

SYSTEMATIC REVIEW

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¹Doctoral program of Public Health Faculty, Hasanuddin University, Makassar, South Sulawesi, Indonesia

²Department of Epidemiology, Public Health Faculty, Hasanuddin University, Makassar, South Sulawesi, Indonesia

³Department of Nutrition, Public Health Faculty, Hasanuddin University, Makassar, South Sulawesi, Indonesia

⁴Department of Occupational Health and Safety, Public Health Faculty, Hasanuddin University, Makassar, South Sulawesi, Indonesia

⁵Department of Environmental Health, Public Health Faculty, Hasanuddin University, Makassar, South Sulawesi, Indonesia

⁶Graduate School of Hasanuddin University, Makassar, South Sulawesi, Indonesia

Corresponding author: Joko Supto Pramono, PhD (Cand.). Doctoral program of Public Health Faculty, Hasanuddin University, Makassar, South Sulawesi, Indonesia. E-mail: jokosuptopramonoph@gmail.com . ORCID ID: <https://orcid.org/0000-0003-0592-6614>.

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Active Case Finding for Tuberculosis in Migrants: a Systematic Review

Joko Supto Pramono¹, Ridwan A.², Ida Leida Maria², Aminudin Syam³, Syamsiar S. Russeng⁴, Syamsuar⁵, Andi Agus Mumang⁶

ABSTRACT

Background: Active case finding (ACF) is an alternative strategy to accelerate the identification of TB cases among the migrant population. **Objective:** This study aimed to synthesize the evidence for the effectiveness of ACF TB in migrants. **Methods:** This study uses the PRISMA model as a method of searching for journal articles in the databases of Google Scholar, ProQuest, EBSCO, ScienceDirect, Elsevier, and PubMed, as well as other sources such as textbooks and reports from 2017 to 2021 with the keywords "tuberculosis" AND "active case finding" AND "migrant". The search revealed 371 articles, of which 26 met the criteria for further discussion. **Results:** Most studies show that the TB incidence among migrants is higher than in the local population. Factors leading to increased cases include lack of knowledge about the symptoms, high mobilization, social isolation, economic problems, and medication adherence that impact an advanced stage. Furthermore, it is also influenced by the low quality of health services, including accessibility, health facilities, health workers, and information. Therefore, Active Case Finding (ACF) is more effective in identifying cases of TB in the risk groups. This was conducted on migrants with increased notifications followed up with treatment. **Conclusion:** ACF is effective approach in screening and diagnosing TB in the migrant group.

Keywords: active case finding, tuberculosis, migrant.

1. BACKGROUND

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis* and transmitted by droplets (1, 2). One of the Sustainable Development Goals (SDGs) is to end the epidemic by 2030 through the End TB strategy (1). WHO provides recommendations to identify and screen contacts of infectious TB patients and implement prevention, treatment, and control as a national strategy to end this disease worldwide (3). Active case finding (ACF) is an essential complementary strategy to accelerate TB control, particularly among high-risk household populations and close contacts in slum areas (1, 4).

Migrants are a heterogeneous population and their health status may be affected by various infectious diseases such as TB (5). The World Migration Report estimates that there will be 272 million migrants by 2020. However, this number is relatively small representing only 3.5% of the world's population (6). The migrant population is at greater risk for LTBI treatment and interventions to improve adherence (7). In addition, population status, accessibility, and finances limit case detection and TB treatment among migrants (8). Thailand has responded to migrants' barriers to tuberculosis (TB). The prevalence of TB among migrants worldwide is at a moderate to high rate, with increasing incidence, and tends to be higher than in the indigenous population (9-11). Several developed countries have implemented pre-travel screening policies prior to travel authorization to reduce the transmission of imported TB. One such strategy is active case finding (ACF). ACF can be effectively implemented to target at-risk groups such as migrants. However, to the best of our best knowledge, there is limited research exploring this topic.

2. OBJECTIVE

This study aims to conduct a comprehensive systematic review of the effectiveness of ACF for TB among migrants.

3. MATERIAL AND METHODS

This systematic review was conducted following the Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA) checklist (<http://www.prisma-statement.org/>).

Search strategy

A comprehensive and systematic search was conducted for research articles available in the databases of Google Scholar, ProQuest, EBSCO, ScienceDirect, Elsevier, and PubMed using the keywords 'active case finding' AND 'tuberculosis' AND 'migrants'.

Inclusion and exclusion criteria

The inclusion criteria for this study are a) full-text articles, b) available abstracts, c) articles available in Open Journal Sources, d) published in 5 years from 2017 to 2021, e) articles explicitly discussing active case finding of tuberculosis in the migrant population, and f) articles from low-, middle-, and high-income countries. Meanwhile, the exclusion criteria are non-English language and not indexed in the database.

Article selection

Electronic websites were used as data and information search strategies to identify relevant studies. Figure 1 shows the results of the article search results using PRISMA. The full text of each selected study that met the inclusion criteria was collected for further review.

