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TRENDS IN SERVICES FOR HOUSEHOLD CONTACTS OF TUBERCULOSIS PATIENTS IN SURABAYA CITY, INDONESIA: CONTACT INVESTIGATION, EXAMINATION, AND THERAPY

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ABSTRACT:

Background: Home contact investigation services for TB patients are crucial for the early detection of active TB, which helps reduce the severity and transmission of *Mycobacterium tuberculosis* to others, as well as for identifying latent TB infection (LTBI). This study aims to analyze trends in the provision of services for household contacts of TB patients in Surabaya City, including contact investigation, examination, and therapy. **Methods:** The data were sourced from secondary data provided by the Surabaya City Health Office, obtained from the Tuberculosis Information System (TBIS) at 63 health centers over three periods: 2020–2022. The research variables include contact investigation, referrals, examinations, and therapy for household contacts of TB patients. **Results and Discussions:** The study results show that in Surabaya City, from 2020 to 2022, there was an increase in the number of contacts investigated in absolute terms, rising from 10,132 people in 2020 to 92,756 people in 2021, and further to 349,859 people in 2022. Comparing 2020 to 2022, there was a notable increase in contact investigations for household contacts, with a rise of 178,076 for males and 171,782 for females. The number of household contacts referred increased by 20,946 (5.99%), with 16,197 (77.33%) examined, 5,085 (31.39%) receiving anti-tuberculosis drugs, and 910 (5.62%) receiving tuberculosis preventive therapy. **Conclusion:** In Surabaya City, during the period from 2020 to 2022, there was an increasing trend in services for household contacts of TB patients, including contact investigation, referral, examination, and therapy, which can improve detection of TB and LTBI cases.

Keywords: *Household contacts of TB patients, contact investigation, examination, therapy.*

Introduction

In 2022, tuberculosis became the second leading cause of death worldwide due to a single infectious agent, after COVID-19, and caused nearly double the number of deaths compared to HIV/AIDS. Every year, more than 10 million people worldwide fall ill due to tuberculosis (TB). In 2022, the number of newly diagnosed TB cases reached 7.5 million, with India, Indonesia, and the Philippines collectively accounting for the majority (≥60%) (WHO, 2023a). Every year around the world, more than 15 million children are exposed to tuberculosis (TB), and it is estimated that 7.5 million children suffer from latent TB infection (LTBI), with around 1-1.2 million expected to develop into active TB disease, more than half of whom are under 5 years old (UNICEF Indonesia,

2022). The prevalence of LTBI remains high worldwide, with nearly a quarter of the population infected with latent TB (Ding et al., 2022).

According to the Global TB Report 2022, the estimated incidence of tuberculosis (TB) in Indonesia is 969,000, or 354 per 100,000 population. This places Indonesia in second position for the highest TB burden after India. Deaths due to tuberculosis (TB) are estimated at 144,000 or 52 per 100,000 population, and TB-HIV deaths at 6,500 or 2.4 per 100,000 population. In 2021, TB cases increased by 18%, with 819,000 cases or 301 per 100,000 population in 2020, and 969,000 cases or 354 per 100,000 population in 2021. Based on the incidence of TB, there were 724,309 notified TB cases in 2022 (75%); meaning there is still 25% that has not been notified, whether they are unreachable, undetected, or unreported (Directorate General of Disease Prevention and Control, 2023). Those who have not been found are a source of tuberculosis transmission in the community (Ministry of Health of The Republic of Indonesia, 2019)

Globally, in 2022, it was estimated that there were 13 million household contacts from bacteriologically confirmed cases of pulmonary TB across all ages. However, only 8.9 million contacts were reported, and 7.1 million (80%) of these contacts were evaluated for TB infection and disease (WHO, 2023b). Studies show that approximately 3.5–5.5%, equivalent to a prevalence of 3,500–5,500 per 100,000 population, household members or other close contacts of individuals with contagious tuberculosis also have active TB that was previously undiagnosed (Morrison et al., 2008). In 95 studies from low- and middle-income settings, the prevalence of active TB among all contacts was 3.1%, microbiologically confirmed TB was 1.2%, and latent TB infection was 51.5% (Fox et al., 2013). Other studies show that from contact investigation results, the prevalence of TB is 2.87%, while bacteriologically confirmed active TB is 2.04%, and LTBI is 43.83% (Velleca et al., 2021).

