

Empowering community health volunteer on community-based tuberculosis case management programs in lower-income countries: A systematic review

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Submitted: 30 June 2019

Revised: 30 July 2019

Accepted: 6 September 2019

ABSTRACT Globally, almost 40% of tuberculosis clients are undiagnosed and delayed treatment. This condition leads to disease transmission and increasing new cases. Healthcare workers and community health volunteers as an active case finding frontliner and case manager in the community. The elevated numbers of new case findings and comprehensive management of diseases are the successful indicators of the tuberculosis prevention program. This study identified research articles related to community health volunteer empowerment in tuberculosis case management. Literature study of 20 articles from journal database, such as: Science Direct, Proquest, Scopus, and EBSCO for the last 5 years. It used keywords tuberculosis, community volunteer or empowerment, community-based early case finding. Data were analyzed in tables consist of title, author, year, methodology, result, and recommendation. The empowerment of the community health volunteers was effective in increasing tuberculosis case finding, especially in the border areas, remote areas and rural area. The existence of the community health volunteers brought tuberculosis services closer to the community and able to minimize barriers of health access and costs. Increasing the capacity of the community health volunteers is needed to support their role. Community health volunteers with a history of tuberculosis or from a family with tuberculosis are more acceptable in the community so the success of case finding and treatment is achieved. Community health volunteers worked through home visits were able to change community's perspectives, promote the formation of health seeking behavior and minimize public-stigma. The empowerment of the community health volunteers is essentially needed as the alternative strategies to find new cases in the community and strengthen its management. There need to provide a wholesome moral and material support from the government for the community health volunteers. This can be integrated into the management of tuberculosis programs in primary health care facilities.

KEYWORDS community empowerment; health volunteers; tuberculosis case management

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1. Introduction

Tuberculosis (TB) is a global public health problem. Every person in the world is at risk of being infected with this disease so that it becomes a priority for health problems that need to be resolved. TB is the second highest cause of death in the world based on the Global Burden of Disease study in the Indonesian Ministry of Health.¹ TB patients reached 1/3 of the total population in the world and nearly 40% of TB clients are left undiagnosed and experienced treatment delays.² Globally, the number of new TB cases was 18%, of the cases that have been treated have multidrug-resistant TB (MDR-TB). It is estimated that 8.5% of TB patients diagnosed with MDR-TB have experienced extensive drug-resistant TB (XDR-TB).³ TB becomes one of the diseases with a steadily increasing number of cases in Indonesia.⁴ Moreover, Indonesia is one of the countries with the highest prevalence of tuberculosis in ASEAN and is ranked third after India and China. The report stated that Indonesia was included in the list of 30 high TB burden countries.¹ The number of TB cases in Indonesia was 420,994 cases in 2017, who are dominated by people of productive age.⁴

The Government of Indonesia had set targets in the National Mid-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional* - RJP MN) contained in Presidential Regulation Number 59 of 2017 concerning SDGs, which is to set the target for the prevalence of TB in 2019 to 245 per 100,000 population. Minister of Health Regulation No. 67 of 2016 stated the target of national TB Management, namely TB Elimination in 2035, and TB-Free Indonesia in 2050. The National Target of Indonesia was the number of TB cases decrease to 1 per 1,000,000 residents.⁴

The Directly Observed Treatment Short-course (DOTS) strategy applied by the government as an effort to control TB by involving TB treatment observers (*Pengawas Minum Obat* - PMO) to monitor each dose consumed by TB clients as an effort to help successful TB treatment and obtain satisfactory results.⁵ The government also established the Find, Treat, and Cure TB (*Temukan Obati Sampai Sembuh* –TOSS-TB) program to

encourage clients to take medication regularly and completely as planned so that they can prevent the incidents of MDR and XDR-TB. In addition, the community also took part in another TB control program in Indonesia by establishing the Indonesian Tuberculosis Eradication Association (*Perkumpulan Pemberantasan Tuberculosis Indonesia* - PPTI), which is a professional organization in partnership with the government focusing on TB control program. PPTI committees are spread in various regions in Indonesia with the activities including relay of TB-related information and also hold training for community health volunteers (CHV), specifically called cadres in Indonesia.⁶

Based on this phenomenon, the implementation of TB control programs requires special handling with the involvement of all parties, including the Government, Private Sector, and active community participation. Increasing active community participation, especially clients of TB, PMO, and TB health volunteers are highly recommended for increasing case findings and complete treatment to avoid the uprise incidents of MDR-TB and XDR-TB.

