HOME VISIT BY COMMUNITY HEALTH WORKERS TO IMPROVE DETECTION OF NEW CASES OF TUBERCULOSIS

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Abstract

One of the problems in controlling tuberculosis is the delay in diagnosis, this is at risk of increasing the possibility of transmission in the household and community. Community-based Active Case Finding (ACF) is an effective method for detecting new cases of tuberculosis by empowering Community Health Workers (CHWs). The purpose of this study is analyze the relationship between home visit with detection of new cases tuberculosis among household contacts by CHWs. The design of this study was cross-sectional descriptive survey, using a quantitative approach, carried out from July to September 2021 at 26 Public Health Centers in Samarinda. The research sample were 304 CHWs using purposive sampling. Bivariate analysis test using chi square showed a significant relationship between home visits and detection of new cases of tuberculosis in household contacts (p-value = 0.000) and OR = 3.685 (95% CI). ACF by CHWs through home visits is very effective in finding new cases tuberculosis of household contacts. It is necessary to increase CHWs participation, improve coordination among CHWs and Health Center Personnel, certified training and adequate facilities.

Keywords: *Home visit, active case finding, tuberculosis, Community Health Workers (CHWs)*

INTRODUCTION

Tuberculosis (TB) is an infectious disease that is the main cause of global health problems, it is estimated that a third of the world's population has been infected by this bacterium and is one of the top 10 causes of death after HIV/AIDS[1]. This has become a global urgency to increase the detection of new cases of tuberculosis in communities and households[2]. Tuberculosis is caused by infection with the mycobacterium tuberculosis which can spread through active tuberculosis droplets, social interactions in the household and community are the main risk factors for transmission[3]

Based on the WHO Global Tuberculosis Report in 2020, Indonesia was ranked 2nd after India, WHO noted that 44% of the world's TB cases were in India, Indonesia, South Africa and the Philippines[4]. It is estimated that there are 1,000,000 new TB cases per year (399 per 100,000 population) with 100,000 deaths per year (41 per 100,000 population). Indonesian Health Profile data in 2016, there was an increase in TB cases from 330,729 cases in 2015 to 351,893 cases in 2016. Indonesia's TB prevalence rate is 0.4%, there are 400 people diagnosed with positive pulmonary TB out of every 100,000 population[5].

East Kalimantan is one of the provinces in Indonesia with a significant increase in the number of new cases of TB AFB (+), ranking 17th in the number of TB case notifications per

100,000 population in Indonesia in 2016 or an increase of 7 places from position 24 in 2012 The number of new TB cases discovered in 2013 was 2,416 people, in 2014 it fell to 1,953 people and increased again in 2015 by 2,391 people and decreased in 2016 to 2,383 new case findings, increasing again in 2017 to 2,425 cases. The highest prevalence of pulmonary tuberculosis sufferers is in the city of Samarinda, which is 457 people[6].

One of the problems in controlling tuberculosis is the delay in diagnosis, this risks increasing the possibility of transmission in the household and community[7,8]. The risk of transmission is higher than cases of active tuberculosis in household contacts. Any delay in diagnosis and treatment increases the risk of household transmission of the disease. Screening of household contacts is important for early detection of infection transmission[9]. Contact investigation is an important strategy for TB elimination, the early detection and prevention of TB has important benefits for contacts and their communities[10]. WHO provides recommendations to identify and screen contacts of people with infectious tuberculosis, carry out prevention, treatment and control as a national strategy to end the world's TB disease by 2035[11].

Active case finding (ACF) is an action procedure that aims to make an early diagnosis through a systematic examination[12], the implementation forms need to be developed around the world especially in high burden countries[13]. ACF as an alternative strategy to identify and treat tuberculosis sufferers who do not seek health facilities for care and treatment, the pattern that developed subsequently was around contact with infectious cases or populations at risk of infection[14]. ACF is a way to find cases that were not previously infected by tuberculosis and immediately start a treatment program. Community-based ACF can help find more TB cases and overcome barriers to access to health services[15,16]. Household contact screening for active TB case finding is a feasible and efficient method that has the potential to result in earlier diagnosis and treatment of active TB, thereby minimizing severity and reducing transmission. It may also contribute to improved treatment outcomes, sequelae, and social and economic consequences of TB[17,18].