The Tuberculosis Control Program in Indonesia involves not only "passive detection through active promotion" but also "intensive and massive active case finding based on family and community," while still paying attention to and maintaining quality services in accordance with standards. One important activity to support the success of this active discovery strategy is contact tracing and investigation (Ministry of Health of The Republic of Indonesia, 2019). Tuberculosis contact investigation is a systematic and active inquiry into TB contacts, whether they are household contacts or other close contacts, aimed at detecting TB infection and disease. This intervention contributes to the early identification of active TB, thereby reducing the severity and transmission of Mycobacterium tuberculosis, as well as identifying latent TB infection (LTBI) for prevention purposes. Other studies have shown that contact investigation is very useful for identifying childhood TB, helping to identify individuals who need follow-up, such as drug-resistant TB index cases or people infected with HIV, who are at high risk of rapidly developing active TB (WHO, 2012).

Based on the technical guidelines for the management of latent tuberculosis infection (LTBI) in Indonesia, household contacts are defined as individuals who have lived in the same house for at least one night, or frequently spent time in that house during the day with the index case in the three months prior to the index case starting anti-tuberculosis drugs (ATD) (Ministry of Health of the Republic of Indonesia, 2020). Contact investigation is an investigative activity conducted on household contacts of patients with confirmed bacteriological tuberculosis (index cases) to identify cases of tuberculosis or latent TB infection, both actively and passively (Ministry of Health of the Republic of Indonesia, 2022b). As a result of the contact investigation activities conducted by the officers, household contacts will be referred to the community health center for examination. The examination at the community health center is conducted according to the applicable algorithm, based on clinical symptoms, tuberculin skin tests (TST), X-ray examinations, and rapid molecular test (Ministry of Health of the Republic of Indonesia, 2022b). As a result of the contact investigation activities conducted by the officers, household contacts will be referred to the community health center for examination. The examination at the community health center is conducted according to the applicable algorithms, based on clinical symptoms, tuberculin tests, X-ray examinations, and molecular rapid tests (MRT) (Ministry of Health of the Republic of Indonesia, 2022c). Based on the results of the examination, they are used to establish a diagnosis. If diagnosed as a case of TB, the patient will subsequently receive anti-tuberculosis medication, and if diagnosed with LTBI, they will receive tuberculosis preventive therapy (TPT). For children under 5 years old who have household contact with a confirmed bacteriological TB patient, TPT may be administered with or without examination (Ministry of Health of the Republic of Indonesia, 2022a).

Considering the importance of services for household contacts of TB patients, this study aims to analyze the trends in services for household contacts of TB patients in Surabaya City, which includes contact investigation services, examinations, and therapy.

Literatur Review

Contact investigation (CI) is the activity of tracing and investigating individuals who have been in contact with TB patients to identify suspected TB cases. Those suspected of having TB will be referred to services for further examination, and if diagnosed with TB, they will receive appropriate treatment according to standards as soon as possible. Contact investigation consists of several steps: 1) Data collection: All individuals infected with tuberculosis are recorded by officers and public health workers; 2) Screening: Identified contacts must undergo health checks; 3) Referral: Contacts showing symptoms will be referred for further examination; 4) Education: Providing information and knowledge to the community about tuberculosis; 5) Monitoring: Monitoring tuberculosis patients' adherence to treatment. The CI activities are organized through collaboration between healthcare service providers and the communities present in society, such as health cadres, medication supervisor

, peer educators, and so on (Ministry of Health of The Republic of Indonesia, 2019). The discovery of children with LTBI can be carried out through contact investigation activities, both active and passive (contact invitations), as well as screening in specific locations and routine health examinations. Contact investigation is carried out on individuals around the index case, particularly household contacts and close contacts (Ministry of Health of the Republic of Indonesia, 2020b).

Household contacts that are found must undergo examination. The procedure for examining household contacts is as follows: 1) If a household contact of a TB patient exhibits any TB symptoms such as cough, fever, night sweats, coughing up blood, chest pain, shortness of breath, weakness/fatigue, or weight loss (for example, a child under 5 years old with normal appetite but no weight gain/failure to thrive, despite nutritional improvements), further diagnosis must be established through a Molecular Rapid Test (MRT); 2) A chest X-ray can be performed if available at the healthcare facility; 3) Diagnosis and follow-up are determined by the doctor based on the patient's clinical considerations. The doctor's recommendations may include monitoring with non-specific therapy or declaring the case as clinical TB if there are signs/symptoms pointing to TB, allowing for the administration of anti-tuberculosis drugs (OAT), or declaring it as non-TB if there are no signs/symptoms pointing to TB, leading to TST/ Interferon Gamma Release Assay (IGRA) testing; 4) Tuberculosis preventive therapy (TPT) can be administered if there are no contraindications for TPT. TB examinations may include tuberculin tests, IGRA, molecular rapid tests, and chest X-rays (Ministry of Health of the Republic of Indonesia, 2022c).

