculosis (TB) is still a global health problem, associated with high morbidity and mortality throughout the world. WHO data for 2022 shows that the incidence of TB in the world is 134 per 100,000 population with a death rate of 1.6 million people and around 2 billion people in the world suffer from TB infection (latent TB) (World Health Organization, 2022a). Even though there was a decline during the COVID -19 pandemic, in Indonesia the incidence of TB from 2020 to 2021 increased by 18% (Kementerian Kesehatan RI, 2022).

TB is an infectious disease caused by the *Mycobacterium tuberculosis bacillus*, which usually infects the lungs but can also infect other tissues. Transmission occurs when people who are sick with TB spread the bacteria into the air, for example through coughing (World Health Organization, 2022a). Children are at higher risk of developing TB disease, including severe forms of TB, than older age groups. The majority of children become ill with TB within a few months of exposure and infection (World Health Organization, 2022b).

Children and adolescents (0-15 years) represent approximately 11% of TB sufferers in the world. This means that

almost 1.1 million children become ill with TB every year, and almost half of this number are under five years old. However, the National TB Program only reports half the number of cases in children, meaning there is a large case detection gap (World Health Organization, 2022b). In 2018, the World Health Organization (WHO) stated that the incidence of childhood TB increased by around 11% compared to the previous year. However, only around 46% (506,000) of TB cases in children have been reported throughout the world. Missing cases were 594,000 children and deaths due to childhood TB were 253,000 children which could have been prevented and cured (World Health Organization, 2019).

Data from the Indonesian Ministry of Health shows that the number of confirmed TB cases found in children in Indonesia is 56,446 cases as of 2019 or around 56% of the estimated incidence of tuberculosis cases in 2019. The notification rate for TB cases in children under 15 years of age shows an increase from 2016 to 2019. However, the coverage of TB case finding and treatment in children under 15 years is still far below the global target of 90% (Kementerian Kesehatan RI, 2020b). The coverage of TB case detection in children in Jambi City in 2020 and 2021 also still has not reached the target, around 21% in 2020 and 24% in 2021.

Reasons for the gap in finding cases of TB in children include the challenges of specimen collection and bacteriological confirmation in young children, due to the paucibacillary nature of TB disease in this age group and the lack of test sensitivity for small amounts of bacteria (World Health Organization, 2022b). The difficulty of establishing a diagnosis of pediatric TB in primary health centers is the main problem in finding pediatric TB cases. Not all health centers have tuberculin tests and chest x-rays which are another problem in pediatric TB (Sari et al., 2022).

In addition to the gap in detection of pediatric TB cases, efforts to prevent pediatric TB are also not optimal. Based on

the literature, close contacts of positive bacteriological TB cases are known to be at high risk of being infected with TB or experiencing Latent Tuberculosis Infection (LTBI) and developing TB disease, including children. Children, especially those aged under five years, have an increased risk of suffering from severe forms of TB, such as TB meningitis and miliary TB. Therefore, WHO strongly recommends that all children under five years of age who are household contacts of a person with bacteriologically confirmed pulmonary TB be given preventive TB treatment (Goroh et al., 2023). However, data from WHO states that in 2020 only a third of children under five household contacts who were eligible for TB preventive treatment (TPT) actually received TPT (World Health Organization, 2022b).

The 2019 Global TB Report shows that the coverage of providing TPT to children under 5 years of age (toddlers) is 8.5% (6,080 toddlers) and the coverage of providing TPT to people living with HIV/AIDS (PLWHA) is 16% or 7,681 PLWHA. The achievement of providing TPT is still far from the expected target for both children under five and PLWHA of 40% in 2018 (Kementerian Kesehatan RI, 2020b). The coverage of providing TPT in Jambi City is also still low. In 2020, TPT coverage for children under five was only around 0.2% and only reached 1.2% in 2021.

At the beginning of 2022, the Ministry of Health has conducted outreach to the Health Service and TB Community Health Center officers in Jambi Province to encourage the provision of preventive therapy to people who have risk factors for developing LTBI, including children under five years of age who are in contact with TB patients. However, the coverage of providing TPT to children under five and other risk factors in 2022 is still far from the target set. Based on a preliminary survey conducted at the Jambi City Health Office, the coverage of providing TPT to toddlers in Jambi City in 2022 will only be around 1.8%.

