The Disruptions-Related Tuberculosis Case Finding and Treatment in Indonesia during COVID-19

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ABSTRACT

***Background**: This study aims to find out the disruptions related to the TB new case finding and treatment program during the COVID-19 pandemic in Indonesia. This understanding is needed to conceive effective strategies to face and prevent the issues of toward TB programs implementation in health services and health care. **Methods**: This review used selected articles conducted in Indonesia, published during the COVID-19 pandemic from March 2020 to July 2022 from ScienceDirect, PubMed, ProQuest, and Google Scholar journal databases. **Results**: 7187 related studies were identified by the keywords. In the final process, there were 7 studies included in the review. The studies covered 5 provinces – mentioned 3 cities and 2 regencies. The disruptions in TB new case finding and treatment health services were affected by participants' knowledge to differences between TB and COVID-19, family support, family history of COVID-19, comorbidity, double workloads of the health workers, and accessibility of healthcare accommodation. New methods for new case findings and treatment adherence such as scheduled home visits, community-based finding health empowerment, the development of a new invention of eNose-TB, modification of the administration process, and the use of virtual care were implemented to overcome these issues during this pandemic. **Conclusion**: The majority of tuberculosis issues during COVID-19 were related to social determinants. The health empowerment that involved community and several modifications to health services were applied in healthcare as resolutions besides preserving the achievement of new case findings and treatment programs.*

***Keywords**: Covid-19, Health empowerment, Health service, Indonesia, Tuberculosis.*

INTRODUCTION

The pandemic of COVID-19 since early 2020 had had significant impacts on essential health services for any priority disease, including tuberculosis infection, which led to the unmet TB treatment coverage and new case finding targets worldwide (Djalante *et al.*, 2020; WHO, 2021). Tuberculosis (TB) by the *Mycobacterium tuberculosis* complex is a communicable disease that can cause pulmonary and extrapulmonary infection in healthy individuals from inhaled infected droplets of the sick from coughing, sneezing, or talking (WHO, 2019). In 2020, the World Health Organization (WHO) reported the majority of TB cases geographically were in Southeast Asia regions (43%), Africa (25%), and Western Pacific (18%) (WHO, 2021). While slight cases were in Eastern Mediterranean (8.3%), America (3.0%), and Europe (2.3%). Among regions in Southeast Asia, Indonesia (8.4%) placed in third rank following India and China in 2021 with 824,000 cases and 93,000s death per year (Chakaya *et al.*, 2021; WHO, 2021).

TB case finding becomes a priority program of the World Health Organization for TB elimination (Malik *et al.*, 2020). Based on the WHO Global Tuberculosis Report in 2021, there was a sharp fall in TB newly diagnosed case notifications between 2019 to 2020 (18%) from 7.1 million to 5.8 million. The WHO reported the three countries that significantly contribute to this global drop as India

Received: 20-07-2022, Accepted: 15-08-2022, Published Online: 04-09-2023

(41%), Indonesia (14%), and Philippines (12%) (WHO, 2019, 2021). While in Indonesia, the TB newly diagnosed case notifications dropped to 351,939 in 2020 from 568, 987 in 2019 according to Indonesian Health Profile 2020 (Kemenkes, 2021). This finding leads to the increasing number of TB deaths becoming 1.3 million in 2020 from 1.2 million in 2019 among HIV-negative population worldwide. These severe situations were affected by the COVID-19 pandemic since early 2020 which caused a drastic decline in the coverage of TB case findings due to the shifted focus on COVID-19 control (Alene, Wangdi and Clements, 2020; McQuaid *et al.*, 2021; Rodrigues *et al.*, 2022).

The COVID-19 pandemic brought various interferences in several countries, as manifested in a significant decrease in the number of healthcare visits, the number of TB finding cases, TB identification, the number of new patients starting treatment, and use of interventions (Aznar *et al.*, 2020; Odume *et al.*, 2020). These issues would impact on newly TB diagnosis findings delay and increase the treatment failure of TB which might cause drug resistance (DR-TB) and TB-related deaths (Aznar *et al.*, 2020; Jain *et al.*, 2020; Rodrigues *et al.*, 2022).

This review aims to find out the disruptions related the TB new case finding and treatment implementation during the COVID-19 pandemic, the efforts, and innovations that have been made to overcome the issues in Indonesia. This understanding is needed to conceive effective strategies to face and prevent the issues toward TB programs implementation in health services and healthcare.