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Research Methode

The data is sourced from secondary data from the Surabaya City Health Office obtained from the Tuberculosis Information System. (SITB). This data is the result of the TB program services conducted by health centers in the city of Surabaya, totaling 63 health centers. This data is the result of service activities related to household contacts of TB patients, which includes contact investigation data, referred household contacts, examinations conducted, and therapy provided, over three periods from 2020 to 2022.

The research variables consist of investigating TB contacts by gender, household contacts referred, household contacts examined, household contacts receiving anti-tuberculosis drugs (ATD), and household contacts receiving tuberculosis preventive therapy. The contact investigation variables in this study are sourced from the active and passive contact investigation activities conducted by the community health center in Surabaya City, which include the number of household contacts of TB patients by gender and the total number of contacts. The household contact variable referred to is the number of household contacts referred for examination at the community health center. The household contact variable examined is the number of household contacts who underwent examination at the community health center, based on clinical symptoms, tuberculin tests, or molecular rapid tests. The household contact variable receiving ATD therapy is those contacts diagnosed with active TB based on examination results and receiving ATD therapy. The household contact variable receiving TPT therapy is those contacts diagnosed with LTBI based on examination results and receiving TPT therapy.

Data analysis will be conducted descriptively using tables and graphs to illustrate the service trends for individuals who are household contacts of TB patients, including trends in contact investigation services by gender and trends in referrals, examinations, and therapies for household contacts. In addition, information related to the proportion of referrals, examinations, and therapy for household contacts from the results of TB contact investigations is presented.

Results and Discussion

Figure 1 shows an increasing trend in contact investigation services for household contacts of TB patients in Surabaya City over the past three years, from 2020 to 2022, with 10,132 people in 2020, 92,756 people in 2021, and 349,859 people in 2022. Compared to 2020, there was an increase in household contact investigations in 2022, with a rise of 178,076 for males and 171,782 for females.

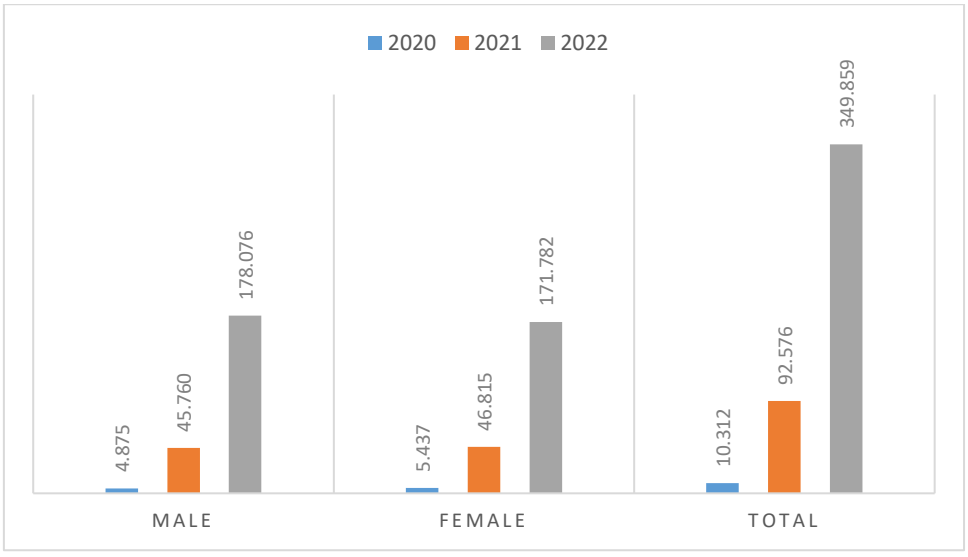

Figure 1. Contact Investigation Services for Household Contacts of TB Patients in Surabaya City, 2020-2022

As a result of the household contact investigation activities in Surabaya, it was followed up with a referral to the community health center for examination and therapy according to the diagnosis. Figure 2 shows the trend of increased referral services, examinations, and therapy for household contacts of tuberculosis patients in Surabaya City during the period of 2020-2022. Compared to the year 2020, in 2022 there was an increase in the number of household contacts referred by 20,946 (32.7 times), and the number of examinations increased by 16,197 (34.3 times). Similarly, the number of household contacts diagnosed with TB and receiving anti-tuberculosis medication increased by 5,085 (195.6 times), and the number of household contacts receiving tuberculosis preventive treatment (TPT) increased by 910 (36,4 times).