Contact Investigation is an activity carried out to increase TB case detection by early and systematic detection of people who have contact with the source of TB infection (Kementerian Kesehatan RI, 2024). Rahmawati in 2020, in a systematic study concluded that implementing Contact Investigation and administering TPT is a strategy for preventing and transmitting TB to children (Rahmawati et al., 2020) and analysis of research by Tadesse Y et al (2016) in Ethiopia, states that contact investigations are a good entry point in providing TPT to children at risk and should become routine practice as recommended by WHO (Tadesse et al., 2016).

A cross-sectional study in Kisumu County, Kenya, concluded that TPT initiation which was influenced by index and contact characteristics was still less than optimal. This research suggests that TB programs should provide training to health workers/cadres, provide appropriate pediatric TB diagnostic tools, work aids and monitoring tools, and ensure sustainable drug supplies, to facilitate the implementation of TPT (Burmen et al., 2019).

In Jambi City, during the implementation of the Contact Investigation in 2022, the total number of household contacts was 6,838 contacts with the number of children under five years who had contact with the TB index case being 344. However, the number of contacts of children under five years who were referred to the Community Health Center was only 16 and only 11 were given TPT. Based on the explanation above, the implementation of Contact Investigation and provision of TPT to children under five in Jambi City is not optimal. The target for finding cases of TB in children has also not been achieved. However, so far, there has been no systematic and structured study to analyze problems related to the low level of implementation of Contact Investigations and Provision of TPT in Jambi Province, especially Jambi City. Based on these problems, the aim of this research is to see how the implementation of contact

investigations and administering TPT to children under five years of age who are in contact with TB index cases in Jambi City is implemented by analyzing the input components.

MATERIALS & METHODS

This research is a study of health policy using qualitative methods. This research was conducted in Jambi City. The institution chosen for this research is the Jambi City Health Office and includes 4 health centers in Jambi City, namely Putri Ayu Health Center, Rawasari Health Center, Pakuan Baru Health Center and Simpang IV Sipin Health Center. Research was also conducted at the Penabulu-STPI TB elimination community. The informants in this study were 20 people consisting of the Jambi City Health Office TB Wasor, Puskesmas TB program officers, the Doctor in Charge of the TB Program, community cadres, and parents who have toddlers who are in contact with TB patients or TB index cases.

The study began with the collection of data on TB index cases, contact investigation data, and data on toddlers who received TPT from the Jambi City Health Office. Furthermore, interviews were conducted with TB supervisor informants, officers and doctors in charge of TB at the puskesmas, conducting FGD with cadres of the STPI penabulu community, conducting document reviews and field observations. Qualitative data analysis on the implementation of contact investigations and the provision of TPT to under-five household contacts in Jambi City was carried out by thematic analysis to obtain themes in accordance with the objectives of this study.

RESULT

Overview of Jambi City

Jambi City is located between 1° 30' 2.98" - 1° 40' 1.07" South latitude and 103° 40' 1.67" - 103° 40' 0.22" East longitude. Jambi City is relatively flat with an altitude of 10 to 60 m above sea level with an area of approximately 205.38 km².

Administratively, Jambi City consists of 11 sub-districts and 62 villages. The sub-district that has the largest area in Jambi City is Kecamatan Alam Barajo with an area of 41.67 km² and the sub-district that has the smallest area is Kecamatan Pasar Jambi 4,01 km². The sub-district that has the most urban villages is East Jambi Sub-district which has 9 urban villages.

Based on data from the Jambi City Statistics Agency (BPS) in 2023, the total population of Jambi City in 2022 was 619,553 people. The total male population is 311,616 people, and the total female population is 307,937 people. The population pyramid of Jambi City shows that the population structure in Jambi City is a young population structure. This can be seen from the large number of young people. The body of the pyramid is large, indicating a large number of people of productive age.

The health service facilities owned by the Jambi City Government include hospitals,

health centers, clinics, independent practices, pharmacies, health laboratories, and pharmaceutical installations. There are 20 health centers located in the Jambi City area. Analysis of Input Components in the Implementation of Contact Investigation and Provision of TPT to children under five in Jambi City.

The informants of this study totaled 21 people consisting of 16 in-depth interview informants and 5 FGD informants. In-depth interview informants came from the Jambi City Health Office, 4 health centers in Jambi city, the Penabulu STPI Community Consortium and parents who have children under five in contact with bacteriologically confirmed TB patients. While informants for FGDs are Penabulu-STPI community cadres who carry out contact investigations. The characteristics of the research informants are presented in tables 1 and 2.