Home visits are a form of comprehensive and well-planned health service that aims to improve the health of individuals and families, through data mining, and fostering health-prone families. Home visits in health services have an impact on the reach of health services, health education, are cost-effective, and the benefits of improving health status are better [19–22], community-based home visit programs using Community Health Workers (CHWs) have become a way of which is popular in providing health care services, given the limited number of health professionals[23,24]. This home visit activity has long been used as a means of intervention, especially among populations who are vulnerable and at risk of experiencing health problems. Home visit activities carried out by CHWs certainly have special challenges in their preparation[25].

CHWs are community members elected by and working for the community who are supported by the health system but do not have to be part of a health facility organization, have been trained in the shorter term from professional health workers to help communities improve their health status[26,27], empowering CHWs with initial health facility-based checks and contact tracing in households and communities to increase the Crude Detection Rate (CDR) and Incident Rate (IR) of Tuberculosis[26], CHWs effectively play a role in reducing the incidence rate, increasing the cure rate of tuberculosis patients[28].

CHWs have great potential to improve access and quality of primary care but are underutilized[29], CHWs generally have good knowledge in case finding, but are not significantly related to the role of CHWs in preventing the incidence of tuberculosis [30,31], as well as self-efficacy did not show a significant relationship to performance in home visits for pulmonary TB patients[32], after a series of training there was an increase in performance on the role of CHWs in TB case finding and the relationship between supervision and guidance factors from the Health Center with the role of CHWs. Various trainings carried out for both health workers and CHWs[33], do not seem to have met expectations because there is no definite data that new cases of pulmonary TB are an active discovery of health workers or CHWs.

This study aims to analyze the relationship between the initiation of home visits as the implementation of active case finding with the identification of new cases of active tuberculosis among household contacts by CHWs in the city of Samarinda.

MATERIAL AND METHODS

The design of this study used a cross sectional, descriptive survey design. This research was conducted from July to September 2021 in the working areas of all public Health Centers in Samarinda, covered 26 health centers. The research sample was 304 CHWs who were working at Community Integrated Healthcare Center (Posyandu) using purposive sampling, where respondents were selected based on a number of criteria set by the researcher. The inclusion criteria are CHWs who were still active in providing Posyandu services and registered at the Health Center, healthy conditions and not currently undergoing treatment at the hospital, willing to participate in this study. Exclusion criteria were non-active Health Center CHWs, aged more than 60 years, currently undergoing treatment at a hospital and refusing to be respondents.

The independent variable in this study is the role of the initiative in active case finding through home visits, and the dependent variable is the detection of new cases of household contact tuberculosis. Data were collected by using a questionnaire made by the researcher. The socio-demographic questionnaire included age, gender, education, occupation, monthly family income, training on tuberculosis, and length of service as a CHW. Both variables were

measured using the Guttman scale ("yes" and "no") then the scoring was categorized into “good” and “no good”. Secondary data were obtained from Health Center with positive smear tuberculosis case index and data from CHWs in the working area of Health Center.

Data collection began with the licensing process, limited respondents are collected in each Health Center, explaining the research objectives and respondents signing an informed consent form. Univariate analysis was used to describe each variable with a frequency distribution, and bivariate analysis used chi square to examine the relationship between variables.

RESULTS

This study involved 304 CHWs who work actively in Posyandu at 26 Public Health Centers in Samarinda. Table 1 describes the frequency distribution of respondents' characteristics, the age of the majority of respondents is more than 30 years (93,8%), gender is almost entirely female (96,7%), most of them have high school and university education (74,3%).

Table 1. Demographic Characteristic of CHWs in Samarinda 2021

Characteristics	n=304	
	f	%
Age (years)		
< 30	19	6,3
≥ 30	285	93,8
Sex		
Male	10	3,3
Female	294	96,7
Formal Education		
Low (Elementary and Middle School)	78	25,7
High (Senior High School and University)	226	74,3
Employment		
Unemployment	189	62,2
Formal employment	115	37,8
Family income		
< Rp. 4.000.000,00	234	77,0
≥ Rp. 4.000.000,00	70	23,0
Length of service (years)		
< 10	227	74,7
≥ 10	77	25,3
Tuberculosis training		
Never	139	45,7
Ever	165	54,3

Most of CHWs do not work (62,8%) still rely on income from the head of the family (husband) so that the average family income is less than Rp. 4.000.000.00. Most of respondents (74,7%) had less than 10 years of experience in carrying out their duties as CHWs, and many had never received training on tuberculosis (45,7%).