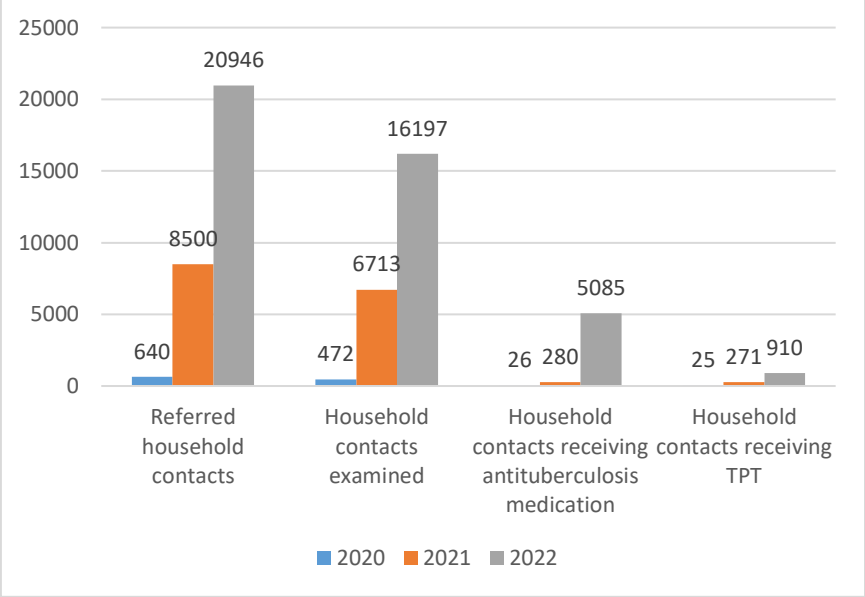

Figure 2. Referral services, examination and therapy for household contacts of TB patients in Surabaya City, 2020-2022.

Based on Table 1, it shows the proportion of services provided during household contact with TB patients in Surabaya City for the period 2020-2022 based on the results of contact investigations. The proportion of household contacts referred has experienced fluctuations, namely 6.21% (2020), increasing to 9.18% (2021) and then decreasing to 5.99% (2022). The proportion of examinations on household contacts has also fluctuated, at 73.75% (2020), increasing to 78.98% (2021) and then decreasing to 77.33% (2022). The proportion of household contacts receiving anti-tuberculosis medication has fluctuated, recorded at 5.5% (2020), 4.17% (2021), and 31.39% (2022). Meanwhile, the proportion of household contacts receiving TPT has relatively fluctuated, at 5.29% (2020), decreasing to 4.03% (2021) and then increasing to 5.62% (2022).

Tabel 1. Proportion of service for household contacts of TB patients in Surabaya City, Indonesia, 2020-2022.

Variabel	**Proporsi (tahun)**					
	2020 (N =10,312)		**2021 (N = 95,576)**		**2022 (349,859)**	
	n	**%**	**n**	**%**	**n**	**%**
Referred household contacts	640	6.21	8,500	9.18	20,946	5.99
Household contacs examined	472	73.75	6,713	78.98	16,197	77.33
Proportion of TB in household contacts receiving anti-tuberculosis medication	26	5.5	280	4.17	5085	31.39
Proportion of LTBI in household contacts receiving TPT	25	5.29	271	4.03	910	5.62