Table 1. Characteristics of indepth interview informant

Informant Code	Gender	Age	Educational Background	Job title
Inf 1	Female	51	D3	Deputy Supervisor of Program TBC
Inf 2	Female	33	S2	Doctor of Putri Ayu Health Center
Inf 3	Female	51	S1	Doctor of Rawasari Health Center
Inf 4	Female	38	S1	Doctor of Simpang IV Sipin Health Center
Inf 5	Female	54	S1	Doctor of Pakuan Baru Health Center
Inf 6	Female	48	D3	TB Program officer of Putri Ayu Health Center
Inf 7	Female	34	D3	TB Program officer of Rawasari Health Center
Inf 8	Female	54	D3	TB Program officer of Simpang IV Sipin Health Center
Inf 9	Female	45	D3	TB Program officer of Pakuan Baru Health Center
Inf 10	Female	36	SMA	Parents of contact toddler
Inf 11	Male	38	SD	Parents of contact toddler
Inf 12	Female	32	SMA	Parents of contact toddler
Inf 13	Male	45	S2	Head of Pena bulu-STPI consortium community
Inf 14	Female	30	SMA	Parents of contact toddler
Inf 15	Male	25	S1	Pharmacy Instalation staff
Inf 21	Male	45	S1	Health promotion program officer of Putri Ayu HC

Table 2. Characteristic of Focus Group Discussion informant

Informant Code	Gender	Age	Educational Background	Job title
Inf 16	Female	46	S1	Cadre coordinator
Inf 17	Female	25	S1	Cadre
Inf 18	Female	41	SMP	Cadre coordinator
Inf 19	Female	25	S1	Cadre
Inf 20	Female	25	S1	Cadre

Input components in the implementation of contact investigation and provision of

TPT to children under five years old in Jambi City.

Policy

The policy on the implementation of contact investigation and the policy on the provision of Tuberculosis Preventive Therapy (TPT) in Jambi City has referred to the central government regulations, namely Permenkes No. 67 of 2016 and Perpres No. 67 of 2021 on tuberculosis control. However, there is no derivative policy or regulation issued by the Jambi City Government that serves as a reference for TB control in Jambi City, including the implementation of contact investigation and the provision of TPT.

"It is in the Permenkes and Perpres, Permenkes 67 of 2016 and Perpres 67 of 2021. For us, it is only based on the presidential regulation and the Permenkes, if there is no derivative from the province, we also do not have a policy on TPT, we only carry out government policies related to Permenkes and Perpres." (inf 1, 7)

"We are now advocating with our friends from the health department, how there can be regulations, especially in the city because the intervention area is in the city. From the city government, at least there is an instruction...if the local regulation is long it has to be submitted first but if what can be direct is the mayor's instruction so it can be direct that it is requested to the sub-district head, village head, and all multi-sectors to support the program that is not yet but we are heading there" (Inf 13).

Human Resources

Human resources in the implementation of Contact Investigation and Provision of TPT in toddlers are personnel or officers who are directly involved in the implementation of Contact Investigation and Provision of TPT in toddlers in Jambi City, including the doctor in charge of Puskesmas TB, Puskesmas TB Program Officer, Pena Bulu-STPI TB Elimination Community Cadre.

Human Resources for Contact investigation. The availability of human resources (HR) to carry out contact investigations in this study is still less than needed, because currently there are only 16

active community cadres out of 30 people registered in the Penabulu STPI Community in Jambi City. Meanwhile, the Puskesmas TBC officer to carry out contact investigations is only 1 person at each puskesmas and the officer also still concurrently performs other duties besides the TB program.

"It is still lacking, because there is only one officer. Sometimes we don't have time because we are busy. I have asked for additional officers There is a mandated officer in children's services to help me here. If I am absent, they can also replace me but every time they are asked, they have work to do. I also double as an officer in the ER for 3 days a week." (inf 7)

"There are active and inactive cadres, now there are about 17 active cadres...The recruitment of these cadres is sometimes invited if we have friends...then they are offered whether or not they want to join the cadre training for a few days...the training is willing to participate...already got the knowledge...but later when they go down to the field they don't want to participate anymore." (Inf 18)

"Initially there were 28 people, then they resigned without news. Now the active ones are around 6 of them. This cadre works on the side. some of them work as security guards some of them work at PT, so when they are off, they index go down to investigate the important thing is that their names are still there." (Inf 16)

Human resources for provision of TPT.