2. Methods

A literature review strategy in this research article was carried out comprehensively and systematically. There were 20 research articles from the databases of Science Direct, Proquest, Scopus, and EBSCO in the last five years. The inclusion criteria are: (1) articles are English, (2) published in indexed journals with a range of 2015-2019, (3) original research with various designs, (4) free-access full text, (5) the articles have aim to identify efforts to empower cadres in the TB management, (6) the keywords are used Tuberculosis, community volunteer or empowerment, community-based early case finding. Data were analyzed in a table consists of title, author, year, methodology, results, and recommendations. The critical appraisal used Critical Appraisal Skills Program (CASP). Figure 1 shows the process of research articles selection

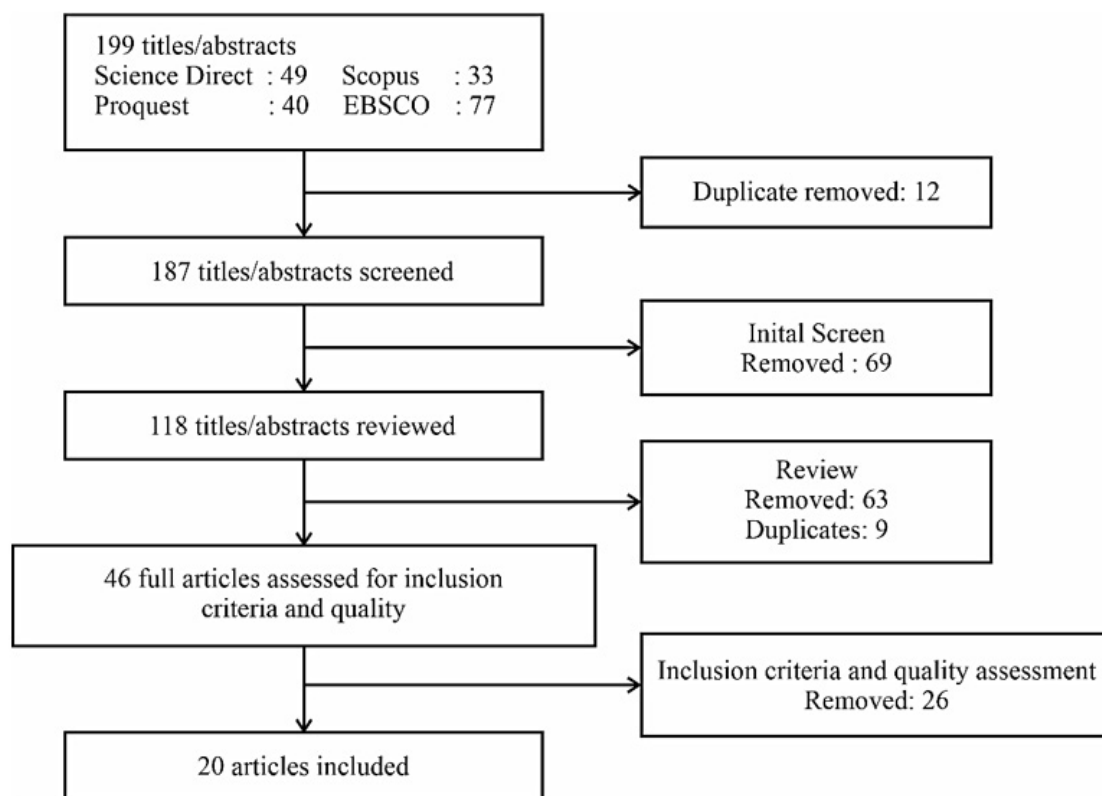


Figure 1. Article selection based on inclusion and exclusion criteria

based on inclusion criteria.

3. Results

Based on the articles that have been analyzed, the empowerment of CHV effectively increased the discovery of TB cases, especially in urban areas. CHV was able to bring TB services closer to the community, thereby reducing barriers to access and costs. CHV also play a role in exploring knowledge, behavior, and stigma related to TB patients, and early detection of cases in the community. Summary of articles that have been analyzed is presented in Table 1.

The results of the literature review showed the empowerment of CHV effective in the management of TB cases. This was proven by CHV who took part in structured training were able to mention the signs and symptoms of TB, identify suspected TB cases in the community, and also the CHV received a response from the sub-district health management team on surveillance reports.⁸ In addition, CHV have

high enthusiasm participating in the training, as shown by their attendance, which were held based on the national TB program guidelines. However, standardization of incentive for CHV is needed as well as the quality of supervision to ensure CHV performance as one of the main axis of the national TB program in the community.