Source: TBIS Health Office of Surabaya City, 2022

The results show that in the last 3 years, there has been an increasing trend in contact investigation (CI) services for household contacts of TB patients in Surabaya City during the period of 2020-2022, where the increase in the number of male household contacts is greater than that of females. The city of Surabaya contributes the largest number of TB cases in East Java Province. The proportion of TB cases in Surabaya is higher among men compared to women, with men accounting for 5,868 cases (56.52%) and women for 4,514 cases (43.48%). Similarly, in East Java Province, men represent 44,253 cases (56.2%) and women account for 34,546 cases (43.8%). This is because generally, men's mobility outside the home is higher than that of women. Additionally,

risk factors such as smoking and alcohol consumption also affect the decline of the body's immune system (East Java Provincial Health Office, 2023). In 2022, Indonesia had not yet reached the national CI target (90%). The highest CI coverage was in West Nusa Tenggara and Bali (69%), Central Java (62%), while East Java was at 50%. The ratio of tuberculosis case incidence among contacts conducted by IK is 1:16.7 (Directorate General of Disease Prevention and Control, 2023)

The challenges of contact investigation in Indonesia include community rejection, referred contacts not returning to the health center, suboptimal capacity of health center staff and community health workers, and obstacles in the progress of integrating data from contact investigations conducted by community health workers and reported through the Community Tuberculosis Information System (CTIS) into the tuberculosis information system (TBIS) (Directorate General of Disease Prevention and Control, 2023). The challenge of conducting contact investigations in low- and middle-income countries is the limitation of resources and infrastructure, resulting in implementation that is neither systematic nor consistent (Fox et al., 2013). On the other hand, the barriers faced by patients and contacts include concerns about stigma and privacy, which make individuals reluctant to disclose contacts due to the fear of stigma associated with TB. Therefore, it is essential to emphasize confidentiality in the investigation process, so that contacts feel committed and can cooperate with the officials (Agbaje et al., 2024; Goroh et al., 2023). This situation also occurs in contact investigations of patients with MDR-TB status, where it must be disclosed to third parties, inadvertently causing MDR-TB patients to experience social discrimination and stigma. For this reason, patients tend to be less willing to disclose their MDR-TB status, negatively impacting public interests (Oo & Borry, 2024). Research in Ethiopia shows that adherence to household contact screening is influenced by higher education levels, good knowledge and attitudes, having contacts under fifteen years old, and having a positive bacteriological index case (Naga Mamo et al., 2023).

Therefore, there is a need to enhance the community's knowledge about tuberculosis (TB) and the importance of TB therapy. A study in Makassar, Indonesia, shows that the use of e-modules for electronic education can improve the understanding of household contacts, making them more willing to undergo TCM testing to increase the detection of TB cases among household contacts (Rafika et al., 2022). Studies have shown that the role of the family as a medication supervisor plays a significant part in the success of tuberculosis treatment adherence (Ananditha et al., 2021; Purba & Sudirman, 2024).

Similarly, the results of the contact investigation activities among household contacts in Surabaya during the period of 2020-2022 show a trend of increased referral services, examinations, and therapy. Compared to the year 2020, in 2022 the number of household contacts referred increased by 32.7 times, while the proportion of referred household contacts fluctuated between 6-9% of the household contacts that were successfully investigated. The results indicate that from the investigation of contacts, there has been an increase in referrals to the community health center; however, in proportion to the number of contacts identified, referrals still need to be improved. The coverage of household contact referrals in Surabaya is lower than the national achievement, with the number of contacts referred being 514,639 (12.47%) (Directorate General of Disease Prevention and Control, 2023)

Based on the technical guidelines for contact investigation from the Ministry of Health, it states that health workers/community health volunteers conduct direct or face-to-face screening of contacts. If the contact is under 5 years old, they will be referred with a referral letter to a healthcare facility. However, if the contact is 5 years old or older, the health cadres will investigate symptoms and risk factors, where contacts aged 5 years and older will be given a referral letter to a healthcare facility if there are symptoms of cough and/or other symptoms (such as shortness of breath, night sweats without activity, fever lasting more than a month) and other risk factors. (Diabetes Mellitus), elderly, HIV, smokers, pregnant women, malnutrition, children aged 5 to 14 years) (Ministry of Health of The Republic of Indonesia, 2019). Regarding this policy, the investigation of contacts aged ≥ 5 years is only for the detection of TB cases and the treatment of active TB, as referrals to community health centers are only made if TB symptoms are present. This policy is counterproductive to the National TB Control Strategy, which emphasizes the detection of latent TB infection and preventive treatment, explaining that the target population includes not only child contacts under 5 years of age who are HIV positive but also household contacts over 5 years and other at-risk groups (prison inmates, immunocompromised patients, healthcare workers, military barracks, boarding schools, intravenous drug users, etc) (Ministry of Health of The Republic of Indonesia, 2022).