The availability of human resources for the provision of TPT at the Jambi City puskesmas is available because there is already a Puskesmas TB Program Implementation Team of 4 people consisting of nurses, doctors, laboratory analysts and pharmaceutical officers. In this study, the human resources who played a role in providing TPT to toddlers in contact were the TB program holder and the doctor in charge of the Puskesmas TB program or the doctor in charge of the Pediatric Clinic. However, in the provision of TPT in Jambi

City, the available human resources have not all received training on the provision of TPT. Based on data from the Jambi City Health Office, out of 20 Puskesmas in Jambi City, only 7 Puskesmas or 35% of TB officers and doctors in charge of Puskesmas have received training and workshops on ILTB management and TPT administration. This causes the capacity of human resources in providing TPT is still lacking. PHC doctor informants stated that they were still hesitant in giving TPT to toddlers in contact so they referred them to pediatricians. In addition, there are still health center doctor informants who do not know about the provision of TPT to toddlers in contact.

“For training, only seven puskesmas were trained, which happened to be during the socialization of TPT ee for close contact of bacteriologically confirmed patients, seven puskesmas were directly trained to the national to the center in Bekasi” (Inf 1)

“Already been there. Twice, the first time was in Jambi and then in Bekasi in 2022. The program holders and doctors went” (Inf 9)

“For TB training, we have, but not for contact and TPT investigations...I did not participate in the one in Bekasi. In Jambi, there is also no training on contact investigation and TPT...if TPT is preventive therapy, it means...I don't understand that one. Prevention means that there are no symptoms, right?” (inf 4)

“So honestly...almost why is it low...we don't dare...well because of the children we don't dare. Actually, without being able to do anything in the past, it can be treated, right, it's just that the INH PP doesn't work. So this INH drug was piled up at the puskesmas. apparently this is not removable INH. it turns out to be prophylactic INH.” (Inf 5)

Facilities

Facilities and infrastructure in providing TPT to toddlers in contact in Jambi City are also still lacking. The facilities and infrastructure needed in providing TPT to

toddlers in contact at the puskesmas consist of TPT drugs and Tuberculin.

Lack of stock of TPT drugs and the absence of child-friendly TPT drugs.

In this study, it was found that the availability of TPT drugs for contact toddlers in Jambi City is still lacking and there is no availability of child-friendly drug preparations. Based on interviews with informants from Puskesmas TB officers and community cadres, there are obstacles in providing TPT to toddlers because there are often vacancies of TPT drugs and expired drugs. According to the Jambi City TB Program Supervisor, the stock of TPT drugs is caused by inappropriate planning of TPT drug needs. Initially, TPT drug planning in Jambi City did not include the number of toddlers who were eligible for TPT.

“At the beginning, because we were new at that time, we had a shortage. But after quite a lot of demand from the province, we now have enough stock. The only thing that is out of stock now is the 3RH FDC, because the 3 RH ED is here.” (inf 1)

“If the TPT medicine is available... Now there is 3HP, 3HR has expired, 6H does not exist.” (Inf 9)

Based on interviews with officers and supervisors of the Jambi City TB Program, information was also obtained that one of the obstacles in providing TPT is the type of TPT drug preparation that is not child-friendly. The patient's parents refused to give TPT because of the large amount of medicine and the difficulty in giving medicine to children. In addition, based on the results of FGDs with community cadres, information was obtained that one of the causes of parents refusing to administer TPT is the dosage form of drugs that are still in the form of tablets and the amounts of drugs that must be consumed are quite large.

“For children above 2 years old, we can give 3RH or 3HP but the 3HP cannot be a combipak, it must be a removable one, but not for children under 2 years old. 2-14 years old also cannot be 3 HP FDC. Above

14 years old we can only give 3HP FDC. Now if the removable one we can give to children 2-14 years old but if you see the removable one, the patient refuses because there are more tablets.” (inf 1,6)

“well this is what sometimes makes it difficult for us too the drug preparation. Because this 3HP which is FDC has not been proven for children. There is no definite research yet. So we still give the removable ones” (Inf 1)

Lack of tuberculin Stock. There is also a shortage of tuberculin stock for examining household contacts since September 2023. The tuberculin stock available at the beginning of 2023 was 67 vials and the receipt of tuberculin in January-September 2023 was 110 vials. The use of tuberculin in Jambi City was 177 vials during January-September 2023 with distribution to all puskesmas and hospitals in Jambi City. The shortage of tuberculin stock is due to the lack of monitoring and evaluation in drug requests and retrieval. After taking tuberculin at the pharmacy warehouse, officers often do not fill in the SITB application, which causes stock vacancies to be known late by the TB wasor and pharmacy manager, and the Ministry of Health because in the SITB application the tuberculin stock is still available.