Table 2 describes the activities of CHWs implementing active case finding through home visit initiatives to identify new TB cases in household contacts. It was seen that more than half (59,5%) of CHWs were not well informed about the presence of active Tuberculosis patients who received treatment programs from the Health Center, more than half of them (54,3%) were good in terms of making home visits. CHWs identified symptoms similar to Tuberculosis (53,9%), and subsequently referred to the Health Center only a small proportion (28,3%) were good.

Table 2. Home Visit Initiative as an Implementation of Tuberculosis ACF by CHWs in Samarinda 2021

No.	Characteristics	n=304	
		f	%
1.	**Looked for tuberculosis patient information**		
	No	181	59,5
	Yes	123	40,5
2.	**Home visited**		
	No	139	45,7
	Yes	165	54,3
3.	**Identified signs and symptoms of tuberculosis in family members**		
	No	140	46,1
	Yes	164	53,9
4.	**Reported and referred to the Health Center**		
	No	218	71,7
	Yes	86	28,3

Table 3 shows the results of the detection of new cases of tuberculosis by CHWs. where most of CHWs (60,9%) stated that they did not receive information on the presence of active Tuberculosis patients from the Puskesmas. 119 respondents stated that they received information and after making home visits they found 65 (21,4%) families whose rooms were not separated from the tuberculosis patients. 87 CHWs found family members who had symptoms similar to tuberculosis, and after being referred to the Health Center, 69 (22,7%) of them were smear positive.

Table 3. Detection of new tuberculosis cases in household contacts by CHWs in Samarinda, 2021

No.	Characteristics	n=304	
		f	%
1.	**Obtained information on active tuberculosis patients**		
	No	185	60,9
	Yes	119	39,1
2.	**Observed family members' room were not separated from active TB patients**		
	No	239	78,6
	Yes	65	21,4
3.	**Identified tuberculosis in household members**		
	No	217	71,4
	Yes	87	28,6

No.	Characteristics	n=304	
		f	%
4.	**Detected smear positive in family members of household contacts**		
	No	235	77,3
	Yes	69	22,7

The crosstab in table 4 shows that 127 (41,8%) CHWs were not good at making home visits, most (80,3%) of them were not good at detecting new cases of tuberculosis, and only a small proportion (19,7%) had good skills. While 177 (58,2%) CHWs were good at home visits, 52,5% of them were not good at detecting new cases of tuberculosis and 47.5% were good. The results of the bivariate analysis using chi square showed a significant relationship with the home visit initiative as the implementation of active case finding with the detection of new tuberculosis cases in household contacts (p-value = 0.000) and OR = 3.685 (95% CI = 2.174 - 6.246) which means that home visits will be able to detect new cases of household contacts by 3,685 times.

Table 4. The relationship between home visits and the detection of new cases of tuberculosis by Community Health Workers in Samarinda, 2021

Detection	Not Good		Good		p-*value* (95%CI)	OR (95%CI)
Home visit	**n**	**%**	**n**	**%**		
Not Good	102	80,3	25	19,7	0,000	3,685 (2,174-6,246)
Good	93	52,5	84	47,5		

DISCUSSION

Sociodemographic Characteristics of Respondents

Community Health Workers (CHWs) are at the forefront of trusted communities and have a very good understanding of the communities they serve. CHWs serve as liaisons between health and social services and the community to facilitate access to services and to improve the quality and competence of service delivery culture[33,34]. The majority of respondents were more than 30 years old, these showed maturity in decision-making, community mobilization, and self-confidence. The level of maturity of a person generally increases with age, older people are generally more responsible than younger people. Increasing age will also increase a person's ability to make decisions, control emotions, think rationally, and tolerate the views of others[35].

Most of the respondents have less than 10 years of experience, these illustrates the lack of experience in serving the community, especially helping control tuberculosis. Length of work and education are related to self-efficacy, tenure allows experience and skills in carrying out more roles so as to ensure work productivity, work experience will ensure good work productivity. Work experience supported by work motivation, skills and a good work atmosphere will guarantee good work productivity as well [36]. There are still many respondents

who have not received training on tuberculosis control which has an impact on the lack of understanding and ability to detect tuberculosis cases in their work area. Training is needed to increase TB control knowledge and skills so that CHWs have the confidence to carry out their duties well[37,38].