Therefore, all household contacts with the index case, even if they are aged ≥ 5 years, must be referred for examination at the community health center.

Compared to the year 2020, the number of household contacts examined increased by 16,197 cases or 34.3 times in 2022. However, compared to the number of household contacts from the investigation, the proportion of household contacts examined decreased in 2022 to 77.3%, compared to 78.98% in 2021. Nationally, the number of household contacts examined was 265,981 (51.68%) (Directorate General of Disease Prevention and Control, 2023). The decline in examinations of household contacts is likely due to logistical limitations in TB testing. This situation is supported by research conducted at the Surabaya City Health Center, which found that there are obstacles in the materials needed for TB diagnosis, particularly the availability of cartridges for molecular rapid test. Similarly, the limited availability of the Mantoux test is also due to its use for screening pilgrims in Surabaya City (Fitriya, 2023; Hakim, 2023). Research shows that the obstacles to the implementation of the TB program in community health centers are the availability of facilities and infrastructure, including a lack of tools and materials for TB diagnosis such as sputum tests, cultures, and sensitivity tests, as well as TB rooms that do not meet standards (Noviyanti & Adriansyah, 2022). Other research shows that the implementation of TB diagnosis in the public health centers of Surabaya City does not meet national standards, as evidenced by the low detection of TB suspects and newly confirmed bacteriologically positive pulmonary TB patients in several sampled health centers (Dwiyanti, 2020).

The results show that in 2022, the number of household contacts diagnosed with TB who received anti-TB drugs increased by 195.6 times compared to 2020. Similarly, the proportion of household contacts receiving anti-tuberculosis drugs tended to rise to 31.39% in 2022. This condition indicates that through household contact investigations, there has been an increase in the detection of TB cases that have successfully received tuberculosis treatment. Meanwhile, on a national level, the number of household contacts with TB is 19,305 cases (7.26%) out of 4,146,123 contacts that were successfully investigated (Directorate General of Disease Prevention and Control, 2023).

Based on data from the Surabaya City Health Office, the case detection rate for TB in Surabaya has not yet reached the target. In 2021, the case detection rate (CDR) was 44%, compared to the target of 91%. This is due to the suboptimal identification of TB patients at community health centers and hospitals, exacerbated by the Covid pandemic, as well as issues with recording and reporting systems. Consequently, there are still TB cases that have been identified and treated but remain underreported due to the lack of optimal internal networks within each healthcare facility, particularly hospitals that have not yet implemented a one-stop management system for TB case handling (Surabaya City Health Office, 2021). In 2022, the number of TB cases discovered in the city of Surabaya increased to 10,382 cases, contributing the highest number of cases in East Java Province. The success rate of TB treatment in Surabaya has reached a target of 90.4% (target 90%), while in East Java it has not yet been achieved (89.01%). In East Java, 11% of the TB cases found are in children (0-14 years old) from all age groups. The discovery of cases in children in the community indicates that there is a source of transmission from the surrounding adults, so contact investigation must be conducted immediately to identify the source of the transmission (East Java Provincial Health Office, 2023). The national discovery of TB cases in Indonesia in 2022 amounted to 724,309 cases, with adult TB cases totaling 613,428 (84.7%) and pediatric TB cases reaching 110,881 (15.3%) (Directorate General of Disease Prevention and Control, 2023).

Research shows that investigating household contacts will help identify TB cases. A study in India indicated that out of 82 contacts from 55 index cases examined over one year, 15 (18%) patients developed tuberculosis. 12 of them suffered from pulmonary tuberculosis, and 3 others suffered from extrapulmonary tuberculosis. The average age of sick contacts is 5.5 years (Shanbag et al., 2022). A study conducted in Ethiopia found that the prevalence of pulmonary tuberculosis among adult household contacts was 7.8% (95% CI: 5.8–10.0). Among household contacts, risk factors for tuberculosis infection included eating less than three times a day (AOR = 4.31; 95% CI: 1.61, 11.55), drinking raw milk (AOR = 4.12; 95% CI: 1.43, 11.90), having a family history of tuberculosis with more than one index case (AOR = 2.7; 95% CI: 1.02, 6.92), and living in a house with poor ventilation (AOR = 4.02; 95% CI: 1.38 (Adane et al., 2020).