The shortage of tuberculin stock resulted in delays in the examination of contact toddlers. Based on observations at the Putri Ayu Health Center, there were indeed constraints on the vacancy of tuberculin stocks at the Jambi City Health Office in September 2023, resulting in delays in tuberculin testing of contact toddlers in the puskesmas area, one of which was at an Orphanage that had a bacteriologically confirmed pulmonary TB patient with a total of 6 contact toddlers. The health center has not yet provided TPT for the contact toddler because it is constrained by not being able to do the tuberculin test.

“The Tuberculin test yesterday we got quite a lot of stock from the province. We got 100 vials. It has been distributed to 37 services

in Jambi City including hospitals. Now our constraints for ee. tuberculin and OAT for children are empty. It is in the process of being procured at the center” (Inf 1).

“Now it's been almost 3 weeks for the tuberculin test... But the TPT is there, it's just the tuberculin that's not there” (Inf 9).

“The tuberculin test is available but now only 1 vial is left. It is now empty in the warehouse, other health centers cannot do it.” (inf 8)

“Why it can be empty is because it is not yet available from the center, sometimes puskesmas officers after taking tuberculin or TB drugs here do not fill in the SITB, so the center sees that there has been no collection and there is still stock that's why it's often late to know that the stock has run out. When this medicine comes in, it comes out depending on the wasor, the puskesmas if they ask for medicine acc wasor first we only store and distribute” (Inf 15).

METHODS

The results of interviews with informants of Puskesmas TB officers found that not all puskesmas had Standard Operating Procedures (SOP) and contact investigation guidelines, as well as SOPs and guidelines for providing TPT to toddlers. Meanwhile, from the explanation of the TB Program Supervisor of the Jambi City Health Office, information was obtained that the guidelines for contact investigation and TPT administration had been socialized to Puskesmas TB program officers and Puskesmas doctors. Searches conducted at 4 Puskesmas in Jambi City found that only 2 Puskesmas had contact investigation SOPs, namely the Putri Ayu Puskesmas and the Simpang IV Sipin Puskesmas, while the SOP for providing TPT was only found in 1 Puskesmas, namely the Simpang IV Sipin Puskesmas, but the SOP did not explain in detail the steps for giving TPT to toddlers.

“We have a group, that's where I will share everything. The agency has provided the guidelines.” (Inf 1)

“there is there is everything the guidebook is there when the training in Bekasi was

given the module in the form of a soft copy, we have not had time to print it” (Inf 6)

“all the books have been given there is a book about ILTB but we print it ourselves only the soft copies are given.” (Inf 7)

“For the contact investigation SOP, there is, for TPT not yet, not yet because it is still new in 2022. I have looked for the soup but it is not ready yet” (Inf 7)

“The SOP is not yet, it just so happens that this TPT is new in 2022. So it's just a plan to be made.” (Inf 9)

Meanwhile, the results of research conducted at the Penabulu-STPI Community in Jambi City have also not found any contact investigation SOP for cadres. Likewise, with the availability of guideline books, the availability of guidebooks for contact investigations and guidebooks for TPT administration at the Jambi City Health Center has not been found in all health centers. Only 1 out of 4 health centers has a print out of the ILTB guidebook and ILTB and TPT training modules, namely the Rawasari Health Center. Likewise, with the availability of contact investigation guidebooks, not all health centers have these guidelines. Based on research on community cadres, no contact investigation guidebooks were found, cadres only had the 2009 TB program cadre handbook.

“There is no SOP, but it has been explained before during the cadre briefing...these cadre friends already understand...” (inf 13)

“There is a pocket book for cadres...I always carry it around.” (Inf 18)

“Yes, all cadres have been given a pocket book” (Inf 16, 17)

DISCUSSION

This study explored the input components of the implementation of contact investigation and the provision of tuberculosis preventive therapy to children under five years of age who have household contact with tuberculosis patients in Jambi City. Based on thematic analysis, the input components identified were policy, human resources,

budget, facilities and infrastructure, and methods used.