METHODS

This review was conducted and designed in April 2022. The relevant articles were obtained from reputable journal databases including ScienceDirect, PubMed, ProQuest, and Google Scholar as a final search completion. The searching strategies were using "tuberculosis," "health service," "healthcare," "pandemic," "COVID-19," and "Indonesia" as keywords. In addition, "tuberkulosis" and "pelayanan" keywords were also used to accentuate the relatable articles which used Bahasa. The relevant articles were in English and Bahasa with selected time interval of two years between 2020 and 2022. The search for articles required the screening process of titles and abstracts to specify the selected articles. During this process, the first author involved the co-authors to determine the articles if there was uncertainty. This article selection procedure used the PRISMA diagram scheme. Inclusion criteria of this study were: publication time of studies were March 2020 to July 2022; qualitative or quantitative studies; the studies were conducted during the COVID-19 pandemic; took place in Indonesia; and focused on problem of tuberculosis new case finding and treatment program implementation in healthcare. The articles which used systematic review and meta-analysis were not involved in this study.

Quality appraisal of the studies

The selected articles must be indexed by Scopus and or Science and Technology Index (SINTA) Indonesia Ministry of Education, Research, and Technology. The quality appraisal of all articles was assessed by the first author and co-authors using CASP (Critical Appraisal Skill Program) checklist for both qualitative and quantitative studies (CASP, 2018). This checklist consisted of 10 items. The selected articles had to pass half of the checklist items to be included in this study (Elm *et al.*, 2014)

RESULTS AND DISCUSSION

Of 7187 related studies identified by the keywords, 24 records were included and analyzed for objectives and results. This study found 12 articles were not comprehensive in objectives and results. Another four articles did not pass the quality appraisal and an article that query. In the final process, there were seven studies that included in review. The review selection process is presented in Figure 1. The result of selection process in this articles review is provided in Table 1.

All studies were conducted and published during March 2020 – July 2022. The studies covered five province-mentioned three cities and two regencies. Selected studies were frequently conducted in Makassar, South Sulawesi. Study designs were varied in quantity, quality, mixed method (quantitative-qualitative), and implementation research. Observation, interview, and

Received: 22-07-2022, Accepted: 15-08-2022, Published Online: 04-09-2023

questionnaire were dominantly used as sources of data collection.

A total of 144 participants were involved in these studies as informants and respondents. All selected articles in Bahasa and published in Indonesian journal were cited in SINTA of Indonesia Ministry of Education, Research, and Technology journal database, while others were cited in Scopus and varied in Quartile (Q) level.

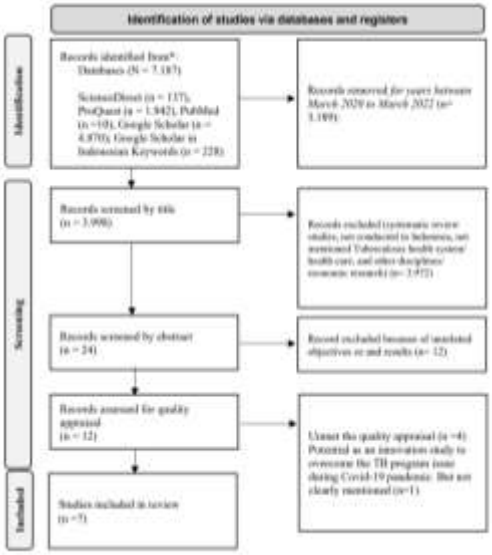

Figure 1. PRISMA flow diagram for reporting systematic review selection process for articles published between March 2020 to July 2022 (Page *et al.*, 2021).

Mainly the studies were conducted in urban areas. Interferences of the TB health services and TB treatment in healthcare were participants' knowledge about TB, knowledge about COVID-19, family support toward treatment, provide any help, and assistance, family history of COVID-19, participants' anxiety of going to healthcare, comorbid status including diabetes mellitus and anemia, the tardiness of program and case reports, double workloads of the health workers, insufficient health promotion toward TB program, accessibility of healthcare accommodation, healthcare location, given social and culture acceptability by health workers. Diverse strategies were implemented: support on the community-based TB active case-finding program and regular virtual supervision.

Two articles mentioned the ability or knowledge to differentiate between TB disease and COVID-19 affected the patients' visit for seeking care of the TB health services (Appulembang *et al.*, 2021; Syahridha *et al.*, 2021). Considering both TB, COVID-19, and other chronic obstructive pulmonary diseases (COPD), main transmission route was respiratory with the lung as the main target, this led to the misconception. In certain patients with poor educational levels, similar symptoms between TB and COVID-19 stigmatized them. The similar clinical symptoms of COVID-19 and TB disease potentially misled the information for patients and led to interference of TB new case finding in the population (Odume *et al.*, 2020; Visca *et al.*, 2020). While patients were unwilling for seeking healthcare for certain diagnoses and treatment, as a result, the number of lost to follow up, drug resistant cases, drop out, duration of recovery, and underreported TB new cases increased during this pandemic (Aznar *et al.*, 2020; Santos *et al.*, 2021). Further, cases of household transmission might increase due to home- isolation of suspected patients with active TB in this pandemic.