4. Discussion

CHV are workers in health care who carry out their functions by providing health services, trained in the context of interventions, but do not have tertiary education. Meeting the demand for services, increasing use of health services, improving management in various conditions is a key role of CHV empowerment programs.¹⁵ Based on the knowledge of TB CHV, the CHV empowerment program is able to identify TB knowledge that is lacking in patients, affecting TB management from clients. CHV play a role in raising awareness of TB clients in the community and promoting adherence

Table 1. Summary of articles related to empowering community health cadres in the management of TB cases in 2013-2018 (n = 20)

No	Authors	Year	Methods	Sample	Results
1	Amenuvegbe et al. ⁷	2016	Cross sectional	932 patients and 105 CHV	A total of 932 patients reporting prolonged cough (2 weeks or more), 230 performed sputum examinations, 57 patients had smear (+) result, 52 patients treated. A total of 105 CHV attended structured training, were able to mention the signs and symptoms of TB, 28 out of 105 cadres had identified suspected TB cases in their community, only 10 CHV received a response from the sub-district health management team about surveillance reports. The majority of health care facilities empower cadres for monitoring but did not always provide feedback.
2	Mpagama et al. ⁸	2019	Mix-method of quantitative and qualitative approach, retrospective cohort and cross sectional	399 patients	399 TB patients were recruited, 160 patients collected sputum, 120 sputum specimens, 16 patients diagnosed with MDR TB and needed a treatment. As many as 28 of the 55 sub-districts participated, 11 sub-districts had Rapid Molecular diagnostic laboratories and 64 laboratory offices. The use of molecular diagnostics needs to be improved through empowerment and training for health workers to reduce delay in diagnosis.
3	Soe et al. ⁹	2017	Cross sectional	21,995 TB cases	As many as four NGOs reached out to the communities with the main target of migrant workers in border and conflicted areas. There are differences in terms of community health volunteers, there are NGOs that empower CHV in the health structure, there are those who organize and there are those who empower cadres around the client. NGOs succeeded in supporting community-based TB treatment activities in the detection of TB cases.
4	Han et al. ¹⁰	2017	Descriptive study	4 NGOs	As many as 4 NGOs assist National TB Programmes in carrying out Community Based TB Care activities in remote areas. Every NGO had diverse problems and was able to respond with the right strategies. The total cost required was US \$ 140 754 to US \$ 550 221 during the study. The costs required per patient range from US \$ 215 to US \$ 1,076 for new cases and US \$ 354 to US \$ 1,015 for cases of repeat care based on the target area and package services offered.
5	Lorent et al. ¹¹	2015	A Mixed-Methods Study	117 participants	The majority of participants (91%; n = 87) preferred to be accompanied by CHV to accompany people who suffer from TB. Sputum collection at home was considered comfortable by 71 people (83%), but 16 people (17%) felt it was embarrassing. Strong involvement with community representatives is believed to be important in gaining access to communities at high risk of TB.
6	Dewi et al. ¹²	2016	A Mixed-Methods Study	50 participants	A total of 50 participants in six villages were interviewed and three group discussions were conducted in intervention villages plus 1-5 hours of observation during monthly visits. Knowledge of TB increased after intervention in educational activities in the villages. Early case detection also increased in villages. Behavior changes related to TB prevention are also clearly seen in the villages that have been intervened.
7	James et al. ¹³	2017	Retrospective study	737 cases	The Active Case Finding (ACF) model is based on a door-to-door program in poor urban areas. The program was effective in finding TB cases in disease control programs. Empowerment of CHV is important for identifying patients' symptoms. In addition, cost-effectiveness comparisons were used to inform the allocation of resource decisions of national policy makers.
8	Wai et al. ¹⁴	2018	Cohort study	456 participants	Patients who received family, health workers, and CHV' supports had 80% higher chance of starting treatment [aHR (0.95 CI): 1.8 (1,3, 2,3)] when compared to patients who did not receive support. In addition, age 15 ± 54 years, previous history.