The policy on the implementation of contact investigation and the policy on the provision of Tuberculosis Preventive Therapy (TPT) in Jambi City has referred to the central government regulations, namely Permenkes No. 67 of 2016 and Perpres No. 67 of 2021 on tuberculosis control. However, there is no derivative policy or regulation issued by the Jambi City Government that serves as a reference for TB control in Jambi City, including the implementation of contact investigation and the provision of TPT. The absence of a regional policy is due to the fact that the advocacy process to the Jambi City Government is still being carried out by the Penabulu STPI Community together with the Jambi City Health Office. This advocacy process aims to issue a regulation in the form of an instruction or circular letter from the Jambi Mayor that calls on regional apparatus, namely sub-district heads, village heads and neighborhood associations as well as other related cross-sectors and allocates resources to support TB control in Jambi City.

This is in line with the Policy Implementation of Permenkes No. 67/2016 on Tuberculosis Control in Tegal City which states that the implementation of TB control policies has not run optimally due to the lack of policy resources and lack of community support for TB control in Tegal City (Faradis and Indarjo, 2018). However, this study is not in line with research in Yogyakarta which states that the implementation of TB control policies in the area is good because there is already a mayoral regulation No. 90 of 2019 as a form of commitment of the Yogyakarta city government in tackling TB (Adrian MM et al, 2019). Both studies describe the implementation of TB control policies in general, while studies that specifically discuss the implementation of contact investigation policies and the provision of TPT to children under five have not been found.

The absence of a policy that prioritizes the implementation of contact investigations and the provision of TPT to toddlers in Jambi City has caused the implementation of this policy to not run optimally. This is evident from the coverage of the implementation of contact investigations which has not yet reached the target, which is only 58.8% of the 90% target. Likewise, with the provision of TPT to toddlers, of the 20 Puskesmas in Jambi City, only 5 Puskesmas have implemented the provision of TPT to toddlers so that it will have an impact on the low coverage of providing TPT to toddlers in contact. Based on the results of the study, it is stated that children who are in household contact with TB patients will be at risk of being infected with TB or becoming ILTB (Latent Tuberculosis Infection), and the results of the study show that 5-10% of people with ILTB will develop into active TB, usually within 5 years from the first time they are infected (Kementerian Kesehatan RI, 2020a; Nasution and Amalia, 2022).

Failure in policy implementation can be caused by an implementation gap due to bad policy, bad implementation, or bad lucky policies (Sriatmi et al., 2020). In this study, the policy of contact investigation and provision of TPT to toddlers in Jambi City has not provided satisfactory results due to its poor implementation and lack of attention. The provision of TPT to toddlers has not been a priority in TB control in Jambi City compared to other indicators such as case finding and treatment of TB patients. In addition, there is no derivative policy regulation regarding the implementation of contact investigations and the provision of TPT in Jambi City.

The National Strategy for Tuberculosis Control in Indonesia 2020-2024 in strategy one states that it is necessary to strengthen the commitment and leadership of the central, provincial and district/city governments to support the acceleration of tuberculosis elimination by 2030 (Kementerian Kesehatan RI, 2020b). Based on this strategy, there is a need for

regulation and support from the Jambi City local government in TB control in Jambi City, including prioritizing the implementation of contact investigations and the provision of TB preventive therapy to toddler contacts who are at high risk of contracting TB disease in addition to achieving other key indicators.

The availability of human resources (HR) for the implementation of contact investigations in Jambi City is still less than needed because currently the number of active Penabulu STPI community cadres is only 16 out of 30 registered people. Penabulu- STPI Community Cadres are the implementers of contact investigations for bacteriological confirmed TB patients. Likewise, the health centre officer as the implementer of contact investigation is only one person at each health centre. In line with research on the provision of TPT in Tanzania which identified a shortage of personnel in the implementation of contact investigations. In this study, it was stated that there was a shortage of community-based human resources and a lack of community health workers in the implementation of TB contact investigations (Emerson et al., 2019). This condition is similar to that obtained in Jambi City, because although contact investigation human resources are available both from the TB elimination community and health centre officers, the number is still insufficient, making it difficult to carry out contact investigations on time. Another study also mentioned that there was a critical shortage of staff for the implementation of contact investigations in Malaysia, making it difficult to carry out contact investigations in a timely manner (Goroh et al., 2023). However, in the Goroh et al study, human resources for contact investigation only came from TB clinic staff, there was no community empowerment to help the contact investigation process, unlike in Jambi City which already had cadres from the community.