During the period from 2020 to 2022, the number of household contacts receiving preventive treatment (TPT) increased by 36.4 times, while the proportion of household contacts receiving TPT fluctuated relatively, ranging from 5.29% to 5.62%. In Indonesia, the national target for the coverage of household contact tuberculosis prevention from 2020 to 2024 is set at 1,450,700 people, with a target of 90% for children under 5 years old and 50% for children aged 5 to 14 years (Ministry of Health of the Republic of Indonesia, 2020a). Nevertheless, the coverage of preventive therapy is still very low compared to the national target. The coverage of early childhood education nationally in 2020 and 2021 was 1.6% and 1.9%, respectively (Ministry of Health of the Republic of Indonesia, 2020b). In 2021, the coverage of TPT for children under 5 years old in DKI Jakarta was the highest at 4.8%, while in East Java, it was 3.1%. The coverage of TPT for household contacts of children aged 5-14 years nationally was 0.2%, with the highest in Jakarta at 1.6%, while in East Java, it was also 0.2% (Ministry of Health of the Republic of Indonesia, 2020c). In 2022, there was an increase in the provision of preventive therapy for tuberculosis (TPT) among children under 5 years old, amounting to 6,949 (5.7%), but the achievement was still far below the target for 2022, which was 122,909 (65%). The coverage of TPT for all ages among household contacts in Indonesia from 2020 to 2022 showed an increase, with the highest coverage in 2022 at 1.3%, compared to 0.2% in 2020 and 0.3% in 2021. The highest coverage of TPT among household contacts was in Yogyakarta Province (5.3%) and the lowest in Aceh (0.1%), while East Java recorded 1.8% (Directorate General of Disease Prevention and Control, 2023). Globally, 1.9 million household contacts received TPT in 2022, representing about 21% of the 8.9 million reported contacts and 15% of the estimated 13 million contacts (WHO, 2023a).

Contact investigation not only has the ability to identify new TB patients but can also be used to detect LTBI in order to obtain preventive therapy. Research conducted in Semarang, Indonesia shows that the prevalence of latent TB infection among household contacts of active TB patients is quite high at 68.3% (Karbito & Maisaroh, 2023). In the city of Surabaya, the coverage of preventive treatment among household contacts is only 6%, which is far from the national target of 58%. This is due to the still insufficient network of healthcare facilities providing TPT for children in the city of Surabaya (Aprilidyawati et al., 2020). In addition, there is a stigma that the Tuberculosis Preventive Therapy (TPT) is given to someone who has been confirmed positive for tuberculosis, so education is needed to enhance public knowledge about TPT in the city of Surabaya (Fitriya, 2023). Research in Indonesia shows a low provision of IPT due to the suboptimal management of TB in terms of planning, funding, and the implementation of TB contact investigations (Hendri et al., 2021). Likewise, the knowledge of the officers regarding ILTB and TPT is still low (Wibowo, 2023). Research in South Africa indicates that the low administration of TPT is due to healthcare workers' perceptions that TPT causes patient discomfort and the still insufficient availability of INH in healthcare facilities (Ahmed et al., 2021). Another study found that the barriers to TPT include a lack of competence among healthcare workers in administering TPT, TPT toxicity, insufficient funding and logistics for TPT, a lack of coordination between TB and HIV programs, weak management support, and a lack of partnerships in the program (Ghimire et al., 2022; Massini et al., 2020; Surie et al., 2019). Research shows that the factors influencing the implementation of TPT in Malaysia related to parents or guardians are cooperation, commitment, knowledge, and the presence of misconceptions about treatment, while the factors related to treatment include the presence of side effects (Goroh et al., 2023). Research in the Kyrgyz Republic, from the results of household contact investigations, found that 23 children (9%) were diagnosed with TB (9%, 95% CI: 6–13%). Out of 238 children who were free of TB, 130 (55%) qualified for tuberculosis preventive treatment (TPT), but only 64 children (49%) started TPT, and 52 children (81%) successfully completed TPT (Kadyrov et al., 2023).

Conclusion and Implications

In Surabaya City, during the period from 2020 to 2022, there has been a noticeable increase in services for household contacts of TB patients, including contact investigation, examination, and therapy, which can improve detection of TB and LTBI cases. The implications of this research highlight the importance of contact investigation activities among household contacts of patients with confirmed bacteriological tuberculosis (TB) and the need to enhance referrals and examinations at health facilities. This approach aims to identify TB cases early to prevent transmission and latent TB infection (LTBI) among household contacts, thereby preventing the progression to active TB.

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