Table 1. Continued

No	Authors	Year	Methods	Sample	Results
9	Okeyo and Dowse ¹⁵	2016	Qualitative Study	14 participants	Three themes emerged from data analysis. First, altruism was identified as the main motivating factor, with the desire to help others. Second, Community care workers report great satisfaction and pride in their work. Third, most identified the need for further training and access to additional information about TB, specifically MDR- and XDR-TB, to strengthen knowledge and to educate patients about drug-resistant TB.
10	André et al. ¹⁶	2018	Experimental Design	1713 CHV	CHV who play a role in screening families with tuberculosis are more acceptable to family members and able to access populations in rural areas. Screening has the potential to reduce TB-related morbidity and mortality and reduce transmission of disease in the community. The ability of cadres in screening to search for active TB cases is increasing with experience, and participating in supporting long-term projects. The higher the frequency of contact between cadres and the population, this intervention further increases awareness of tuberculosis and its symptoms.
11	Zhang et al. ¹⁷	2016	Systematic literature review	17 articles	Involvement of CHV who play a role in screening families with tuberculosis are more acceptable to family members and able to access populations in rural areas. The ability of CHV in screening to search for active TB cases is increasing with experience, and participating in supporting long-term projects. The higher the frequency of contact between cadres and the population, this intervention further increases awareness of tuberculosis and its symptoms.
12	Vries and Pool. ¹⁸	2017	Systematic Review	32 articles	The results of 32 studies cannot show concrete results, only one study was able to show the statistical size of Community and Lay Health Worker (CLHW) program integration in the community. Instead, the results of the study show a bigger problem, namely the absence of indicators that measure community relations with the CLHW program in the study. Studies only pay attention to gender and other roles, limited demographic information about the recruitment process. To improve results, the CLHW program must be directed at the public health system, ignoring needs in strategic cooperation and learning to share.
13	Adejumo et al. ¹⁹	2015	Case Study	115 CHV	This study compared four models of increasing case finding in the community and found a relative contribution in overcoming the high burden of TB cases in Nigeria. Community-based TB care can be a core strategy in TB control in Nigeria because 75% of people with Positive Acid-Fast Bacillus TB have the potential to be identified in community members. Early detection of TB cases in communities in the country requires a case-based strategy and the contribution of CHV to significantly detect TB cases.
14	Datiko et al. ²⁰	2015	Qualitative Study	37 participants	TB REACH interventions were provided by all health workers in vulnerable groups, rural and remote community groups. CHV are intrinsic components in motivating roles. The importance of providing services close to the community to improve access to TB diagnosis and care services, especially in vulnerable groups, and poor populations in remote areas. It takes a program based on the development of support providers and maintaining motivation by CHV.
15	Choowong et al. ²¹	2016	Qualitative Study	10 participants	Perception of leaders of Direct Observation Treatment (DOT) Program Management: Compliance with TB treatment program guidelines, Management DOT program follows the National TB Program guidelines, Health education training for CHV. Achieve full recovery, the need for support: Home visits and follow-up. TB patients and their families: Empowerment, care and health education. Community needs: participation, good cooperation among stakeholders (district leaders, village health volunteers, TB patients and their families, villagers). Need to improve motivation for district leaders. Health system: Having effective information material for village health volunteers (Cadre).

Table 1. Continued

No	Authors	Year	Methods	Sample	Results
16	Myet et al. ²²	2017	Penelitiandekriptif	84 TB patients	4 years monitoring of TB program program showed that the number of TB suspected cases has decreased, as well as the number of TB patients receiving treatment but not statistically significant ($p = 0.051$). There was an increase in TB case notifications compared to the number of TB clients who received treatment and referrals. The decrease in the number of TB clients receiving treatment is in the regions of Bago, Naypitaw, Mon, and Eastern Shan. Of the 84 districts that were targeted for research, the contribution of CBTC in changing TB detection cases decreased from 6% to 4% for 4 years.
17	Islam et al. ²³	2013	Cross-sectional retrospective study	9037 participants (TB patients)	CHV were assigned as well as village doctors to visit the house. TB training given by doctors, community health workers and CHV took place from 2005-2010 with a total of 536 trainings and attended by 9037 people. In addition, there were 4570 patients recovering from TB who had also been trained. There had been an increase in TB patient visits to laboratory diagnostic tests from 8211 patients in 2004 to 10961 in 2005, with positive smear patients increasing from 7.1% to 11.2%. Referral of patients to the laboratory is influenced by the role of cadres, with as many as 58% of participants expressing the initiative to visit a diagnostic testing laboratory.
18	Samal and Dehury ²⁴	2018	Cross-sectional	648 CHV	The selected cadres attended the TB management-related training for 2 days will later be assigned to prevent TB in the community. After training, CHV were expected to be able to carry out the tasks: creating public awareness, being able to recognize the signs and symptoms of TB and referring them to health services, to provide medical support. The training also includes basic material related to the TB program and Directly Observed Treatment Short Course strategy as well as the checklist format that is needed while carrying out its role as a cadre. CHV training was significantly able to increase knowledge but not attitudes. Of the 10 trained CHV, 8 were assigned to various levels of activity in the community. A total of 5633 households were contacted by CHV to raise awareness about TB.
19	Barker et al. ²⁵	2002	Prospective cohort study	170 CHV	Patients who have been diagnosed and allowed to go home by the hospital will be referred to the community and accompanied by a CHV. CHV serving as PMO with the family supervised during the treatment regimen lasted 1476 TB patients identified 1358 with additional intrapulmonary diagnoses, and 82% positive Acid-Fast Bacillus, and 10 of them were MDR-TB.
20	Tuot et al. ²⁶	2019	Qualitative Study	56 participants	The active case finding model, seek-and-recruit, was generally well received by study participants. Researchers see the benefits of involving TB survivors and using their social networks to find new TB cases in the community. CHV also play an important role in the success of this model. The social attachment of the model in the local community is one of the main strengths. The success of the model also depends on integration with existing health facilities. Having a broad, motivated, and well-informed social network about TB is an important characteristic of successful seeds. Study participants reported challenges in motivating recruitment for screening, logistics capacity, and high workload during implementation.