While the availability of human resources for the provision of TPT to toddlers at the Jambi City Puskesmas is sufficient. However, the capacity of human resources in providing TPT to toddlers in contact is still lacking because not all of them have received training and doctors are still unsure in providing TPT to toddlers in contact. In line with Emerson's research (2019) that the capacity of officers in providing TPT is still lacking so that training of health workers in the provision of TPT is needed to improve the implementation of TPT provision in Tanzania and research in Nepal also states that there are limitations to training and time allocated for TPT during training, lack of number of staff trained and lack of detailed TPT training materials provided (Ghimire et al., 2022). Another study in Malaysia also mentioned the inability of staff in counselling TPT administration, this study also recommended training for staff to avoid misunderstanding of preventive drug administration (Goroh et al., 2023).

The uneven implementation of training on ILTB and the provision of TPT among TB officers and health centre doctors causes their doubts and concerns in providing TPT to toddlers, especially health centre doctors who should be the decision makers in providing TPT. Doctors' concerns about underdiagnosis or overdiagnosis in the management of contact toddlers cause doctors to hesitate in providing TPT to contact toddlers. It is necessary to strengthen the capacity of health centre doctors in the implementation of child TB scoring to provide confidence to doctors and health centre TB officers in the management of contact children and the provision of TPT to contact children.

The results of this study also show that there is still a lack of facilities and infrastructure in the provision of TPT to toddler contacts in Jambi City. The facilities and infrastructure needed in providing TPT to toddlers in contact at the health centre consist of TPT drugs and Tuberculin. In this study, it was found that the availability of TPT drugs for toddler contacts in Jambi

City was still lacking. Based on interviews with informants of Puskesmas TB officers and community cadres, one of the obstacles in providing TPT to toddlers is the frequent vacancies of TPT drugs and the existence of expired drugs. According to the Jambi City TB Programme Supervisor, the stock of TPT drugs is caused by inappropriate planning of TPT drug needs. Initially, TPT drug planning in Jambi City did not include the number of toddlers who were eligible for TPT.

Drug preparation is also one of the obstacles in the provision of TPT drugs in Jambi City. Parents of toddlers refuse to give TPT because they see the drug preparation in the form of tablets and the amount of medicine is large. The types of TPT regimens that can be used for children < 2 years consist of 6H and 3HR regimens, while for children > 2 years can be given a 3HP regimen. 6H regimen is given once a day for 6 months, 3HR regimen is given once a day for 3 months, while 3HP regimen can be given once a week for 3 months. In this study, it was found that the type of TPT regimen most commonly used for under-fives at Puskesmas is the 3HR regimen because the duration of administration is shorter, namely 3 months and is already available in the form of FDC (Fix dose combination) so it is easier to administer than 6H which is given for 6 months. However, the availability of the 3HR FDC TPT drug regimen is the lowest, resulting in frequent stock-outs. The 3HP FDC TPT regimen is actually easier to administer because it is only once a week for 3 months, but the 3HP FDC has not been recommended for children <5 years. The 3HP regimen given to toddlers in Jambi City is in the form of a removable drug consisting of INH and Rifapentin whose dose is calculated based on the child's weight so that the amounts of drugs given is more and the preparation takes longer.

In line with a study in Peru, which stated that one of the barriers to TPT administration is the time- and labor-consuming preparation and administration of drugs due to drug formulations that are

not child-friendly (Chiang et al., 2017). This is also consistent with a systematic review on TPT which stated that the availability of shorter, child-friendly TPT regimens for child contacts provides an additional important opportunity to improve TPT acceptance and adherence (Howell et al., 2022). However, this is not in line with the study on TPT in children in Malaysia, which states that there is already access to child-friendly forms of drugs that facilitate the completion of treatment. In this study, it was mentioned that the drug given in syrup form and having a sweet taste contributed greatly to the acceptance of TPT in children (Goroh et al., 2023).

Although the program for the provision of TB preventive drugs to children under five years of age has been in place since 2016, it has received little attention from program managers and health service providers. It was only in 2020 that the TPT program for children under five years of age was intensified in line with the provision of TPT in other ILTB conditions. TPT stock planning is the first step in achieving good logistics management. Logistics planning starts from the process of selecting the type of medicine, the amount of medicine needed, and evaluating the price of each type of medicine needed.