Home Visit

The results showed that most of the CHWs were not good at getting information about Tuberculosis patients in their working area. The busyness of CHWs taking care of the household and other activities may be the cause, even coordination with health workers at the Health Center to obtain information on active tuberculosis patients in their work areas has not been maximized. Active tuberculosis cases data is usually notified by health workers at meetings or days of Posyandu services, even specifically conveying information to CHWs. CHWs conduct home visits from the case index obtained from the Health Center to identify possible risks of transmission to other family members. Furthermore, the CHWs also identified family members with signs of tuberculosis, and a small number of suspected tuberculosis were reported or referred to the Health Center.

Home visits provide a closer opportunity to make direct observations of the home environment, family structure, family roles and relationships, lifestyle, cultural practices, group dynamics, and make assessments of family health. Family members have more time and privacy and feel free to ask questions, seek clarification and resolve their concerns. CHWs also have the opportunity to directly observe the health of family members, home conditions and environmental health, plan and provide family health services. Families participate actively which allows planning and implementation of comprehensive family health services with an emphasis on promotive and preventive[39].

The benefits of home visits are as a means of intervention, especially among populations who are vulnerable and at risk of experiencing health problems. Research on home visits by CHWs or health professional personnel describes varying results. The provision of nursing care and education in the family increases changes in the healthy family index and the level of family independence[40]. CHWs home visits result in better care, but have no direct benefits[41]. Identification of health problems by trained CHWs is increasing in areas that are difficult to reach with limited professional health personnel [42], home visits by CHWs should be an expansion of the role of the primary health care team[43].

For CHWs, home visits have special challenges in preparing for their ability to explore health problems and carry out interventions[24]. so it is necessary to prepare in a structured way for planning, organizing and implementing home visits[44]. Several barriers to conducting home visits require attention to the importance of beginner and advanced CHWs training,

appropriate caseloads, effective communication, and adequate funding, which can inform future CHWs programs[24].

Detecting New Cases of Tuberculosis

The results showed that most (60,9%) did not get information about active TB patients in their work area, in line with the data on the lack of desire to get information. If CHWs actively participate in meetings at the Health Center or often coordinate with health workers, the possibility of getting information about active tuberculosis patients is maximized. Another possibility is the fact that there are no active tuberculosis patients in the work area.

Only a small proportion of patients with active tuberculosis were found (21,4%). Families that do not separate their members from active tuberculosis patients are very at risk of transmission due to droplets when the patient coughs. 87 CHWs stated that they had identified family members who had symptoms similar to Tuberculosis, referred to the Health Center and found 69 CHWs of whom stated that the TB suspect referred had a positive result.

The method of finding new cases of tuberculosis is not only waiting for patients to come to health services (passive case finding) but can be done actively (active case finding) on household contacts or close contacts[45]. Tuberculosis transmission is determined by the concentration of inhaled germs, the length of time the bacteria are inhaled, the virulence of the germs, and a person's condition, such as age, immune system, nutritional status, immunization and residential density[46]. Family members who live in the same house, especially if they are not separated from rooms with active tuberculosis patients, bacteriologically increase the risk of transmission, so it is necessary to implement routine TB contact tracing to control TB in countries with a high TB burden[47]. Improving the function of the diagnostic center, active TB case finding activities, and expanding health education about TB disease will help improve TB case detection in the district[48].

Low TB case detection causes an increase in the spread of TB to family members and the community because each active case has the capacity to infect 10-15 people per year. Early case detection and treatment immediately cure patients, stop transmission, and improve TB control programs[48]. The need for viable strategies such as active case finding to improve case detection, and improved case management to reduce mortality[49], emphasized that early case detection, either by passive or active case finding, is a necessary but not necessary condition. sufficient for effective TB control. A high commitment is needed for complete tuberculosis control, completion of effective treatment with the DOTS strategy[50].