TB: tuberculosis; CHV: community health volunteers; NGO: non-governmental organization; MDR-TB: multidrug-resistant TB; XDR-TB: experienced extensive drug-resistant TB; PMO: pengawas minum obat (drug taking supervisors)

among patients.¹⁵

The analysis above also shows that CHV have a role in increasing the discovery of new TB cases and management of their treatment. The majority of participants in a study by Lorent et al. (91%; n = 87) preferred to be accompanied by CHV to assist people who suffer from TB. Sputum collection at home was considered comfortable by 71 people (83%), but 16 people (17%) felt it was embarrassing.¹¹ Strong involvement with community representatives is believed to be the Model Active Case Finding (ACF) based on a door-to-door program in poor urban areas. The program is effective in finding TB cases in disease control programs.¹³ Empowerment of CHV is important for identifying patient symptoms. In addition, cost-effectiveness comparisons are used to inform the allocation of resource decisions of national policy makers.

Several researches had shown that CHV were able to change trust and stigma within the community. The health CHV role as educators in the community can increase knowledge and attitudes towards TB. The increased knowledge among others regarding understanding causes, transmission, prevention, signs and symptoms, and awareness of free TB services. Increased knowledge will reduce diagnostic delays among people at risk.²⁷

CHV are the intrinsic components in community motivating roles. The pivotal function of CHV included providing health services that are close to the community to improve access to TB diagnosis and care services, especially in vulnerable groups, and poor populations in remote areas.²⁰ TB management program in the community worked by carrying out a program based on the national development of supporting providers and maintaining motivation through the helps of the CHV. It increase coverage of TB treatment and find missed TB cases and play a role in providing input into TB policy design in populations.⁸

5. Conclusion

Community-based TB management is the main strategy of TB control program in various countries

in the world. Empowerment of CHV is proven to be able to increase access to people who are at high risk of TB transmission. CHV collaborating with health workers are expected to play an active role in the discovery of new cases through home visits, raise public awareness, treatment support, conducting TB transmission preventive activities, and carrying out referral system to the clients in the community. The involvement of CHV is able to increase the number of new case discoveries, reduce the incidents of drug-resistant TB, reduce complications and even mortality from TB disease.

Recruitment of special TB CHV in each region becomes one of the implication of the benefitting roles and functions of CHV based on the researches, as needed. CHV who have treated TB clients or have a history of TB have a good approach to TB clients. There are also needs of providing full moral and material support from the government to CHV. The government, in this case is the health office through the health center, is obliged to perform training, mentoring, and provide operational costs for CHV in the management of TB control. This can be integrated in the management of TB programs in primary health care facilities.

Acknowledgement

We express our gratitude for the support from all parties, especially to the Universitas Indonesia Hospital; Department of Nursing, Polytechnic of the Ministry of Health, Semarang; Faculty of Nursing, Universitas Indonesia; Nursing Department, Faculty of Health, General Sudirman University; and Nursing Department, Faculty of Medicine and Science Health of Alaudin Makassar Islamic University.

Conflict of interest

There is no conflict of interests.

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