Based on the Ministry of Health's TPT logistics guidelines, TPT logistics planning activities are carried out in stages, starting from the District/ City Health Office, Provincial Health Office and the Ministry of Health using a combined calculation approach of consumption and epidemiological methods by an integrated drug planning team consisting of program managers pharmaceutical managers. TPT drug planning is carried out in January-March each year, with a 2-year drug requirement planning calculation period because the drugs proposed this year will only be available the following year. The district/municipality integrated drug planning team requires data sources in the form of TPT targets and targets and drug stocks in SITB in planning TPT drugs. The

calculation of TPT drugs for children under five is calculated based on the estimated number of household contacts and the estimated number of children under five who are eligible for TPT, then the needs are calculated based on the types of TPT drugs needed (Kementerian Kesehatan RI, 2020a). Methods are guidelines, procedures, techniques, or steps for doing something in particular to achieve a certain goal. In this study, the methods referred to are the Guidelines and SOPs for the Implementation of contact investigations and Guidelines and SOPs for the provision of TPT to infants in contact. The results of this study indicate that there are still challenges in the implementation of the implementation of contact investigations and the provision of TPT in terms of the availability of guidelines, the readiness of SOP documents and the details of the steps for implementing procedures. The Jambi City Health Office is expected to monitor the availability of guidelines and the preparation of SOPs for the implementation of contact investigations and the provision of TPT at all health centres in Jambi City to improve the implementation of contact investigations and the provision of TPT to toddlers in Jambi City. Coordination between the Health Office and Puskesmas is also needed in the preparation of SOPs so that there is uniformity in the steps of implementing contact investigations and providing TPT in accordance with the guidelines set by the Indonesian Ministry of Health.

In accordance with research conducted in South Africa on barriers to TPT administration in HIV clinics also stated the same thing that staff and prescribers did not know the guidelines for TPT administration and did not know its benefits (Mishra et al., 2023). Another study conducted in Malaysia also stated that the flow and contact investigation system was not clearly and easily available and some provisions of the TPT implementation guidelines were not clear (Goroh et al., 2023). The implementation of tuberculosis control in

Magelang district states that there is a relationship between the availability of SOPs and the implementation of tuberculosis control at the health center in Magelang district. This study supports the theory put forward by Van Metter and Van Horn which states that the characteristics of the implementing agency, one of which is the availability of SOPs, is a supporting factor for the implementation of the program (Lestari et al., 2019).

The implementation of contact investigations and the provision of TPT should be guided by manuals or guidelines from the central government and technical guidelines in the field which are realized in the form of SOPs, so the availability of SOPs plays an important role in guiding officers in carrying out activities. The availability of complete and clear program implementation instructions will guide implementers in their actions and avoid shortcomings in implementing a policy.

The results of this study indicate that there are still challenges in the implementation of the implementation of contact investigations and the provision of TPT in terms of the availability of guidelines, the readiness of SOP documents and the details of the procedure implementation steps. The Jambi City Health Office is expected to monitor the availability of guidelines and the preparation of SOPs for contact investigation and TPT provision at all health centers in Jambi City to improve the implementation of contact investigation and TPT provision for under-fives in Jambi City. Coordination between the Health Office and Puskesmas is also needed in the preparation of SOPs so that there is uniformity in the steps of implementing contact investigations and providing TPT in accordance with the guidelines set by the Indonesian Ministry of Health.

CONCLUSION

This study provides an overview of the lack of input components in the implementation of contact investigation activities and the provision of TPT to toddlers in Jambi City.

In contact investigation, it was found that the number of active cadres was still lacking and the lack of availability of guidelines and SOPs caused the implementation of this activity to be not optimal. Meanwhile, in the provision of TPT for toddlers in the same house, the shortcomings of the input components identified were the lack of capacity of TB officers and doctors, the lack of availability of tuberculin and TPT drugs, the unavailability of child-friendly drug formulations, and the unoptimal availability of SOPs for the provision of TPT for toddlers in the same house. In addition, the policy of implementing contact investigations and providing TPT has not received support from the Jambi city government. Dissemination of the findings of this study to stakeholders, namely policy makers and TB programme supervisors, is expected to improve the quality of implementation of contact investigations and provision of TPT to children under five years of age. It requires commitment from all stakeholders for the implementation of this policy, including increasing advocacy to the city government, strengthening partnerships with communities to address inactive cadres, strengthening planning and monitoring for the availability of drugs and tuberculin and reviewing the availability of SOPs and procedural steps for contact investigation and provision of TPT to under-five household contacts.

Declaration by Authors

Ethical Approval: Approved

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