Data Extraction and Synthesis

Table 1 was compiled based on keywords, then the variables studied were identified. Further, the available data were extracted to draw conclusions from the included articles. The topic of the article was determined by evaluating all data extraction forms, descriptive analysis was performed based on keywords, and a systematic review of the results was concluded.

4. RESULTS

The number of articles from the search results that matched the topic was 586, of which 215 were excluded due to duplication. From the remaining 371 articles, 26 were selected for further discussion according to the inclusion and exclusion criteria (Figure 1). Studies included low-, middle-, and high-income countries, and the designs used were cross-sectional, retrospective or prospective cohort, case-control, survey, comparative, qualitative, mixed methods, and single-center cohort. Populations have included the general public, at-risk groups, suspected cases, and health care professionals or workers.

This study found three main keywords consisting of tuberculosis, active case finding (ACF), and migrant (Table 1).

TB Epidemiology

According to the results, the factors that cause an increase in the preva-

lence of TB are social, gender, age, low level of education, and LTBI (34). Others include the low quality of health services, such as accessibility, health facilities, lack of training, health workers, and information systems (13). TB occurs mainly in adults (3, 16, 34) with an increasing trend in children (20), and in the elderly (20, 22). Household contact is the main source of transmission to children (23).

Active case finding for Tuberculosis

ACF is an operational procedure that aims to provide early diagnosis through a systematic screening, identify cases that were not previously infected with TB, and immediately implement a treatment program (19). It is one of the most important ways to reduce the spread of the disease (24, 25). Furthermore, ACF is highly and less effective in at-risk groups and the general population, respectively (24, 29). It complements current strategies for early detection and improved treatment (32) but requires follow-up monitoring (33). ACF in the migrant populations has been successful in identifying significant cases in several studies conducted (30), especially those around infectious contact cases or populations at risk of infection (8).

Tuberculosis in Migrants

The incidence of tuberculosis among Taiwanese migrants is higher than in the local population (16). The Chinese migrant population had a higher risk of TB incidence compared with the local population (31). It is also mentioned that transmission between migrants and natives is the main mechanism driving the local incidence of this disease in urban centers (27). Migrant groups in Denmark have a high risk of TB on arrival and in the long term (35). However, there is no clear pattern of transmission and immigration in three European countries, such as Germany, Italy, and Nor-