Syahridha et al. (2021) mentioned the presence of comorbid (partial diabetes mellitus and asthma) and a family history of COVID-19 were determined treatment successfulness on TB with the common comorbidities found were cardiovascular, diabetes mellitus, obesity, and hypertension. The concomitant of comorbidity with TB or COVID-19 associated with the high risk of mortality (Migliori, 2022).

The comorbidity could exacerbate the symptoms, worsen disease progression, and lead to mortality. The condition of moderate to severe asthma might affect respiratory tracts which lead to asthmatic attacks, pneumonia, and acute respiratory distress. This reasoning become the setting of patients' limiting access to routine healthcare and reduced accessibility of healthcare (Sanyaolu *et al.*, 2020; Bastani *et al.*, 2021; Rodrigues *et al.*, 2022). Furthermore, a family history of COVID-19 increased the anxiety and depression in patients which become the other most common reasons for avoid health-care visits during this pandemic. Thus, family support toward treatment, providing any help, and assistance during treatment affected the decrease of patients' anxiety level toward healthcare visits (Stephenson *et al.*, 2021).

Reducing operational work hours, lockdown of some health services, COVID-

Received: 22-07-2022, Accepted: 15-08-2022, Published Online: 04-09-2023

19 centered-focused by health workers, and the patients' consideration of getting infected by coronavirus in the healthcare became the additional factors exacerbating TB programs (Alene, Wangdi and Clements, 2020; Jain *et al.*, 2020; Rodrigues *et al.*, 2022). The misconception of those issue affected their decision to seek for health services for anti-TB treatment (McQuaid *et al.*, 2021).

The double workload of health workers included the reduction of both number of health workers, the delay of the health services, and frequency of screening programs were also observed in other studies (Aznar *et al.*, 2020). Min *et al* (2022) studied a Korea TB cohort database from January to May 2020 using multivariate analysis and found that healthcare delay could be reach up to >5 days during the first wave of the COVID-19 pandemic (Min *et al.*, 2022). Diversion of health workers to focus on COVID-19 control hampered the TB programs to work according to the plan of action. Health workers were responsible for assisted and supported treatment adherence by ensuring the continuity of essential health services, including prevention, active case finding, diagnosis, directly observed therapy (DOT) program, treatment implication, and giving precautions and advise for patients with TB during this pandemic (Zimmer *et al.*, 2021). Health workers aligned the social and culture acceptability toward TB and COVID-19 misconception further.

Several performances were made to overcome the disruptions. Healthcare provided new methods of new case finding using scheduled home visit, community-based finding, and the invention of eNose-TB in 2020 (Chan *et al.*, 2021; Mading *et al.*, 2021; Saktiawati *et al.*, 2021). The development of eNose-TB is a new invention for TB screening with the purpose to find new cases using electronic nose to screen TB by breath test with inexpensive production cost, non-invasive, convenient, and low maintenance cost. This study was conducted in the first and second phases with the result of a sensitivity value of 95% and a specificity value of 82% (Saktiawati *et al.*, 2021).

Other efforts, including modification of the TB administration process, the use of mobile health or virtual care, social media optimization for health education, and home delivery for treatment were made as potential TB treatment adherence accomplishment. Mobile health, virtual care, telemedicine, or related became the most used system to replace healthcare visits during the pandemic predominantly among elderly and patients with comorbid, direct education, and to provide outpatient treatment (for example DOT) (Eberly *et al.*, 2020; Stephenson *et al.*, 2021; Zimmer *et al.*, 2021; Arora, Mehta and Ha, 2022). The use of virtual care was also as a response to unmet aspects (acceptability, accessibility, and accommodation) of health services in healthcare, substitution of direct program supervisor, and information system (Napitupulu and Prasetyo, 2021; Rezkiani, Batara and Amelia, 2021).

CONCLUSION

Comprehensive recognition of the issues faced in the implementation of the TB program, including health services, of TB new cases findings and TB treatment in healthcare, were an important part in determining the performance strategies for health services (program implementation, treatment, program management, etc.) and healthcare (hospital, primary health care, clinics, etc.) (Visca *et al.*, 2020; Rodrigues *et al.*, 2022). Based on literature findings, the majority of new tuberculosis case finding and treatment of crucial issues during COVID-19 were related to social determinants. Although the individual health background and shift of health services have the responsibility, health empowerment that involved community and several modifications of health services were applied in healthcare as resolutions besides preserving the achievement of new case findings and treatment program during this time.

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Received: 22-07-2022, Accepted: 15-08-2022, Published Online: 04-09-2023

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Received: 22-07-2022, Accepted: 15-08-2022, Published Online: 04-09-2023

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Received: 22-07-2022, Accepted: 15-08-2022, Published Online: 04-09-2023