Relationship between Home Visits and Detection of New Tuberculosis Cases

The results showed that 127 (41,8%) CHWs were not good at home visits, most (80,3%) of them were not good at detecting new cases of tuberculosis, and only a small

proportion (19,7%) had good abilities. This information illustrates the lack of knowledge and ability to identify signs and symptoms of tuberculosis, supported by data that illustrates that less than half (45,7%) have never received training on tuberculosis. The low initiative to make home visits is also possible because of the limited time and opportunity of CHWs and the lack of information from health workers at the Health Center so that they do not know tuberculosis sufferers in their working areas. However, more than some CHWs are good at home visits, so they can identify new suspected cases of tuberculosis among household contacts with tuberculosis patients. While 177 (58,2%) CHWs who scored well in conducting home visits, 52,5% of them were not good at detecting new cases of tuberculosis and 47,5% were good at identifying tuberculosis, this illustrates knowledge about tuberculosis and how to detect signs and symptoms of suspected tuberculosis. tuberculosis has not been maximized.

The results of the bivariate analysis test with chi square showed a significant relationship between the home visit initiative as the implementation of active case finding with the detection of new cases of tuberculosis among household contacts in family members (p-value = 0,000) and OR = 3,685 (95% CI = 2,174-6,246) which means that home visits will be able to find new cases of household contacts by 3.685 times.

The ultimate goal of TB control is to stop transmission with early and accurate case detection, as well as effective treatment adherence to prevent transmission and prevent latent TB treatment[50]. Globally, nearly 40% of tuberculosis clients are undiagnosed and treatment is delayed. This condition causes disease transmission and an increase in new cases. Health workers and CHWs are active case finding frontliners and case managers in the community[51]. CHWs have been shown to increase access to health services, reduce morbidity and mortality[52], provide promotive, preventive and curative health services (limited), can contribute to reducing inequality in access to health services, have been proven to contribute to improving public health, especially rural areas and the poor[53]. As people who are close to the community they are chosen by the community itself who are given tasks and work for certain programs such as the Tuberculosis program, some with a wider workload, they become the main contact and unique intermediary between the community and health facilities[54]. Empowering CHWs to promote TB screening and household contact tracing could lead to increased detection of new tuberculosis cases[55].

Home visits of trained CHWs resulted in better identification of health and care issues, but had no direct benefit in hard-to-reach areas with limited health [41,42]. Steps to detect new TB cases among household contacts as ACF implementation through home visits are carried out by screening TB symptoms and follow-up referrals to the Health Center for further examination[56]. It is necessary to consider a contact screening strategy of index cases[57,58], family contacts are more likely to get TB from the Tuberculosis index from the Health Center or Hospital, so they are prioritized in detecting new cases of tuberculosis[59]. Active screening

is one of the most effective ways to reduce the spread of disease. However, due to financial constraints, it can only be used to a certain extent. Properly applied detection can limit the spread of disease while minimizing costs[60].

Several previous studies provided information on the positive effect of home visits by CHW son detection, active Household Tuberculosis Contact Investigation (HTCI) of all forms of TB cases yielding comparable or higher results than those reported elsewhere. HTCI contributes to better and timely detection of TB cases among populations who may not seek health care due to minimal symptoms or access problems. Active HTCI can be successfully implemented through an integrated approach with existing community TB programs for better coordination and efficiency. Referral criteria should include factors that are significantly associated with active disease[61]. ACF is less effective if performed in the general population in a population with a moderate TB prevalence and should indeed be targeted at populations at risk of tuberculosis transmission. There was no significant difference between ACF and cumulative TB incidence for ACF, although prevalence decreased after three rounds of active screening[56]. The ACF strategy can be economically and epidemiologically relevant if it reduces transmission rates[62]. Effective community-based case finding of active TB is a challenge to design, implement and maintain[53,63], implementing the right ACF approach improves the detection of tuberculosis cases in the short term (Mhimbira 2017).

CONCLUSION

The implementation of ACF through home visits as the initiation of CHWs has not been maximally carried out. Home visits by CHWs have a statistically significant relationship with the detection of new cases of tuberculosis among household contacts of family members. Most of the respondents have less than 10 experience in carrying out their duties as CHWs, and many have never received training on tuberculosis, causing their understanding and ability to detect new cases of tuberculosis is still low.

It is necessary to increase understanding and ability to detect new cases of tuberculosis through certified training, improve coordination with health center personnel to monitor active tuberculosis patients during treatment with the DOTS strategy and prevent transmission of household contacts, facilities (a simple guide to detecting the signs and symptoms of tuberculosis) and incentives for CHWs.

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