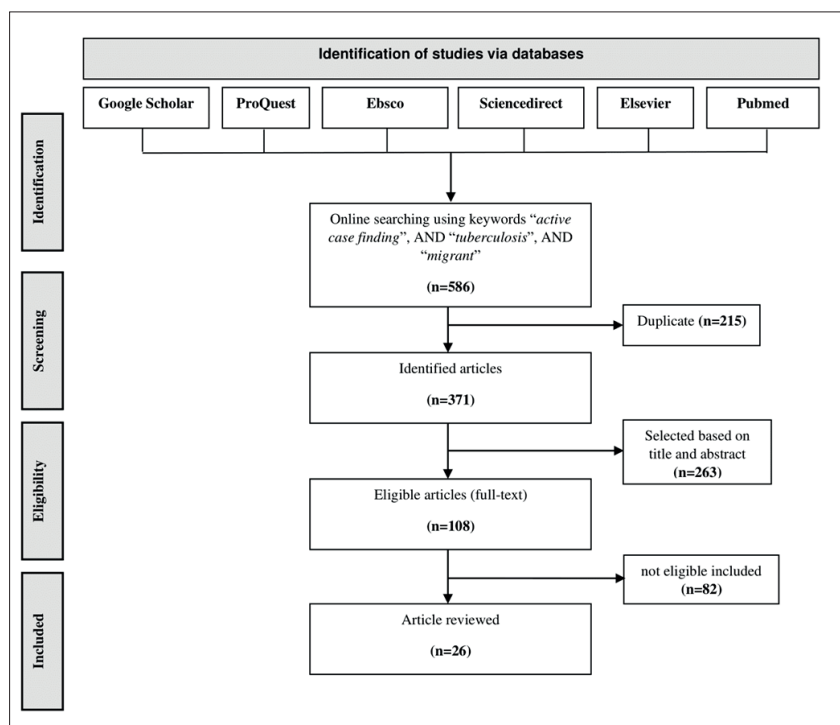


Figure 1. PRISMA flow diagram of the article search process

Keywords, author, year	Research focus	References
Tuberculosis		
Ragonnet, et al. (2019)	TB Epidemiology	(12)
MacPherson et al. (2020)	Prevalence of TB and LTBI	
Ding C, et al. (2020)	TB screening and early detection	(13)
Abayneh, et al. (2020)	Incidence and risk factors for transmission	
Bustamante-Rengifo, et al. (2020)	Household contacts and close contacts	(14)
Huang, et al. (2020)		(15)
		(16)
		(17)
Active case finding		
Garg et al., (2020)	TB patient profile, sociodemography, clinical symptoms, and treatment	(18)
Chen et al. (2019)		(19)
Vyas, et al.(2019)	Community-based ACF strategy	(20)
Vo, et al.(2020)	ACF Implementation	(21)
Tomczak, et al. (2021)	ACF in the general population and at-risk populations	(22)
Chen, et al. (2017)	ACF model of health cadres and health workers	
Hoseinpoor, et al. (2017)	ACF Effectiveness and Cost Efficiency	(23)
Singh, et al. (2020)		(24)
D'Ambrosio, et al. (2021)		(25)
		(26)
Migrant		
Xue, et al (2018)	TB transmission among migrants and residents based on genomic, spatial, and epidemiological data	(27)
Myriam, et al. (2020)		(9)
Tschirhart, et al. (2017)	TB prevalence in migrant children	(8)
Spruijt, et al. (2020)	The number of immigrants and the incidence rate of TB in Europe	
Shriraam, et al. (2019)		(28)
Langholz, et al. (2020)	Differences in the characteristics of TB patients between local residents and immigrants	(29)
D. Boudville, et al. (2020)		
Zhao, et al. (2020)	Incidence of TB in migrants and local residents	(30)
Lu, et al (2019)	ACF TB in migrants	
C. Yang, et al. (2018)	LTBI screening program, treatment, and education for migrants and refugees	(31)
	TB surveillance and health systems	(32)
	Provision of services and quality of TB care for migrant patients	(11)
	Long-term TB risk among migrants by migrant status and region of origin	(33)

Table 1. Grouping selected articles by keyword and research focus

way (36). Active case finding improves the screening and diagnosis of TB in migrant populations (30). Despite the knowledge of other risk factors, screening for the disease in migrant children at the age of 5 years is beneficial for public health (12).

Health problems and health services, especially the treatment of TB in the migrant populations are caused by legal status, financial resources, and barriers to accessing health services (11, 37, 38). Lack of knowledge about the symptoms, high mobilization, social isolation, and medication adherence affect advanced stages (14). Interventions to improve migrant access and adherence to TB treatment (39) should be extended beyond the health care system. Furthermore, significant resources are required to expand equitable access to treatment (11).

5. DISCUSSION

TB manifestations are the impact of social interaction and close contact dimensions. The primary mechanism underlining this manifestation is local transmission

between migrants and residents (27). Groups of people moving between geographic regions or countries with different health profiles affect their access to health services, thereby affecting their health status. Therefore, the problem of multidrug-resistant TB (MDR-TB) in migrant populations must be taken seriously (28).

According to our systematic review, several studies have shown that population movement from countries with a high TB burden affects countries with a low incidence (15, 16, 18, 21). The results of studies in Germany, Italy, and Norway show a significant positive correlation between the level of TB notification and the number of high immigration rates observed (36). The incidence of this disease in the United States is increasing and concentrated in the non-AS-born population (26). Differences in the characteristics of the TB epidemic in Jiading City, China, explain that it is 2.5 times higher in migrants than in the local population (31).

Migrants may be at increased risk of TB infection, poor treatment outcomes, and drug resistance due to legal status and registration, living and working condi-

tions, financial problems, poor access to services, and discrimination. International migration to middle-income countries results in reactivation of latent TB infection and transmission (11, 40). Screening of migrant populations is a key strategy to manage risk and minimize transmission. It is also an important component of elimination strategies including active case finding (ACF) (25, 41).

Active case finding (ACF) is a process that aims to achieve early diagnosis by systematically screening and finding cases that were not previously infected with TB, followed by an immediate treatment program. It is one of the key measures for the prevention and control of infectious diseases, especially in contact with infected persons or populations at risk (8). In addition, ACF demonstrates the effectiveness of TB case finding due to limited health workers and health service coverage (26). WHO recommends TB contact screening for prevention and treatment by health workers as an alternative to using cadres (7). Migrant communities are successfully reached and motivated for LTBI screening and treatment programs when adequate resources (i.e., personnel) are available.

ACF is effective in the early detection and diagnosis of TB cases, reducing prevalence, incidence and deaths from disease complications, particularly among high-risk groups such as the homeless, prisoners and the poor. However, there is insufficient evidence to support the use of this approach in developing countries (25, 41). ACF, which is less effective when administered to the general population, should be targeted to those at risk of transmission (24). Therefore, properly applied detection can limit the spread of disease while minimizing costs (22).

In addition, communities can help overcome barriers to accessing health services (21, 42). This can be achieved through community-based organizations that provide integrated support, which has a positive impact on TB reporting (43). Meanwhile, community-based symptom screening followed by laboratory testing is also feasible and effective in improving case finding (23).

6. CONCLUSION

TB manifestations are the impact of social interaction and close contact dimensions. The incidence of this disease in migrants is increasing compared to the resident population due to such high mobilization. ACF is an effective approach in at-risk groups to complement current strategies for early detection and better treatment, especially in migrants, and requires follow-up during treatment.

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the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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